COMP9414 Artificial Intelligence

Assignment 1: Constraint Satisfaction Search

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Due Date: Week 5, Friday, October 17, 5.00pm

Objective

This assignment concerns developing optimal solutions to a scheduling problem inspired by the scenario of a manufacturing plant that has to fulfil multiple customer orders with varying deadlines, but where there may be constraints on tasks and on relationships between tasks. Any number of tasks can be scheduled at the same time, but it is possible that some tasks cannot be finished before their deadline. A task finishing late is acceptable, however incurs a cost, which for this assignment is a simple (dollar) amount per hour that the task is late.

A *fuzzy scheduling* problem in this scenario is simplified by ignoring customer orders and having just one machine and a number of *tasks*, each with a fixed duration in hours. Each task must start and finish on the same day, within working hours (9am to 5pm). In addition, there can be *constraints*, both on single tasks and between two tasks. One type of constraint is that a task can have a deadline, which can be "hard" (the deadline must be met in any valid schedule) or "soft" (the task may be finished late – though still at or before 5pm – but with a "cost" per hour for missing the deadline). The aim is to develop an overall schedule for all the tasks (in a single week) that minimizes the total cost of all the tasks that finish late, provided that all the hard constraints on tasks are satisfied.

More technically, this assignment is an example of a *constraint optimization problem* (or *constrained optimization problem*), a problem that has constraints like a standard Constraint Satisfaction Problem (CSP), but also a *cost* associated with each solution. For this assignment, we will use a *greedy* algorithm to find optimal solutions to fuzzy scheduling problems that are specified as text strings. However, unlike the greedy search algorithm described in the lectures on search, this greedy algorithm has the property that it is guaranteed to find an optimal solution for any problem (if a solution exists).

The assignment will use the AIPython code of Poole & Mackworth. You are given code to translate fuzzy scheduling problems specified as text strings into CSPs with a cost, and you are given code for several constraint solving algorithms – based on domain splitting and arc consistency, and based on depth-first search. The assignment will be to implement some missing procedures and to analyse the performance of the constraint solving methods, both analytically and experimentally.

Submission Instructions

- This is an individual assignment.
- Write your answers in **this** notebook and submit **this** notebook on Moodle under **Assignment 1**.
- Name your submission `<zid>-<firstname>-<lastname>.ipynb` where `<firstname>-<lastname>` is your **real** (not Moodle) name.
- Make sure you set up AIPython (as done below) so the code can be run on either CSE machines or a marker's own machine.
- Do not submit any AIPython code. Hence do not change any AIPython code to make your code run.
- Make sure your notebook runs cleanly (restart the kernel, clear all outputs and run each cell to check).
- After checking that your notebook runs cleanly, run all cells and submit the notebook **with** the outputs included (do not submit the empty version).
- Make sure images (for plots/graphs) are **included** in the notebook you submit (sometimes images are saved on your machine but are not in the notebook).
- Do not modify the existing code in this notebook except to answer the questions. Marks will be given as and where indicated.
- If you want to submit additional code (e.g. for generating plots), add that at the end of the notebook.
- **Important: Do not distribute any of this code on the Internet. This includes ChatGPT. Do not put this assignment into any LLM.**

Late Penalties

Standard UNSW late penalties apply (5% of the value of the assignment per day or part day late).

Note: Unlike the CSE systems, there is no grace period on Moodle. The due date and time is 5pm **precisely** on Friday October 17.

Important: You can submit as many times as you want before the due date, but if you do submit before the due date, you cannot submit on Moodle after the due date. If you do not submit before the due date, you can submit on Moodle after the due date.

Plagiarism

Remember that ALL work submitted for this assignment must be your own work and no sharing or copying of code or answers is allowed. You may discuss the assignment with other students but must not collaborate on developing answers to the questions. You

may use code from the Internet only with suitable attribution of the source. You may not use ChatGPT or any similar software to generate any part of your explanations, evaluations or code. Do not use public code repositories on sites such as github or file sharing sites such as Google Drive to save any part of your work – make sure your code repository or cloud storage is private and do not share any links. This also applies after you have finished the course, as we do not want next year's students accessing your solution, and plagiarism penalties can still apply after the course has finished.

All submitted assignments will be run through plagiarism detection software to detect similarities to other submissions, including from past years. You should **carefully** read the UNSW policy on academic integrity and plagiarism (linked from the course web page), noting, in particular, that collusion (working together on an assignment, or sharing parts of assignment solutions) is a form of plagiarism.

Finally, do not use any contract cheating "academies" or online "tutoring" services. This counts as serious misconduct with heavy penalties up to automatic failure of the course with 0 marks, and expulsion from the university for repeat offenders.

Fuzzy Scheduling

A CSP for this assignment is a set of variables representing tasks, binary constraints on pairs of tasks, and unary constraints (hard or soft) on tasks. The domains are all the working hours in one week, and a task duration is in hours. Days are represented (in the input and output) as strings 'mon', 'tue', 'wed', 'thu' and 'fri', and times are represented as strings '9am', '10am', '11am', '12pm', '1pm', '2pm', '3pm', '4pm' and '5pm'. The only possible values for the start and end times of a task are combinations of a day and times, e.g. 'mon 9am'. Each task name is a string (with no spaces), and the only soft constraints are the soft deadline constraints.

There are three types of constraint:

- **Binary Constraints:** These specify a hard requirement for the relationship between two tasks.
- **Hard Domain Constraints:** These specify hard requirements for the tasks themselves.
- **Soft Deadline Constraints:** These constraints specify that a task may finish late, but with a given cost.

Each soft constraint has a function defining the *cost* associated with violating the preference, that the constraint solver must minimize, while respecting all the hard constraints. The *cost* of a solution is simply the sum of the costs for the soft constraints that the solution violates (and is always a non-negative integer).

This is the list of possible constraints for a fuzzy scheduling problem (comments below are for explanation and do **not** appear in the input specification; however, the code we supply *should* work with comments that take up a full line):

```
# binary constraints
constraint, ⟨t1⟩ before ⟨t2⟩           # t1 ends when or before
t2 starts
constraint, ⟨t1⟩ after ⟨t2⟩            # t1 starts after or when
t2 ends
constraint, ⟨t1⟩ same-day ⟨t2⟩         # t1 and t2 are scheduled
on the same day
constraint, ⟨t1⟩ starts-at ⟨t2⟩        # t1 starts exactly when
t2 ends

# hard domain constraints
domain, ⟨t⟩, ⟨day⟩, hard                                    # t
starts on given day at any time
domain, ⟨t⟩, ⟨time⟩, hard                                   # t
starts at given time on any day
domain, ⟨t⟩, starts-before ⟨day⟩ ⟨time⟩, hard               # t
starts at or before day, time
domain, ⟨t⟩, starts-after ⟨day⟩ ⟨time⟩, hard                # t
starts at or after day, time
domain, ⟨t⟩, ends-before ⟨day⟩ ⟨time⟩, hard                 # t
ends at or before day, time
domain, ⟨t⟩, ends-after ⟨day⟩ ⟨time⟩, hard                  # t
starts at or after day, time
domain, ⟨t⟩, starts-in ⟨day1⟩ ⟨time1⟩-⟨day2⟩ ⟨time2⟩, hard  # day-
time range for start time; includes day1, time1 and day2, time2
domain, ⟨t⟩, ends-in ⟨day1⟩ ⟨time1⟩-⟨day2⟩ ⟨time2⟩, hard    # day-
time range for end time; includes day1, time1 and day2, time2
domain, ⟨t⟩, starts-before ⟨time⟩, hard                     # t
starts at or before time on any day
domain, ⟨t⟩, ends-before ⟨time⟩, hard                       # t
ends at or before time on any day
domain, ⟨t⟩, starts-after ⟨time⟩, hard                      # t
starts at or after time on any day
domain, ⟨t⟩, ends-after ⟨time⟩, hard                        # t
ends at or after time on any day

# soft deadline constraint
domain, ⟨t⟩, ends-by ⟨day⟩ ⟨time⟩ ⟨cost⟩, soft          # cost per
hour of missing deadline
```

The input specification will consist of several “blocks”, listing the tasks, binary constraints, hard unary constraints and soft deadline constraints for the given problem. A “declaration” of each task will be included before it is used in a constraint. A sample input specification is as follows. Comments are for explanation and do **not** have to be included in the input.

```
# two tasks with two binary constraints and soft deadlines
task, t1 3
task, t2 4
# two binary constraints
constraint, t1 before t2
constraint, t1 same-day t2
# domain constraint
domain, t2 mon
```

```
    # soft deadline constraints
    domain, t1 ends-by mon 3pm 10
    domain, t2 ends-by mon 3pm 10
```

Preparation

1. Set up AIPython

You will need AIPython for this assignment. To find the aipython files, the aipython directory has to be added to the Python path.

Do this temporarily, as done here, so we can find AIPython and run your code (you will not submit any AIPython code).

You can add either the full path (using `os.path.abspath`), or as in the code below, the relative path.

In [146…
```
import sys
sys.path.append('aipython') # change to your directory
sys.path # check that aipython is now on the path
```

Out[146…
```
['C:\\Users\\yueye\\Desktop\\UNSW\\9414',
 'C:\\Users\\yueye\\anaconda3\\python312.zip',
 'C:\\Users\\yueye\\anaconda3\\DLLs',
 'C:\\Users\\yueye\\anaconda3\\Lib',
 'C:\\Users\\yueye\\anaconda3',
 '',
 'C:\\Users\\yueye\\anaconda3\\Lib\\site-packages',
 'C:\\Users\\yueye\\anaconda3\\Lib\\site-packages\\win32',
 'C:\\Users\\yueye\\anaconda3\\Lib\\site-packages\\win32\\lib',
 'C:\\Users\\yueye\\anaconda3\\Lib\\site-packages\\Pythonwin',
 'C:\\Users\\yueye\\anaconda3\\Lib\\site-packages\\setuptools\\_vendor',
 'aipython',
 'aipython']
```

2. Representation of Day Times

Input and output are day time strings such as 'mon 10am' or a range of day time strings such as 'mon 10am-mon 4pm'.

The CSP will represent these as integer hour numbers in the week, ranging from 0 to 39.

The following code handles the conversion between day time strings and hour numbers.

In [149…
```
# -*- coding: utf-8 -*-

""" day_time string format is a day plus time, e.g. Mon 10am, Tue 4pm, or just T
    if only day or time, returns day number or hour number only
    day_time strings are converted to and from integer hours in the week from 0
"""
class Day_Time():
    num_hours_in_day = 8
    num_days_in_week = 5
```

```
    def __init__(self):
        self.day_names = ['mon','tue','wed','thu','fri']
        self.time_names = ['9am','10am','11am','12pm','1pm','2pm','3pm','4pm']

    def string_to_week_hour_number(self, day_time_str):
        """ convert a single day_time into an integer hour in the week """
        value = None
        value_type = None
        day_time_list = day_time_str.split()
        if len(day_time_list) == 1:
            str1 = day_time_list[0].strip()
            if str1 in self.time_names: # this is a time
                value = self.time_names.index(str1)
                value_type = 'hour_number'
            else:
                value = self.day_names.index(str1) # this is a day
                value_type = 'day_number'
            # if not day or time, throw an exception
        else:
            value = self.day_names.index(day_time_list[0].strip())*self.num_hour
                + self.time_names.index(day_time_list[1].strip())
            value_type = 'week_hour_number'
        return (value_type, value)

    def string_to_number_set(self, day_time_list_str):
        """ convert a list of day-times or ranges 'Mon 9am, Tue 9am-Tue 4pm' int
            e.g. 'mon 9am-1pm, mon 4pm' -> [0,1,2,3,4,7]
        """
        number_set = set()
        type1 = None
        for str1 in day_time_list_str.lower().split(','):
            if str1.find('-') > 0:
                # day time range
                type1, v1 = self.string_to_week_hour_number(str1.split('-')[0].s
                type2, v2 = self.string_to_week_hour_number(str1.split('-')[1].s
                if type1 != type2: return None # error, types in range spec are
                number_set.update({n for n in range(v1, v2+1)})
            else:
                # single day time
                type2, value2 = self.string_to_week_hour_number(str1)
                if type1 != None and type1 != type2: return None # error: type i
                type1 = type2
                number_set.update({value2})
        return (type1, number_set)

    # convert integer hour in week to day time string
    def week_hour_number_to_day_time(self, week_hour_number):
        hour = self.day_hour_number(week_hour_number)
        day = self.day_number(week_hour_number)
        return self.day_names[day]+' '+self.time_names[hour]

    # convert integer hour in week to integer day and integer time in day
    def hour_day_split(self, week_hour_number):
        return (self.day_hour_number(week_hour_number), self.day_number(week_hou

    # convert integer hour in week to integer day in week
    def day_number(self, week_hour_number):
        return int(week_hour_number / self.num_hours_in_day)

    # convert integer hour in week to integer time in day
```

```
    def day_hour_number(self, week_hour_number):
        return week_hour_number % self.num_hours_in_day

    def __repr__(self):
        day_hour_number = self.week_hour_number % self.num_hours_in_day
        day_number = int(self.week_hour_number / self.num_hours_in_day)
        return self.day_names[day_number]+' '+self.time_names[day_hour_number]
```

3. Constraint Satisfaction Problems with Costs over Tasks with Durations

Since AI Python does not provide the CSP class with an explicit cost, we implement our own class that extends `CSP`.

We also store the cost functions and the durations of all tasks explicitly in the CSP.

The durations of the tasks are used in the `hold` function to evaluate constraints.

In [152…

```
from cspProblem import CSP, Constraint

# We need to override Constraint, because tasks have durations
class Task_Constraint(Constraint):
    """A Task_Constraint consists of
    * scope: a tuple of variables
    * spec: text description of the constraint used in debugging
    * condition: a function that can applied to a tuple of values for the variab
    * durations: durations of all tasks
    * func_key: index to the function used to evaluate the constraint
    """
    def __init__(self, scope, spec, condition, durations, func_key):
        super().__init__(scope, condition, spec)
        self.scope = scope
        self.condition = condition
        self.durations = durations
        self.func_key = func_key

    def holds(self, assignment):
        """returns the value of Constraint con evaluated in assignment.

        precondition: all variables are assigned in assignment

        CSP has only binary constraints
        condition is in the form week_hour_number1, week_hour_number2
        add task durations as appropriate to evaluate condition
        """
        if self.func_key == 'before':
            # t1 ends before t2 starts, so we need add duration to t1 assignment
            ass0 = assignment[self.scope[0]] + self.durations[self.scope[0]]
            ass1 = assignment[self.scope[1]]
        elif self.func_key == 'after':
            # t2 ends before t1 starts so we need add duration to t2 assignment
            ass0 = assignment[self.scope[0]]
            ass1 = assignment[self.scope[1]] + self.durations[self.scope[1]]
        elif self.func_key == 'starts-at':
            # t1 starts exactly when t2 ends, so we need add duration to t2 assi
            ass0 = assignment[self.scope[0]]
            ass1 = assignment[self.scope[1]] + self.durations[self.scope[1]]
        else:
```

```
            return self.condition(*tuple(assignment[v] for v in self.scope))
        # condition here comes from get_binary_constraint
        return self.condition(*tuple([ass0, ass1]))

# implement nodes as CSP problems with cost functions
class CSP_with_Cost(CSP):
    """ cost_functions maps a CSP var, here a task name, to a list of functions
    def __init__(self, domains, durations, constraints, cost_functions, soft_day
        self.domains = domains
        self.variables = self.domains.keys()
        super().__init__("title of csp", self.variables, constraints)
        self.durations = durations
        self.cost_functions = cost_functions
        self.soft_day_time = soft_day_time
        self.soft_costs = soft_costs
        self.cost = self.calculate_cost()

    # specific to fuzzy scheduling CSP problems
    def calculate_cost(self):
        """ this is really a function f = path cost + heuristic to be used by th
        cost = 0
        # TODO: write cost function
        dt = Day_Time()
        def week_hour(x):
            if isinstance(x, int):
                return x
            t, v = dt.string_to_week_hour_number(str(x).strip())
            if t == 'week_hour_number':
                return int(v)
            if t == 'day_number':
                return int(v) * dt.num_hours_in_day
            if t == 'hour_number':
                return int(v)
            return 0

        for v, dom in self.domains.items():
            if v in self.soft_day_time and int(self.soft_costs[v]) > 0:
                deadline = week_hour(self.soft_day_time[v])
                dur = int(self.durations[v])
                rate = int(self.soft_costs[v])
                best = float('inf')
                for val in dom:
                    finish = int(val) + dur
                    late = finish - deadline
                    if late < 0:
                        late = 0
                    c = late * rate
                    if c < best:
                        best = c
                if best != float('inf'):
                    cost += best
            else:
                cost += 0
        return cost

    def __repr__(self):
        """ string representation of an arc"""
        return "CSP_with_Cost("+str(list(self.domains.keys()))+':'+str(self.cost
```

This formulates a solver for a CSP with cost as a search problem, using domain splitting with arc consistency to define the successors of a node.

In [155…

```
from cspConsistency import Con_solver, select, partition_domain
from searchProblem import Arc, Search_problem
from operator import eq, le, ge

# rewrites rather than extends Search_with_AC_from_CSP
class Search_with_AC_from_Cost_CSP(Search_problem):
    """ A search problem with domain splitting and arc consistency """
    def __init__(self, csp):
        self.cons = Con_solver(csp) # copy of the CSP with access to arc consist
        self.domains = self.cons.make_arc_consistent(csp.domains)
        self.constraints = csp.constraints
        self.cost_functions = csp.cost_functions
        self.durations = csp.durations
        self.soft_day_time = csp.soft_day_time
        self.soft_costs = csp.soft_costs
        csp.domains = self.domains # after arc consistency
        self.csp = csp

    def is_goal(self, node):
        """ node is a goal if all domains have exactly 1 element """
        return all(len(node.domains[var]) == 1 for var in node.domains)

    def start_node(self):
        return CSP_with_Cost(self.domains, self.durations, self.constraints,
                             self.cost_functions, self.soft_day_time, self.soft_

    def neighbors(self, node):
        """returns the neighboring nodes of node.
        """
        neighs = []
        var = select(x for x in node.domains if len(node.domains[x]) > 1) # chos
        if var:
            dom1, dom2 = partition_domain(node.domains[var])
            self.display(2, "Splitting", var, "into", dom1, "and", dom2)
            to_do = self.cons.new_to_do(var, None)
            for dom in [dom1,dom2]:
                newdoms = node.domains | {var: dom} # overwrite domain of var wi
                cons_doms = self.cons.make_arc_consistent(newdoms, to_do)
                if all(len(cons_doms[v]) > 0 for v in cons_doms):
                    # all domains are non-empty
                    # make new CSP_with_Cost node to continue the search
                    csp_node = CSP_with_Cost(cons_doms, self.durations, self.con
                             self.cost_functions, self.soft_day_time, self.soft_
                    neighs.append(Arc(node, csp_node))
                else:
                    self.display(2,"...",var,"in",dom,"has no solution")
        return neighs

    def heuristic(self, n):
        return n.cost
```

4. Fuzzy Scheduling Constraint Satisfaction Problems

The following code sets up a CSP problem from a given specification.

Hard (unary) domain constraints are applied to reduce the domains of the variables before the constraint solver runs.

In [158…

```
# domain specific CSP builder for week schedule
class CSP_builder():
    # list of text lines without comments and empty lines
    _, default_domain = Day_Time().string_to_number_set('mon 9am-fri 4pm') # sho

    # hard unary constraints: domain is a list of values, params is a single val
    # starts-before, ends-before (for starts-before duration should be 0)
    # vals in domain are actual task start/end date/time, so must be val <= what
    def apply_before(self, param_type, params, duration, domain):
        domain_orig = domain.copy()
        param_val = params.pop()
        for val in domain_orig: # val is week_hour_number
            val1 = val + duration
            h, d = Day_Time().hour_day_split(val1)
            if param_type == 'hour_number' and h > param_val:
                if val in domain: domain.remove(val)
            if param_type == 'day_number' and d > param_val:
                if val in domain: domain.remove(val)
            if param_type == 'week_hour_number' and val1 > param_val:
                if val in domain: domain.remove(val)
        return domain

    def apply_after(self, param_type, params, duration, domain):
        domain_orig = domain.copy()
        param_val = params.pop()
        for val in domain_orig: # val is week_hour_number
            val1 = val + duration
            h, d = Day_Time().hour_day_split(val1)
            if param_type == 'hour_number' and h < param_val:
                if val in domain: domain.remove(val)
            if param_type == 'day_number' and d < param_val:
                if val in domain: domain.remove(val)
            if param_type == 'week_hour_number' and val1 < param_val:
                if val in domain: domain.remove(val)
        return domain

    # day time range only
    # includes starts-in, ends-in
    # duration is 0 for starts-in, task duration for ends-in
    def apply_in(self, params, duration, domain):
        domain_orig = domain.copy()
        for val in domain_orig: # val is week_hour_number
            # task must be within range
            if val in domain and val+duration not in params:
                domain.remove(val)
        return domain

    # task must start at day/time
    def apply_at(self, param_type, param,domain):
        domain_orig = domain.copy()
        for val in domain_orig:
            h, d = Day_Time().hour_day_split(val)
            if param_type == 'hour_number' and param != h:
                if val in domain: domain.remove(val)
            if param_type == 'day_number' and param != d:
                if val in domain: domain.remove(val)
```

```
            if param_type == 'week_hour_number' and param != val:
                if val in domain: domain.remove(val)
        return domain

    # soft deadline constraints: return cost to break constraint
    # ends-by implementation: domain_dt is the day, hour from the domain
    # constr_dt is the soft const spec, dur is the duration of task
    # soft_cost is the unit cost of completion delay
    # so if the tasks starts on domain_dt, it ends on domain_dt+dur
    """
    <t> ends-by <day> <time>, both must be specified
    delay = day_hour(T2) - day_hour(T1) + 24*(D2 - D1),
    where day_hour(9am) = 0, day_hour(5pm) = 7
    """
    def ends_by(self, domain_dt, constr_dt_str, dur, soft_cost):
        param_type,params = Day_Time().string_to_number_set(constr_dt_str)
        param_val = params.pop()
        dom_h, dom_d = Day_Time().hour_day_split(domain_dt+dur)
        if param_type == 'week_hour_number':
            con_h, con_d = Day_Time().hour_day_split(param_val)
            return 0 if domain_dt + dur <= param_val else soft_cost*(dom_h - con
        else:
            return None # not good, must be day and time

    def no_cost(self, day ,hour):
        return 0

    # hard binary constraint, the rest are implemented as gt, lt, eq
    def same_day(self, week_hour1, week_hour2):
        h1, d1 = Day_Time().hour_day_split(week_hour1)
        h2, d2 = Day_Time().hour_day_split(week_hour2)
        return d1 == d2

    # domain is a list of values
    def apply_hard_constraint(self, domain, duration, spec):
        tokens = func_key = spec.split(' ')
        if len(tokens) > 1:
            func_key = spec.split(' ')[0].strip()
            param_type, params = Day_Time().string_to_number_set(spec[len(func_ke
            if func_key == 'starts-before':
                # duration is 0 for starts before, since we do not modify the time
                return self.apply_before(param_type, params, 0, domain)
            if func_key == 'ends-before':
                return self.apply_before(param_type, params, duration, domain)
            if func_key == 'starts-after':
                return self.apply_after(param_type,params,0,domain)
            if func_key == 'ends-after':
                return self.apply_after(param_type, params, duration, domain)
            if func_key == 'starts-in':
                return self.apply_in(params, 0, domain)
            if func_key == 'ends-in':
                return self.apply_in(params, duration, domain)
        else:
            # here we have task day or time, it has no func key so we need to par
            param_type,params = Day_Time().string_to_week_hour_number(spec)
            return self.apply_at(param_type, params, domain)

    def get_cost_function(self, spec):
        func_dict = {'ends-by':self.ends_by, 'no-cost':self.no_cost}
        return [func_dict[spec]]
```

```
    # spec is the text of a constraint, e.g. 't1 before t2'
    # durations are durations of all tasks
    def get_binary_constraint(self, spec, durations):
        tokens = spec.strip().split(' ')
        if len(tokens) != 3: return None # error in spec
        # task1 relation task2
        fun_dict = {'before':le, 'after':ge, 'starts-at':eq, 'same-day':self.sam
        return Task_Constraint((tokens[0].strip(), tokens[2].strip()), spec, fun

    def get_CSP_with_Cost(self, input_lines):
        # Note: It would be more elegant to make task a class but AIpython is no
        # CSP_with_Cost inherits from CSP, which takes domains and constraints f
        domains = dict()
        constraints = []
        cost_functions = dict()
        durations = dict() # durations of tasks
        soft_day_time = dict() # day time specs of soft constraints
        soft_costs = dict() # costs of soft constraints

        for input_line in input_lines:
            func_spec = None
            input_line_tokens = input_line.strip().split(',')
            if len(input_line_tokens) != 2:
                return None # must have number of tokens = 2
            line_token1 = input_line_tokens[0].strip()
            line_token2 = input_line_tokens[1].strip()
            if line_token1 == 'task':
                tokens = line_token2.split(' ')
                if len(tokens) != 2:
                    return None # must have number of tokens = 3
                key = tokens[0].strip()
                # check the duration and save it
                duration = int(tokens[1].strip())
                if duration > Day_Time().num_hours_in_day:
                    return None
                durations[key] = duration
                # set zero cost function for this task as default, may add real
                cost_functions[key] = self.get_cost_function('no-cost')
                soft_costs[key] = '0'
                soft_day_time[key] = 'fri 5pm'
                # restrict domain to times that are within allowed range
                # that is start 9-5, start+duration in 9-5
                domains[key] = {x for x in self.default_domain \
                                if Day_Time().day_number(x+duration) \
                                == Day_Time().day_number(x)}
            elif line_token1 == 'domain':
                tokens = line_token2.split(' ')
                if len(tokens) < 2:
                    return None # must have number of tokens >= 2
                key = tokens[0].strip()
                # if soft constraint, it is handled differently from hard constr
                if tokens[1].strip() == 'ends-by':
                    # need to retain day time and cost from the line
                    # must have task, 'end-by', day, time, cost
                    # or task, 'end-by', day, cost
                    # or task, 'end-by', time, cost
                    if len(tokens) != 5:
                        return None
                    # get the rest of the line after 'ends-by'
```

```
                    soft_costs[key] = int(tokens[len(tokens)-1].strip()) # last
                    # pass the day time string to avoid passing param_type
                    day_time_str = tokens[2] + ' ' + tokens[3]
                    soft_day_time[key] = day_time_str
                    cost_functions[key] = self.get_cost_function(tokens[1].strip
                else:
                    # the rest of domain spec, after key, are hard unary domain
                    # func spec has day time, we also need duration
                    dur = durations[key]
                    func_spec = line_token2[len(key):].strip()
                    domains[key] = self.apply_hard_constraint(domains[key], dur,
            elif line_token1 == 'constraint': # all binary constraints
                constraints.append(self.get_binary_constraint(line_token2, durat
            else:
                return None

        return CSP_with_Cost(domains, durations, constraints, cost_functions, so

def create_CSP_from_spec(spec: str):
    input_lines = list()
    spec = spec.split('\n')
    # strip comments
    for input_line in spec:
        input_line = input_line.split('#')
        if len(input_line[0]) > 0:
            input_lines.append(input_line[0])
            print(input_line[0])
    # construct initial CSP problem
    csp = CSP_builder()
    csp_problem = csp.get_CSP_with_Cost(input_lines)
    return csp_problem
```

5. Greedy Search Constraint Solver using Domain Splitting and Arc Consistency

Create a GreedySearcher to search over the CSP.

The *cost* function for CSP nodes is used as the heuristic, but is actually a direct estimate of the total path cost function *f* used in A* Search.

In [161…

```
from searchGeneric import AStarSearcher

class GreedySearcher(AStarSearcher):
    """ returns a searcher for a problem.
    Paths can be found by repeatedly calling search().
    """
    def add_to_frontier(self, path):
        """ add path to the frontier with the appropriate cost """
        # value = path.cost + self.problem.heuristic(path.end()) -- A* definitio
        value = path.end().cost
        self.frontier.add(path, value)
```

Run the GreedySearcher on the CSP derived from the sample input.

Note: The solution cost will always be 0 (which is wrong for the sample input) until you write the cost function in the cell above.

In [164…

```
# Sample problem specification

sample_spec = """
# two tasks with two binary constraints and soft deadlines
task, t1 3
task, t2 4
# two binary constraints
constraint, t1 before t2
constraint, t1 same-day t2
# domain constraint
domain, t2 mon
# soft deadlines
domain, t1 ends-by mon 3pm 10
domain, t2 ends-by mon 3pm 10
"""
```

In [166…

```
# display details (0 turns off)
Con_solver.max_display_level = 0
Search_with_AC_from_Cost_CSP.max_display_level = 2
GreedySearcher.max_display_level = 0

def test_csp_solver(searcher):
    final_path = searcher.search()
    if final_path == None:
        print('No solution')
    else:
        domains = final_path.end().domains
        result_str = ''
        for name, domain in domains.items():
            for n in domain:
                result_str += '\n'+str(name)+': '+Day_Time().week_hour_number_to
        print(result_str[1:]+'\ncost: '+str(final_path.end().cost))

csp_problem = create_CSP_from_spec(sample_spec)
solver = GreedySearcher(Search_with_AC_from_Cost_CSP(csp_problem))
test_csp_solver(solver)
```

```
task, t1 3
task, t2 4
constraint, t1 before t2
constraint, t1 same-day t2
domain, t2 mon
domain, t1 ends-by mon 3pm 10
domain, t2 ends-by mon 3pm 10
t1: mon 9am
t2: mon 12pm
cost: 10
```

6. Depth-First Search Constraint Solver

The Depth-First Constraint Solver in AIPython by default uses a random ordering of the variables in the CSP.

We need to modify this code to make it compatible with the arc consistency solver.

Run the solver by calling `dfs_solve1` (first solution) or `dfs_solve_all` (all solutions).

In [169…

```
num_expanded = 0
display = False

def dfs_solver(constraints, domains, context, var_order):
    """ generator for all solutions to csp
        context is an assignment of values to some of the variables
        var_order is a list of the variables in csp that are not in context
    """
    global num_expanded, display
    to_eval = {c for c in constraints if c.can_evaluate(context)}
    if all(c.holds(context) for c in to_eval):
        if var_order == []:
            print("Nodes expanded to reach solution:", num_expanded)
            yield context
        else:
            rem_cons = [c for c in constraints if c not in to_eval]
            var = var_order[0]
            for val in domains[var]:
                if display:
                    print("Setting", var, "to", val)
                num_expanded += 1
                yield from dfs_solver(rem_cons, domains, context|{var:val}, var_

def dfs_solve_all(csp, var_order=None):
    """ depth-first CSP solver to return a list of all solutions to csp """
    global num_expanded
    num_expanded = 0
    if var_order == None:    # use an arbitrary variable order
        var_order = list(csp.domains)
    return list(dfs_solver(csp.constraints, csp.domains, {}, var_order))

def dfs_solve1(csp, var_order=None):
    """ depth-first CSP solver """
    global num_expanded
    num_expanded = 0
    if var_order == None:    # use an arbitrary variable order
        var_order = list(csp.domains)
    for sol in dfs_solver(csp.constraints, csp.domains, {}, var_order):
        return sol  # return first one
```

Run the Depth-First Solver on the sample problem.

Note: Again there are no costs calculated.

In [172…

```
def test_dfs_solver(csp_problem):
    solution = dfs_solve1(csp_problem)
    if solution == None:
        print('No solution')
    else:
        result_str = ''
        for name in solution.keys():
            result_str += '\n'+str(name)+': '+Day_Time().week_hour_number_to_day
        print(result_str[1:])

# call the Depth-First Search solver
csp_problem = create_CSP_from_spec(sample_spec)
test_dfs_solver(csp_problem) # set display to True to see nodes expanded
```

```
task, t1 3
task, t2 4
constraint, t1 before t2
constraint, t1 same-day t2
domain, t2 mon
domain, t1 ends-by mon 3pm 10
domain, t2 ends-by mon 3pm 10
Nodes expanded to reach solution: 5
t1: mon 9am
t2: mon 12pm
```

7. Depth-First Search Constraint Solver using Forward Checking with MRV Heuristic

The Depth-First Constraint Solver in AIPython by default uses a random ordering of the variables in the CSP.

We redefine the `dfs_solver` methods to implement the MRV (Minimum Remaining Values) heuristic using forward checking.

Because the AIPython code is designed to manipulate domain sets, we also need to redefine `can_evaluate` to handle partial assignments.

In [175…

```python
num_expanded = 0
display = False

def can_evaluate(c, assignment):
    """ assignment is a variable:value dictionary
        returns True if the constraint can be evaluated given assignment
    """
    return assignment != {} and all(v in assignment.keys() and type(assignment[v

def mrv_dfs_solver(constraints, domains, context, var_order):
    """ generator for all solutions to csp.
        context is an assignment of values to some of the variables.
        var_order is a list of the variables in csp that are not in context.
    """
    global num_expanded, display
    if display:
        print("Context", context)
    to_eval = {c for c in constraints if can_evaluate(c, context)}
    if all(c.holds(context) for c in to_eval):
        if var_order == []:
            print("Nodes expanded to reach solution:", num_expanded)
            yield context
        else:
            rem_cons = [c for c in constraints if c not in to_eval] # constraint
            var = var_order[0]
            rem_vars = var_order[1:]
            for val in domains[var]:
                if display:
                    print("Setting", var, "to", val)
                num_expanded += 1
                rem_context = context|{var:val}
                # apply forward checking on remaining variables
                if len(var_order) > 1:
                    rem_vars_original = list((v, list(domains[v].copy())) for v
```

```
                    if display:
                        print("Original domains:", rem_vars_original)
                    # constraints that can't already be evaluated in rem_cons
                    rem_cons_ff = [c for c in constraints if c in rem_cons and n
                    for rem_var in rem_vars:
                        # constraints that can be evaluated by adding a value of
                        any_value = list(domains[rem_var])[0]
                        rem_to_eval = {c for c in rem_cons_ff if can_evaluate(c,
                        # new domain for rem_var are the values for which all ne
                        rem_vals = domains[rem_var].copy()
                        for rem_val in domains[rem_var]:
                            # no constraint with rem_var in the existing context
                            for c in rem_to_eval:
                                if not c.holds(rem_context|{rem_var: rem_val}):
                                    if rem_val in rem_vals:
                                        rem_vals.remove(rem_val)
                        domains[rem_var] = rem_vals
                        # order remaining variables by MRV
                        rem_vars.sort(key=lambda v: len(domains[v]))
                    if display:
                        print("After forward checking:", list((v, domains[v]) fo
                if rem_vars == [] or all(len(domains[rem_var]) > 0 for rem_var i
                    yield from mrv_dfs_solver(rem_cons, domains, context|{var:va
                # restore original domains if changed through forward checking
                if len(var_order) > 1:
                    if display:
                        print("Restoring original domain", rem_vars_original)
                    for (v, domain) in rem_vars_original:
                        domains[v] = domain
            if display:
                print("Nodes expanded so far:", num_expanded)

def mrv_dfs_solve_all(csp, var_order=None):
    """ depth-first CSP solver to return a list of all solutions to csp """
    global num_expanded
    num_expanded = 0
    if var_order == None:    # order variables by MRV
        var_order = list(csp.domains)
        var_order.sort(key=lambda var: len(csp.domains[var]))
    return list(mrv_dfs_solver(csp.constraints, csp.domains, {}, var_order))

def mrv_dfs_solve1(csp, var_order=None):
    """ depth-first CSP solver """
    global num_expanded
    num_expanded = 0
    if var_order == None:    # order variables by MRV
        var_order = list(csp.domains)
        var_order.sort(key=lambda var: len(csp.domains[var]))
    for sol in mrv_dfs_solver(csp.constraints, csp.domains, {}, var_order):
        return sol  # return first one
```

Run this solver on the sample problem.

Note: Again there are no costs calculated.

In [178…

```
def test_mrv_dfs_solver(csp_problem):
    solution = mrv_dfs_solve1(csp_problem)
    if solution == None:
        print('No solution')
```

```
    else:
        result_str = ''
        for name in solution.keys():
            result_str += '\n'+str(name)+': '+Day_Time().week_hour_number_to_day
        print(result_str[1:])

# call the Depth-First MRV Search solver
csp_problem = create_CSP_from_spec(sample_spec)
test_mrv_dfs_solver(csp_problem) # set display to True to see nodes expanded
```

```
task, t1 3
task, t2 4
constraint, t1 before t2
constraint, t1 same-day t2
domain, t2 mon
domain, t1 ends-by mon 3pm 10
domain, t2 ends-by mon 3pm 10
Nodes expanded to reach solution: 5
t2: mon 12pm
t1: mon 9am
```

Assignment

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Question 1 (4 marks)

Consider the search spaces for the fuzzy scheduling CSP solvers – domain splitting with arc consistency and the DFS solver (without forward checking).

- Describe the search spaces in terms of start state, successor functions and goal state(s) (1 mark)
- What is the branching factor and maximum depth to find any solution for the two algorithms (ignoring costs)? (1 mark)
- What is the worst case time and space complexity of the two search algorithms? (1 mark)
- Give one example of a fuzzy scheduling problem that is *easier* for the domain splitting with arc consistency solver than it is for the DFS solver, and explain why (1 mark)

For the second and third part-questions, give the answer in a general form in terms of fuzzy scheduling CSP size parameters.

Answers for Question 1

(a):
1.The search space in a CSP is consisted of all possible combinations of variable-domain that the solver may explore, so for the 'Start State', it is the initail state of all tasks with a certain domain that is 9am to 5pm but without a fixed start time.
2.And the 'fuccessor function' is the algorithm which tells how to move from the current

state to the next state. The domain splitting plus arc consistency method will split a variable's domain into smaller parts and prune inconsistent values using arc consistency, and the DFS method directly set a specific start time to one variable at a time and continue recursively.
3.The goal state is the state that all variables' domain is becoming a single-valued domain, which means that a complete and valid schedule satisfying all hard constrains is done.

(b):(here I note branching factor as b and maximum depth as D for explainning)(and let d=max(i)|Di|
Branching factor is that how many successors each node can generate and the maximum depth is that how many steps it will take to reach a full assignment.
1.For DFS, the branching factor is that, for each unassigned variable, we could have as many choices as there are domain values, that is b = d; and as for the maximum depth, DFS must assign n variables, so D = n.
2. For domain-splitting, the branching factor is that each node splits one domain into k parts, that is b = k, and usually it takes 2; as domain-splitting gradually make domain in to 1/2, and the total splitting time is about logd, so the maximum depth is around O(nlogd).

(c):
1.For DFS:
Time: since we must try all combinations, T=O(d^n).
Space: we will need O(n) space to store only the current branch with depth-first.
2.For domain-splitting:
Time: let n be the number of variables, and m be number of the binary constraints, since each split calls are consistency which checks all constrains and prunes values, the time cost will be O(d^n), and in the worst case, after all splits and AC for each nodes, here take AC-3 as standard, it will cost O(md^3), thus the total time cost is around O(md^(n+3)), that is the result of O(d^n) x O(md^3). Space: since the greedy solver must keep all frontier nodes, the space complexity is up to O(d^n).

(d):
For example we might have A B C D, 4 tasks and they all cost 2 hours to complete, and A must be done before B, B before C, C before D, and the constraints are all hard type, thus if we apply Domain-splitting & Arc consistency method, it will give up some obvious conflicted combinations at the very beginning stage, while DFS method won't check these, DFS will just do all the combinations till all combinations are checked. So in such situation where lots of binary hard constraints exist, Domain-splitting & Arc consistency method will perform better than DFS methods.

Question 2 (5 marks)

Define the *cost* function for a fuzzy scheduling CSP (i.e. a node in the search space for domain splitting and arc consistency) as the total cost of the soft deadline constraints violated for all of the variables, assuming that each variable is assigned one of the best

possible values from its domain, where a "best" value for a variable *v* is one that has the lowest cost to violate the soft deadline constraint (if any) for that variable *v*.

- Implement the cost function in the indicated cell and place a copy of the code below (3 marks)
- What is its computational complexity (give a general form in terms of fuzzy scheduling CSP size parameters)? (1 mark)
- Show that the cost function *f* never decreases along a path, and explain why this means the search algorithm is optimal (1 mark)

In [185…

```
# Code for Question 2
# Place a copy of your code here and run it in the relevant cell
def calculate_cost(self):
    """ this is really a function f = path cost + heuristic to be used by the co
    cost = 0
    # TODO: write cost function
    dt = Day_Time()
    def week_hour(x):
        if isinstance(x, int):
            return x
        t, v = dt.string_to_week_hour_number(str(x).strip())
        if t == 'week_hour_number':
            return int(v)
        if t == 'day_number':
            return int(v) * dt.num_hours_in_day
        if t == 'hour_number':
            return int(v)
        return 0

    for v, dom in self.domains.items():
        if v in self.soft_day_time and int(self.soft_costs[v]) > 0:
            deadline = week_hour(self.soft_day_time[v])
            dur = int(self.durations[v])
            rate = int(self.soft_costs[v])
            best = float('inf')
            for val in dom:
                finish = int(val) + dur
                late = finish - deadline
                if late < 0:
                    late = 0
                c = late * rate
                if c < best:
                    best = c
            if best != float('inf'):
                cost += best
        else:
            cost += 0
    return cost
```

Answers for Question 2

Q2 (b):computational complexity

Here let n be the number of tasks (variables), and let the current domain sizes be $d_1, d_2, \ldots, d_n$. Then computing the cost **once** runs in

$$T(n) = \Theta\Big(\sum_{i=1}^{n} d_i\Big).$$

with using the average domain size $\bar{d}$, this is

$$T(n) = \Theta(n\,\bar{d}\,).$$

thus if each domain has a uniform upper bound d, then

$$T(n) = O(nd).$$

And the extra space is $O(1)$ (this is when it only have a few scalars), or $O(n)$ if per-task accumulators are counted.

(c):
Here I define:

$$f(n) = \sum_{v} \min_{s \in D_v(n)} c_v \cdot \max\big(0,\ (s + \mathrm{dur}_v) - L_v\big),$$

where $D_v(n)$ is the current domain of task v, and c_v is the per-hour penalty, L_v is the soft deadline in week-hours, and dur_v is the duration.

1.For Monotonicity (non-decreasing along any path):
When we go from a parent state to a child state in domain-splitting & AC method, each variable's domain either **shrinks** or becomes **a singleton**.
And here for any variable v, $\min D_v$ is non-decreasing as the domain shrinks;

hence we could have that:

$$\min_{s \in D'_v} c_v \max(0, (s + \mathrm{dur}_v) - L_v) \quad \geq \quad \min_{s \in D_v} c_v \max(0, (s + \mathrm{dur}_v) - L_v).$$

If v becomes assigned, its **actual cost** is larger than or equal to this lower bound.
Summing over v gives: $f(\mathrm{child}) \geq f(\mathrm{parent})$.

2.For optimality:
Since f is consistent, a best-first search that expands nodes in non-decreasing f will never bypass a cheaper path. Therefore, the first goal node popped is optimal with minimum total lateness cost.

Question 3 (4 marks)

Conduct an empirical evaluation of the domain splitting CSP solver using the cost function defined as above compared to using no cost function (i.e. the zero cost function, as originally defined in the above cell). Use the *average number of nodes expanded* as a metric to compare the two algorithms.

- Write a function `generate_problem(n)` that takes an integer `n` and generates a problem specification with `n` tasks and a random set of hard constraints and soft deadline constraints in the correct format for the constraint solvers (2 marks)

Run the CSP solver (with and without the cost function) over a number of problems of size `n` for a range of values of `n`.

- Plot the performance of the two constraint solving algorithms on the above metric against `n` (1 mark)
- Quantify the performance gain (if any) achieved by the use of this cost function (1 mark)

In [207…

```
# Code for Question 3
# Place your code here
import random, re, math, time
import matplotlib.pyplot as plt
# Main function to set the generation part.
def generate_problem(n):
    days = ["mon","tue","wed","thu","fri"]
    times = ["11am","12pm","1pm","2pm","3pm","4pm"]
    tasks = [f"task, t{i+1} {random.randint(1,6)}" for i in range(n)]
    pairs = [(i,j) for i in range(1,n+1) for j in range(i+1,n+1)]
    random.shuffle(pairs)
    m_before = random.randint(0, max(0, n*(n-1)//6))
    m_same = random.randint(0, max(0, n//3))
    cons = []
    for i in range(m_before):
        a,b = pairs[i % len(pairs)]
        cons.append(f"constraint, t{a} before t{b}")
    random.shuffle(pairs)
    for i in range(m_same):
        a,b = pairs[i % len(pairs)]
        if a != b:
            cons.append(f"constraint, t{a} same-day t{b}")
    domains = []
    fixed = set(random.sample(range(1,n+1), random.randint(0, n//3)))
    for i in sorted(fixed):
        domains.append(f"domain, t{i} {random.choice(days)}")
    soft_set = set(random.sample(range(1,n+1), max(1, n//2)))
    for i in range(1,n+1):
        if i in soft_set:
            d = random.choice(days)
            if i in fixed:
                for line in domains:
                    if line.startswith(f"domain, t{i} "):
                        d = line.split()[2]
                        break
            t = random.choice(times)
            c = random.choice([5,10,15,20])
            domains.append(f"domain, t{i} ends-by {d} {t} {c}")
    lines = []
    lines.append("# auto-generated problem")
    lines += tasks
    if cons:
        lines.append("# binary constraints")
        lines += cons
    if domains:
        lines.append("# domain constraints")
        lines += domains
    return "\n".join(lines)
# Set the zero ones for comparison
def make_zero_cost(spec_text):
```

```
    pat = re.compile(r'^(domain,\s*t\d+\s*ends-by\s+\w+\s+\d+(?:am|pm))\s+\d+\s*
    out = []
    for line in spec_text.splitlines():
        m = pat.match(line.strip())
        if m:
            out.append(m.group(1) + " 0")
        else:
            out.append(line)
    return "\n".join(out)

def get_expanded_count(searcher):
    for name in ("nexpanded","num_expanded","expanded","nodes_expanded"):
        if hasattr(searcher, name):
            return getattr(searcher, name)
    if hasattr(searcher, "problem") and hasattr(searcher.problem, "num_expanded"
        return searcher.problem.num_expanded
    return None
# One single try setting
def run_once(spec_text, mode="cost"):
    if mode == "zero":
        spec_use = make_zero_cost(spec_text)
    else:
        spec_use = spec_text
    csp_problem = create_CSP_from_spec(spec_use)
    solver = GreedySearcher(Search_with_AC_from_Cost_CSP(csp_problem))
    final_path = solver.search()
    expanded = get_expanded_count(solver)
    return expanded if expanded is not None else float("nan")
# Result showing
def evaluate_and_plot(ns, K=20, seed=0):
    random.seed(seed)
    avg_cost = []
    avg_zero = []
    for n in ns:
        vals_c = []
        vals_z = []
        for _ in range(K):
            spec = generate_problem(n)
            ez = run_once(spec, "zero")
            ec = run_once(spec, "cost")
            vals_z.append(ez)
            vals_c.append(ec)
        m_z = sum(vals_z)/len(vals_z)
        m_c = sum(vals_c)/len(vals_c)
        avg_zero.append(m_z)
        avg_cost.append(m_c)
    plt.figure()
    plt.plot(ns, avg_zero, marker="o", label="Zero cost")
    plt.plot(ns, avg_cost, marker="o", label="With cost")
    plt.xlabel("n (number of tasks)")
    plt.ylabel("Average nodes expanded")
    plt.title("Domain-splitting CSP: nodes expanded vs n")
    plt.legend()
    plt.show()
    gains = []
    for z,c in zip(avg_zero, avg_cost):
        gains.append(0.0 if z==0 else (z-c)/z*100.0)
    for n,z,c,g in zip(ns, avg_zero, avg_cost, gains):
        print(f"n={n:>2}  zero={z:.1f}   cost={c:.1f}   gain={g:.1f}%")
    return {"n":ns, "avg_zero":avg_zero, "avg_cost":avg_cost, "gain_pct":gains}
```

```
# Here I take n belongs to {4,6,8,10,12} and 20 random examples for each n, with

### To rerun, you can delete the '#' and rerun the below code if you need to che
### BUT THE RESULT IS VERY VERY LONG, I DID NOT HIDE THE LOGs!!

res = evaluate_and_plot(ns=[4,6,8,10,12], K=20, seed=0)
```

```
task, t1 4
task, t2 4
task, t3 1
task, t4 3
constraint, t1 before t2
domain, t2 wed
domain, t1 ends-by mon 4pm 0
domain, t3 ends-by thu 3pm 0
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
task, t1 4
task, t2 4
task, t3 1
task, t4 3
constraint, t1 before t2
domain, t2 wed
domain, t1 ends-by mon 4pm 15
domain, t3 ends-by thu 3pm 5
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
task, t1 3
task, t2 4
task, t3 3
task, t4 5
domain, t2 wed
domain, t1 ends-by fri 12pm 0
domain, t4 ends-by tue 3pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
```

```
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
task, t1 3
task, t2 4
task, t3 3
task, t4 5
domain, t2 wed
domain, t1 ends-by fri 12pm 10
domain, t4 ends-by tue 3pm 20
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
task, t1 1
task, t2 1
task, t3 3
task, t4 5
constraint, t2 before t4
constraint, t1 before t3
domain, t1 fri
domain, t2 ends-by fri 12pm 0
domain, t4 ends-by tue 12pm 0
Splitting t1 into {32, 33} and {34, 35}
Splitting t1 into {32} and {33}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {33, 34} and {35, 36}
Splitting t3 into {33} and {34}
Splitting t4 into {32, 1, 2, 34, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {32, 1, 2} and {8, 33, 34, 9}
Splitting t4 into {32} and {1, 2}
task, t1 1
task, t2 1
task, t3 3
task, t4 5
constraint, t2 before t4
```

```
constraint, t1 before t3
domain, t1 fri
domain, t2 ends-by fri 12pm 15
domain, t4 ends-by tue 12pm 10
Splitting t1 into {32, 33} and {34, 35}
Splitting t1 into {32} and {33}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {33, 34} and {35, 36}
Splitting t3 into {33} and {34}
Splitting t4 into {32, 1, 2, 34, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {32, 1, 2} and {8, 33, 34, 9}
Splitting t4 into {32} and {1, 2}
Splitting t4 into {1} and {2}
task, t1 1
task, t2 5
task, t3 6
task, t4 3
domain, t2 ends-by fri 2pm 0
domain, t3 ends-by thu 2pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
task, t1 1
task, t2 5
task, t3 6
task, t4 3
domain, t2 ends-by fri 2pm 15
domain, t3 ends-by thu 2pm 15
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
```

```
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
task, t1 1
task, t2 3
task, t3 5
task, t4 1
constraint, t1 same-day t4
domain, t1 mon
domain, t2 ends-by tue 11am 0
domain, t3 ends-by mon 11am 0
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t4 into {0} and {1, 2}
task, t1 1
task, t2 3
task, t3 5
task, t4 1
constraint, t1 same-day t4
domain, t1 mon
domain, t2 ends-by tue 11am 5
domain, t3 ends-by mon 11am 10
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t4 into {0} and {1, 2}
task, t1 5
task, t2 5
task, t3 1
task, t4 4
domain, t3 ends-by mon 1pm 0
domain, t4 ends-by tue 11am 0
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
```

```
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
task, t1 5
task, t2 5
task, t3 1
task, t4 4
domain, t3 ends-by mon 1pm 5
domain, t4 ends-by tue 11am 15
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
task, t1 3
task, t2 4
task, t3 2
task, t4 1
constraint, t1 before t3
constraint, t3 before t4
constraint, t1 same-day t3
domain, t1 ends-by tue 12pm 0
domain, t2 ends-by fri 1pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 17, 18, 19,
20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12, 16}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {3} and {4, 5}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t4 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t4 into {8} and {5, 6}
task, t1 3
task, t2 4
task, t3 2
```

```
task, t4 1
constraint, t1 before t3
constraint, t3 before t4
constraint, t1 same-day t3
domain, t1 ends-by tue 12pm 15
domain, t2 ends-by fri 1pm 5
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 17, 18, 19,
20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12, 16}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {3} and {4, 5}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t4 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t4 into {8} and {5, 6}
task, t1 5
task, t2 4
task, t3 6
task, t4 2
constraint, t3 before t4
constraint, t1 before t3
constraint, t1 same-day t2
domain, t1 wed
domain, t1 ends-by wed 12pm 0
domain, t3 ends-by thu 1pm 0
Splitting t1 into {16} and {17, 18}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {24} and {25}
Splitting t4 into {32, 33, 34} and {35, 36, 37}
Splitting t4 into {32} and {33, 34}
task, t1 5
task, t2 4
task, t3 6
task, t4 2
constraint, t3 before t4
constraint, t1 before t3
constraint, t1 same-day t2
domain, t1 wed
domain, t1 ends-by wed 12pm 10
domain, t3 ends-by thu 1pm 15
Splitting t1 into {16} and {17, 18}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {24} and {25}
Splitting t4 into {32, 33, 34} and {35, 36, 37}
Splitting t4 into {32} and {33, 34}
task, t1 6
task, t2 3
task, t3 5
task, t4 6
constraint, t1 before t2
constraint, t2 before t3
domain, t1 ends-by thu 2pm 0
```

```
domain, t2 ends-by mon 2pm 0
Splitting t1 into {0, 1, 8} and {16, 9, 17}
Splitting t1 into {0} and {8, 1}
Splitting t2 into {8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {8, 9, 10} and {16, 17, 11, 12}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t3 into {32, 33} and {16, 34}
Splitting t3 into {32} and {33}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
task, t1 6
task, t2 3
task, t3 5
task, t4 6
constraint, t1 before t2
constraint, t2 before t3
domain, t1 ends-by thu 2pm 20
domain, t2 ends-by mon 2pm 20
Splitting t1 into {0, 1, 8} and {16, 9, 17}
Splitting t1 into {0} and {8, 1}
Splitting t2 into {8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {8, 9, 10} and {16, 17, 11, 12}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t3 into {32, 33} and {16, 34}
Splitting t3 into {32} and {33}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
task, t1 6
task, t2 6
task, t3 1
task, t4 2
constraint, t1 before t3
constraint, t3 same-day t4
domain, t3 thu
domain, t1 ends-by tue 3pm 0
domain, t2 ends-by tue 11am 0
Splitting t1 into {0, 1, 8} and {16, 9, 17, 24}
Splitting t1 into {0} and {8, 1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t3 into {24} and {25, 26}
Splitting t4 into {24, 25, 26} and {27, 28, 29}
Splitting t4 into {24} and {25, 26}
task, t1 6
task, t2 6
task, t3 1
task, t4 2
constraint, t1 before t3
constraint, t3 same-day t4
domain, t3 thu
domain, t1 ends-by tue 3pm 5
domain, t2 ends-by tue 11am 20
Splitting t1 into {0, 1, 8} and {16, 9, 17, 24}
Splitting t1 into {0} and {8, 1}
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Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t3 into {24} and {25, 26}
Splitting t4 into {24, 25, 26} and {27, 28, 29}
Splitting t4 into {24} and {25, 26}
task, t1 6
task, t2 4
task, t3 3
task, t4 1
domain, t2 ends-by mon 11am 0
domain, t4 ends-by thu 11am 0
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
task, t1 6
task, t2 4
task, t3 3
task, t4 1
domain, t2 ends-by mon 11am 15
domain, t4 ends-by thu 11am 15
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
task, t1 2
```

```
task, t2 6
task, t3 5
task, t4 6
domain, t1 fri
domain, t3 ends-by thu 4pm 0
domain, t4 ends-by wed 3pm 0
Splitting t1 into {32, 33, 34} and {35, 36, 37}
Splitting t1 into {32} and {33, 34}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
task, t1 2
task, t2 6
task, t3 5
task, t4 6
domain, t1 fri
domain, t3 ends-by thu 4pm 20
domain, t4 ends-by wed 3pm 10
Splitting t1 into {32, 33, 34} and {35, 36, 37}
Splitting t1 into {32} and {33, 34}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
task, t1 2
task, t2 4
task, t3 5
task, t4 3
constraint, t3 before t4
constraint, t1 same-day t4
domain, t1 ends-by tue 3pm 0
domain, t3 ends-by wed 2pm 0
Splitting t1 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21} and {32, 33, 34,
35, 36, 37, 24, 25, 26, 27, 28, 29}
Splitting t1 into {8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 20, 21}
Splitting t1 into {8, 9, 10} and {11, 12, 13}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
task, t1 2
task, t2 4
task, t3 5
task, t4 3
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constraint, t3 before t4
constraint, t1 same-day t4
domain, t1 ends-by tue 3pm 15
domain, t3 ends-by wed 2pm 10
Splitting t1 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21} and {32, 33, 34,
35, 36, 37, 24, 25, 26, 27, 28, 29}
Splitting t1 into {8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 20, 21}
Splitting t1 into {8, 9, 10} and {11, 12, 13}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
task, t1 3
task, t2 1
task, t3 4
task, t4 6
constraint, t3 before t4
constraint, t2 same-day t3
domain, t4 wed
domain, t1 ends-by thu 11am 0
domain, t3 ends-by thu 11am 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {16} and {17}
task, t1 3
task, t2 1
task, t3 4
task, t4 6
constraint, t3 before t4
constraint, t2 same-day t3
domain, t4 wed
domain, t1 ends-by thu 11am 20
domain, t3 ends-by thu 11am 15
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {16} and {17}
task, t1 3
task, t2 6
task, t3 6
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```
task, t4 2
domain, t3 ends-by fri 1pm 0
domain, t4 ends-by thu 3pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
task, t1 3
task, t2 6
task, t3 6
task, t4 2
domain, t3 ends-by fri 1pm 20
domain, t4 ends-by thu 3pm 10
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
task, t1 4
task, t2 1
task, t3 3
task, t4 2
constraint, t3 before t4
domain, t2 ends-by wed 12pm 0
domain, t4 ends-by tue 3pm 0
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
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Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 34, 17, 18,
19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12, 16}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33, 3
4, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t4 into {3, 4, 5} and {8, 9, 10}
Splitting t4 into {3} and {4, 5}
task, t1 4
task, t2 1
task, t3 3
task, t4 2
constraint, t3 before t4
domain, t2 ends-by wed 12pm 5
domain, t4 ends-by tue 3pm 10
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 34, 17, 18,
19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12, 16}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33, 3
4, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t4 into {3, 4, 5} and {8, 9, 10}
Splitting t4 into {3} and {4, 5}
task, t1 1
task, t2 2
task, t3 4
task, t4 4
constraint, t3 same-day t4
domain, t4 tue
domain, t1 ends-by wed 4pm 0
domain, t2 ends-by wed 11am 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {8, 9} and {10, 11}
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```
Splitting t3 into {8} and {9}
Splitting t4 into {8, 9} and {10, 11}
Splitting t4 into {8} and {9}
task, t1 1
task, t2 2
task, t3 4
task, t4 4
constraint, t3 same-day t4
domain, t4 tue
domain, t1 ends-by wed 4pm 15
domain, t2 ends-by wed 11am 10
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {8, 9} and {10, 11}
Splitting t3 into {8} and {9}
Splitting t4 into {8, 9} and {10, 11}
Splitting t4 into {8} and {9}
task, t1 3
task, t2 5
task, t3 2
task, t4 4
constraint, t1 before t3
constraint, t3 before t4
domain, t2 ends-by tue 12pm 0
domain, t4 ends-by wed 3pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17}
Splitting t3 into {3, 4} and {8, 9, 5}
Splitting t3 into {3} and {4}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
task, t1 3
task, t2 5
task, t3 2
task, t4 4
constraint, t1 before t3
constraint, t3 before t4
domain, t2 ends-by tue 12pm 20
```

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domain, t4 ends-by wed 3pm 20
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17}
Splitting t3 into {3, 4} and {8, 9, 5}
Splitting t3 into {3} and {4}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {8, 9} and {10, 11}
Splitting t4 into {8} and {9}
task, t1 5
task, t2 5
task, t3 1
task, t4 5
constraint, t2 same-day t3
domain, t1 ends-by mon 4pm 0
domain, t3 ends-by wed 3pm 0
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
task, t1 5
task, t2 5
task, t3 1
task, t4 5
constraint, t2 same-day t3
domain, t1 ends-by mon 4pm 10
domain, t3 ends-by wed 3pm 15
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
task, t1 3
task, t2 1
task, t3 4
task, t4 3
domain, t4 tue
```

```
domain, t3 ends-by mon 4pm 0
domain, t4 ends-by tue 2pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
task, t1 3
task, t2 1
task, t3 4
task, t4 3
domain, t4 tue
domain, t3 ends-by mon 4pm 10
domain, t4 ends-by tue 2pm 5
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
task, t1 5
task, t2 4
task, t3 4
task, t4 4
task, t5 1
task, t6 1
constraint, t1 before t5
constraint, t1 before t3
constraint, t2 before t4
domain, t6 mon
domain, t1 ends-by thu 2pm 0
domain, t2 ends-by tue 2pm 0
domain, t5 ends-by mon 11am 0
```

```
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t3 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t5 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t5 into {8} and {5, 6}
Splitting t6 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t6 into {0} and {1, 2}
task, t1 5
task, t2 4
task, t3 4
task, t4 4
task, t5 1
task, t6 1
constraint, t1 before t5
constraint, t1 before t3
constraint, t2 before t4
domain, t6 mon
domain, t1 ends-by thu 2pm 15
domain, t2 ends-by tue 2pm 15
domain, t5 ends-by mon 11am 5
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t3 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t5 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t5 into {8} and {5, 6}
Splitting t5 into {5} and {6}
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```
Splitting t6 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t6 into {0} and {1, 2}
task, t1 4
task, t2 3
task, t3 1
task, t4 5
task, t5 6
task, t6 5
domain, t1 ends-by wed 4pm 0
domain, t3 ends-by wed 1pm 0
domain, t5 ends-by mon 12pm 0
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t6 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t6 into {0} and {1, 2}
task, t1 4
task, t2 3
task, t3 1
task, t4 5
task, t5 6
task, t6 5
domain, t1 ends-by wed 4pm 5
domain, t3 ends-by wed 1pm 10
domain, t5 ends-by mon 12pm 15
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
```

```
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t6 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t6 into {0} and {1, 2}
task, t1 1
task, t2 5
task, t3 2
task, t4 2
task, t5 1
task, t6 2
constraint, t1 before t4
constraint, t2 before t5
constraint, t1 before t5
constraint, t2 same-day t5
domain, t3 ends-by tue 2pm 0
domain, t5 ends-by tue 12pm 0
domain, t6 ends-by fri 12pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 36, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 33,
34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {1, 2, 3} and {8, 9, 4, 5}
Splitting t4 into {1} and {2, 3}
Splitting t5 into {5} and {6}
Splitting t6 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t6 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t6 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t6 into {0} and {1, 2}
task, t1 1
task, t2 5
task, t3 2
task, t4 2
task, t5 1
task, t6 2
constraint, t1 before t4
constraint, t2 before t5
constraint, t1 before t5
constraint, t2 same-day t5
```

```
domain, t3 ends-by tue 2pm 10
domain, t5 ends-by tue 12pm 15
domain, t6 ends-by fri 12pm 10
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 36, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 33,
34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {1, 2, 3} and {8, 9, 4, 5}
Splitting t4 into {1} and {2, 3}
Splitting t5 into {5} and {6}
Splitting t6 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t6 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t6 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t6 into {0} and {1, 2}
task, t1 2
task, t2 3
task, t3 3
task, t4 4
task, t5 6
task, t6 1
constraint, t2 before t6
constraint, t3 before t6
constraint, t2 before t3
constraint, t3 before t5
constraint, t4 same-day t6
domain, t2 wed
domain, t1 ends-by tue 11am 0
domain, t3 ends-by mon 3pm 0
domain, t4 ends-by thu 2pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16, 17} and {18, 19, 20}
Splitting t2 into {16} and {17}
Splitting t3 into {24, 19, 20} and {25, 26, 27, 28}
Splitting t3 into {24} and {19, 20}
Splitting t4 into {32, 33, 34, 35} and {24, 25, 26, 27}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {32} and {33}
Splitting t6 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t6 into {32} and {33, 34}
task, t1 2
task, t2 3
```

```
task, t3 3
task, t4 4
task, t5 6
task, t6 1
constraint, t2 before t6
constraint, t3 before t6
constraint, t2 before t3
constraint, t3 before t5
constraint, t4 same-day t6
domain, t2 wed
domain, t1 ends-by tue 11am 15
domain, t3 ends-by mon 3pm 10
domain, t4 ends-by thu 2pm 10
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16, 17} and {18, 19, 20}
Splitting t2 into {16} and {17}
Splitting t3 into {24, 19, 20} and {25, 26, 27, 28}
Splitting t3 into {24} and {19, 20}
Splitting t3 into {19} and {20}
Splitting t4 into {32, 33, 34, 35, 16, 17} and {18, 19, 24, 25, 26, 27}
Splitting t4 into {32, 33, 34} and {16, 17, 35}
Splitting t4 into {16} and {17, 35}
Splitting t5 into {32, 33} and {24, 25}
Splitting t5 into {32} and {33}
task, t1 4
task, t2 4
task, t3 2
task, t4 2
task, t5 4
task, t6 3
constraint, t3 before t4
constraint, t2 before t4
domain, t6 mon
domain, t1 ends-by mon 1pm 0
domain, t3 ends-by fri 3pm 0
domain, t6 ends-by mon 11am 0
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 32, 33, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t2 into {0, 1, 2, 3} and {32, 33, 8, 9, 10}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t4 into {8, 4, 5} and {9, 10, 11}
Splitting t4 into {8} and {4, 5}
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Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1} and {2, 3, 4}
Splitting t6 into {0} and {1}
task, t1 4
task, t2 4
task, t3 2
task, t4 2
task, t5 4
task, t6 3
constraint, t3 before t4
constraint, t2 before t4
domain, t6 mon
domain, t1 ends-by mon 1pm 20
domain, t3 ends-by fri 3pm 20
domain, t6 ends-by mon 11am 15
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 32, 33, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t2 into {0, 1, 2, 3} and {32, 33, 8, 9, 10}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t4 into {8, 4, 5} and {9, 10, 11}
Splitting t4 into {8} and {4, 5}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1} and {2, 3, 4}
Splitting t6 into {0} and {1}
task, t1 3
task, t2 3
task, t3 6
task, t4 2
task, t5 5
task, t6 1
constraint, t1 before t5
constraint, t1 before t4
constraint, t1 same-day t5
constraint, t4 same-day t6
domain, t5 tue
domain, t1 ends-by thu 2pm 0
domain, t2 ends-by tue 3pm 0
domain, t5 ends-by tue 4pm 0
```

```
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t2 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
... t2 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 3
task, t2 3
task, t3 6
task, t4 2
task, t5 5
task, t6 1
constraint, t1 before t5
constraint, t1 before t4
constraint, t1 same-day t5
constraint, t4 same-day t6
domain, t5 tue
domain, t1 ends-by thu 2pm 20
domain, t2 ends-by tue 3pm 15
domain, t5 ends-by tue 4pm 20
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t2 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
... t2 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 4
task, t3 2
task, t4 4
task, t5 4
task, t6 6
constraint, t3 before t4
constraint, t2 before t4
constraint, t5 before t6
constraint, t1 same-day t3
domain, t2 fri
domain, t6 wed
domain, t1 ends-by thu 4pm 0
domain, t2 ends-by fri 12pm 0
domain, t4 ends-by thu 4pm 0
Splitting t5 into {0, 1, 2, 3} and {8, 9, 10, 11}
... t5 in {0, 1, 2, 3} has no solution
... t5 in {8, 9, 10, 11} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 4
task, t3 2
task, t4 4
task, t5 4
task, t6 6
constraint, t3 before t4
constraint, t2 before t4
constraint, t5 before t6
constraint, t1 same-day t3
domain, t2 fri
domain, t6 wed
domain, t1 ends-by thu 4pm 15
domain, t2 ends-by fri 12pm 15
domain, t4 ends-by thu 4pm 20
Splitting t5 into {0, 1, 2, 3} and {8, 9, 10, 11}
... t5 in {0, 1, 2, 3} has no solution
```

```
... t5 in {8, 9, 10, 11} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 4
task, t3 6
task, t4 2
task, t5 5
task, t6 3
constraint, t4 before t5
constraint, t1 before t2
constraint, t2 before t6
constraint, t1 before t6
constraint, t1 same-day t5
constraint, t2 same-day t5
domain, t1 wed
domain, t5 wed
domain, t1 ends-by wed 4pm 0
domain, t4 ends-by fri 2pm 0
domain, t6 ends-by wed 4pm 0
Splitting t1 into {16} and {17}
Splitting t2 into {18} and {19}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13, 16}
Splitting t4 into {0, 1, 2} and {3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {16} and {17, 18}
Splitting t6 into {32, 33, 34, 35, 36} and {24, 25, 26, 27, 28}
Splitting t6 into {32, 33} and {34, 35, 36}
Splitting t6 into {32} and {33}
task, t1 2
task, t2 4
task, t3 6
task, t4 2
task, t5 5
task, t6 3
constraint, t4 before t5
constraint, t1 before t2
constraint, t2 before t6
constraint, t1 before t6
constraint, t1 same-day t5
constraint, t2 same-day t5
domain, t1 wed
domain, t5 wed
domain, t1 ends-by wed 4pm 20
domain, t4 ends-by fri 2pm 20
domain, t6 ends-by wed 4pm 20
Splitting t1 into {16} and {17}
Splitting t2 into {18} and {19}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13, 16}
Splitting t4 into {0, 1, 2} and {3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {16} and {17, 18}
Splitting t6 into {32, 33, 34, 35, 36} and {24, 25, 26, 27, 28}
Splitting t6 into {24, 25} and {26, 27, 28}
Splitting t6 into {24} and {25}
```

```
task, t1 2
task, t2 3
task, t3 3
task, t4 1
task, t5 1
task, t6 1
constraint, t3 before t6
constraint, t3 before t4
constraint, t2 before t6
domain, t2 ends-by tue 12pm 0
domain, t3 ends-by wed 1pm 0
domain, t5 ends-by wed 2pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and
{32, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t4 into {3, 4, 5, 6} and {8, 9, 10, 11}
Splitting t4 into {3, 4} and {5, 6}
Splitting t4 into {3} and {4}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and
{32, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t6 into {3, 4, 5, 6} and {8, 9, 10, 11}
Splitting t6 into {3, 4} and {5, 6}
Splitting t6 into {3} and {4}
task, t1 2
task, t2 3
task, t3 3
task, t4 1
task, t5 1
task, t6 1
constraint, t3 before t6
constraint, t3 before t4
constraint, t2 before t6
domain, t2 ends-by tue 12pm 15
domain, t3 ends-by wed 1pm 20
domain, t5 ends-by wed 2pm 15
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
```

```
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and
{32, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t4 into {3, 4, 5, 6} and {8, 9, 10, 11}
Splitting t4 into {3, 4} and {5, 6}
Splitting t4 into {3} and {4}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and
{32, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t6 into {3, 4, 5, 6} and {8, 9, 10, 11}
Splitting t6 into {3, 4} and {5, 6}
Splitting t6 into {3} and {4}
task, t1 6
task, t2 2
task, t3 1
task, t4 3
task, t5 5
task, t6 1
domain, t3 wed
domain, t1 ends-by fri 3pm 0
domain, t3 ends-by wed 2pm 0
domain, t4 ends-by fri 4pm 0
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {16, 17, 18} and {19, 20, 21, 22}
Splitting t3 into {16} and {17, 18}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
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```
Splitting t6 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t6 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t6 into {0, 1} and {2, 3}
Splitting t6 into {0} and {1}
task, t1 6
task, t2 2
task, t3 1
task, t4 3
task, t5 5
task, t6 1
domain, t3 wed
domain, t1 ends-by fri 3pm 10
domain, t3 ends-by wed 2pm 20
domain, t4 ends-by fri 4pm 15
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {16, 17, 18} and {19, 20, 21, 22}
Splitting t3 into {16} and {17, 18}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t6 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t6 into {0, 1} and {2, 3}
Splitting t6 into {0} and {1}
task, t1 3
task, t2 2
task, t3 1
task, t4 1
task, t5 5
task, t6 6
constraint, t5 before t6
constraint, t4 before t6
constraint, t2 before t5
constraint, t3 same-day t6
constraint, t1 same-day t2
domain, t2 wed
domain, t3 thu
domain, t2 ends-by wed 11am 0
domain, t3 ends-by thu 3pm 0
domain, t5 ends-by tue 2pm 0
Splitting t1 into {16, 17} and {18, 19, 20}
Splitting t1 into {16} and {17}
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Splitting t3 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t3 into {24} and {25, 26}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24}
Splitting t4 into {0, 1, 2, 3, 4} and {5, 6, 8, 9, 10, 11}
Splitting t4 into {0, 1} and {2, 3, 4}
Splitting t4 into {0} and {1}
Splitting t6 into {24} and {25}
task, t1 3
task, t2 2
task, t3 1
task, t4 1
task, t5 5
task, t6 6
constraint, t5 before t6
constraint, t4 before t6
constraint, t2 before t5
constraint, t3 same-day t6
constraint, t1 same-day t2
domain, t2 wed
domain, t3 thu
domain, t2 ends-by wed 11am 15
domain, t3 ends-by thu 3pm 5
domain, t5 ends-by tue 2pm 10
Splitting t1 into {16, 17} and {18, 19, 20}
Splitting t1 into {16} and {17}
Splitting t3 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t3 into {24} and {25, 26}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24}
Splitting t4 into {0, 1, 2, 3, 4} and {5, 6, 8, 9, 10, 11}
Splitting t4 into {0, 1} and {2, 3, 4}
Splitting t4 into {0} and {1}
Splitting t6 into {24} and {25}
task, t1 2
task, t2 5
task, t3 1
task, t4 2
task, t5 2
task, t6 4
constraint, t5 same-day t6
constraint, t1 same-day t3
domain, t4 wed
domain, t5 mon
domain, t2 ends-by tue 1pm 0
domain, t3 ends-by thu 11am 0
domain, t4 ends-by wed 1pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {16, 17, 18} and {19, 20, 21}
Splitting t4 into {16} and {17, 18}
Splitting t5 into {0, 1, 2} and {3, 4, 5}
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```
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1} and {2, 3}
Splitting t6 into {0} and {1}
task, t1 2
task, t2 5
task, t3 1
task, t4 2
task, t5 2
task, t6 4
constraint, t5 same-day t6
constraint, t1 same-day t3
domain, t4 wed
domain, t5 mon
domain, t2 ends-by tue 1pm 15
domain, t3 ends-by thu 11am 10
domain, t4 ends-by wed 1pm 10
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {16, 17, 18} and {19, 20, 21}
Splitting t4 into {16} and {17, 18}
Splitting t5 into {0, 1, 2} and {3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1} and {2, 3}
Splitting t6 into {0} and {1}
task, t1 3
task, t2 4
task, t3 6
task, t4 6
task, t5 6
task, t6 6
constraint, t3 before t6
constraint, t2 before t5
constraint, t5 before t6
constraint, t4 same-day t5
constraint, t2 same-day t6
domain, t4 tue
domain, t2 ends-by wed 4pm 0
domain, t3 ends-by thu 11am 0
domain, t6 ends-by wed 3pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t1 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
... t1 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 3
task, t2 4
task, t3 6
task, t4 6
task, t5 6
task, t6 6
constraint, t3 before t6
constraint, t2 before t5
```

```
constraint, t5 before t6
constraint, t4 same-day t5
constraint, t2 same-day t6
domain, t4 tue
domain, t2 ends-by wed 4pm 20
domain, t3 ends-by thu 11am 20
domain, t6 ends-by wed 3pm 20
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t1 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
... t1 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 1
task, t2 5
task, t3 1
task, t4 4
task, t5 4
task, t6 2
constraint, t1 before t5
constraint, t2 before t4
constraint, t5 before t6
constraint, t1 before t6
constraint, t2 before t3
constraint, t1 same-day t6
constraint, t2 same-day t6
domain, t4 mon
domain, t6 mon
domain, t1 ends-by wed 4pm 0
domain, t3 ends-by thu 12pm 0
domain, t4 ends-by mon 4pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 1
task, t2 5
task, t3 1
task, t4 4
task, t5 4
task, t6 2
constraint, t1 before t5
constraint, t2 before t4
constraint, t5 before t6
constraint, t1 before t6
constraint, t2 before t3
constraint, t1 same-day t6
constraint, t2 same-day t6
domain, t4 mon
domain, t6 mon
domain, t1 ends-by wed 4pm 10
domain, t3 ends-by thu 12pm 15
domain, t4 ends-by mon 4pm 20
No (more) solutions. Total of 1 paths expanded.
task, t1 3
task, t2 3
task, t3 4
task, t4 4
task, t5 1
task, t6 3
constraint, t1 before t3
constraint, t2 before t4
constraint, t1 before t4
constraint, t1 same-day t2
```

```
domain, t1 ends-by tue 3pm 0
domain, t3 ends-by tue 12pm 0
domain, t5 ends-by mon 3pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t3 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t3 into {32, 33} and {34, 3}
Splitting t3 into {32} and {33}
Splitting t4 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t4 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t4 into {32, 33} and {34, 3}
Splitting t4 into {32} and {33}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t6 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t6 into {0, 1, 2} and {8, 3, 4}
Splitting t6 into {0} and {1, 2}
task, t1 3
task, t2 3
task, t3 4
task, t4 4
task, t5 1
task, t6 3
constraint, t1 before t3
constraint, t2 before t4
constraint, t1 before t4
constraint, t1 same-day t2
domain, t1 ends-by tue 3pm 15
domain, t3 ends-by tue 12pm 15
domain, t5 ends-by mon 3pm 5
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t3 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t3 into {32, 33} and {34, 3}
Splitting t3 into {34} and {3}
Splitting t4 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t4 into {32, 33, 34, 3} and {8, 9, 10, 35}
```

```
Splitting t4 into {32, 33} and {34, 3}
Splitting t4 into {32} and {33}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t6 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t6 into {0, 1, 2} and {8, 3, 4}
Splitting t6 into {0} and {1, 2}
task, t1 5
task, t2 2
task, t3 3
task, t4 3
task, t5 3
task, t6 6
constraint, t2 before t6
constraint, t1 before t5
domain, t1 ends-by fri 4pm 0
domain, t2 ends-by thu 1pm 0
domain, t6 ends-by wed 11am 0
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t5 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t5 into {8, 9} and {10, 11, 12}
Splitting t5 into {8} and {9}
Splitting t6 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t6 into {32, 33} and {8, 9}
Splitting t6 into {32} and {33}
task, t1 5
task, t2 2
task, t3 3
task, t4 3
task, t5 3
task, t6 6
constraint, t2 before t6
constraint, t1 before t5
domain, t1 ends-by fri 4pm 20
```

```
domain, t2 ends-by thu 1pm 15
domain, t6 ends-by wed 11am 20
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t5 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t5 into {8, 9} and {10, 11, 12}
Splitting t5 into {8} and {9}
Splitting t6 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t6 into {32, 33} and {8, 9}
Splitting t6 into {8} and {9}
task, t1 6
task, t2 3
task, t3 3
task, t4 5
task, t5 5
task, t6 5
constraint, t5 same-day t6
constraint, t1 same-day t6
domain, t2 tue
domain, t3 thu
domain, t1 ends-by tue 4pm 0
domain, t4 ends-by fri 4pm 0
domain, t5 ends-by tue 12pm 0
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9} and {10, 11, 12}
Splitting t2 into {8} and {9}
Splitting t3 into {24, 25} and {26, 27, 28}
Splitting t3 into {24} and {25}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0} and {1, 2}
task, t1 6
task, t2 3
task, t3 3
task, t4 5
task, t5 5
task, t6 5
constraint, t5 same-day t6
```

```
constraint, t1 same-day t6
domain, t2 tue
domain, t3 thu
domain, t1 ends-by tue 4pm 20
domain, t4 ends-by fri 4pm 5
domain, t5 ends-by tue 12pm 20
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9} and {10, 11, 12}
Splitting t2 into {8} and {9}
Splitting t3 into {24, 25} and {26, 27, 28}
Splitting t3 into {24} and {25}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0} and {1, 2}
task, t1 1
task, t2 4
task, t3 6
task, t4 4
task, t5 3
task, t6 3
constraint, t3 before t5
constraint, t2 before t6
constraint, t2 before t5
constraint, t1 same-day t4
domain, t4 fri
domain, t1 ends-by fri 1pm 0
domain, t2 ends-by mon 11am 0
domain, t5 ends-by mon 4pm 0
Splitting t1 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t1 into {32} and {33, 34}
Splitting t2 into {0, 1, 2, 3, 32, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 26,
27}
Splitting t2 into {0, 1, 2, 3} and {32, 8, 10, 9}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {0, 1} and {8, 9}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t5 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t5 into {8, 9} and {10, 11, 12}
Splitting t5 into {8} and {9}
Splitting t6 into {4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 36,
20, 24, 25, 26, 27, 28}
Splitting t6 into {4, 8, 9, 10, 11} and {12, 16, 17, 18, 19}
Splitting t6 into {8, 4} and {9, 10, 11}
Splitting t6 into {8} and {4}
task, t1 1
task, t2 4
task, t3 6
task, t4 4
task, t5 3
task, t6 3
```

```
constraint, t3 before t5
constraint, t2 before t6
constraint, t2 before t5
constraint, t1 same-day t4
domain, t4 fri
domain, t1 ends-by fri 1pm 15
domain, t2 ends-by mon 11am 10
domain, t5 ends-by mon 4pm 20
Splitting t1 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t1 into {32} and {33, 34}
Splitting t2 into {0, 1, 2, 3, 32, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 26,
27}
Splitting t2 into {0, 1, 2, 3} and {32, 8, 10, 9}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {0, 1} and {8, 9}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t5 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t5 into {8, 9} and {10, 11, 12}
Splitting t5 into {8} and {9}
Splitting t6 into {4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 36,
20, 24, 25, 26, 27, 28}
Splitting t6 into {4, 8, 9, 10, 11} and {12, 16, 17, 18, 19}
Splitting t6 into {8, 4} and {9, 10, 11}
Splitting t6 into {8} and {4}
task, t1 1
task, t2 3
task, t3 1
task, t4 3
task, t5 4
task, t6 2
constraint, t1 before t3
constraint, t3 same-day t6
domain, t2 wed
domain, t3 ends-by fri 2pm 0
domain, t5 ends-by thu 3pm 0
domain, t6 ends-by mon 4pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17} and {18, 19, 20}
Splitting t2 into {16} and {17}
Splitting t3 into {1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} an
d {32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {1, 2, 3, 4, 5, 6, 8, 9} and {10, 11, 12, 13, 14, 16, 17, 18, 1
9}
Splitting t3 into {1, 2, 3, 4} and {8, 9, 5, 6}
Splitting t3 into {1, 2} and {3, 4}
Splitting t3 into {1} and {2}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
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```
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2} and {3, 4, 5}
Splitting t6 into {0} and {1, 2}
task, t1 1
task, t2 3
task, t3 1
task, t4 3
task, t5 4
task, t6 2
constraint, t1 before t3
constraint, t3 same-day t6
domain, t2 wed
domain, t3 ends-by fri 2pm 10
domain, t5 ends-by thu 3pm 10
domain, t6 ends-by mon 4pm 10
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17} and {18, 19, 20}
Splitting t2 into {16} and {17}
Splitting t3 into {1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} an
d {32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {1, 2, 3, 4, 5, 6, 8, 9} and {10, 11, 12, 13, 14, 16, 17, 18, 1
9}
Splitting t3 into {1, 2, 3, 4} and {8, 9, 5, 6}
Splitting t3 into {1, 2} and {3, 4}
Splitting t3 into {1} and {2}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2} and {3, 4, 5}
Splitting t6 into {0} and {1, 2}
task, t1 6
task, t2 5
task, t3 1
task, t4 3
task, t5 1
task, t6 2
constraint, t1 before t6
constraint, t1 before t2
constraint, t2 before t4
constraint, t5 before t6
```

```
domain, t1 wed
domain, t2 mon
domain, t1 ends-by wed 3pm 0
domain, t2 ends-by mon 2pm 0
domain, t6 ends-by wed 2pm 0
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
... t3 in {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} has no solu
tion
... t3 in {32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 3
0} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 5
task, t3 1
task, t4 3
task, t5 1
task, t6 2
constraint, t1 before t6
constraint, t1 before t2
constraint, t2 before t4
constraint, t5 before t6
domain, t1 wed
domain, t2 mon
domain, t1 ends-by wed 3pm 10
domain, t2 ends-by mon 2pm 5
domain, t6 ends-by wed 2pm 5
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
... t3 in {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} has no solu
tion
... t3 in {32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 3
0} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 6
task, t3 2
task, t4 3
task, t5 1
task, t6 4
task, t7 1
task, t8 4
constraint, t5 before t6
constraint, t4 before t7
constraint, t3 before t6
constraint, t2 before t3
constraint, t7 before t8
constraint, t1 same-day t3
domain, t3 fri
domain, t2 ends-by tue 3pm 0
domain, t3 ends-by fri 2pm 0
domain, t6 ends-by mon 12pm 0
domain, t7 ends-by wed 1pm 0
Splitting t1 into {32} and {33, 34}
Splitting t2 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {32} and {33}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
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```
Splitting t4 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t4 into {0, 1} and {2, 3, 4}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 34, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t5 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {34} and {35}
Splitting t7 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and {32, 33,
34, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t7 into {3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18}
Splitting t7 into {3, 4, 5} and {8, 9, 10, 6}
Splitting t7 into {3} and {4, 5}
Splitting t8 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t8 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t8 into {32, 33} and {34, 35}
Splitting t8 into {32} and {33}
task, t1 5
task, t2 6
task, t3 2
task, t4 3
task, t5 1
task, t6 4
task, t7 1
task, t8 4
constraint, t5 before t6
constraint, t4 before t7
constraint, t3 before t6
constraint, t2 before t3
constraint, t7 before t8
constraint, t1 same-day t3
domain, t3 fri
domain, t2 ends-by tue 3pm 15
domain, t3 ends-by fri 2pm 20
domain, t6 ends-by mon 12pm 10
domain, t7 ends-by wed 1pm 10
Splitting t1 into {32} and {33, 34}
Splitting t2 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {32} and {33}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t4 into {0, 1} and {2, 3, 4}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 34, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t5 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {34} and {35}
Splitting t7 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and {32, 33,
34, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t7 into {3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18}
Splitting t7 into {3, 4, 5} and {8, 9, 10, 6}
Splitting t7 into {3} and {4, 5}
Splitting t8 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
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27}
Splitting t8 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t8 into {32, 33} and {34, 35}
Splitting t8 into {32} and {33}
task, t1 2
task, t2 3
task, t3 2
task, t4 2
task, t5 4
task, t6 4
task, t7 3
task, t8 5
constraint, t3 before t8
constraint, t2 before t3
constraint, t3 before t5
constraint, t2 before t5
constraint, t1 before t5
constraint, t4 before t6
constraint, t1 before t8
constraint, t1 before t4
constraint, t1 before t3
constraint, t1 same-day t6
constraint, t3 same-day t8
domain, t5 fri
domain, t1 ends-by fri 2pm 0
domain, t5 ends-by fri 11am 0
domain, t6 ends-by thu 4pm 0
domain, t7 ends-by fri 11am 0
Splitting t7 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t7 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
... t7 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 3
task, t3 2
task, t4 2
task, t5 4
task, t6 4
task, t7 3
task, t8 5
constraint, t3 before t8
constraint, t2 before t3
constraint, t3 before t5
constraint, t2 before t5
constraint, t1 before t5
constraint, t4 before t6
constraint, t1 before t8
constraint, t1 before t4
constraint, t1 before t3
constraint, t1 same-day t6
constraint, t3 same-day t8
domain, t5 fri
domain, t1 ends-by fri 2pm 10
domain, t5 ends-by fri 11am 15
domain, t6 ends-by thu 4pm 5
domain, t7 ends-by fri 11am 10
Splitting t7 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t7 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
```

```
... t7 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 4
task, t3 1
task, t4 4
task, t5 6
task, t6 4
task, t7 4
task, t8 1
constraint, t2 same-day t7
domain, t1 ends-by tue 2pm 0
domain, t2 ends-by fri 4pm 0
domain, t3 ends-by wed 4pm 0
domain, t5 ends-by thu 1pm 0
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t6 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t6 into {0, 1} and {8, 2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1} and {2, 3}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t8 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t8 into {0, 1} and {2, 3}
Splitting t8 into {0} and {1}
task, t1 6
task, t2 4
task, t3 1
task, t4 4
task, t5 6
task, t6 4
task, t7 4
task, t8 1
```

```
constraint, t2 same-day t7
domain, t1 ends-by tue 2pm 15
domain, t2 ends-by fri 4pm 15
domain, t3 ends-by wed 4pm 5
domain, t5 ends-by thu 1pm 10
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t6 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t6 into {0, 1} and {8, 2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1} and {2, 3}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t8 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t8 into {0, 1} and {2, 3}
Splitting t8 into {0} and {1}
task, t1 3
task, t2 6
task, t3 5
task, t4 3
task, t5 5
task, t6 6
task, t7 2
task, t8 4
constraint, t4 before t7
constraint, t1 before t5
constraint, t1 before t6
constraint, t6 before t7
constraint, t6 before t8
constraint, t1 before t8
domain, t7 wed
domain, t1 ends-by tue 2pm 0
domain, t2 ends-by thu 11am 0
domain, t4 ends-by wed 12pm 0
```

```
domain, t5 ends-by mon 2pm 0
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t5 into {32, 33, 34} and {8, 9, 10}
Splitting t5 into {32} and {33, 34}
Splitting t6 into {8} and {9}
Splitting t7 into {16, 17, 18} and {19, 20, 21}
Splitting t7 into {16} and {17, 18}
Splitting t8 into {32, 33, 34, 35, 16, 17} and {18, 19, 24, 25, 26, 27}
Splitting t8 into {32, 33, 34} and {16, 17, 35}
Splitting t8 into {32} and {33, 34}
task, t1 3
task, t2 6
task, t3 5
task, t4 3
task, t5 5
task, t6 6
task, t7 2
task, t8 4
constraint, t4 before t7
constraint, t1 before t5
constraint, t1 before t6
constraint, t6 before t7
constraint, t6 before t8
constraint, t1 before t8
domain, t7 wed
domain, t1 ends-by tue 2pm 5
domain, t2 ends-by thu 11am 20
domain, t4 ends-by wed 12pm 20
domain, t5 ends-by mon 2pm 5
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t5 into {32, 33, 34} and {8, 9, 10}
Splitting t5 into {8} and {9, 10}
Splitting t6 into {8} and {9}
Splitting t7 into {16, 17, 18} and {19, 20, 21}
Splitting t7 into {16} and {17, 18}
Splitting t8 into {32, 33, 34, 35, 16, 17} and {18, 19, 24, 25, 26, 27}
Splitting t8 into {32, 33, 34} and {16, 17, 35}
Splitting t8 into {32} and {33, 34}
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```
task, t1 3
task, t2 5
task, t3 4
task, t4 5
task, t5 6
task, t6 4
task, t7 4
task, t8 3
constraint, t5 before t7
constraint, t2 before t6
constraint, t1 same-day t5
constraint, t2 same-day t3
domain, t2 ends-by tue 4pm 0
domain, t3 ends-by thu 12pm 0
domain, t4 ends-by wed 12pm 0
domain, t5 ends-by wed 1pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {8, 9, 10}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0} and {1}
Splitting t6 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t6 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t6 into {32, 33} and {34, 35}
Splitting t6 into {32} and {33}
Splitting t7 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t7 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t7 into {32, 33} and {34, 35}
Splitting t7 into {32} and {33}
Splitting t8 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t8 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t8 into {0, 1, 2} and {8, 3, 4}
Splitting t8 into {0} and {1, 2}
task, t1 3
task, t2 5
task, t3 4
task, t4 5
task, t5 6
task, t6 4
task, t7 4
task, t8 3
constraint, t5 before t7
constraint, t2 before t6
constraint, t1 same-day t5
constraint, t2 same-day t3
domain, t2 ends-by tue 4pm 15
domain, t3 ends-by thu 12pm 10
domain, t4 ends-by wed 12pm 20
```

```
domain, t5 ends-by wed 1pm 20
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {8, 9, 10}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0} and {1}
Splitting t6 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t6 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t6 into {32, 33} and {34, 35}
Splitting t6 into {32} and {33}
Splitting t7 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t7 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t7 into {32, 33} and {34, 35}
Splitting t7 into {32} and {33}
Splitting t8 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t8 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t8 into {0, 1, 2} and {8, 3, 4}
Splitting t8 into {0} and {1, 2}
task, t1 5
task, t2 2
task, t3 1
task, t4 4
task, t5 3
task, t6 5
task, t7 4
task, t8 2
constraint, t4 before t8
constraint, t3 before t7
constraint, t1 before t8
constraint, t1 before t6
constraint, t2 before t6
constraint, t1 before t2
constraint, t3 before t5
constraint, t6 before t8
constraint, t5 before t8
constraint, t2 same-day t3
constraint, t2 same-day t6
domain, t1 tue
domain, t6 mon
domain, t1 ends-by tue 11am 0
domain, t4 ends-by mon 4pm 0
domain, t5 ends-by tue 11am 0
domain, t8 ends-by mon 3pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 2
task, t3 1
task, t4 4
```

```
task, t5 3
task, t6 5
task, t7 4
task, t8 2
constraint, t4 before t8
constraint, t3 before t7
constraint, t1 before t8
constraint, t1 before t6
constraint, t2 before t6
constraint, t1 before t2
constraint, t3 before t5
constraint, t6 before t8
constraint, t5 before t8
constraint, t2 same-day t3
constraint, t2 same-day t6
domain, t1 tue
domain, t6 mon
domain, t1 ends-by tue 11am 10
domain, t4 ends-by mon 4pm 20
domain, t5 ends-by tue 11am 20
domain, t8 ends-by mon 3pm 10
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 2
task, t3 4
task, t4 4
task, t5 4
task, t6 1
task, t7 4
task, t8 2
constraint, t1 before t8
constraint, t1 before t7
constraint, t2 before t5
constraint, t2 before t3
constraint, t4 before t8
constraint, t7 before t8
constraint, t1 before t5
constraint, t5 before t7
constraint, t6 same-day t7
constraint, t1 same-day t8
domain, t1 fri
domain, t2 ends-by thu 12pm 0
domain, t4 ends-by thu 2pm 0
domain, t7 ends-by tue 2pm 0
domain, t8 ends-by wed 4pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 2
task, t3 4
task, t4 4
task, t5 4
task, t6 1
task, t7 4
task, t8 2
constraint, t1 before t8
constraint, t1 before t7
constraint, t2 before t5
constraint, t2 before t3
constraint, t4 before t8
constraint, t7 before t8
```

```
constraint, t1 before t5
constraint, t5 before t7
constraint, t6 same-day t7
constraint, t1 same-day t8
domain, t1 fri
domain, t2 ends-by thu 12pm 15
domain, t4 ends-by thu 2pm 10
domain, t7 ends-by tue 2pm 15
domain, t8 ends-by wed 4pm 20
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 2
task, t3 5
task, t4 6
task, t5 1
task, t6 2
task, t7 3
task, t8 5
constraint, t7 before t8
constraint, t5 before t7
constraint, t2 before t5
constraint, t3 before t4
constraint, t6 before t8
constraint, t2 before t7
constraint, t2 before t4
constraint, t3 before t7
constraint, t4 before t5
domain, t3 ends-by thu 2pm 0
domain, t4 ends-by thu 11am 0
domain, t5 ends-by tue 11am 0
domain, t6 ends-by thu 2pm 0
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {8, 9, 10}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8, 9} and {16, 17}
Splitting t4 into {8} and {9}
Splitting t5 into {14, 16, 17, 18, 19, 20} and {21, 22, 24, 25, 26, 27}
Splitting t5 into {16, 17, 14} and {18, 19, 20}
Splitting t5 into {16} and {17, 14}
Splitting t6 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t6 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t6 into {0, 1, 2} and {3, 4, 5}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {17, 18, 19, 20} and {24, 25, 26, 27, 28}
Splitting t7 into {17, 18} and {19, 20}
Splitting t7 into {17} and {18}
Splitting t8 into {32, 33, 34} and {24, 25, 26}
Splitting t8 into {32} and {33, 34}
task, t1 5
task, t2 2
task, t3 5
task, t4 6
task, t5 1
task, t6 2
```

```
task, t7 3
task, t8 5
constraint, t7 before t8
constraint, t5 before t7
constraint, t2 before t5
constraint, t3 before t4
constraint, t6 before t8
constraint, t2 before t7
constraint, t2 before t4
constraint, t3 before t7
constraint, t4 before t5
domain, t3 ends-by thu 2pm 15
domain, t4 ends-by thu 11am 10
domain, t5 ends-by tue 11am 10
domain, t6 ends-by thu 2pm 10
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {8, 9, 10}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8, 9} and {16, 17}
Splitting t4 into {8} and {9}
Splitting t5 into {14, 16, 17, 18, 19, 20} and {21, 22, 24, 25, 26, 27}
Splitting t5 into {16, 17, 14} and {18, 19, 20}
Splitting t5 into {16} and {17, 14}
Splitting t5 into {17} and {14}
Splitting t6 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t6 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t6 into {0, 1, 2} and {3, 4, 5}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {16, 17, 18, 19, 20} and {24, 25, 26, 27, 28}
Splitting t7 into {16, 17} and {18, 19, 20}
Splitting t7 into {16} and {17}
Splitting t8 into {32, 33, 34} and {24, 25, 26}
Splitting t8 into {32} and {33, 34}
task, t1 3
task, t2 6
task, t3 1
task, t4 1
task, t5 4
task, t6 2
task, t7 1
task, t8 4
constraint, t2 before t7
constraint, t5 before t6
constraint, t5 before t8
constraint, t1 same-day t3
constraint, t6 same-day t8
domain, t6 thu
domain, t1 ends-by tue 12pm 0
domain, t4 ends-by mon 4pm 0
domain, t5 ends-by tue 11am 0
domain, t8 ends-by wed 2pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
```

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Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 8, 9} and {10, 11, 16, 17, 18, 19}
Splitting t5 into {0, 1, 2} and {8, 9, 3}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {24, 25, 26} and {27, 28, 29}
Splitting t6 into {24} and {25, 26}
Splitting t7 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t7 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t7 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t7 into {8} and {9, 6}
Splitting t8 into {24, 25} and {26, 27}
Splitting t8 into {24} and {25}
task, t1 3
task, t2 6
task, t3 1
task, t4 1
task, t5 4
task, t6 2
task, t7 1
task, t8 4
constraint, t2 before t7
constraint, t5 before t6
constraint, t5 before t8
constraint, t1 same-day t3
constraint, t6 same-day t8
domain, t6 thu
domain, t1 ends-by tue 12pm 5
domain, t4 ends-by mon 4pm 20
domain, t5 ends-by tue 11am 15
domain, t8 ends-by wed 2pm 5
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
```

```
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 8, 9} and {10, 11, 16, 17, 18, 19}
Splitting t5 into {0, 1, 2} and {8, 9, 3}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {24, 25, 26} and {27, 28, 29}
Splitting t6 into {24} and {25, 26}
Splitting t7 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t7 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t7 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t7 into {8} and {9, 6}
Splitting t8 into {24, 25} and {26, 27}
Splitting t8 into {24} and {25}
task, t1 3
task, t2 3
task, t3 3
task, t4 5
task, t5 6
task, t6 2
task, t7 6
task, t8 5
constraint, t4 before t8
constraint, t1 before t4
constraint, t4 before t6
constraint, t1 before t5
constraint, t2 before t3
domain, t6 mon
domain, t1 ends-by mon 12pm 0
domain, t2 ends-by tue 3pm 0
domain, t3 ends-by thu 11am 0
domain, t5 ends-by fri 3pm 0
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 17, 18, 19,
20, 24, 25, 26, 27, 28}
... t2 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} has no solution
... t2 in {32, 33, 17, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 3
task, t2 3
task, t3 3
task, t4 5
task, t5 6
task, t6 2
task, t7 6
task, t8 5
constraint, t4 before t8
constraint, t1 before t4
constraint, t4 before t6
constraint, t1 before t5
constraint, t2 before t3
domain, t6 mon
domain, t1 ends-by mon 12pm 15
domain, t2 ends-by tue 3pm 15
domain, t3 ends-by thu 11am 20
domain, t5 ends-by fri 3pm 20
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 17, 18, 19,
20, 24, 25, 26, 27, 28}
... t2 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} has no solution
... t2 in {32, 33, 17, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 1
```

```
task, t2 1
task, t3 5
task, t4 4
task, t5 3
task, t6 2
task, t7 3
task, t8 2
constraint, t5 before t8
constraint, t2 before t3
constraint, t3 before t7
constraint, t3 before t6
constraint, t4 same-day t5
domain, t5 wed
domain, t1 ends-by tue 4pm 0
domain, t4 ends-by tue 12pm 0
domain, t7 ends-by tue 1pm 0
domain, t8 ends-by tue 3pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25}
Splitting t2 into {0, 1, 2, 3, 4} and {5, 6, 8, 9, 10, 11}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {1, 2} and {8, 9, 10}
Splitting t3 into {1} and {2}
Splitting t4 into {16, 17} and {18, 19}
Splitting t4 into {16} and {17}
Splitting t5 into {16, 17} and {18, 19, 20}
Splitting t5 into {16} and {17}
Splitting t6 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21} and {32, 33, 34,
35, 36, 37, 24, 25, 26, 27, 28, 29}
Splitting t6 into {8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 20, 21}
Splitting t6 into {8, 9, 10} and {11, 12, 13}
Splitting t6 into {8} and {9, 10}
Splitting t7 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t7 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t7 into {8, 9} and {10, 11, 12}
Splitting t7 into {8} and {9}
Splitting t8 into {32, 33, 34, 35, 36, 37, 19} and {20, 21, 24, 25, 26, 27, 28, 2
9}
Splitting t8 into {32, 33, 34} and {19, 35, 36, 37}
Splitting t8 into {32} and {33, 34}
task, t1 1
task, t2 1
task, t3 5
task, t4 4
task, t5 3
task, t6 2
task, t7 3
task, t8 2
constraint, t5 before t8
constraint, t2 before t3
```

```
constraint, t3 before t7
constraint, t3 before t6
constraint, t4 same-day t5
domain, t5 wed
domain, t1 ends-by tue 4pm 15
domain, t4 ends-by tue 12pm 10
domain, t7 ends-by tue 1pm 10
domain, t8 ends-by tue 3pm 15
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25}
Splitting t2 into {0, 1, 2, 3, 4} and {5, 6, 8, 9, 10, 11}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {1, 2} and {8, 9, 10}
Splitting t3 into {1} and {2}
Splitting t4 into {16, 17} and {18, 19}
Splitting t4 into {16} and {17}
Splitting t5 into {16, 17} and {18, 19, 20}
Splitting t5 into {16} and {17}
Splitting t6 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21} and {32, 33, 34,
35, 36, 37, 24, 25, 26, 27, 28, 29}
Splitting t6 into {8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 20, 21}
Splitting t6 into {8, 9, 10} and {11, 12, 13}
Splitting t6 into {8} and {9, 10}
Splitting t7 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t7 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t7 into {8, 9} and {10, 11, 12}
Splitting t7 into {8} and {9}
Splitting t8 into {32, 33, 34, 35, 36, 37, 19} and {20, 21, 24, 25, 26, 27, 28, 2
9}
Splitting t8 into {32, 33, 34} and {19, 35, 36, 37}
Splitting t8 into {35, 19} and {36, 37}
Splitting t8 into {35} and {19}
task, t1 5
task, t2 1
task, t3 2
task, t4 2
task, t5 6
task, t6 4
task, t7 6
task, t8 2
constraint, t1 before t3
constraint, t2 before t8
constraint, t5 before t6
constraint, t4 before t6
constraint, t2 before t6
constraint, t4 before t7
constraint, t6 before t8
constraint, t5 before t7
domain, t1 fri
domain, t5 tue
```

```
domain, t3 ends-by wed 3pm 0
domain, t6 ends-by tue 11am 0
domain, t7 ends-by tue 3pm 0
domain, t8 ends-by wed 2pm 0
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t4 into {0, 1, 2} and {3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {8} and {9}
Splitting t6 into {32, 33, 16, 17, 18} and {19, 24, 25, 26, 27}
Splitting t6 into {32, 33} and {16, 17, 18}
Splitting t6 into {32} and {33}
Splitting t7 into {32, 33, 16} and {24, 17, 25}
Splitting t7 into {32} and {16, 33}
Splitting t8 into {36} and {37}
task, t1 5
task, t2 1
task, t3 2
task, t4 2
task, t5 6
task, t6 4
task, t7 6
task, t8 2
constraint, t1 before t3
constraint, t2 before t8
constraint, t5 before t6
constraint, t4 before t6
constraint, t2 before t6
constraint, t4 before t7
constraint, t6 before t8
constraint, t5 before t7
domain, t1 fri
domain, t5 tue
domain, t3 ends-by wed 3pm 15
domain, t6 ends-by tue 11am 20
domain, t7 ends-by tue 3pm 20
domain, t8 ends-by wed 2pm 15
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t4 into {0, 1, 2} and {3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {8} and {9}
Splitting t6 into {32, 33, 16, 17, 18} and {19, 24, 25, 26, 27}
Splitting t6 into {32, 33} and {16, 17, 18}
Splitting t6 into {16} and {17, 18}
Splitting t7 into {32, 33, 16} and {24, 17, 25}
Splitting t7 into {32} and {16, 33}
Splitting t7 into {16} and {33}
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Splitting t8 into {32, 33, 34, 35, 36, 37, 20} and {21, 24, 25, 26, 27, 28, 29}
Splitting t8 into {32, 33, 34} and {20, 35, 36, 37}
Splitting t8 into {35, 20} and {36, 37}
Splitting t8 into {35} and {20}
task, t1 4
task, t2 2
task, t3 4
task, t4 3
task, t5 6
task, t6 3
task, t7 3
task, t8 6
constraint, t3 before t5
constraint, t1 before t2
constraint, t1 before t3
constraint, t2 same-day t5
domain, t2 fri
domain, t1 ends-by tue 11am 0
domain, t6 ends-by wed 4pm 0
domain, t7 ends-by thu 12pm 0
domain, t8 ends-by tue 12pm 0
Splitting t1 into {0, 1, 2, 3, 8, 9} and {10, 11, 16, 17, 18, 19}
Splitting t1 into {0, 1, 2} and {8, 9, 3}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 34} and {35, 36, 37}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {8, 9, 10, 11, 16, 17} and {18, 19, 24, 25, 26, 27}
Splitting t3 into {8, 9, 10} and {16, 17, 11}
Splitting t3 into {8} and {9, 10}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32} and {33}
Splitting t6 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t6 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t6 into {0, 1, 2} and {8, 3, 4}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t7 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t7 into {0, 1, 2} and {8, 3, 4}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t8 into {0, 1} and {32, 33, 8}
Splitting t8 into {0} and {1}
task, t1 4
task, t2 2
task, t3 4
task, t4 3
task, t5 6
task, t6 3
task, t7 3
task, t8 6
constraint, t3 before t5
constraint, t1 before t2
constraint, t1 before t3
constraint, t2 same-day t5
```

```
domain, t2 fri
domain, t1 ends-by tue 11am 15
domain, t6 ends-by wed 4pm 10
domain, t7 ends-by thu 12pm 15
domain, t8 ends-by tue 12pm 20
Splitting t1 into {0, 1, 2, 3, 8, 9} and {10, 11, 16, 17, 18, 19}
Splitting t1 into {0, 1, 2} and {8, 9, 3}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 34} and {35, 36, 37}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {8, 9, 10, 11, 16, 17} and {18, 19, 24, 25, 26, 27}
Splitting t3 into {8, 9, 10} and {16, 17, 11}
Splitting t3 into {8} and {9, 10}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32} and {33}
Splitting t6 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t6 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t6 into {0, 1, 2} and {8, 3, 4}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t7 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t7 into {0, 1, 2} and {8, 3, 4}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t8 into {0, 1} and {32, 33, 8}
Splitting t8 into {0} and {1}
task, t1 6
task, t2 2
task, t3 5
task, t4 5
task, t5 5
task, t6 4
task, t7 5
task, t8 6
constraint, t2 before t7
constraint, t5 before t6
constraint, t4 before t8
constraint, t2 before t8
constraint, t5 same-day t8
constraint, t4 same-day t7
domain, t5 mon
domain, t1 ends-by mon 11am 0
domain, t5 ends-by mon 11am 0
domain, t6 ends-by thu 2pm 0
domain, t7 ends-by wed 4pm 0
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
... t1 in {0, 1, 32, 33, 8} has no solution
... t1 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 2
task, t3 5
task, t4 5
task, t5 5
```

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task, t6 4
task, t7 5
task, t8 6
constraint, t2 before t7
constraint, t5 before t6
constraint, t4 before t8
constraint, t2 before t8
constraint, t5 same-day t8
constraint, t4 same-day t7
domain, t5 mon
domain, t1 ends-by mon 11am 5
domain, t5 ends-by mon 11am 20
domain, t6 ends-by thu 2pm 5
domain, t7 ends-by wed 4pm 10
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
... t1 in {0, 1, 32, 33, 8} has no solution
... t1 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 1
task, t2 6
task, t3 4
task, t4 6
task, t5 5
task, t6 6
task, t7 2
task, t8 1
constraint, t1 before t7
constraint, t6 before t7
constraint, t2 before t3
constraint, t7 before t8
constraint, t2 before t7
constraint, t5 before t7
constraint, t2 same-day t4
constraint, t5 same-day t6
domain, t2 mon
domain, t4 ends-by fri 2pm 0
domain, t6 ends-by fri 11am 0
domain, t7 ends-by tue 4pm 0
domain, t8 ends-by fri 1pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t3 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {8, 9, 10}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0} and {1}
Splitting t7 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34, 35,
36, 21, 24, 25, 26, 27, 28, 29}
Splitting t7 into {8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t7 into {8, 9} and {10, 11, 12}
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Splitting t7 into {8} and {9}
Splitting t8 into {10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 24} and {32, 3
3, 34, 35, 36, 37, 38, 25, 26, 27, 28, 29, 30}
Splitting t8 into {10, 11, 12, 13, 14, 16} and {17, 18, 19, 20, 21, 22, 24}
Splitting t8 into {10, 11, 12} and {16, 13, 14}
Splitting t8 into {10} and {11, 12}
task, t1 1
task, t2 6
task, t3 4
task, t4 6
task, t5 5
task, t6 6
task, t7 2
task, t8 1
constraint, t1 before t7
constraint, t6 before t7
constraint, t2 before t3
constraint, t7 before t8
constraint, t2 before t7
constraint, t5 before t7
constraint, t2 same-day t4
constraint, t5 same-day t6
domain, t2 mon
domain, t4 ends-by fri 2pm 20
domain, t6 ends-by fri 11am 10
domain, t7 ends-by tue 4pm 20
domain, t8 ends-by fri 1pm 10
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t3 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {8, 9, 10}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0} and {1}
Splitting t7 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34, 35,
36, 21, 24, 25, 26, 27, 28, 29}
Splitting t7 into {8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t7 into {8, 9} and {10, 11, 12}
Splitting t7 into {8} and {9}
Splitting t8 into {10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 24} and {32, 3
3, 34, 35, 36, 37, 38, 25, 26, 27, 28, 29, 30}
Splitting t8 into {10, 11, 12, 13, 14, 16} and {17, 18, 19, 20, 21, 22, 24}
Splitting t8 into {10, 11, 12} and {16, 13, 14}
Splitting t8 into {10} and {11, 12}
task, t1 1
task, t2 2
task, t3 2
task, t4 1
task, t5 4
task, t6 6
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```
task, t7 5
task, t8 1
constraint, t6 before t8
constraint, t3 before t8
constraint, t3 before t4
constraint, t6 before t7
constraint, t2 before t3
constraint, t1 before t6
constraint, t1 same-day t7
constraint, t1 same-day t5
domain, t3 thu
domain, t7 wed
domain, t1 ends-by fri 3pm 0
domain, t2 ends-by fri 2pm 0
domain, t4 ends-by fri 1pm 0
domain, t8 ends-by fri 4pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 1
task, t2 2
task, t3 2
task, t4 1
task, t5 4
task, t6 6
task, t7 5
task, t8 1
constraint, t6 before t8
constraint, t3 before t8
constraint, t3 before t4
constraint, t6 before t7
constraint, t2 before t3
constraint, t1 before t6
constraint, t1 same-day t7
constraint, t1 same-day t5
domain, t3 thu
domain, t7 wed
domain, t1 ends-by fri 3pm 10
domain, t2 ends-by fri 2pm 15
domain, t4 ends-by fri 1pm 20
domain, t8 ends-by fri 4pm 10
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 4
task, t3 4
task, t4 2
task, t5 3
task, t6 4
task, t7 3
task, t8 2
constraint, t1 before t2
constraint, t1 before t7
constraint, t2 before t5
constraint, t5 before t6
constraint, t3 before t6
constraint, t7 before t8
constraint, t1 before t5
constraint, t1 before t3
constraint, t3 before t7
domain, t6 thu
domain, t1 ends-by wed 12pm 0
domain, t6 ends-by thu 4pm 0
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domain, t7 ends-by wed 3pm 0
domain, t8 ends-by thu 1pm 0
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {8, 9, 10, 11} and {16, 17, 18, 19}
Splitting t2 into {8, 9} and {10, 11}
Splitting t2 into {8} and {9}
Splitting t3 into {8, 9, 10, 11} and {16, 17, 18, 19}
Splitting t3 into {8, 9} and {10, 11}
Splitting t3 into {8} and {9}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {16, 17, 12} and {24, 18, 19, 20}
Splitting t5 into {16} and {17, 12}
Splitting t6 into {24, 25} and {26, 27}
Splitting t6 into {24} and {25}
Splitting t7 into {32, 33, 34, 12, 16, 17, 18} and {19, 20, 24, 25, 26, 27, 28}
Splitting t7 into {32, 33, 34} and {16, 17, 18, 12}
Splitting t7 into {32} and {33, 34}
Splitting t8 into {35} and {36, 37}
task, t1 5
task, t2 4
task, t3 4
task, t4 2
task, t5 3
task, t6 4
task, t7 3
task, t8 2
constraint, t1 before t2
constraint, t1 before t7
constraint, t2 before t5
constraint, t5 before t6
constraint, t3 before t6
constraint, t7 before t8
constraint, t1 before t5
constraint, t1 before t3
constraint, t3 before t7
domain, t6 thu
domain, t1 ends-by wed 12pm 15
domain, t6 ends-by thu 4pm 20
domain, t7 ends-by wed 3pm 20
domain, t8 ends-by thu 1pm 10
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {8, 9, 10, 11} and {16, 17, 18, 19}
Splitting t2 into {8, 9} and {10, 11}
Splitting t2 into {8} and {9}
Splitting t3 into {8, 9, 10, 11} and {16, 17, 18, 19}
Splitting t3 into {8, 9} and {10, 11}
Splitting t3 into {8} and {9}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {16, 17, 12} and {24, 18, 19, 20}
Splitting t5 into {16} and {17, 12}
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Splitting t6 into {24, 25} and {26, 27}
Splitting t6 into {24} and {25}
Splitting t7 into {32, 33, 34, 12, 16, 17, 18} and {19, 20, 24, 25, 26, 27, 28}
Splitting t7 into {32, 33, 34} and {16, 17, 18, 12}
Splitting t7 into {16, 17} and {18, 12}
Splitting t7 into {16} and {17}
Splitting t8 into {32, 33, 34, 35, 36, 37, 19} and {20, 21, 24, 25, 26, 27, 28, 2
9}
Splitting t8 into {32, 33, 34} and {19, 35, 36, 37}
Splitting t8 into {35, 19} and {36, 37}
Splitting t8 into {35} and {19}
task, t1 6
task, t2 1
task, t3 6
task, t4 1
task, t5 6
task, t6 1
task, t7 5
task, t8 1
constraint, t5 before t6
constraint, t4 before t7
domain, t2 ends-by mon 2pm 0
domain, t3 ends-by tue 2pm 0
domain, t5 ends-by fri 1pm 0
domain, t7 ends-by tue 2pm 0
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t4 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 8}
Splitting t5 into {0} and {1}
Splitting t6 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t6 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t6 into {8} and {9, 6}
Splitting t7 into {32, 1, 2, 34, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t7 into {32, 1, 2} and {8, 33, 34, 9}
Splitting t7 into {32} and {1, 2}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t8 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t8 into {0, 1} and {2, 3}
```

```
Splitting t8 into {0} and {1}
task, t1 6
task, t2 1
task, t3 6
task, t4 1
task, t5 6
task, t6 1
task, t7 5
task, t8 1
constraint, t5 before t6
constraint, t4 before t7
domain, t2 ends-by mon 2pm 10
domain, t3 ends-by tue 2pm 5
domain, t5 ends-by fri 1pm 10
domain, t7 ends-by tue 2pm 15
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t4 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 8}
Splitting t5 into {0} and {1}
Splitting t6 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t6 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t6 into {8} and {9, 6}
Splitting t7 into {32, 1, 2, 34, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t7 into {32, 1, 2} and {8, 33, 34, 9}
Splitting t7 into {32} and {1, 2}
Splitting t7 into {1} and {2}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t8 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t8 into {0, 1} and {2, 3}
Splitting t8 into {0} and {1}
task, t1 6
task, t2 4
task, t3 2
task, t4 6
task, t5 6
task, t6 6
task, t7 3
task, t8 6
```

```
constraint, t2 before t3
constraint, t1 before t2
constraint, t5 same-day t6
constraint, t6 same-day t7
domain, t2 ends-by mon 12pm 0
domain, t6 ends-by tue 11am 0
domain, t7 ends-by thu 11am 0
domain, t8 ends-by fri 12pm 0
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33, 8, 9, 10, 11, 16} and {17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {32, 33, 8} and {16, 9, 10, 11}
Splitting t2 into {32} and {8, 33}
Splitting t3 into {36} and {37}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1} and {2, 3, 4}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t8 into {0, 1} and {32, 33, 8}
Splitting t8 into {0} and {1}
task, t1 6
task, t2 4
task, t3 2
task, t4 6
task, t5 6
task, t6 6
task, t7 3
task, t8 6
constraint, t2 before t3
constraint, t1 before t2
constraint, t5 same-day t6
constraint, t6 same-day t7
domain, t2 ends-by mon 12pm 10
domain, t6 ends-by tue 11am 20
domain, t7 ends-by thu 11am 10
domain, t8 ends-by fri 12pm 10
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33, 8, 9, 10, 11, 16} and {17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {32, 33, 8} and {16, 9, 10, 11}
Splitting t2 into {32} and {8, 33}
Splitting t2 into {8} and {33}
Splitting t3 into {12, 13, 16, 17, 18, 19, 20, 21, 24, 25} and {32, 33, 34, 35, 3
6, 37, 26, 27, 28, 29}
Splitting t3 into {12, 13, 16, 17, 18} and {19, 20, 21, 24, 25}
Splitting t3 into {12, 13} and {16, 17, 18}
Splitting t3 into {12} and {13}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
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```
Splitting t5 into {0} and {1}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1} and {2, 3, 4}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t8 into {0, 1} and {32, 33, 8}
Splitting t8 into {0} and {1}
task, t1 4
task, t2 1
task, t3 2
task, t4 1
task, t5 5
task, t6 2
task, t7 5
task, t8 2
constraint, t1 before t7
constraint, t1 before t4
constraint, t4 before t8
constraint, t2 before t5
constraint, t1 before t8
constraint, t1 before t6
constraint, t1 before t3
constraint, t1 same-day t6
domain, t2 wed
domain, t2 ends-by wed 4pm 0
domain, t3 ends-by thu 11am 0
domain, t4 ends-by thu 11am 0
domain, t5 ends-by tue 3pm 0
Splitting t1 into {0, 1, 2, 3, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25}
Splitting t1 into {0, 1, 2} and {8, 9, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17, 18} and {19, 20, 21, 22}
Splitting t2 into {16} and {17, 18}
Splitting t3 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t3 into {8, 4, 5} and {9, 10, 11}
Splitting t3 into {8} and {4, 5}
Splitting t4 into {4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and {32, 3
3, 34, 35, 36, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19}
Splitting t4 into {4, 5, 6} and {8, 9, 10, 11}
Splitting t4 into {4} and {5, 6}
Splitting t5 into {32, 33, 34, 17} and {24, 25, 18, 26}
Splitting t5 into {32, 33} and {17, 34}
Splitting t5 into {32} and {33}
Splitting t6 into {4} and {5}
Splitting t7 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t7 into {32, 33, 34} and {8, 9, 10}
Splitting t7 into {32} and {33, 34}
Splitting t8 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t8 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t8 into {8, 9, 5} and {10, 11, 12}
Splitting t8 into {8} and {9, 5}
task, t1 4
task, t2 1
task, t3 2
task, t4 1
task, t5 5
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```
task, t6 2
task, t7 5
task, t8 2
constraint, t1 before t7
constraint, t1 before t4
constraint, t4 before t8
constraint, t2 before t5
constraint, t1 before t8
constraint, t1 before t6
constraint, t1 before t3
constraint, t1 same-day t6
domain, t2 wed
domain, t2 ends-by wed 4pm 20
domain, t3 ends-by thu 11am 10
domain, t4 ends-by thu 11am 15
domain, t5 ends-by tue 3pm 10
Splitting t1 into {0, 1, 2, 3, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25}
Splitting t1 into {0, 1, 2} and {8, 9, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17, 18} and {19, 20, 21, 22}
Splitting t2 into {16} and {17, 18}
Splitting t3 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t3 into {8, 4, 5} and {9, 10, 11}
Splitting t3 into {8} and {4, 5}
Splitting t4 into {4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and {32, 3
3, 34, 35, 36, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19}
Splitting t4 into {4, 5, 6} and {8, 9, 10, 11}
Splitting t4 into {4} and {5, 6}
Splitting t5 into {32, 33, 34, 17} and {24, 25, 18, 26}
Splitting t5 into {32, 33} and {17, 34}
Splitting t5 into {17} and {34}
Splitting t6 into {4} and {5}
Splitting t7 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t7 into {32, 33, 34} and {8, 9, 10}
Splitting t7 into {32} and {33, 34}
Splitting t8 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t8 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t8 into {8, 9, 5} and {10, 11, 12}
Splitting t8 into {8} and {9, 5}
task, t1 5
task, t2 4
task, t3 3
task, t4 2
task, t5 5
task, t6 2
task, t7 5
task, t8 4
task, t9 3
task, t10 6
constraint, t1 before t6
constraint, t6 before t9
constraint, t3 before t7
constraint, t4 before t6
constraint, t3 same-day t9
domain, t2 thu
domain, t4 wed
```

```
domain, t5 tue
domain, t2 ends-by thu 11am 0
domain, t3 ends-by thu 11am 0
domain, t5 ends-by tue 3pm 0
domain, t8 ends-by thu 3pm 0
domain, t10 ends-by tue 11am 0
Splitting t1 into {0, 1, 2, 8} and {9, 10, 16, 17, 18}
Splitting t1 into {0, 1} and {8, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {24, 25} and {26, 27}
Splitting t2 into {24} and {25}
Splitting t3 into {16, 17, 18, 19, 20} and {24, 25, 26, 27, 28}
Splitting t3 into {16, 17} and {18, 19, 20}
Splitting t3 into {16} and {17}
Splitting t5 into {8} and {9, 10}
Splitting t7 into {32, 33, 34} and {24, 25, 26}
Splitting t7 into {32} and {33, 34}
Splitting t8 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t8 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t8 into {0, 1} and {8, 2, 3}
Splitting t8 into {0} and {1}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
task, t1 5
task, t2 4
task, t3 3
task, t4 2
task, t5 5
task, t6 2
task, t7 5
task, t8 4
task, t9 3
task, t10 6
constraint, t1 before t6
constraint, t6 before t9
constraint, t3 before t7
constraint, t4 before t6
constraint, t3 same-day t9
domain, t2 thu
domain, t4 wed
domain, t5 tue
domain, t2 ends-by thu 11am 20
domain, t3 ends-by thu 11am 15
domain, t5 ends-by tue 3pm 20
domain, t8 ends-by thu 3pm 10
domain, t10 ends-by tue 11am 15
Splitting t1 into {0, 1, 2, 8} and {9, 10, 16, 17, 18}
Splitting t1 into {0, 1} and {8, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {24, 25} and {26, 27}
Splitting t2 into {24} and {25}
Splitting t3 into {16, 17, 18, 19, 20} and {24, 25, 26, 27, 28}
Splitting t3 into {16, 17} and {18, 19, 20}
Splitting t3 into {16} and {17}
Splitting t5 into {8} and {9, 10}
Splitting t7 into {32, 33, 34} and {24, 25, 26}
Splitting t7 into {32} and {33, 34}
Splitting t8 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
```

```
24, 25, 26, 27}
Splitting t8 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t8 into {0, 1} and {8, 2, 3}
Splitting t8 into {0} and {1}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
task, t1 1
task, t2 4
task, t3 6
task, t4 3
task, t5 2
task, t6 4
task, t7 4
task, t8 3
task, t9 5
task, t10 4
constraint, t4 before t6
constraint, t2 before t6
constraint, t1 before t4
constraint, t3 before t9
constraint, t6 before t8
constraint, t7 before t8
constraint, t9 before t10
constraint, t5 same-day t7
constraint, t7 same-day t9
constraint, t3 same-day t7
domain, t1 mon
domain, t4 tue
domain, t3 ends-by tue 2pm 0
domain, t4 ends-by tue 2pm 0
domain, t8 ends-by mon 11am 0
domain, t9 ends-by mon 4pm 0
domain, t10 ends-by tue 1pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 1
task, t2 4
task, t3 6
task, t4 3
task, t5 2
task, t6 4
task, t7 4
task, t8 3
task, t9 5
task, t10 4
constraint, t4 before t6
constraint, t2 before t6
constraint, t1 before t4
constraint, t3 before t9
constraint, t6 before t8
constraint, t7 before t8
constraint, t9 before t10
constraint, t5 same-day t7
constraint, t7 same-day t9
constraint, t3 same-day t7
domain, t1 mon
domain, t4 tue
domain, t3 ends-by tue 2pm 5
domain, t4 ends-by tue 2pm 5
domain, t8 ends-by mon 11am 15
```

```
domain, t9 ends-by mon 4pm 20
domain, t10 ends-by tue 1pm 20
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 4
task, t3 6
task, t4 5
task, t5 5
task, t6 5
task, t7 3
task, t8 2
task, t9 4
task, t10 6
constraint, t3 same-day t6
domain, t3 thu
domain, t8 thu
domain, t3 ends-by thu 2pm 0
domain, t5 ends-by wed 11am 0
domain, t7 ends-by thu 2pm 0
domain, t8 ends-by thu 4pm 0
domain, t9 ends-by wed 12pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {24} and {25}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {24} and {25, 26}
Splitting t7 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t7 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t7 into {0, 1, 2} and {8, 3, 4}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {24, 25, 26} and {27, 28, 29}
Splitting t8 into {24} and {25, 26}
Splitting t9 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t9 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t9 into {0, 1} and {8, 2, 3}
Splitting t9 into {0} and {1}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
task, t1 2
task, t2 4
task, t3 6
task, t4 5
task, t5 5
task, t6 5
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task, t7 3
task, t8 2
task, t9 4
task, t10 6
constraint, t3 same-day t6
domain, t3 thu
domain, t8 thu
domain, t3 ends-by thu 2pm 10
domain, t5 ends-by wed 11am 20
domain, t7 ends-by thu 2pm 15
domain, t8 ends-by thu 4pm 10
domain, t9 ends-by wed 12pm 20
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {24} and {25}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {24} and {25, 26}
Splitting t7 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t7 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t7 into {0, 1, 2} and {8, 3, 4}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {24, 25, 26} and {27, 28, 29}
Splitting t8 into {24} and {25, 26}
Splitting t9 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t9 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t9 into {0, 1} and {8, 2, 3}
Splitting t9 into {0} and {1}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
task, t1 1
task, t2 5
task, t3 3
task, t4 2
task, t5 2
task, t6 4
task, t7 1
task, t8 1
task, t9 2
task, t10 5
constraint, t5 before t7
domain, t2 thu
domain, t5 ends-by fri 3pm 0
domain, t6 ends-by wed 12pm 0
domain, t8 ends-by tue 3pm 0
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```
domain, t9 ends-by wed 4pm 0
domain, t10 ends-by wed 3pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t6 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t6 into {0, 1} and {8, 2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and
{32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t7 into {2, 3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18, 19}
Splitting t7 into {2, 3, 4, 5} and {8, 9, 10, 6}
Splitting t7 into {2, 3} and {4, 5}
Splitting t7 into {2} and {3}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t8 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t8 into {0, 1} and {2, 3}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t9 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t10 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t10 into {0} and {1, 2}
task, t1 1
task, t2 5
task, t3 3
task, t4 2
task, t5 2
task, t6 4
task, t7 1
task, t8 1
task, t9 2
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```
task, t10 5
constraint, t5 before t7
domain, t2 thu
domain, t5 ends-by fri 3pm 20
domain, t6 ends-by wed 12pm 5
domain, t8 ends-by tue 3pm 20
domain, t9 ends-by wed 4pm 15
domain, t10 ends-by wed 3pm 15
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t6 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t6 into {0, 1} and {8, 2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and
{32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t7 into {2, 3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18, 19}
Splitting t7 into {2, 3, 4, 5} and {8, 9, 10, 6}
Splitting t7 into {2, 3} and {4, 5}
Splitting t7 into {2} and {3}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t8 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t8 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t8 into {0, 1} and {2, 3}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t9 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t10 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t10 into {0} and {1, 2}
task, t1 1
task, t2 1
task, t3 1
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task, t4 2
task, t5 3
task, t6 6
task, t7 6
task, t8 6
task, t9 2
task, t10 6
constraint, t2 before t8
constraint, t3 same-day t6
constraint, t7 same-day t8
domain, t1 ends-by tue 4pm 0
domain, t2 ends-by fri 11am 0
domain, t4 ends-by fri 4pm 0
domain, t6 ends-by thu 2pm 0
domain, t7 ends-by tue 4pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t7 into {0, 1} and {32, 33, 8}
Splitting t7 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t9 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
task, t1 1
task, t2 1
task, t3 1
task, t4 2
```

```
task, t5 3
task, t6 6
task, t7 6
task, t8 6
task, t9 2
task, t10 6
constraint, t2 before t8
constraint, t3 same-day t6
constraint, t7 same-day t8
domain, t1 ends-by tue 4pm 20
domain, t2 ends-by fri 11am 10
domain, t4 ends-by fri 4pm 20
domain, t6 ends-by thu 2pm 10
domain, t7 ends-by tue 4pm 20
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t7 into {0, 1} and {32, 33, 8}
Splitting t7 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t9 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
task, t1 4
task, t2 4
task, t3 6
task, t4 6
task, t5 6
```

```
task, t6 6
task, t7 2
task, t8 3
task, t9 1
task, t10 6
constraint, t1 before t3
constraint, t8 before t10
constraint, t1 before t4
constraint, t4 before t9
constraint, t1 before t9
constraint, t5 before t6
constraint, t1 before t7
constraint, t4 before t10
domain, t3 tue
domain, t9 tue
domain, t1 ends-by thu 2pm 0
domain, t2 ends-by fri 3pm 0
domain, t4 ends-by tue 4pm 0
domain, t6 ends-by fri 12pm 0
domain, t7 ends-by mon 1pm 0
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {8} and {9}
Splitting t5 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t5 into {0, 1} and {8, 9}
Splitting t5 into {0} and {1}
Splitting t6 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t6 into {32, 33} and {8, 9}
Splitting t6 into {32} and {33}
Splitting t7 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t7 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t7 into {8, 4, 5} and {9, 10, 11}
Splitting t7 into {8} and {4, 5}
Splitting t8 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t8 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t8 into {0, 1} and {2, 3, 4}
Splitting t8 into {0} and {1}
Splitting t10 into {32, 33, 16} and {24, 17, 25}
Splitting t10 into {32} and {16, 33}
task, t1 4
task, t2 4
task, t3 6
task, t4 6
task, t5 6
task, t6 6
task, t7 2
task, t8 3
task, t9 1
task, t10 6
constraint, t1 before t3
constraint, t8 before t10
constraint, t1 before t4
constraint, t4 before t9
```

```
constraint, t1 before t9
constraint, t5 before t6
constraint, t1 before t7
constraint, t4 before t10
domain, t3 tue
domain, t9 tue
domain, t1 ends-by thu 2pm 5
domain, t2 ends-by fri 3pm 5
domain, t4 ends-by tue 4pm 20
domain, t6 ends-by fri 12pm 15
domain, t7 ends-by mon 1pm 15
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {8} and {9}
Splitting t5 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t5 into {0, 1} and {8, 9}
Splitting t5 into {0} and {1}
Splitting t6 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t6 into {32, 33} and {8, 9}
Splitting t6 into {8} and {9}
Splitting t7 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t7 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t7 into {8, 4, 5} and {9, 10, 11}
Splitting t7 into {8} and {4, 5}
Splitting t7 into {4} and {5}
Splitting t8 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t8 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t8 into {0, 1} and {2, 3, 4}
Splitting t8 into {0} and {1}
Splitting t10 into {32, 33, 16} and {24, 17, 25}
Splitting t10 into {32} and {16, 33}
task, t1 2
task, t2 4
task, t3 3
task, t4 1
task, t5 3
task, t6 1
task, t7 1
task, t8 5
task, t9 6
task, t10 1
constraint, t6 before t7
constraint, t6 before t10
constraint, t2 before t3
constraint, t2 same-day t10
constraint, t4 same-day t9
constraint, t4 same-day t7
domain, t2 ends-by fri 11am 0
domain, t3 ends-by mon 3pm 0
domain, t4 ends-by tue 4pm 0
domain, t7 ends-by thu 12pm 0
domain, t10 ends-by wed 1pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
```

```
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 32, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 26,
27}
Splitting t2 into {0, 1, 2, 3} and {32, 8, 10, 9}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 36,
20, 24, 25, 26, 27, 28}
Splitting t3 into {4, 8, 9, 10, 11} and {12, 16, 17, 18, 19}
Splitting t3 into {8, 4} and {9, 10, 11}
Splitting t3 into {8} and {4}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 2} and {3, 4, 5}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {1, 2, 3} and {4, 5, 6}
Splitting t7 into {1} and {2, 3}
Splitting t8 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t8 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {0} and {1}
Splitting t10 into {1, 2, 3} and {4, 5, 6}
Splitting t10 into {1} and {2, 3}
task, t1 2
task, t2 4
task, t3 3
task, t4 1
task, t5 3
task, t6 1
task, t7 1
task, t8 5
task, t9 6
task, t10 1
constraint, t6 before t7
constraint, t6 before t10
constraint, t2 before t3
constraint, t2 same-day t10
constraint, t4 same-day t9
constraint, t4 same-day t7
domain, t2 ends-by fri 11am 15
domain, t3 ends-by mon 3pm 5
domain, t4 ends-by tue 4pm 15
domain, t7 ends-by thu 12pm 20
domain, t10 ends-by wed 1pm 10
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
```

```
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 32, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 26,
27}
Splitting t2 into {0, 1, 2, 3} and {32, 8, 10, 9}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 36,
20, 24, 25, 26, 27, 28}
Splitting t3 into {4, 8, 9, 10, 11} and {12, 16, 17, 18, 19}
Splitting t3 into {8, 4} and {9, 10, 11}
Splitting t3 into {8} and {4}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 2} and {3, 4, 5}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {1, 2, 3} and {4, 5, 6}
Splitting t7 into {1} and {2, 3}
Splitting t8 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t8 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {0} and {1}
Splitting t10 into {1, 2, 3} and {4, 5, 6}
Splitting t10 into {1} and {2, 3}
task, t1 6
task, t2 4
task, t3 3
task, t4 2
task, t5 2
task, t6 6
task, t7 1
task, t8 2
task, t9 6
task, t10 5
constraint, t4 before t6
constraint, t3 before t10
constraint, t6 before t9
constraint, t7 same-day t9
constraint, t2 same-day t10
domain, t1 fri
domain, t4 tue
domain, t7 fri
domain, t1 ends-by fri 11am 0
domain, t2 ends-by wed 1pm 0
domain, t4 ends-by tue 1pm 0
domain, t8 ends-by thu 1pm 0
domain, t10 ends-by fri 1pm 0
Splitting t1 into {32} and {33}
Splitting t2 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
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```
Splitting t2 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t2 into {32, 33} and {34, 35}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10} and {11, 12, 13}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {16, 17} and {24, 25}
Splitting t6 into {16} and {17}
Splitting t7 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t7 into {32} and {33, 34}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t8 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {32} and {33}
Splitting t10 into {32} and {33, 34}
task, t1 6
task, t2 4
task, t3 3
task, t4 2
task, t5 2
task, t6 6
task, t7 1
task, t8 2
task, t9 6
task, t10 5
constraint, t4 before t6
constraint, t3 before t10
constraint, t6 before t9
constraint, t7 same-day t9
constraint, t2 same-day t10
domain, t1 fri
domain, t4 tue
domain, t7 fri
domain, t1 ends-by fri 11am 10
domain, t2 ends-by wed 1pm 15
domain, t4 ends-by tue 1pm 20
domain, t8 ends-by thu 1pm 15
domain, t10 ends-by fri 1pm 20
Splitting t1 into {32} and {33}
Splitting t2 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t2 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t2 into {8, 9} and {10, 11}
Splitting t2 into {8} and {9}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10} and {11, 12, 13}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
```

```
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {16, 17} and {24, 25}
Splitting t6 into {16} and {17}
Splitting t7 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t7 into {32} and {33, 34}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t8 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {32} and {33}
Splitting t10 into {8} and {9, 10}
task, t1 5
task, t2 3
task, t3 4
task, t4 6
task, t5 3
task, t6 4
task, t7 3
task, t8 6
task, t9 1
task, t10 2
constraint, t7 before t8
constraint, t5 before t9
constraint, t3 before t10
constraint, t5 before t10
constraint, t5 before t7
constraint, t1 before t8
constraint, t7 same-day t10
domain, t1 tue
domain, t6 mon
domain, t9 fri
domain, t1 ends-by tue 12pm 0
domain, t5 ends-by thu 4pm 0
domain, t7 ends-by thu 1pm 0
domain, t8 ends-by wed 11am 0
domain, t10 ends-by mon 2pm 0
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25}
Splitting t3 into {0, 1, 2} and {8, 9, 10, 3}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10} and {11, 12, 16, 17, 18, 19, 20, 24,
25}
Splitting t5 into {0, 1, 2, 3} and {8, 9, 10, 4}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1} and {2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {3, 4, 8, 9, 10, 11, 12, 16} and {17, 18, 19, 20, 24, 25, 26, 2
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7, 28}
Splitting t7 into {8, 9, 3, 4} and {16, 10, 11, 12}
Splitting t7 into {8, 9} and {3, 4}
Splitting t7 into {8} and {9}
Splitting t8 into {32, 33, 16} and {24, 17, 25}
Splitting t8 into {32} and {16, 33}
Splitting t9 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t9 into {32} and {33, 34}
Splitting t10 into {8, 9, 10} and {11, 12, 13}
Splitting t10 into {8} and {9, 10}
task, t1 5
task, t2 3
task, t3 4
task, t4 6
task, t5 3
task, t6 4
task, t7 3
task, t8 6
task, t9 1
task, t10 2
constraint, t7 before t8
constraint, t5 before t9
constraint, t3 before t10
constraint, t5 before t10
constraint, t5 before t7
constraint, t1 before t8
constraint, t7 same-day t10
domain, t1 tue
domain, t6 mon
domain, t9 fri
domain, t1 ends-by tue 12pm 15
domain, t5 ends-by thu 4pm 5
domain, t7 ends-by thu 1pm 20
domain, t8 ends-by wed 11am 20
domain, t10 ends-by mon 2pm 5
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25}
Splitting t3 into {0, 1, 2} and {8, 9, 10, 3}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10} and {11, 12, 16, 17, 18, 19, 20, 24,
25}
Splitting t5 into {0, 1, 2, 3} and {8, 9, 10, 4}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1} and {2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {3, 4, 8, 9, 10, 11, 12, 16} and {17, 18, 19, 20, 24, 25, 26, 2
7, 28}
Splitting t7 into {8, 9, 3, 4} and {16, 10, 11, 12}
Splitting t7 into {8, 9} and {3, 4}
Splitting t7 into {3} and {4}
Splitting t8 into {32, 33, 16} and {24, 17, 25}
```

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Splitting t8 into {32} and {16, 33}
Splitting t8 into {16} and {33}
Splitting t9 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t9 into {32} and {33, 34}
Splitting t10 into {4} and {5}
task, t1 2
task, t2 3
task, t3 3
task, t4 3
task, t5 5
task, t6 2
task, t7 4
task, t8 4
task, t9 1
task, t10 5
constraint, t2 before t8
constraint, t7 before t9
constraint, t7 before t10
constraint, t3 before t8
constraint, t5 before t6
constraint, t8 before t10
constraint, t5 before t10
constraint, t5 same-day t7
constraint, t5 same-day t10
constraint, t3 same-day t9
domain, t1 ends-by thu 11am 0
domain, t4 ends-by mon 3pm 0
domain, t5 ends-by tue 2pm 0
domain, t8 ends-by fri 1pm 0
domain, t9 ends-by tue 1pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t1 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} has no solution
... t1 in {32, 33, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 3
task, t3 3
task, t4 3
task, t5 5
task, t6 2
task, t7 4
task, t8 4
task, t9 1
task, t10 5
constraint, t2 before t8
constraint, t7 before t9
constraint, t7 before t10
constraint, t3 before t8
constraint, t5 before t6
constraint, t8 before t10
constraint, t5 before t10
constraint, t5 same-day t7
constraint, t5 same-day t10
constraint, t3 same-day t9
domain, t1 ends-by thu 11am 5
domain, t4 ends-by mon 3pm 10
domain, t5 ends-by tue 2pm 10
domain, t8 ends-by fri 1pm 5
```

```
domain, t9 ends-by tue 1pm 5
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t1 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} has no solution
... t1 in {32, 33, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 3
task, t3 6
task, t4 3
task, t5 5
task, t6 2
task, t7 5
task, t8 3
task, t9 1
task, t10 5
constraint, t1 before t10
constraint, t4 before t8
constraint, t4 before t9
constraint, t2 before t4
constraint, t2 before t10
constraint, t8 before t9
constraint, t7 before t10
constraint, t1 before t5
constraint, t6 before t9
constraint, t3 before t10
constraint, t2 before t5
constraint, t6 before t10
constraint, t3 same-day t9
constraint, t1 same-day t7
domain, t7 tue
domain, t3 ends-by thu 3pm 0
domain, t5 ends-by mon 4pm 0
domain, t6 ends-by tue 3pm 0
domain, t7 ends-by tue 12pm 0
domain, t10 ends-by fri 11am 0
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18, 19, 20}
Splitting t2 into {0, 1, 2} and {8, 9, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {8, 9, 16} and {24, 17, 25}
Splitting t3 into {8} and {16, 9}
Splitting t4 into {8} and {3, 4}
Splitting t5 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t5 into {32, 33} and {16, 34}
Splitting t5 into {32} and {33}
Splitting t6 into {0, 1, 2, 3, 4} and {5, 8, 9, 10, 11, 12}
Splitting t6 into {0, 1} and {2, 3, 4}
Splitting t6 into {0} and {1}
Splitting t7 into {8} and {9, 10}
Splitting t10 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t10 into {32, 33} and {16, 34}
Splitting t10 into {32} and {33}
task, t1 5
task, t2 3
task, t3 6
task, t4 3
task, t5 5
task, t6 2
```

```
task, t7 5
task, t8 3
task, t9 1
task, t10 5
constraint, t1 before t10
constraint, t4 before t8
constraint, t4 before t9
constraint, t2 before t4
constraint, t2 before t10
constraint, t8 before t9
constraint, t7 before t10
constraint, t1 before t5
constraint, t6 before t9
constraint, t3 before t10
constraint, t2 before t5
constraint, t6 before t10
constraint, t3 same-day t9
constraint, t1 same-day t7
domain, t7 tue
domain, t3 ends-by thu 3pm 15
domain, t5 ends-by mon 4pm 10
domain, t6 ends-by tue 3pm 20
domain, t7 ends-by tue 12pm 5
domain, t10 ends-by fri 11am 10
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18, 19, 20}
Splitting t2 into {0, 1, 2} and {8, 9, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {8, 9, 16} and {24, 17, 25}
Splitting t3 into {8} and {16, 9}
Splitting t4 into {8} and {3, 4}
Splitting t5 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t5 into {32, 33} and {16, 34}
Splitting t5 into {16} and {34}
Splitting t6 into {0, 1, 2, 3, 4} and {5, 8, 9, 10, 11, 12}
Splitting t6 into {0, 1} and {2, 3, 4}
Splitting t6 into {0} and {1}
Splitting t7 into {8} and {9, 10}
Splitting t10 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t10 into {32, 33} and {16, 34}
Splitting t10 into {16} and {34}
task, t1 2
task, t2 3
task, t3 1
task, t4 3
task, t5 1
task, t6 2
task, t7 5
task, t8 6
task, t9 5
task, t10 5
constraint, t5 before t9
constraint, t6 before t7
constraint, t6 before t8
constraint, t6 before t9
constraint, t7 before t9
constraint, t4 before t10
constraint, t3 before t6
constraint, t7 before t10
constraint, t8 before t10
```

```
constraint, t4 before t6
constraint, t2 before t6
constraint, t8 same-day t10
constraint, t5 same-day t9
constraint, t1 same-day t2
domain, t3 ends-by wed 2pm 0
domain, t5 ends-by wed 11am 0
domain, t7 ends-by mon 2pm 0
domain, t8 ends-by mon 11am 0
domain, t10 ends-by tue 1pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 3
task, t3 1
task, t4 3
task, t5 1
task, t6 2
task, t7 5
task, t8 6
task, t9 5
task, t10 5
constraint, t5 before t9
constraint, t6 before t7
constraint, t6 before t8
constraint, t6 before t9
constraint, t7 before t9
constraint, t4 before t10
constraint, t3 before t6
constraint, t7 before t10
constraint, t8 before t10
constraint, t4 before t6
constraint, t2 before t6
constraint, t8 same-day t10
constraint, t5 same-day t9
constraint, t1 same-day t2
domain, t3 ends-by wed 2pm 10
domain, t5 ends-by wed 11am 20
domain, t7 ends-by mon 2pm 10
domain, t8 ends-by mon 11am 20
domain, t10 ends-by tue 1pm 5
No (more) solutions. Total of 1 paths expanded.
task, t1 4
task, t2 6
task, t3 5
task, t4 3
task, t5 5
task, t6 1
task, t7 5
task, t8 1
task, t9 4
task, t10 6
constraint, t3 before t4
constraint, t8 before t9
constraint, t6 before t8
constraint, t8 before t10
constraint, t9 before t10
constraint, t6 before t10
constraint, t1 before t4
constraint, t6 before t7
constraint, t2 before t6
```

```
constraint, t5 before t8
constraint, t7 before t10
constraint, t1 before t10
constraint, t2 same-day t3
constraint, t4 same-day t5
domain, t6 tue
domain, t2 ends-by wed 4pm 0
domain, t4 ends-by mon 11am 0
domain, t6 ends-by tue 4pm 0
domain, t8 ends-by tue 12pm 0
domain, t10 ends-by mon 12pm 0
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11, 16}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {8, 1}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
Splitting t5 into {8} and {9, 10}
Splitting t6 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t6 into {8} and {9, 10}
Splitting t7 into {16, 9, 10, 17} and {24, 25, 18, 26}
Splitting t7 into {16, 9} and {17, 10}
Splitting t7 into {16} and {9}
Splitting t8 into {13, 14, 16, 17, 18, 19} and {20, 21, 22, 24, 25, 26}
Splitting t8 into {16, 13, 14} and {17, 18, 19}
Splitting t8 into {16} and {13, 14}
Splitting t9 into {17, 18, 19} and {24, 25, 26, 27}
Splitting t9 into {17} and {18, 19}
Splitting t10 into {32, 33} and {24, 25}
Splitting t10 into {32} and {33}
task, t1 4
task, t2 6
task, t3 5
task, t4 3
task, t5 5
task, t6 1
task, t7 5
task, t8 1
task, t9 4
task, t10 6
constraint, t3 before t4
constraint, t8 before t9
constraint, t6 before t8
constraint, t8 before t10
constraint, t9 before t10
constraint, t6 before t10
constraint, t1 before t4
constraint, t6 before t7
constraint, t2 before t6
constraint, t5 before t8
constraint, t7 before t10
constraint, t1 before t10
constraint, t2 same-day t3
constraint, t4 same-day t5
domain, t6 tue
domain, t2 ends-by wed 4pm 15
domain, t4 ends-by mon 11am 20
domain, t6 ends-by tue 4pm 20
```

```
domain, t8 ends-by tue 12pm 20
domain, t10 ends-by mon 12pm 5
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11, 16}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {8, 1}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
Splitting t5 into {8} and {9, 10}
Splitting t6 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t6 into {8} and {9, 10}
Splitting t7 into {16, 9, 10, 17} and {24, 25, 18, 26}
Splitting t7 into {16, 9} and {17, 10}
Splitting t7 into {16} and {9}
Splitting t8 into {13, 14, 16, 17, 18, 19} and {20, 21, 22, 24, 25, 26}
Splitting t8 into {16, 13, 14} and {17, 18, 19}
Splitting t8 into {16} and {13, 14}
Splitting t8 into {13} and {14}
Splitting t9 into {16, 17, 18, 19} and {24, 25, 26, 27}
Splitting t9 into {16, 17} and {18, 19}
Splitting t9 into {16} and {17}
Splitting t10 into {32, 33} and {24, 25}
Splitting t10 into {24} and {25}
task, t1 2
task, t2 5
task, t3 6
task, t4 1
task, t5 1
task, t6 3
task, t7 1
task, t8 6
task, t9 2
task, t10 2
constraint, t3 before t9
constraint, t1 before t8
constraint, t4 before t8
constraint, t4 before t6
constraint, t1 before t9
constraint, t7 before t9
constraint, t1 before t7
constraint, t7 before t8
constraint, t3 before t8
constraint, t4 before t10
constraint, t2 before t3
constraint, t4 before t5
constraint, t9 same-day t10
constraint, t4 same-day t10
domain, t8 wed
domain, t9 wed
domain, t10 mon
domain, t2 ends-by mon 12pm 0
domain, t3 ends-by thu 1pm 0
domain, t5 ends-by wed 3pm 0
domain, t6 ends-by tue 3pm 0
domain, t10 ends-by mon 1pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 5
```

```
task, t3 6
task, t4 1
task, t5 1
task, t6 3
task, t7 1
task, t8 6
task, t9 2
task, t10 2
constraint, t3 before t9
constraint, t1 before t8
constraint, t4 before t8
constraint, t4 before t6
constraint, t1 before t9
constraint, t7 before t9
constraint, t1 before t7
constraint, t7 before t8
constraint, t3 before t8
constraint, t4 before t10
constraint, t2 before t3
constraint, t4 before t5
constraint, t9 same-day t10
constraint, t4 same-day t10
domain, t8 wed
domain, t9 wed
domain, t10 mon
domain, t2 ends-by mon 12pm 20
domain, t3 ends-by thu 1pm 15
domain, t5 ends-by wed 3pm 10
domain, t6 ends-by tue 3pm 20
domain, t10 ends-by mon 1pm 20
No (more) solutions. Total of 1 paths expanded.
task, t1 1
task, t2 1
task, t3 6
task, t4 2
task, t5 5
task, t6 1
task, t7 3
task, t8 3
task, t9 3
task, t10 3
constraint, t6 same-day t10
constraint, t3 same-day t9
constraint, t6 same-day t8
domain, t3 ends-by tue 3pm 0
domain, t6 ends-by fri 2pm 0
domain, t7 ends-by tue 2pm 0
domain, t9 ends-by tue 11am 0
domain, t10 ends-by wed 4pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
```

```
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t6 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t6 into {0, 1} and {2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t7 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t7 into {0, 1, 2} and {8, 3, 4}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {0, 1} and {2, 3, 4}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1} and {2, 3, 4}
Splitting t9 into {0} and {1}
Splitting t10 into {0, 1} and {2, 3, 4}
Splitting t10 into {0} and {1}
task, t1 1
task, t2 1
task, t3 6
task, t4 2
task, t5 5
task, t6 1
task, t7 3
task, t8 3
task, t9 3
task, t10 3
constraint, t6 same-day t10
constraint, t3 same-day t9
constraint, t6 same-day t8
domain, t3 ends-by tue 3pm 20
domain, t6 ends-by fri 2pm 20
domain, t7 ends-by tue 2pm 15
domain, t9 ends-by tue 11am 15
domain, t10 ends-by wed 4pm 15
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
```

```
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t6 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t6 into {0, 1} and {2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t7 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t7 into {0, 1, 2} and {8, 3, 4}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {0, 1} and {2, 3, 4}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1} and {2, 3, 4}
Splitting t9 into {0} and {1}
Splitting t10 into {0, 1} and {2, 3, 4}
Splitting t10 into {0} and {1}
task, t1 6
task, t2 3
task, t3 2
task, t4 4
task, t5 1
task, t6 1
task, t7 6
task, t8 1
task, t9 2
task, t10 5
constraint, t2 before t9
constraint, t3 before t7
constraint, t3 before t9
constraint, t3 before t4
constraint, t5 before t6
constraint, t7 before t8
constraint, t2 before t7
constraint, t2 before t10
constraint, t1 before t6
constraint, t4 before t8
domain, t1 ends-by fri 12pm 0
domain, t4 ends-by fri 2pm 0
domain, t5 ends-by fri 2pm 0
domain, t7 ends-by thu 11am 0
domain, t8 ends-by tue 12pm 0
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
```

```
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 2, 3, 34, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 2
6, 27}
Splitting t4 into {32, 33, 2, 3} and {8, 9, 34, 10}
Splitting t4 into {32, 33} and {2, 3}
Splitting t4 into {32} and {33}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t6 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t6 into {8} and {9, 6}
Splitting t7 into {32, 8, 9} and {16, 17, 24, 25}
Splitting t7 into {32} and {8, 9}
Splitting t9 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33, 3
4, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t9 into {3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t9 into {3, 4, 5} and {8, 9, 10}
Splitting t9 into {3} and {4, 5}
Splitting t10 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t10 into {32, 33, 34} and {8, 9, 10}
Splitting t10 into {32} and {33, 34}
task, t1 6
task, t2 3
task, t3 2
task, t4 4
task, t5 1
task, t6 1
task, t7 6
task, t8 1
task, t9 2
task, t10 5
constraint, t2 before t9
constraint, t3 before t7
constraint, t3 before t9
constraint, t3 before t4
constraint, t5 before t6
constraint, t7 before t8
constraint, t2 before t7
constraint, t2 before t10
constraint, t1 before t6
constraint, t4 before t8
domain, t1 ends-by fri 12pm 20
domain, t4 ends-by fri 2pm 20
```

```
domain, t5 ends-by fri 2pm 20
domain, t7 ends-by thu 11am 15
domain, t8 ends-by tue 12pm 15
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 2, 3, 34, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 2
6, 27}
Splitting t4 into {32, 33, 2, 3} and {8, 9, 34, 10}
Splitting t4 into {32, 33} and {2, 3}
Splitting t4 into {2} and {3}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t6 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t6 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t6 into {8} and {9, 6}
Splitting t7 into {32, 8, 9} and {16, 17, 24, 25}
Splitting t7 into {32} and {8, 9}
Splitting t7 into {8} and {9}
Splitting t8 into {14, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26} and {32, 33, 34, 3
5, 36, 37, 38, 27, 28, 29, 30}
Splitting t8 into {14, 16, 17, 18, 19} and {20, 21, 22, 24, 25, 26}
Splitting t8 into {16, 14} and {17, 18, 19}
Splitting t8 into {16} and {14}
Splitting t9 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33, 3
4, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t9 into {3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t9 into {3, 4, 5} and {8, 9, 10}
Splitting t9 into {3} and {4, 5}
Splitting t10 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t10 into {32, 33, 34} and {8, 9, 10}
Splitting t10 into {32} and {33, 34}
task, t1 1
task, t2 5
task, t3 5
task, t4 4
task, t5 2
task, t6 5
task, t7 4
task, t8 2
task, t9 6
task, t10 2
constraint, t4 before t6
```

```
constraint, t6 before t7
constraint, t6 before t10
constraint, t1 before t5
constraint, t2 before t9
constraint, t7 before t10
constraint, t7 before t8
constraint, t1 before t4
constraint, t7 before t9
constraint, t1 before t7
constraint, t3 before t8
constraint, t3 same-day t9
constraint, t5 same-day t6
domain, t2 wed
domain, t7 wed
domain, t1 ends-by fri 3pm 0
domain, t5 ends-by mon 1pm 0
domain, t7 ends-by wed 2pm 0
domain, t9 ends-by fri 12pm 0
domain, t10 ends-by thu 2pm 0
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16} and {17, 18}
Splitting t3 into {32, 24} and {25, 26}
Splitting t3 into {32} and {24}
Splitting t4 into {1} and {2, 3}
Splitting t5 into {8, 9, 10} and {11, 12, 13}
Splitting t5 into {8} and {9, 10}
Splitting t6 into {8} and {9, 10}
Splitting t7 into {16, 17} and {18, 19}
Splitting t7 into {16} and {17}
Splitting t9 into {32} and {33}
Splitting t10 into {32, 33, 34, 35, 36, 37, 20} and {21, 24, 25, 26, 27, 28, 29}
Splitting t10 into {32, 33, 34} and {20, 35, 36, 37}
Splitting t10 into {32} and {33, 34}
task, t1 1
task, t2 5
task, t3 5
task, t4 4
task, t5 2
task, t6 5
task, t7 4
task, t8 2
task, t9 6
task, t10 2
constraint, t4 before t6
constraint, t6 before t7
constraint, t6 before t10
constraint, t1 before t5
constraint, t2 before t9
constraint, t7 before t10
constraint, t7 before t8
constraint, t1 before t4
constraint, t7 before t9
constraint, t1 before t7
constraint, t3 before t8
constraint, t3 same-day t9
constraint, t5 same-day t6
domain, t2 wed
domain, t7 wed
domain, t1 ends-by fri 3pm 5
domain, t5 ends-by mon 1pm 20
```

```
domain, t7 ends-by wed 2pm 15
domain, t9 ends-by fri 12pm 5
domain, t10 ends-by thu 2pm 5
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16} and {17, 18}
Splitting t3 into {32, 24} and {25, 26}
Splitting t3 into {32} and {24}
Splitting t4 into {1} and {2, 3}
Splitting t5 into {8, 9, 10} and {11, 12, 13}
Splitting t5 into {8} and {9, 10}
Splitting t6 into {8} and {9, 10}
Splitting t7 into {16, 17} and {18, 19}
Splitting t7 into {16} and {17}
Splitting t8 into {32, 33, 34} and {29, 35, 36, 37}
Splitting t8 into {32} and {33, 34}
Splitting t9 into {24} and {25}
Splitting t10 into {32, 33, 34, 35, 36, 37, 20} and {21, 24, 25, 26, 27, 28, 29}
Splitting t10 into {32, 33, 34} and {20, 35, 36, 37}
Splitting t10 into {35, 20} and {36, 37}
Splitting t10 into {35} and {20}
task, t1 5
task, t2 3
task, t3 5
task, t4 3
task, t5 6
task, t6 2
task, t7 1
task, t8 1
task, t9 2
task, t10 4
constraint, t2 before t9
constraint, t1 before t10
constraint, t1 before t2
constraint, t4 before t10
constraint, t1 before t7
constraint, t6 before t7
constraint, t2 before t10
constraint, t2 before t3
constraint, t4 same-day t9
constraint, t5 same-day t7
constraint, t8 same-day t10
domain, t7 tue
domain, t2 ends-by wed 11am 0
domain, t4 ends-by thu 12pm 0
domain, t6 ends-by wed 2pm 0
domain, t8 ends-by thu 4pm 0
domain, t9 ends-by fri 12pm 0
Splitting t1 into {0, 1} and {8, 9, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {8, 9, 10} and {16, 17, 11, 12}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t3 into {32, 33} and {16, 34}
Splitting t3 into {32} and {33}
Splitting t4 into {32, 8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27,
28}
Splitting t4 into {32, 8, 10, 9} and {16, 17, 11, 12}
Splitting t4 into {32, 8} and {9, 10}
Splitting t4 into {32} and {8}
```

```
Splitting t5 into {8} and {9}
Splitting t6 into {0, 1, 2, 3, 4} and {5, 8, 9, 10, 11, 12}
Splitting t6 into {0, 1} and {2, 3, 4}
Splitting t6 into {0} and {1}
Splitting t7 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t7 into {8} and {9, 10}
Splitting t8 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t8 into {32} and {33, 34}
Splitting t9 into {32, 33, 34} and {35, 36, 37}
Splitting t9 into {32} and {33, 34}
task, t1 5
task, t2 3
task, t3 5
task, t4 3
task, t5 6
task, t6 2
task, t7 1
task, t8 1
task, t9 2
task, t10 4
constraint, t2 before t9
constraint, t1 before t10
constraint, t1 before t2
constraint, t4 before t10
constraint, t1 before t7
constraint, t6 before t7
constraint, t2 before t10
constraint, t2 before t3
constraint, t4 same-day t9
constraint, t5 same-day t7
constraint, t8 same-day t10
domain, t7 tue
domain, t2 ends-by wed 11am 20
domain, t4 ends-by thu 12pm 20
domain, t6 ends-by wed 2pm 10
domain, t8 ends-by thu 4pm 10
domain, t9 ends-by fri 12pm 20
Splitting t1 into {0, 1} and {8, 9, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {8, 9, 10} and {16, 17, 11, 12}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t3 into {32, 33} and {16, 34}
Splitting t3 into {32} and {33}
Splitting t4 into {32, 8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27,
28}
Splitting t4 into {32, 8, 10, 9} and {16, 17, 11, 12}
Splitting t4 into {32, 8} and {9, 10}
Splitting t4 into {32} and {8}
Splitting t5 into {8} and {9}
Splitting t6 into {0, 1, 2, 3, 4} and {5, 8, 9, 10, 11, 12}
Splitting t6 into {0, 1} and {2, 3, 4}
Splitting t6 into {0} and {1}
Splitting t7 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t7 into {8} and {9, 10}
Splitting t8 into {8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22} and {32,
33, 34, 35, 36, 37, 38, 24, 25, 26, 27, 28, 29, 30}
Splitting t8 into {8, 9, 10, 11, 12, 13, 14} and {16, 17, 18, 19, 20, 21, 22}
Splitting t8 into {8, 9, 10} and {11, 12, 13, 14}
```

```
Splitting t8 into {8} and {9, 10}
Splitting t9 into {11} and {12, 13}
task, t1 3
task, t2 4
task, t3 3
task, t4 4
task, t5 2
task, t6 2
task, t7 6
task, t8 5
task, t9 5
task, t10 4
constraint, t2 before t6
constraint, t1 before t5
constraint, t1 before t6
constraint, t5 before t9
constraint, t4 before t10
constraint, t2 before t10
constraint, t1 before t4
constraint, t8 before t10
constraint, t3 before t8
constraint, t1 before t8
constraint, t1 before t10
domain, t1 fri
domain, t4 thu
domain, t5 tue
domain, t1 ends-by fri 2pm 0
domain, t3 ends-by fri 4pm 0
domain, t4 ends-by thu 4pm 0
domain, t8 ends-by mon 1pm 0
domain, t9 ends-by wed 4pm 0
Splitting t7 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
... t7 in {0, 1, 32, 33, 8} has no solution
... t7 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 3
task, t2 4
task, t3 3
task, t4 4
task, t5 2
task, t6 2
task, t7 6
task, t8 5
task, t9 5
task, t10 4
constraint, t2 before t6
constraint, t1 before t5
constraint, t1 before t6
constraint, t5 before t9
constraint, t4 before t10
constraint, t2 before t10
constraint, t1 before t4
constraint, t8 before t10
constraint, t3 before t8
constraint, t1 before t8
constraint, t1 before t10
domain, t1 fri
domain, t4 thu
domain, t5 tue
domain, t1 ends-by fri 2pm 20
```

```
domain, t3 ends-by fri 4pm 20
domain, t4 ends-by thu 4pm 10
domain, t8 ends-by mon 1pm 10
domain, t9 ends-by wed 4pm 15
Splitting t7 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
... t7 in {0, 1, 32, 33, 8} has no solution
... t7 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 5
task, t3 4
task, t4 3
task, t5 3
task, t6 4
task, t7 3
task, t8 6
task, t9 3
task, t10 2
constraint, t6 before t7
constraint, t1 before t3
constraint, t4 before t6
constraint, t1 before t6
constraint, t1 before t9
constraint, t6 before t8
constraint, t4 before t8
constraint, t6 before t9
constraint, t4 before t9
constraint, t5 before t9
constraint, t2 before t3
constraint, t4 before t5
constraint, t8 before t9
constraint, t3 before t10
constraint, t7 before t9
domain, t4 thu
domain, t5 mon
domain, t9 thu
domain, t2 ends-by mon 3pm 0
domain, t3 ends-by fri 12pm 0
domain, t7 ends-by wed 1pm 0
domain, t8 ends-by fri 11am 0
domain, t10 ends-by wed 11am 0
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 5
task, t3 4
task, t4 3
task, t5 3
task, t6 4
task, t7 3
task, t8 6
task, t9 3
task, t10 2
constraint, t6 before t7
constraint, t1 before t3
constraint, t4 before t6
constraint, t1 before t6
constraint, t1 before t9
constraint, t6 before t8
constraint, t4 before t8
constraint, t6 before t9
```

```
constraint, t4 before t9
constraint, t5 before t9
constraint, t2 before t3
constraint, t4 before t5
constraint, t8 before t9
constraint, t3 before t10
constraint, t7 before t9
domain, t4 thu
domain, t5 mon
domain, t9 thu
domain, t2 ends-by mon 3pm 5
domain, t3 ends-by fri 12pm 20
domain, t7 ends-by wed 1pm 10
domain, t8 ends-by fri 11am 15
domain, t10 ends-by wed 11am 10
No (more) solutions. Total of 1 paths expanded.
task, t1 1
task, t2 4
task, t3 1
task, t4 4
task, t5 3
task, t6 3
task, t7 4
task, t8 2
task, t9 1
task, t10 6
task, t11 5
task, t12 2
constraint, t9 before t11
constraint, t3 before t5
constraint, t7 before t8
constraint, t3 before t7
constraint, t9 before t12
constraint, t4 before t7
constraint, t1 before t7
constraint, t6 before t9
constraint, t6 same-day t9
constraint, t6 same-day t7
domain, t1 ends-by wed 12pm 0
domain, t3 ends-by fri 3pm 0
domain, t4 ends-by thu 12pm 0
domain, t6 ends-by wed 12pm 0
domain, t7 ends-by thu 12pm 0
domain, t9 ends-by mon 12pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {6, 8, 9, 10, 11, 12}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26}
Splitting t3 into {0, 1, 2, 3, 4, 5} and {6, 8, 9, 10, 11, 12}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 8, 9} and {10, 11, 16, 17, 18, 19}
```

```
Splitting t4 into {0, 1, 2} and {8, 9, 3}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17, 18} and {32, 33, 34, 35,
36, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {1, 2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18}
Splitting t5 into {1, 2, 3} and {8, 9, 4}
Splitting t5 into {1} and {2, 3}
Splitting t6 into {8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27}
Splitting t6 into {8, 9, 10} and {16, 17, 11, 12}
Splitting t6 into {8} and {9, 10}
Splitting t7 into {8, 9} and {10, 11}
Splitting t7 into {8} and {9}
Splitting t8 into {12, 13, 16, 17, 18, 19, 20, 21, 24, 25} and {32, 33, 34, 35, 3
6, 37, 26, 27, 28, 29}
Splitting t8 into {12, 13, 16, 17, 18} and {19, 20, 21, 24, 25}
Splitting t8 into {12, 13} and {16, 17, 18}
Splitting t8 into {12} and {13}
Splitting t9 into {11, 12} and {13, 14}
Splitting t9 into {11} and {12}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
Splitting t11 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t11 into {32, 33} and {16, 34}
Splitting t11 into {32} and {33}
Splitting t12 into {12, 13, 16, 17, 18, 19, 20, 21, 24, 25} and {32, 33, 34, 35,
36, 37, 26, 27, 28, 29}
Splitting t12 into {12, 13, 16, 17, 18} and {19, 20, 21, 24, 25}
Splitting t12 into {12, 13} and {16, 17, 18}
Splitting t12 into {12} and {13}
task, t1 1
task, t2 4
task, t3 1
task, t4 4
task, t5 3
task, t6 3
task, t7 4
task, t8 2
task, t9 1
task, t10 6
task, t11 5
task, t12 2
constraint, t9 before t11
constraint, t3 before t5
constraint, t7 before t8
constraint, t3 before t7
constraint, t9 before t12
constraint, t4 before t7
constraint, t1 before t7
constraint, t6 before t9
constraint, t6 same-day t9
constraint, t6 same-day t7
domain, t1 ends-by wed 12pm 10
domain, t3 ends-by fri 3pm 5
domain, t4 ends-by thu 12pm 10
domain, t6 ends-by wed 12pm 10
domain, t7 ends-by thu 12pm 5
domain, t9 ends-by mon 12pm 20
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26}
```

```
Splitting t1 into {0, 1, 2, 3, 4, 5} and {6, 8, 9, 10, 11, 12}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26}
Splitting t3 into {0, 1, 2, 3, 4, 5} and {6, 8, 9, 10, 11, 12}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 8, 9} and {10, 11, 16, 17, 18, 19}
Splitting t4 into {0, 1, 2} and {8, 9, 3}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17, 18} and {32, 33, 34, 35,
36, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {1, 2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18}
Splitting t5 into {1, 2, 3} and {8, 9, 4}
Splitting t5 into {1} and {2, 3}
Splitting t6 into {8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27}
Splitting t6 into {8, 9, 10} and {16, 17, 11, 12}
Splitting t6 into {8} and {9, 10}
Splitting t7 into {8, 9} and {10, 11}
Splitting t7 into {8} and {9}
Splitting t8 into {12, 13, 16, 17, 18, 19, 20, 21, 24, 25} and {32, 33, 34, 35, 3
6, 37, 26, 27, 28, 29}
Splitting t8 into {12, 13, 16, 17, 18} and {19, 20, 21, 24, 25}
Splitting t8 into {12, 13} and {16, 17, 18}
Splitting t8 into {12} and {13}
Splitting t9 into {11, 12} and {13, 14}
Splitting t9 into {11} and {12}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
Splitting t11 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t11 into {32, 33} and {16, 34}
Splitting t11 into {32} and {33}
Splitting t12 into {12, 13, 16, 17, 18, 19, 20, 21, 24, 25} and {32, 33, 34, 35,
36, 37, 26, 27, 28, 29}
Splitting t12 into {12, 13, 16, 17, 18} and {19, 20, 21, 24, 25}
Splitting t12 into {12, 13} and {16, 17, 18}
Splitting t12 into {12} and {13}
task, t1 4
task, t2 4
task, t3 6
task, t4 1
task, t5 2
task, t6 5
task, t7 3
task, t8 6
task, t9 3
task, t10 6
task, t11 1
task, t12 5
constraint, t11 before t12
constraint, t1 before t3
constraint, t5 same-day t7
constraint, t5 same-day t8
```

```
constraint, t8 same-day t11
domain, t3 tue
domain, t4 fri
domain, t11 mon
domain, t1 ends-by mon 11am 0
domain, t3 ends-by tue 4pm 0
domain, t6 ends-by thu 1pm 0
domain, t8 ends-by thu 1pm 0
domain, t9 ends-by fri 12pm 0
domain, t11 ends-by mon 4pm 0
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {8} and {9}
Splitting t4 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t4 into {32} and {33, 34}
Splitting t5 into {0, 1, 2} and {3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t6 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {0, 1} and {2, 3, 4}
Splitting t7 into {0} and {1}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t9 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t9 into {0, 1, 2} and {8, 3, 4}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
Splitting t11 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t11 into {0} and {1, 2}
Splitting t12 into {32, 1, 2, 34, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t12 into {32, 1, 2} and {8, 33, 34, 9}
Splitting t12 into {32} and {1, 2}
task, t1 4
task, t2 4
task, t3 6
task, t4 1
task, t5 2
task, t6 5
task, t7 3
task, t8 6
task, t9 3
task, t10 6
task, t11 1
task, t12 5
constraint, t11 before t12
constraint, t1 before t3
constraint, t5 same-day t7
constraint, t5 same-day t8
constraint, t8 same-day t11
domain, t3 tue
domain, t4 fri
```

```
domain, t11 mon
domain, t1 ends-by mon 11am 5
domain, t3 ends-by tue 4pm 10
domain, t6 ends-by thu 1pm 5
domain, t8 ends-by thu 1pm 5
domain, t9 ends-by fri 12pm 5
domain, t11 ends-by mon 4pm 15
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {8} and {9}
Splitting t4 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t4 into {32} and {33, 34}
Splitting t5 into {0, 1, 2} and {3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t6 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {0, 1} and {2, 3, 4}
Splitting t7 into {0} and {1}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t9 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t9 into {0, 1, 2} and {8, 3, 4}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t10 into {0, 1} and {32, 33, 8}
Splitting t10 into {0} and {1}
Splitting t11 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t11 into {0} and {1, 2}
Splitting t12 into {32, 1, 2, 34, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t12 into {32, 1, 2} and {8, 33, 34, 9}
Splitting t12 into {32} and {1, 2}
task, t1 6
task, t2 5
task, t3 6
task, t4 2
task, t5 5
task, t6 6
task, t7 5
task, t8 5
task, t9 2
task, t10 5
task, t11 5
task, t12 3
constraint, t3 same-day t12
domain, t1 wed
domain, t1 ends-by wed 12pm 0
domain, t2 ends-by thu 2pm 0
domain, t3 ends-by wed 1pm 0
domain, t7 ends-by thu 4pm 0
domain, t10 ends-by thu 4pm 0
domain, t11 ends-by thu 12pm 0
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
```

```
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t6 into {0, 1} and {32, 33, 8}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t7 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t8 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t9 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t10 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t10 into {0} and {1, 2}
Splitting t11 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t11 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t11 into {0} and {1, 2}
Splitting t12 into {0, 1} and {2, 3, 4}
Splitting t12 into {0} and {1}
task, t1 6
task, t2 5
task, t3 6
task, t4 2
task, t5 5
task, t6 6
task, t7 5
task, t8 5
task, t9 2
task, t10 5
task, t11 5
task, t12 3
constraint, t3 same-day t12
domain, t1 wed
domain, t1 ends-by wed 12pm 15
domain, t2 ends-by thu 2pm 15
domain, t3 ends-by wed 1pm 15
domain, t7 ends-by thu 4pm 10
domain, t10 ends-by thu 4pm 10
domain, t11 ends-by thu 12pm 20
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
```

```
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t6 into {0, 1} and {32, 33, 8}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t7 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t8 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t9 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t9 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t10 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t10 into {0} and {1, 2}
Splitting t11 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t11 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t11 into {0} and {1, 2}
Splitting t12 into {0, 1} and {2, 3, 4}
Splitting t12 into {0} and {1}
task, t1 5
task, t2 6
task, t3 3
task, t4 3
task, t5 1
task, t6 1
task, t7 6
task, t8 2
task, t9 6
task, t10 3
task, t11 3
task, t12 6
constraint, t8 before t10
constraint, t3 before t10
constraint, t3 before t8
constraint, t8 before t12
constraint, t1 before t11
constraint, t4 before t11
constraint, t6 before t10
constraint, t2 before t10
constraint, t1 before t10
constraint, t4 before t7
constraint, t2 before t12
constraint, t7 before t10
constraint, t1 before t9
constraint, t6 before t12
constraint, t2 before t8
constraint, t4 same-day t9
```

```
constraint, t4 same-day t11
constraint, t5 same-day t10
constraint, t6 same-day t8
domain, t3 ends-by fri 2pm 0
domain, t6 ends-by wed 2pm 0
domain, t7 ends-by wed 2pm 0
domain, t8 ends-by thu 4pm 0
domain, t10 ends-by mon 12pm 0
domain, t12 ends-by wed 12pm 0
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 8} and {16, 9, 17}
Splitting t2 into {0} and {8, 1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11} and {12, 16, 17, 18, 19, 20, 24,
25, 26}
Splitting t3 into {0, 1, 2, 3} and {4, 8, 9, 10, 11}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10} and {16, 17, 11, 12}
Splitting t4 into {8} and {9}
Splitting t5 into {32, 33, 34, 35, 36, 37, 38} and {24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t5 into {32} and {33, 34}
Splitting t6 into {8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and {19, 20, 21, 22, 24,
25, 26, 27, 28, 29, 30}
Splitting t6 into {8, 9, 10, 11, 12} and {13, 14, 16, 17, 18}
Splitting t6 into {8, 9} and {10, 11, 12}
Splitting t6 into {8} and {9}
Splitting t7 into {16, 17} and {24, 25}
Splitting t7 into {16} and {17}
Splitting t8 into {8, 9, 10} and {11, 12, 13}
Splitting t8 into {8} and {9, 10}
Splitting t9 into {8} and {9}
Splitting t10 into {32, 33} and {34, 35, 36}
Splitting t10 into {32} and {33}
Splitting t11 into {11} and {12}
Splitting t12 into {32, 33, 16} and {24, 17, 25}
Splitting t12 into {32} and {16, 33}
task, t1 5
task, t2 6
task, t3 3
task, t4 3
task, t5 1
task, t6 1
task, t7 6
task, t8 2
task, t9 6
task, t10 3
task, t11 3
task, t12 6
constraint, t8 before t10
constraint, t3 before t10
constraint, t3 before t8
constraint, t8 before t12
constraint, t1 before t11
constraint, t4 before t11
constraint, t6 before t10
constraint, t2 before t10
constraint, t1 before t10
constraint, t4 before t7
```

```
constraint, t2 before t12
constraint, t7 before t10
constraint, t1 before t9
constraint, t6 before t12
constraint, t2 before t8
constraint, t4 same-day t9
constraint, t4 same-day t11
constraint, t5 same-day t10
constraint, t6 same-day t8
domain, t3 ends-by fri 2pm 5
domain, t6 ends-by wed 2pm 15
domain, t7 ends-by wed 2pm 15
domain, t8 ends-by thu 4pm 15
domain, t10 ends-by mon 12pm 20
domain, t12 ends-by wed 12pm 5
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 8} and {16, 9, 17}
Splitting t2 into {0} and {8, 1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11} and {12, 16, 17, 18, 19, 20, 24,
25, 26}
Splitting t3 into {0, 1, 2, 3} and {4, 8, 9, 10, 11}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10} and {16, 17, 11, 12}
Splitting t4 into {8} and {9}
Splitting t5 into {32, 33, 34, 35, 36, 37, 38} and {24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t5 into {24} and {25, 26}
Splitting t6 into {8, 9, 10, 11, 12, 13, 14, 16, 17} and {18, 19, 20, 21, 22, 24,
25, 26, 27}
Splitting t6 into {8, 9, 10, 11} and {12, 13, 14, 16, 17}
Splitting t6 into {8, 9} and {10, 11}
Splitting t6 into {8} and {9}
Splitting t7 into {16} and {17}
Splitting t8 into {8, 9, 10} and {11, 12, 13}
Splitting t8 into {8} and {9, 10}
Splitting t9 into {8} and {9}
Splitting t10 into {24, 25} and {26, 27, 28}
Splitting t10 into {24} and {25}
Splitting t11 into {11} and {12}
Splitting t12 into {32, 33, 16} and {24, 17, 25}
Splitting t12 into {32} and {16, 33}
Splitting t12 into {16} and {33}
task, t1 3
task, t2 1
task, t3 4
task, t4 4
task, t5 2
task, t6 5
task, t7 4
task, t8 2
task, t9 6
task, t10 6
task, t11 6
task, t12 6
constraint, t5 before t6
constraint, t4 before t9
constraint, t9 before t12
constraint, t4 before t10
```

```
constraint, t6 before t10
constraint, t3 before t12
constraint, t3 before t8
constraint, t4 before t5
constraint, t3 before t5
constraint, t1 before t5
domain, t5 fri
domain, t8 fri
domain, t2 ends-by thu 4pm 0
domain, t3 ends-by tue 1pm 0
domain, t4 ends-by tue 3pm 0
domain, t5 ends-by fri 11am 0
domain, t11 ends-by tue 12pm 0
domain, t12 ends-by thu 12pm 0
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
... t2 in {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} has no solu
tion
... t2 in {32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 3
0} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 3
task, t2 1
task, t3 4
task, t4 4
task, t5 2
task, t6 5
task, t7 4
task, t8 2
task, t9 6
task, t10 6
task, t11 6
task, t12 6
constraint, t5 before t6
constraint, t4 before t9
constraint, t9 before t12
constraint, t4 before t10
constraint, t6 before t10
constraint, t3 before t12
constraint, t3 before t8
constraint, t4 before t5
constraint, t3 before t5
constraint, t1 before t5
domain, t5 fri
domain, t8 fri
domain, t2 ends-by thu 4pm 10
domain, t3 ends-by tue 1pm 15
domain, t4 ends-by tue 3pm 15
domain, t5 ends-by fri 11am 20
domain, t11 ends-by tue 12pm 10
domain, t12 ends-by thu 12pm 20
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
... t2 in {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} has no solu
tion
... t2 in {32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 3
0} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 3
```

```
task, t3 5
task, t4 1
task, t5 6
task, t6 1
task, t7 6
task, t8 3
task, t9 2
task, t10 1
task, t11 1
task, t12 3
constraint, t9 before t11
constraint, t3 before t12
constraint, t5 before t10
constraint, t3 before t9
constraint, t1 before t4
constraint, t4 before t7
constraint, t6 before t11
constraint, t9 before t12
constraint, t8 before t11
constraint, t1 before t12
constraint, t2 before t5
constraint, t2 before t10
constraint, t3 before t4
constraint, t3 before t11
constraint, t10 before t12
constraint, t7 before t9
constraint, t1 before t2
constraint, t2 before t7
constraint, t7 before t8
constraint, t1 before t5
constraint, t5 same-day t10
domain, t8 mon
domain, t9 fri
domain, t1 ends-by fri 12pm 0
domain, t2 ends-by tue 1pm 0
domain, t5 ends-by tue 2pm 0
domain, t6 ends-by fri 11am 0
domain, t7 ends-by wed 3pm 0
domain, t12 ends-by tue 2pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 3
task, t3 5
task, t4 1
task, t5 6
task, t6 1
task, t7 6
task, t8 3
task, t9 2
task, t10 1
task, t11 1
task, t12 3
constraint, t9 before t11
constraint, t3 before t12
constraint, t5 before t10
constraint, t3 before t9
constraint, t1 before t4
constraint, t4 before t7
constraint, t6 before t11
constraint, t9 before t12
```

```
constraint, t8 before t11
constraint, t1 before t12
constraint, t2 before t5
constraint, t2 before t10
constraint, t3 before t4
constraint, t3 before t11
constraint, t10 before t12
constraint, t7 before t9
constraint, t1 before t2
constraint, t2 before t7
constraint, t7 before t8
constraint, t1 before t5
constraint, t5 same-day t10
domain, t8 mon
domain, t9 fri
domain, t1 ends-by fri 12pm 15
domain, t2 ends-by tue 1pm 20
domain, t5 ends-by tue 2pm 15
domain, t6 ends-by fri 11am 15
domain, t7 ends-by wed 3pm 20
domain, t12 ends-by tue 2pm 20
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 6
task, t3 5
task, t4 3
task, t5 4
task, t6 4
task, t7 4
task, t8 2
task, t9 2
task, t10 4
task, t11 1
task, t12 2
constraint, t4 before t5
constraint, t2 same-day t6
constraint, t6 same-day t7
constraint, t4 same-day t11
constraint, t1 same-day t9
domain, t4 tue
domain, t11 thu
domain, t2 ends-by mon 1pm 0
domain, t3 ends-by mon 4pm 0
domain, t4 ends-by tue 1pm 0
domain, t6 ends-by tue 11am 0
domain, t8 ends-by tue 1pm 0
domain, t12 ends-by mon 11am 0
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
... t1 in {0, 1, 2, 32, 33, 34, 8} has no solution
... t1 in {9, 10, 16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 6
task, t3 5
task, t4 3
task, t5 4
task, t6 4
task, t7 4
task, t8 2
task, t9 2
```

```
task, t10 4
task, t11 1
task, t12 2
constraint, t4 before t5
constraint, t2 same-day t6
constraint, t6 same-day t7
constraint, t4 same-day t11
constraint, t1 same-day t9
domain, t4 tue
domain, t11 thu
domain, t2 ends-by mon 1pm 10
domain, t3 ends-by mon 4pm 15
domain, t4 ends-by tue 1pm 10
domain, t6 ends-by tue 11am 10
domain, t8 ends-by tue 1pm 15
domain, t12 ends-by mon 11am 10
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
... t1 in {0, 1, 2, 32, 33, 34, 8} has no solution
... t1 in {9, 10, 16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 4
task, t3 3
task, t4 6
task, t5 2
task, t6 1
task, t7 1
task, t8 2
task, t9 5
task, t10 5
task, t11 2
task, t12 2
constraint, t8 same-day t10
constraint, t6 same-day t11
constraint, t1 same-day t3
constraint, t2 same-day t9
domain, t2 tue
domain, t8 wed
domain, t9 wed
domain, t12 mon
domain, t4 ends-by wed 1pm 0
domain, t5 ends-by wed 2pm 0
domain, t6 ends-by mon 4pm 0
domain, t10 ends-by thu 12pm 0
domain, t11 ends-by tue 1pm 0
domain, t12 ends-by mon 2pm 0
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
... t1 in {0, 1, 2, 32, 33, 34, 8} has no solution
... t1 in {9, 10, 16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 4
task, t3 3
task, t4 6
task, t5 2
task, t6 1
task, t7 1
task, t8 2
task, t9 5
task, t10 5
```

```
task, t11 2
task, t12 2
constraint, t8 same-day t10
constraint, t6 same-day t11
constraint, t1 same-day t3
constraint, t2 same-day t9
domain, t2 tue
domain, t8 wed
domain, t9 wed
domain, t12 mon
domain, t4 ends-by wed 1pm 15
domain, t5 ends-by wed 2pm 20
domain, t6 ends-by mon 4pm 5
domain, t10 ends-by thu 12pm 10
domain, t11 ends-by tue 1pm 15
domain, t12 ends-by mon 2pm 20
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
... t1 in {0, 1, 2, 32, 33, 34, 8} has no solution
... t1 in {9, 10, 16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 5
task, t3 4
task, t4 2
task, t5 5
task, t6 4
task, t7 3
task, t8 1
task, t9 6
task, t10 2
task, t11 5
task, t12 4
constraint, t5 before t10
constraint, t6 same-day t7
domain, t5 tue
domain, t8 wed
domain, t11 tue
domain, t12 tue
domain, t3 ends-by thu 2pm 0
domain, t4 ends-by tue 1pm 0
domain, t7 ends-by thu 4pm 0
domain, t8 ends-by wed 2pm 0
domain, t9 ends-by thu 4pm 0
domain, t12 ends-by tue 11am 0
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
```

```
Splitting t5 into {8} and {9, 10}
Splitting t6 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t6 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t6 into {0, 1} and {8, 2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1} and {2, 3, 4}
Splitting t7 into {0} and {1}
Splitting t8 into {16, 17, 18} and {19, 20, 21, 22}
Splitting t8 into {16} and {17, 18}
Splitting t9 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t9 into {0, 1} and {32, 33, 8}
Splitting t9 into {0} and {1}
Splitting t10 into {13, 16, 17, 18, 19, 20, 21, 24, 25} and {32, 33, 34, 35, 36,
37, 26, 27, 28, 29}
Splitting t10 into {16, 17, 18, 13} and {19, 20, 21, 24, 25}
Splitting t10 into {16, 17} and {18, 13}
Splitting t10 into {16} and {17}
Splitting t11 into {8} and {9, 10}
Splitting t12 into {8, 9} and {10, 11}
Splitting t12 into {8} and {9}
task, t1 6
task, t2 5
task, t3 4
task, t4 2
task, t5 5
task, t6 4
task, t7 3
task, t8 1
task, t9 6
task, t10 2
task, t11 5
task, t12 4
constraint, t5 before t10
constraint, t6 same-day t7
domain, t5 tue
domain, t8 wed
domain, t11 tue
domain, t12 tue
domain, t3 ends-by thu 2pm 15
domain, t4 ends-by tue 1pm 15
domain, t7 ends-by thu 4pm 10
domain, t8 ends-by wed 2pm 20
domain, t9 ends-by thu 4pm 10
domain, t12 ends-by tue 11am 15
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
```

```
Splitting t4 into {0} and {1, 2}
Splitting t5 into {8} and {9, 10}
Splitting t6 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t6 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t6 into {0, 1} and {8, 2, 3}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1} and {2, 3, 4}
Splitting t7 into {0} and {1}
Splitting t8 into {16, 17, 18} and {19, 20, 21, 22}
Splitting t8 into {16} and {17, 18}
Splitting t9 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t9 into {0, 1} and {32, 33, 8}
Splitting t9 into {0} and {1}
Splitting t10 into {13, 16, 17, 18, 19, 20, 21, 24, 25} and {32, 33, 34, 35, 36,
37, 26, 27, 28, 29}
Splitting t10 into {16, 17, 18, 13} and {19, 20, 21, 24, 25}
Splitting t10 into {16, 17} and {18, 13}
Splitting t10 into {16} and {17}
Splitting t11 into {8} and {9, 10}
Splitting t12 into {8, 9} and {10, 11}
Splitting t12 into {8} and {9}
task, t1 5
task, t2 5
task, t3 6
task, t4 1
task, t5 6
task, t6 4
task, t7 5
task, t8 1
task, t9 4
task, t10 5
task, t11 5
task, t12 2
constraint, t4 before t6
constraint, t1 before t7
constraint, t4 before t5
constraint, t7 before t12
constraint, t2 before t4
constraint, t4 before t10
constraint, t3 before t10
constraint, t3 before t12
constraint, t4 before t8
constraint, t3 before t5
constraint, t3 before t6
constraint, t9 before t10
constraint, t6 before t11
constraint, t2 before t6
constraint, t7 before t10
constraint, t11 before t12
constraint, t6 same-day t11
domain, t9 fri
domain, t1 ends-by wed 2pm 0
domain, t2 ends-by wed 1pm 0
domain, t4 ends-by mon 12pm 0
domain, t6 ends-by wed 2pm 0
domain, t9 ends-by fri 11am 0
domain, t12 ends-by mon 1pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 5
```

```
task, t2 5
task, t3 6
task, t4 1
task, t5 6
task, t6 4
task, t7 5
task, t8 1
task, t9 4
task, t10 5
task, t11 5
task, t12 2
constraint, t4 before t6
constraint, t1 before t7
constraint, t4 before t5
constraint, t7 before t12
constraint, t2 before t4
constraint, t4 before t10
constraint, t3 before t10
constraint, t3 before t12
constraint, t4 before t8
constraint, t3 before t5
constraint, t3 before t6
constraint, t9 before t10
constraint, t6 before t11
constraint, t2 before t6
constraint, t7 before t10
constraint, t11 before t12
constraint, t6 same-day t11
domain, t9 fri
domain, t1 ends-by wed 2pm 20
domain, t2 ends-by wed 1pm 20
domain, t4 ends-by mon 12pm 15
domain, t6 ends-by wed 2pm 15
domain, t9 ends-by fri 11am 5
domain, t12 ends-by mon 1pm 10
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 1
task, t3 3
task, t4 5
task, t5 3
task, t6 5
task, t7 6
task, t8 2
task, t9 6
task, t10 5
task, t11 3
task, t12 5
constraint, t7 before t11
constraint, t2 before t3
constraint, t3 before t12
constraint, t5 before t10
domain, t3 ends-by thu 11am 0
domain, t5 ends-by mon 4pm 0
domain, t9 ends-by fri 4pm 0
domain, t10 ends-by thu 3pm 0
domain, t11 ends-by thu 4pm 0
domain, t12 ends-by mon 11am 0
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
```

```
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {6, 8, 9, 10, 11, 12}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24, 25,
26, 27, 28}
Splitting t3 into {1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t3 into {1, 2} and {3, 4}
Splitting t3 into {1} and {2}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t5 into {0, 1} and {2, 3, 4}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t6 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t7 into {0, 1} and {8, 9}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t8 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t9 into {0, 1} and {32, 33, 8}
Splitting t9 into {0} and {1}
Splitting t10 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t10 into {32, 33, 34} and {8, 9, 10}
Splitting t10 into {32} and {33, 34}
Splitting t11 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 3
6, 24, 25, 26, 27, 28}
Splitting t11 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t11 into {8, 9} and {10, 11, 12}
Splitting t11 into {8} and {9}
Splitting t12 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t12 into {32, 33, 34} and {8, 9, 10}
Splitting t12 into {32} and {33, 34}
task, t1 6
task, t2 1
task, t3 3
task, t4 5
task, t5 3
task, t6 5
task, t7 6
task, t8 2
task, t9 6
task, t10 5
task, t11 3
task, t12 5
constraint, t7 before t11
constraint, t2 before t3
constraint, t3 before t12
constraint, t5 before t10
```

```
domain, t3 ends-by thu 11am 20
domain, t5 ends-by mon 4pm 15
domain, t9 ends-by fri 4pm 15
domain, t10 ends-by thu 3pm 15
domain, t11 ends-by thu 4pm 15
domain, t12 ends-by mon 11am 20
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {6, 8, 9, 10, 11, 12}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24, 25,
26, 27, 28}
Splitting t3 into {1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t3 into {1, 2} and {3, 4}
Splitting t3 into {1} and {2}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t5 into {0, 1} and {2, 3, 4}
Splitting t5 into {0} and {1}
Splitting t6 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t6 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t6 into {0} and {1, 2}
Splitting t7 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t7 into {0, 1} and {8, 9}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t8 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t9 into {0, 1} and {32, 33, 8}
Splitting t9 into {0} and {1}
Splitting t10 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t10 into {32, 33, 34} and {8, 9, 10}
Splitting t10 into {8} and {9, 10}
Splitting t11 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 3
6, 24, 25, 26, 27, 28}
Splitting t11 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t11 into {8, 9} and {10, 11, 12}
Splitting t11 into {8} and {9}
Splitting t12 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t12 into {32, 33, 34} and {8, 9, 10}
Splitting t12 into {8} and {9, 10}
task, t1 6
task, t2 2
task, t3 1
task, t4 6
task, t5 1
task, t6 2
task, t7 3
task, t8 2
```

```
task, t9 1
task, t10 6
task, t11 5
task, t12 2
constraint, t2 before t9
constraint, t4 before t7
constraint, t11 before t12
constraint, t2 before t6
constraint, t4 before t6
constraint, t7 before t9
constraint, t1 before t8
constraint, t2 before t7
constraint, t3 same-day t11
constraint, t6 same-day t8
domain, t3 mon
domain, t10 mon
domain, t11 tue
domain, t1 ends-by thu 12pm 0
domain, t6 ends-by mon 1pm 0
domain, t7 ends-by thu 3pm 0
domain, t8 ends-by fri 1pm 0
domain, t10 ends-by mon 1pm 0
domain, t11 ends-by tue 3pm 0
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
... t1 in {0, 1, 8, 9} has no solution
... t1 in {16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 2
task, t3 1
task, t4 6
task, t5 1
task, t6 2
task, t7 3
task, t8 2
task, t9 1
task, t10 6
task, t11 5
task, t12 2
constraint, t2 before t9
constraint, t4 before t7
constraint, t11 before t12
constraint, t2 before t6
constraint, t4 before t6
constraint, t7 before t9
constraint, t1 before t8
constraint, t2 before t7
constraint, t3 same-day t11
constraint, t6 same-day t8
domain, t3 mon
domain, t10 mon
domain, t11 tue
domain, t1 ends-by thu 12pm 20
domain, t6 ends-by mon 1pm 20
domain, t7 ends-by thu 3pm 20
domain, t8 ends-by fri 1pm 5
domain, t10 ends-by mon 1pm 10
domain, t11 ends-by tue 3pm 20
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
... t1 in {0, 1, 8, 9} has no solution
```

```
... t1 in {16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 3
task, t2 2
task, t3 6
task, t4 5
task, t5 1
task, t6 3
task, t7 4
task, t8 3
task, t9 4
task, t10 5
task, t11 1
task, t12 4
constraint, t1 before t7
constraint, t5 before t8
constraint, t3 before t10
constraint, t2 before t8
constraint, t5 before t10
constraint, t8 before t10
constraint, t2 before t7
constraint, t4 before t6
constraint, t6 before t11
constraint, t10 before t12
domain, t5 ends-by wed 12pm 0
domain, t6 ends-by fri 1pm 0
domain, t8 ends-by mon 2pm 0
domain, t9 ends-by mon 2pm 0
domain, t11 ends-by mon 11am 0
domain, t12 ends-by thu 12pm 0
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 8} and {16, 9, 17}
Splitting t3 into {0} and {8, 1}
Splitting t4 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {8, 9, 10}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9} and {10, 11, 12, 13, 14, 16, 17, 1
8, 19}
Splitting t5 into {0, 1, 2, 3} and {4, 5, 6, 8, 9}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 20, 24,
25, 26, 27, 28}
Splitting t6 into {8, 9, 10, 11} and {12, 16, 17, 18, 19}
Splitting t6 into {8, 9} and {10, 11}
Splitting t6 into {8} and {9}
Splitting t7 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t7 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t7 into {32, 33} and {34, 3}
Splitting t7 into {32} and {33}
Splitting t8 into {2, 3, 4, 8, 9, 10} and {11, 12, 16, 17, 18, 19, 20}
Splitting t8 into {2, 3, 4} and {8, 9, 10}
```

```
Splitting t8 into {2} and {3, 4}
Splitting t9 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t9 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t9 into {0, 1} and {8, 2, 3}
Splitting t9 into {0} and {1}
Splitting t10 into {8, 9, 10, 16} and {17, 18, 24, 25, 26}
Splitting t10 into {8, 9} and {16, 10}
Splitting t10 into {8} and {9}
Splitting t11 into {11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 24} and {32, 33,
34, 35, 36, 37, 38, 25, 26, 27, 28, 29, 30}
Splitting t11 into {11, 12, 13, 14, 16, 17} and {18, 19, 20, 21, 22, 24}
Splitting t11 into {11, 12, 13} and {16, 17, 14}
Splitting t11 into {11} and {12, 13}
Splitting t12 into {32, 33, 34, 35, 16, 17} and {18, 19, 24, 25, 26, 27}
Splitting t12 into {32, 33, 34} and {16, 17, 35}
Splitting t12 into {32} and {33, 34}
task, t1 3
task, t2 2
task, t3 6
task, t4 5
task, t5 1
task, t6 3
task, t7 4
task, t8 3
task, t9 4
task, t10 5
task, t11 1
task, t12 4
constraint, t1 before t7
constraint, t5 before t8
constraint, t3 before t10
constraint, t2 before t8
constraint, t5 before t10
constraint, t8 before t10
constraint, t2 before t7
constraint, t4 before t6
constraint, t6 before t11
constraint, t10 before t12
domain, t5 ends-by wed 12pm 5
domain, t6 ends-by fri 1pm 10
domain, t8 ends-by mon 2pm 20
domain, t9 ends-by mon 2pm 20
domain, t11 ends-by mon 11am 20
domain, t12 ends-by thu 12pm 15
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 8} and {16, 9, 17}
Splitting t3 into {0} and {8, 1}
Splitting t4 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {8, 9, 10}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9} and {10, 11, 12, 13, 14, 16, 17, 1
8, 19}
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Splitting t5 into {0, 1, 2, 3} and {4, 5, 6, 8, 9}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t6 into {8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 20, 24,
25, 26, 27, 28}
Splitting t6 into {8, 9, 10, 11} and {12, 16, 17, 18, 19}
Splitting t6 into {8, 9} and {10, 11}
Splitting t6 into {8} and {9}
Splitting t7 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t7 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t7 into {32, 33} and {34, 3}
Splitting t7 into {32} and {33}
Splitting t8 into {2, 3, 4, 8, 9, 10} and {11, 12, 16, 17, 18, 19, 20}
Splitting t8 into {2, 3, 4} and {8, 9, 10}
Splitting t8 into {2} and {3, 4}
Splitting t9 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t9 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t9 into {0, 1} and {8, 2, 3}
Splitting t9 into {0} and {1}
Splitting t10 into {8, 9, 10, 16} and {17, 18, 24, 25, 26}
Splitting t10 into {8, 9} and {16, 10}
Splitting t10 into {8} and {9}
Splitting t11 into {11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 24} and {32, 33,
34, 35, 36, 37, 38, 25, 26, 27, 28, 29, 30}
Splitting t11 into {11, 12, 13, 14, 16, 17} and {18, 19, 20, 21, 22, 24}
Splitting t11 into {11, 12, 13} and {16, 17, 14}
Splitting t11 into {11} and {12, 13}
Splitting t12 into {32, 33, 34, 35, 16, 17} and {18, 19, 24, 25, 26, 27}
Splitting t12 into {32, 33, 34} and {16, 17, 35}
Splitting t12 into {16} and {17, 35}
task, t1 2
task, t2 5
task, t3 4
task, t4 4
task, t5 1
task, t6 6
task, t7 3
task, t8 6
task, t9 4
task, t10 5
task, t11 3
task, t12 4
constraint, t2 before t5
constraint, t11 before t12
constraint, t6 same-day t7
constraint, t7 same-day t12
constraint, t1 same-day t12
domain, t1 mon
domain, t1 ends-by mon 12pm 0
domain, t2 ends-by thu 12pm 0
domain, t4 ends-by fri 4pm 0
domain, t8 ends-by thu 2pm 0
domain, t9 ends-by mon 3pm 0
domain, t12 ends-by fri 4pm 0
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 8, 9}
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```
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t5 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t5 into {8} and {5, 6}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1} and {2, 3, 4}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t8 into {0, 1} and {32, 33, 8}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t9 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t9 into {0, 1} and {8, 2, 3}
Splitting t9 into {0} and {1}
Splitting t10 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t10 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t10 into {0} and {1, 2}
task, t1 2
task, t2 5
task, t3 4
task, t4 4
task, t5 1
task, t6 6
task, t7 3
task, t8 6
task, t9 4
task, t10 5
task, t11 3
task, t12 4
constraint, t2 before t5
constraint, t11 before t12
constraint, t6 same-day t7
constraint, t7 same-day t12
constraint, t1 same-day t12
domain, t1 mon
domain, t1 ends-by mon 12pm 15
domain, t2 ends-by thu 12pm 10
domain, t4 ends-by fri 4pm 10
domain, t8 ends-by thu 2pm 10
domain, t9 ends-by mon 3pm 20
domain, t12 ends-by fri 4pm 20
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
```

```
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t5 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t5 into {8} and {5, 6}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1} and {2, 3, 4}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t8 into {0, 1} and {32, 33, 8}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t9 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t9 into {0, 1} and {8, 2, 3}
Splitting t9 into {0} and {1}
Splitting t10 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t10 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t10 into {0} and {1, 2}
task, t1 2
task, t2 4
task, t3 5
task, t4 5
task, t5 5
task, t6 6
task, t7 1
task, t8 2
task, t9 5
task, t10 2
task, t11 3
task, t12 5
constraint, t3 before t11
constraint, t6 before t11
constraint, t10 same-day t12
domain, t4 tue
domain, t12 thu
domain, t3 ends-by tue 12pm 0
domain, t5 ends-by wed 4pm 0
domain, t7 ends-by fri 4pm 0
domain, t9 ends-by wed 12pm 0
domain, t11 ends-by tue 4pm 0
domain, t12 ends-by thu 3pm 0
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
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```
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {8, 9, 10}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t6 into {0, 1} and {8, 9}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t7 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t7 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t7 into {0, 1} and {2, 3}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t8 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t9 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {24, 25, 26} and {27, 28, 29}
Splitting t10 into {24} and {25, 26}
Splitting t11 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 3
6, 24, 25, 26, 27, 28}
Splitting t11 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t11 into {8, 9} and {10, 11, 12}
Splitting t11 into {8} and {9}
Splitting t12 into {24} and {25, 26}
task, t1 2
task, t2 4
task, t3 5
task, t4 5
task, t5 5
task, t6 6
task, t7 1
task, t8 2
task, t9 5
task, t10 2
task, t11 3
task, t12 5
constraint, t3 before t11
constraint, t6 before t11
constraint, t10 same-day t12
domain, t4 tue
domain, t12 thu
domain, t3 ends-by tue 12pm 5
domain, t5 ends-by wed 4pm 15
domain, t7 ends-by fri 4pm 5
domain, t9 ends-by wed 12pm 20
domain, t11 ends-by tue 4pm 5
domain, t12 ends-by thu 3pm 10
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
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Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {8, 9, 10}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t6 into {0, 1} and {8, 9}
Splitting t6 into {0} and {1}
Splitting t7 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t7 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t7 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t7 into {0, 1} and {2, 3}
Splitting t7 into {0} and {1}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t8 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t8 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t8 into {0} and {1, 2}
Splitting t9 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t9 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t9 into {0} and {1, 2}
Splitting t10 into {24, 25, 26} and {27, 28, 29}
Splitting t10 into {24} and {25, 26}
Splitting t11 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 3
6, 24, 25, 26, 27, 28}
Splitting t11 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t11 into {8, 9} and {10, 11, 12}
Splitting t11 into {8} and {9}
Splitting t12 into {24} and {25, 26}
task, t1 3
task, t2 4
task, t3 4
task, t4 2
task, t5 5
task, t6 2
task, t7 2
task, t8 6
task, t9 4
task, t10 5
task, t11 5
task, t12 2
constraint, t1 before t6
constraint, t7 before t11
constraint, t8 same-day t12
constraint, t3 same-day t4
constraint, t1 same-day t3
domain, t4 wed
domain, t1 ends-by tue 3pm 0
domain, t4 ends-by wed 1pm 0
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domain, t5 ends-by fri 11am 0
domain, t7 ends-by wed 1pm 0
domain, t10 ends-by wed 2pm 0
domain, t12 ends-by wed 12pm 0
Splitting t1 into {16, 17} and {18, 19, 20}
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {16, 17} and {18, 19}
Splitting t3 into {16} and {17}
Splitting t4 into {16, 17, 18} and {19, 20, 21}
Splitting t4 into {16} and {17, 18}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {32, 33, 34, 35, 36, 37, 19} and {20, 21, 24, 25, 26, 27, 28, 2
9}
Splitting t6 into {32, 33, 34} and {19, 35, 36, 37}
Splitting t6 into {32} and {33, 34}
Splitting t7 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t7 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t7 into {0, 1, 2} and {3, 4, 5}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t8 into {0, 1} and {32, 33, 8}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t9 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t9 into {0, 1} and {8, 2, 3}
Splitting t9 into {0} and {1}
Splitting t10 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t10 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t10 into {0} and {1, 2}
Splitting t11 into {32, 33, 2, 34, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t11 into {32, 33, 2} and {8, 9, 34}
Splitting t11 into {32} and {33, 2}
Splitting t12 into {0, 1, 2} and {3, 4, 5}
Splitting t12 into {0} and {1, 2}
task, t1 3
task, t2 4
task, t3 4
task, t4 2
task, t5 5
task, t6 2
task, t7 2
task, t8 6
task, t9 4
task, t10 5
task, t11 5
task, t12 2
constraint, t1 before t6
constraint, t7 before t11
constraint, t8 same-day t12
constraint, t3 same-day t4
constraint, t1 same-day t3
```

```
domain, t4 wed
domain, t1 ends-by tue 3pm 5
domain, t4 ends-by wed 1pm 15
domain, t5 ends-by fri 11am 20
domain, t7 ends-by wed 1pm 20
domain, t10 ends-by wed 2pm 15
domain, t12 ends-by wed 12pm 15
Splitting t1 into {16, 17} and {18, 19, 20}
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {16, 17} and {18, 19}
Splitting t3 into {16} and {17}
Splitting t4 into {16, 17, 18} and {19, 20, 21}
Splitting t4 into {16} and {17, 18}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t6 into {32, 33, 34, 35, 36, 37, 19} and {20, 21, 24, 25, 26, 27, 28, 2
9}
Splitting t6 into {32, 33, 34} and {19, 35, 36, 37}
Splitting t6 into {32} and {33, 34}
Splitting t7 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t7 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t7 into {0, 1, 2} and {3, 4, 5}
Splitting t7 into {0} and {1, 2}
Splitting t8 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t8 into {0, 1} and {32, 33, 8}
Splitting t8 into {0} and {1}
Splitting t9 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t9 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t9 into {0, 1} and {8, 2, 3}
Splitting t9 into {0} and {1}
Splitting t10 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t10 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t10 into {0} and {1, 2}
Splitting t11 into {32, 33, 2, 34, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t11 into {32, 33, 2} and {8, 9, 34}
Splitting t11 into {32} and {33, 2}
Splitting t12 into {0, 1, 2} and {3, 4, 5}
Splitting t12 into {0} and {1, 2}
task, t1 6
task, t2 6
task, t3 4
task, t4 6
task, t5 2
task, t6 1
task, t7 1
task, t8 3
task, t9 3
task, t10 2
task, t11 5
task, t12 6
constraint, t7 before t12
constraint, t1 before t2
```

```
constraint, t4 before t12
constraint, t1 before t7
constraint, t3 before t12
constraint, t2 before t10
constraint, t1 before t4
constraint, t8 before t9
constraint, t8 same-day t10
domain, t9 tue
domain, t1 ends-by fri 1pm 0
domain, t2 ends-by fri 1pm 0
domain, t4 ends-by tue 11am 0
domain, t5 ends-by fri 4pm 0
domain, t8 ends-by fri 12pm 0
domain, t10 ends-by tue 3pm 0
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t5 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} has no solution
... t5 in {32, 33, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
task, t1 6
task, t2 6
task, t3 4
task, t4 6
task, t5 2
task, t6 1
task, t7 1
task, t8 3
task, t9 3
task, t10 2
task, t11 5
task, t12 6
constraint, t7 before t12
constraint, t1 before t2
constraint, t4 before t12
constraint, t1 before t7
constraint, t3 before t12
constraint, t2 before t10
constraint, t1 before t4
constraint, t8 before t9
constraint, t8 same-day t10
domain, t9 tue
domain, t1 ends-by fri 1pm 5
domain, t2 ends-by fri 1pm 10
domain, t4 ends-by tue 11am 20
domain, t5 ends-by fri 4pm 15
domain, t8 ends-by fri 12pm 20
domain, t10 ends-by tue 3pm 15
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t5 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} has no solution
... t5 in {32, 33, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 5
task, t3 2
task, t4 4
task, t5 1
task, t6 2
```

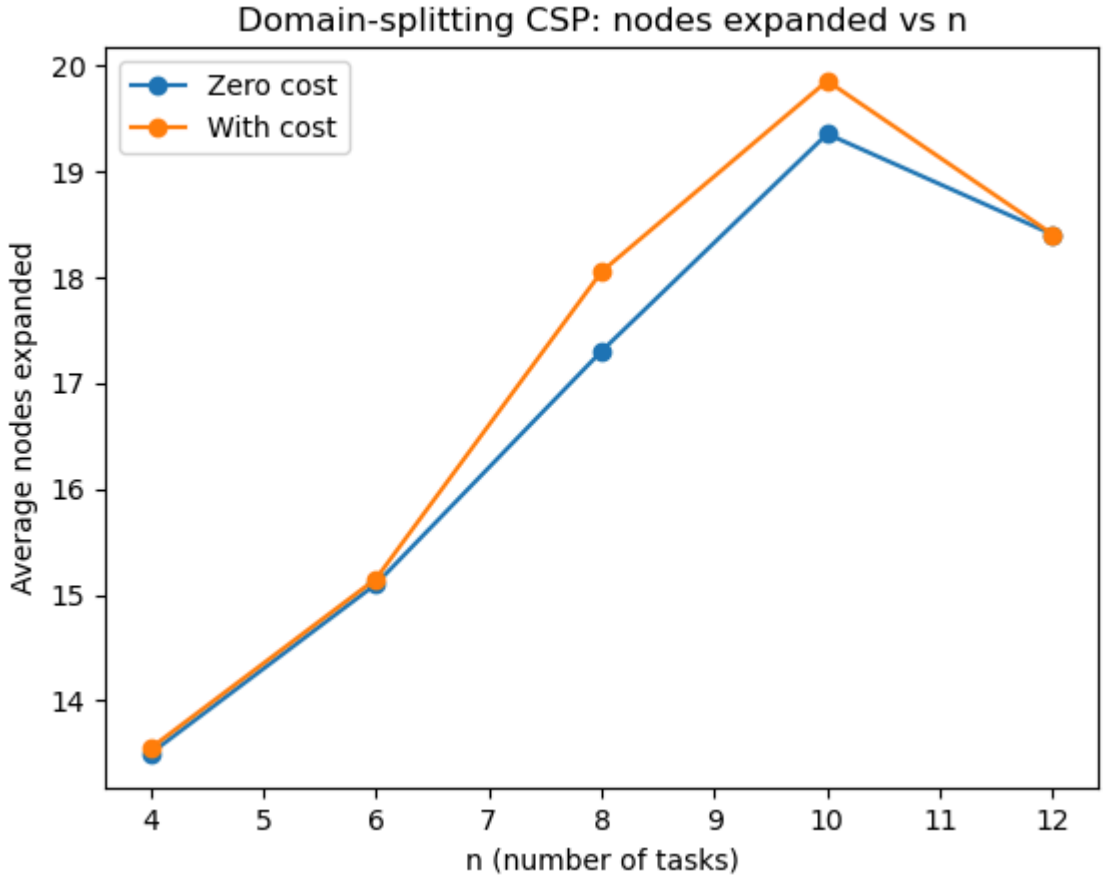
```
task, t7 4
task, t8 3
task, t9 4
task, t10 6
task, t11 5
task, t12 4
constraint, t2 before t12
constraint, t1 before t7
constraint, t2 before t7
constraint, t2 before t11
constraint, t1 before t8
constraint, t11 before t12
constraint, t2 before t5
constraint, t6 before t7
constraint, t5 before t10
constraint, t3 before t12
constraint, t1 before t3
constraint, t10 before t11
constraint, t2 before t9
constraint, t7 before t9
constraint, t2 before t6
constraint, t3 before t8
constraint, t3 before t9
constraint, t5 before t11
constraint, t4 before t12
constraint, t7 before t11
constraint, t2 same-day t10
domain, t3 mon
domain, t4 wed
domain, t12 tue
domain, t2 ends-by tue 3pm 0
domain, t3 ends-by mon 4pm 0
domain, t8 ends-by mon 3pm 0
domain, t9 ends-by wed 3pm 0
domain, t10 ends-by mon 2pm 0
domain, t11 ends-by thu 11am 0
No (more) solutions. Total of 1 paths expanded.
task, t1 5
task, t2 5
task, t3 2
task, t4 4
task, t5 1
task, t6 2
task, t7 4
task, t8 3
task, t9 4
task, t10 6
task, t11 5
task, t12 4
constraint, t2 before t12
constraint, t1 before t7
constraint, t2 before t7
constraint, t2 before t11
constraint, t1 before t8
constraint, t11 before t12
constraint, t2 before t5
constraint, t6 before t7
constraint, t5 before t10
constraint, t3 before t12
constraint, t1 before t3
```

```
constraint, t10 before t11
constraint, t2 before t9
constraint, t7 before t9
constraint, t2 before t6
constraint, t3 before t8
constraint, t3 before t9
constraint, t5 before t11
constraint, t4 before t12
constraint, t7 before t11
constraint, t2 same-day t10
domain, t3 mon
domain, t4 wed
domain, t12 tue
domain, t2 ends-by tue 3pm 20
domain, t3 ends-by mon 4pm 10
domain, t8 ends-by mon 3pm 15
domain, t9 ends-by wed 3pm 5
domain, t10 ends-by mon 2pm 15
domain, t11 ends-by thu 11am 15
No (more) solutions. Total of 1 paths expanded.
task, t1 4
task, t2 1
task, t3 5
task, t4 4
task, t5 4
task, t6 5
task, t7 5
task, t8 3
task, t9 6
task, t10 6
task, t11 4
task, t12 4
constraint, t5 before t12
constraint, t10 before t12
constraint, t6 before t8
constraint, t4 before t12
constraint, t3 before t12
constraint, t2 before t8
constraint, t5 before t10
constraint, t7 before t11
constraint, t1 before t4
constraint, t1 before t8
constraint, t1 before t10
constraint, t4 before t8
constraint, t6 before t10
constraint, t5 before t7
constraint, t8 before t11
constraint, t9 before t10
constraint, t3 before t11
constraint, t3 before t10
constraint, t4 before t6
constraint, t8 before t9
constraint, t6 before t12
constraint, t6 before t7
constraint, t4 same-day t8
constraint, t6 same-day t8
constraint, t9 same-day t12
constraint, t6 same-day t9
domain, t1 fri
domain, t12 tue
```

```
domain, t3 ends-by wed 1pm 0
domain, t5 ends-by wed 12pm 0
domain, t6 ends-by mon 4pm 0
domain, t8 ends-by thu 1pm 0
domain, t10 ends-by tue 11am 0
domain, t12 ends-by tue 3pm 0
No (more) solutions. Total of 1 paths expanded.
task, t1 4
task, t2 1
task, t3 5
task, t4 4
task, t5 4
task, t6 5
task, t7 5
task, t8 3
task, t9 6
task, t10 6
task, t11 4
task, t12 4
constraint, t5 before t12
constraint, t10 before t12
constraint, t6 before t8
constraint, t4 before t12
constraint, t3 before t12
constraint, t2 before t8
constraint, t5 before t10
constraint, t7 before t11
constraint, t1 before t4
constraint, t1 before t8
constraint, t1 before t10
constraint, t4 before t8
constraint, t6 before t10
constraint, t5 before t7
constraint, t8 before t11
constraint, t9 before t10
constraint, t3 before t11
constraint, t3 before t10
constraint, t4 before t6
constraint, t8 before t9
constraint, t6 before t12
constraint, t6 before t7
constraint, t4 same-day t8
constraint, t6 same-day t8
constraint, t9 same-day t12
constraint, t6 same-day t9
domain, t1 fri
domain, t12 tue
domain, t3 ends-by wed 1pm 5
domain, t5 ends-by wed 12pm 20
domain, t6 ends-by mon 4pm 20
domain, t8 ends-by thu 1pm 15
domain, t10 ends-by tue 11am 15
domain, t12 ends-by tue 3pm 5
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 4
task, t3 3
task, t4 2
task, t5 1
task, t6 4
```

```
task, t7 5
task, t8 3
task, t9 5
task, t10 4
task, t11 2
task, t12 5
constraint, t1 before t11
constraint, t9 before t10
constraint, t8 before t11
constraint, t2 before t11
constraint, t6 before t9
constraint, t1 before t5
constraint, t3 before t10
constraint, t1 before t8
constraint, t2 before t3
constraint, t1 same-day t2
domain, t4 tue
domain, t9 fri
domain, t1 ends-by wed 11am 0
domain, t3 ends-by thu 1pm 0
domain, t7 ends-by wed 11am 0
domain, t10 ends-by mon 3pm 0
domain, t11 ends-by tue 3pm 0
domain, t12 ends-by tue 11am 0
Splitting t4 into {8, 9, 10} and {11, 12, 13}
... t4 in {8, 9, 10} has no solution
... t4 in {11, 12, 13} has no solution
No (more) solutions. Total of 1 paths expanded.
task, t1 2
task, t2 4
task, t3 3
task, t4 2
task, t5 1
task, t6 4
task, t7 5
task, t8 3
task, t9 5
task, t10 4
task, t11 2
task, t12 5
constraint, t1 before t11
constraint, t9 before t10
constraint, t8 before t11
constraint, t2 before t11
constraint, t6 before t9
constraint, t1 before t5
constraint, t3 before t10
constraint, t1 before t8
constraint, t2 before t3
constraint, t1 same-day t2
domain, t4 tue
domain, t9 fri
domain, t1 ends-by wed 11am 5
domain, t3 ends-by thu 1pm 15
domain, t7 ends-by wed 11am 20
domain, t10 ends-by mon 3pm 5
domain, t11 ends-by tue 3pm 5
domain, t12 ends-by tue 11am 10
Splitting t4 into {8, 9, 10} and {11, 12, 13}
... t4 in {8, 9, 10} has no solution
```

```
... t4 in {11, 12, 13} has no solution
No (more) solutions. Total of 1 paths expanded.
```




```
n= 4  zero=13.5   cost=13.6   gain=-0.4%
n= 6  zero=15.1   cost=15.2   gain=-0.3%
n= 8  zero=17.3   cost=18.1   gain=-4.3%
n=10  zero=19.4   cost=19.9   gain=-2.6%
n=12  zero=18.4   cost=18.4   gain=0.0%
```

Answers for Question 3

Q3(a):

Setup:

For each

$$n \in \{4, 6, 8, 10, 12\}$$

I generated

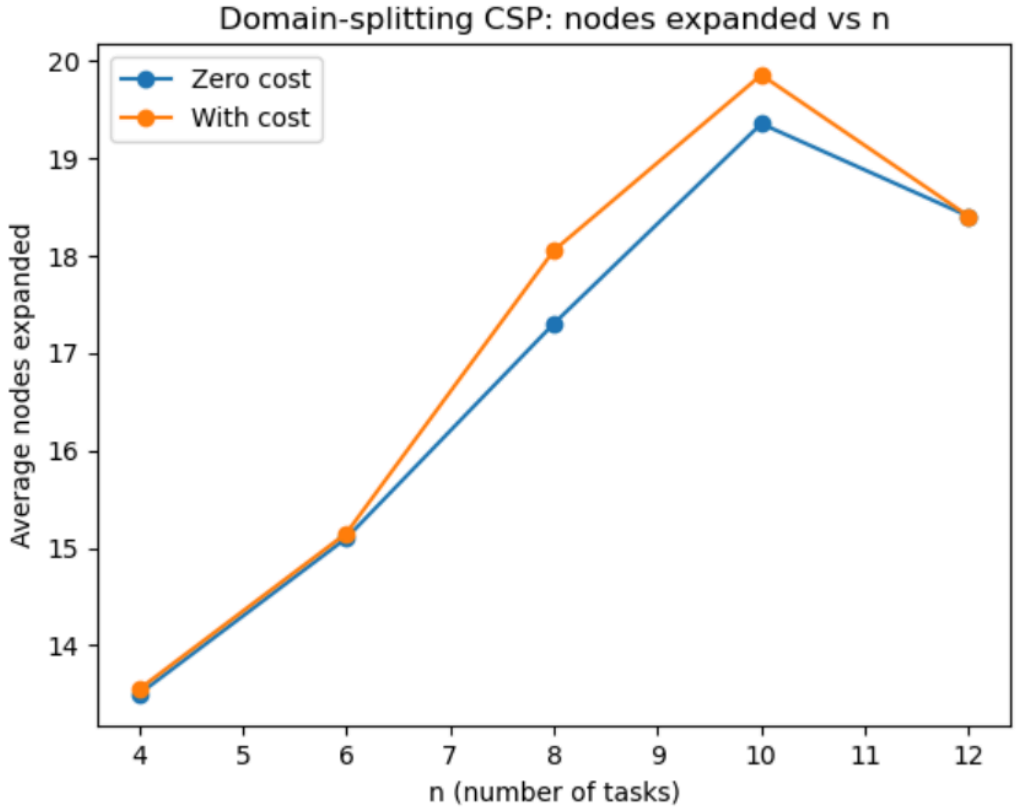
$$K = 20$$

random task-scheduling CSP examples.

Each instance was solved twice: with the original **zero-cost** function and with the **deadline-cost** function.

Metric: **average number of nodes expanded** (where the lower number of nodes needed the better result).

Q3(b)So the result for the above random examples' comparison plot is as below.




```
n= 4  zero=13.5   cost=13.6   gain=-0.4%
n= 6  zero=15.1   cost=15.2   gain=-0.3%
n= 8  zero=17.3   cost=18.1   gain=-4.3%
n=10  zero=19.4   cost=19.9   gain=-2.6%
n=12  zero=18.4   cost=18.4   gain=0.0%
```

Q3(c):cost / zero-cost comparison:
Here I have computed the percent gain as

$$\text{gain}(n) = \frac{\text{zero}(n) - \text{cost}(n)}{\text{zero}(n)} \times 100\%.$$

(n)	zero	cost	gain
4	13.5	13.6	(-0.4%)
6	15.1	15.2	(-0.3%)
8	17.3	18.1	(-4.3%)
10	19.4	19.9	(-2.6%)
12	18.4	18.4	(0.0%)

So that the overall average gain:

$$\overline{\text{gain}} \approx -1.5\%.$$

Brief Explanation. The chosen deadline-based cost provides a weak guidance for partial assignments, early in the search it does not separate branches well and can even steer the search toward harder subproblems. Hence it offers little pruning benefit and sometimes increases node expansions. A more informative cost, that is:

$$\text{cost} = \alpha\,\text{slack}(t)^{-} + \beta\,\text{urgency}(t)$$

the one with tuned weights may perform better.

Question 4 (5 marks)

Compare the Depth-First Search (DFS) solver to the Depth-First Search solver using forward checking with Minimum Remaining Values heuristic (DFS-MRV). For this question, ignore the costs associated with the CSP problems.

- What is the worst case time and space complexity of each algorithm (give a general form in terms of fuzzy scheduling problem sizes)? (1 mark)
- What are the properties of the search algorithms (completeness, optimality)? (1 mark)
- Give an example of a problem that is *easier* for the DFS-MRV solver than it is for the DFS solver, and explain why (1 mark)
- Empirically compare the quality of the first solution found by DFS and DFS-MRV compared to the optimal solution (1 mark)
- Empirically compare DFS-MRV with DFS in terms of the number of nodes expanded (1 mark)

For the empirical evaluations, run the two algorithms on a variety of problems of size `n` for varying `n`. Note that the domain splitting CSP solver with costs should always find an optimal solution.

In [211…

```
# Code for Question 4
# Place your code here
import io, contextlib, random
import matplotlib.pyplot as plt
import numpy as np

def build_csp_quiet(spec):
    buf = io.StringIO()
    with contextlib.redirect_stdout(buf):
        return create_CSP_from_spec(spec)

def run_opt_once(spec):
    csp = build_csp_quiet(spec)
    searcher = GreedySearcher(Search_with_AC_from_Cost_CSP(csp))
    path = searcher.search()
    if path is None:
        return None, 0
    opt_nodes = 0
    if hasattr(searcher, 'num_expanded'):
        opt_nodes = searcher.num_expanded
    elif hasattr(csp, 'num_expanded'):
        opt_nodes = csp.num_expanded
    elif hasattr(searcher.problem, 'num_expanded'):
        opt_nodes = searcher.problem.num_expanded
    return path.end().cost, opt_nodes

def eval_cost(csp, sol):
    csp.context = sol
    return csp.calculate_cost()
```

```python
def run_dfs_once(spec):
    global num_expanded
    num_expanded = 0
    csp = build_csp_quiet(spec)
    sol = dfs_solve1(csp)
    nexp = num_expanded
    if sol is None:
        return None, nexp, None
    cost = eval_cost(csp, sol)
    return sol, nexp, cost

def run_mrv_once(spec):
    global num_expanded
    num_expanded = 0
    csp = build_csp_quiet(spec)
    sol = mrv_dfs_solve1(csp)
    nexp = num_expanded
    if sol is None:
        return None, nexp, None
    cost = eval_cost(csp, sol)
    return sol, nexp, cost

def evaluate_all_methods(ns=(3,4,5,6,7,8), K=20, seed=0, max_tries=500, debug=Fa
    random.seed(seed)
    rows = []

    for n in ns:
        print(f"\nProcessing n={n}...")
        got = 0
        tries = 0
        skipped_optimal = 0

        while got < K and tries < max_tries:
            tries += 1
            spec = generate_problem(n)

            opt_cost, opt_nodes = run_opt_once(spec)
            if opt_cost is None or opt_cost <= 0:
                continue

            dsol, dn, dc = run_dfs_once(spec)
            msol, mn, mc = run_mrv_once(spec)

            if dsol is None or msol is None:
                continue
            if dc is None or mc is None or dc <= 0 or mc <= 0:
                continue

            if debug and tries <= 3:
                print(f"\n  Trial {tries}: n={n}")
                print(f"    Optimal: cost={opt_cost:.2f}, nodes={opt_nodes}")
                print(f"    DFS: cost={dc:.2f}, nodes={dn}, gap={100*(dc-opt_cos
                print(f"    MRV: cost={mc:.2f}, nodes={mn}, gap={100*(mc-opt_cos

            rows.append((n, dn, mn, opt_nodes, dc, mc, opt_cost))
            got += 1

            if got % 5 == 0:
                print(f"  Completed {got}/{K} trials")
```

```
    print(f"  Finished n={n}: {got} valid trials out of {tries} attempts")

byn = {}
for r in rows:
    byn.setdefault(r[0], []).append(r[1:])

Ns = []
dfs_nodes = []
mrv_nodes = []
opt_nodes = []
dfs_gap = []
mrv_gap = []

for n in sorted(byn):
    data = byn[n]
    Ns.append(n)

    dfs_nodes.append(np.mean([x[0] for x in data]))
    mrv_nodes.append(np.mean([x[1] for x in data]))
    opt_nodes.append(np.mean([x[2] for x in data]))

    dfs_gap_vals = []
    mrv_gap_vals = []
    for x in data:
        dc_val, mc_val, opt_val = x[3], x[4], x[5]
        if opt_val > 0:
            dfs_gap_vals.append(100.0 * abs(dc_val - opt_val) / opt_val)
            mrv_gap_vals.append(100.0 * abs(mc_val - opt_val) / opt_val)

    dfs_gap.append(np.mean(dfs_gap_vals) if dfs_gap_vals else 0)
    mrv_gap.append(np.mean(mrv_gap_vals) if mrv_gap_vals else 0)

fig = plt.figure(figsize=(18, 10))

ax1 = plt.subplot(2, 2, 1)
ax1.plot(Ns, dfs_nodes, marker="o", linewidth=2.5, markersize=9,
         label="DFS (Random Order)", color='#FF6B6B')
ax1.plot(Ns, mrv_nodes, marker="s", linewidth=2.5, markersize=9,
         label="DFS-MRV (Forward Checking)", color='#4ECDC4')
ax1.plot(Ns, opt_nodes, marker="^", linewidth=2.5, markersize=9,
         label="Domain Splitting (Optimal)", color='#51CF66')
ax1.set_xlabel("Number of Tasks (n)", fontsize=12, fontweight='bold')
ax1.set_ylabel("Average Nodes Expanded", fontsize=12, fontweight='bold')
ax1.set_title("Nodes Expanded Comparison: All Methods", fontsize=13, fontwei
ax1.legend(fontsize=10, loc='upper left')
ax1.grid(True, alpha=0.3, linestyle='--')
ax1.set_yscale('log')

ax2 = plt.subplot(2, 2, 2)
ax2.plot(Ns, dfs_nodes, marker="o", linewidth=2.5, markersize=9,
         label="DFS", color='#FF6B6B')
ax2.plot(Ns, mrv_nodes, marker="s", linewidth=2.5, markersize=9,
         label="DFS-MRV", color='#4ECDC4')

for i, n in enumerate(Ns):
    if dfs_nodes[i] > 0:
        reduction = (dfs_nodes[i] - mrv_nodes[i]) / dfs_nodes[i] * 100
        mid_y = np.sqrt(dfs_nodes[i] * mrv_nodes[i]) if mrv_nodes[i] > 0 els
        ax2.text(n, mid_y, f'-{reduction:.0f}%',
```

```
                ha='center', va='center', fontsize=9, fontweight='bold',
                bbox=dict(boxstyle='round,pad=0.4', facecolor='yellow', alph

ax2.set_xlabel("Number of Tasks (n)", fontsize=12, fontweight='bold')
ax2.set_ylabel("Average Nodes Expanded", fontsize=12, fontweight='bold')
ax2.set_title("DFS vs DFS-MRV (Detailed)", fontsize=13, fontweight='bold', p
ax2.legend(fontsize=10)
ax2.grid(True, alpha=0.3, linestyle='--')
ax2.set_yscale('log')

ax3 = plt.subplot(2, 2, 3)
width = 0.35
x_pos = np.arange(len(Ns))

bars1 = ax3.bar(x_pos - width/2, dfs_gap, width,
                label='DFS gap to optimal', color='#FF6B6B', alpha=0.8, edge
bars2 = ax3.bar(x_pos + width/2, mrv_gap, width,
                label='DFS-MRV gap to optimal', color='#4ECDC4', alpha=0.8,

ax3.axhline(0, linestyle="--", linewidth=1.5, color='gray', alpha=0.7)
ax3.set_xlabel("Number of Tasks (n)", fontsize=12, fontweight='bold')
ax3.set_ylabel("Avg. % Gap (|First Solution - Optimal| / Optimal)", fontsize
ax3.set_title("Solution Quality Comparison (Absolute Gap)", fontsize=13, fon
ax3.set_xticks(x_pos)
ax3.set_xticklabels(Ns)
ax3.legend(fontsize=10)
ax3.grid(True, alpha=0.3, linestyle='--', axis='y')

for i, (d, m) in enumerate(zip(dfs_gap, mrv_gap)):
    if d > 0:
        ax3.text(i - width/2, d, f'{d:.1f}%', ha='center', va='bottom',
                fontsize=8, color='#FF6B6B', fontweight='bold')
    if m > 0:
        ax3.text(i + width/2, m, f'{m:.1f}%', ha='center', va='bottom',
                fontsize=8, color='#4ECDC4', fontweight='bold')

ax4 = plt.subplot(2, 2, 4)
speedup_dfs_vs_opt = [d/o if o > 0 else 0 for d, o in zip(dfs_nodes, opt_nod
speedup_mrv_vs_opt = [m/o if o > 0 else 0 for m, o in zip(mrv_nodes, opt_nod
speedup_dfs_vs_mrv = [d/m if m > 0 else 0 for d, m in zip(dfs_nodes, mrv_nod

ax4.plot(Ns, speedup_dfs_vs_mrv, marker="o", linewidth=2.5, markersize=9,
         label="DFS / MRV", color='#E74C3C')
ax4.plot(Ns, speedup_dfs_vs_opt, marker="s", linewidth=2.5, markersize=9,
         label="DFS / Optimal", color='#FF6B6B', linestyle='--', alpha=0.7)
ax4.plot(Ns, speedup_mrv_vs_opt, marker="^", linewidth=2.5, markersize=9,
         label="MRV / Optimal", color='#4ECDC4', linestyle='--', alpha=0.7)
ax4.axhline(1, linestyle=":", linewidth=1.5, color='gray', alpha=0.5)

ax4.set_xlabel("Number of Tasks (n)", fontsize=12, fontweight='bold')
ax4.set_ylabel("Speedup Factor (Nodes Ratio)", fontsize=12, fontweight='bold
ax4.set_title("Efficiency Comparison (Lower is Better)", fontsize=13, fontwe
ax4.legend(fontsize=10)
ax4.grid(True, alpha=0.3, linestyle='--')

plt.tight_layout(pad=2.0)
plt.show()

print("\n" + "=" * 110)
print("Table 1: Nodes Expanded Comparison")
```

```
    print("=" * 110)
    print(f"{'n':>3} | {'DFS':>10} | {'MRV':>10} | {'Optimal':>10} | {'Reduction
    print("-" * 110)

    for i, n in enumerate(Ns):
        reduction = (dfs_nodes[i] - mrv_nodes[i]) / dfs_nodes[i] * 100 if dfs_no
        speedup1 = dfs_nodes[i] / mrv_nodes[i] if mrv_nodes[i] > 0 else 0
        speedup2 = mrv_nodes[i] / opt_nodes[i] if opt_nodes[i] > 0 else 0
        print(f"{n:>3} | {dfs_nodes[i]:>10.1f} | {mrv_nodes[i]:>10.1f} | {opt_no
              f"{reduction:>11.1f}% | {speedup1:>9.1f}x | {speedup2:>9.1f}x")

    print("\n" + "=" * 90)
    print("Table 2: Solution Quality Comparison (Absolute Gap)")
    print("=" * 90)
    print(f"{'n':>3} | {'DFS Gap':>12} | {'MRV Gap':>12} | {'MRV Advantage':>15}
    print("-" * 90)

    for i, n in enumerate(Ns):
        quality_gain = dfs_gap[i] - mrv_gap[i]
        print(f"{n:>3} | {dfs_gap[i]:>11.1f}% | {mrv_gap[i]:>11.1f}% | {quality_

    print("=" * 90)

    print("\n" + "=" * 90)
    print("Key Findings:")
    print("=" * 90)
    avg_reduction = np.mean([(dfs_nodes[i] - mrv_nodes[i]) / dfs_nodes[i] * 100
                             for i in range(len(Ns)) if dfs_nodes[i] > 0])
    avg_dfs_speedup = np.mean([dfs_nodes[i] / mrv_nodes[i]
                               for i in range(len(Ns)) if mrv_nodes[i] > 0])
    avg_dfs_gap = np.mean(dfs_gap)
    avg_mrv_gap = np.mean(mrv_gap)

    print(f"1. DFS-MRV reduces nodes by {avg_reduction:.1f}% on average ({avg_df
    print(f"2. DFS first solution differs from optimal by {avg_dfs_gap:.1f}% on
    print(f"3. MRV first solution differs from optimal by {avg_mrv_gap:.1f}% on
    print(f"4. MRV finds solutions {avg_dfs_gap - avg_mrv_gap:.1f}% closer to op
    print(f"5. Domain Splitting explores {np.mean(opt_nodes):.1f} nodes on avera
    print("=" * 90)

    return {
        "n": Ns,
        "dfs_nodes": dfs_nodes,
        "mrv_nodes": mrv_nodes,
        "opt_nodes": opt_nodes,
        "dfs_gap_pct": dfs_gap,
        "mrv_gap_pct": mrv_gap,
        "raw": rows
    }
# code for rerun is as below, it is also long, and will take within 3mins to gen
res = evaluate_all_methods(ns=(3,4,5), K=5, seed=0, debug=True)
```

```
Processing n=3...
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
... t3 in {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} has no solu
tion
... t3 in {32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 3
0} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17, 18} and {32, 33, 34, 35,
36, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {1, 2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18}
Splitting t3 into {1, 2, 3} and {8, 9, 4}
Splitting t3 into {1} and {2, 3}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {32, 33} and {8, 9}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {8} and {9, 10}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
```

```
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t3 into {8} and {9, 10}
Splitting t1 into {16, 17} and {18, 19}
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {16} and {17}
Nodes expanded to reach solution: 491
Nodes expanded to reach solution: 3
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1}
Splitting t3 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21} and {32, 33, 34,
35, 36, 37, 24, 25, 26, 27, 28, 29}
Splitting t3 into {8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 20, 21}
Splitting t3 into {8, 9, 10} and {11, 12, 13}
Splitting t3 into {8} and {9, 10}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 1, 8, 33} and {9, 16, 17, 24, 25}
Splitting t3 into {32, 1} and {8, 33}
Splitting t3 into {32} and {1}
Nodes expanded to reach solution: 4
Nodes expanded to reach solution: 4
Splitting t1 into {8} and {9}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1} and {2, 3}
```

```
Splitting t3 into {0} and {1}
Nodes expanded to reach solution: 3
Nodes expanded to reach solution: 3
Splitting t1 into {24, 25, 26} and {27, 28, 29}
Splitting t1 into {24} and {25, 26}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {24} and {25, 26}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21} and {32, 33, 34,
35, 36, 37, 24, 25, 26, 27, 28, 29}
Splitting t3 into {8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 20, 21}
Splitting t3 into {8, 9, 10} and {11, 12, 13}
Splitting t3 into {8} and {9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {32, 33, 34} and {8, 9, 10}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Nodes expanded to reach solution: 6
Nodes expanded to reach solution: 3
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33,
34, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {2, 3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t2 into {2, 3, 4} and {8, 9, 10, 5}
Splitting t2 into {2} and {3, 4}
Splitting t3 into {24, 25} and {26, 27}
Splitting t3 into {24} and {25}
Nodes expanded to reach solution: 5
Nodes expanded to reach solution: 3
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t2 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
... t2 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
```

```
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and {3
2, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t3 into {4, 5, 6} and {8, 9, 10, 11}
Splitting t3 into {4} and {5, 6}
Splitting t1 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 2, 34, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {32, 33, 2} and {8, 9, 34}
Splitting t3 into {32} and {33, 2}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t2 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
... t2 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {1, 2} and {3, 4, 5}
Splitting t2 into {1} and {2}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 17, 18, 19,
20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12, 16}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {3, 4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 3
6, 20, 24, 25, 26, 27, 28}
Splitting t3 into {3, 4, 8, 9, 10} and {11, 12, 16, 17, 18, 19}
```

```
Splitting t3 into {3, 4} and {8, 9, 10}
Splitting t3 into {3} and {4}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {16, 17, 18} and {19, 20, 21, 22}
Splitting t1 into {16} and {17, 18}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {32, 33, 34, 35, 36, 37, 38, 20} and {21, 22, 24, 25, 26, 27, 2
8, 29, 30}
Splitting t3 into {32, 33, 34, 35} and {20, 36, 37, 38}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {8, 9, 10} and {11, 12, 13}
Splitting t3 into {8} and {9, 10}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
```

```
... t3 in {0, 1, 32, 33, 8} has no solution
... t3 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {16} and {17}
Nodes expanded to reach solution: 3
Nodes expanded to reach solution: 3
Splitting t1 into {8} and {9, 10}
Splitting t2 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t3 into {24} and {25, 26}
Splitting t1 into {24} and {25}
Splitting t2 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {32} and {33, 25}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
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Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and
{32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {2, 3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18, 19}
Splitting t2 into {2, 3, 4, 5} and {8, 9, 10, 6}
Splitting t2 into {2, 3} and {4, 5}
Splitting t2 into {2} and {3}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Nodes expanded to reach solution: 5
Nodes expanded to reach solution: 3
Splitting t1 into {16, 17, 18} and {19, 20, 21}
Splitting t1 into {16} and {17, 18}
Splitting t2 into {32, 33} and {24, 25}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 34, 17, 18,
19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12, 16}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
```

```
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33, 3
4, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t3 into {3, 4, 5} and {8, 9, 10}
Splitting t3 into {3} and {4, 5}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {2, 3} and {4, 5, 6}
Splitting t2 into {2} and {3}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {24, 25} and {26, 27}
Splitting t2 into {24} and {25}
Splitting t3 into {2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33,
34, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {2, 3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t3 into {2, 3, 4} and {8, 9, 10, 5}
Splitting t3 into {2} and {3, 4}
Nodes expanded to reach solution: 5
Nodes expanded to reach solution: 3
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
... t2 in {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} has no solu
tion
... t2 in {32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 3
0} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
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Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17, 18} and {19, 20, 21}
Splitting t2 into {16} and {17, 18}
Splitting t3 into {16, 17} and {18, 19}
Splitting t3 into {16} and {17}
Nodes expanded to reach solution: 63
Nodes expanded to reach solution: 3
Splitting t1 into {24, 25} and {26, 27}
Splitting t1 into {24} and {25}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
```

```
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {24, 25} and {26, 27, 28}
Splitting t2 into {24} and {25}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {24} and {25}
Nodes expanded to reach solution: 3
Nodes expanded to reach solution: 3
  Completed 5/5 trials
  Finished n=3: 5 valid trials out of 53 attempts

Processing n=4...
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {24, 25} and {26, 27, 28}
Splitting t4 into {24} and {25}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
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36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t1 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} has no solution
... t1 in {32, 33, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 2, 34, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {32, 33, 2} and {8, 9, 34}
Splitting t2 into {32} and {33, 2}
Splitting t2 into {33} and {2}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 36, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 36, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
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Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 33,
34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {1, 2, 3} and {8, 9, 4, 5}
Splitting t4 into {1} and {2, 3}
Splitting t1 into {8, 9, 10, 16} and {17, 18, 24, 25, 26}
Splitting t1 into {8, 9} and {16, 10}
Splitting t1 into {8} and {9}
Splitting t2 into {32, 33, 34, 35, 36, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 2
8}
Splitting t2 into {32, 33, 34} and {16, 17, 35, 36}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8} and {9, 10}
Nodes expanded to reach solution: 14576
Nodes expanded to reach solution: 19
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
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{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
... t1 in {0, 1, 2, 8, 9, 10} has no solution
... t1 in {16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {8} and {9}
Nodes expanded to reach solution: 6
Nodes expanded to reach solution: 4
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {8, 9, 10}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 34, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
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Splitting t3 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {24} and {25}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t4 into {32} and {33}
Nodes expanded to reach solution: 22
Nodes expanded to reach solution: 4
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {4, 8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27,
28}
Splitting t3 into {8, 9, 10, 4} and {16, 17, 11, 12}
Splitting t3 into {8, 9} and {10, 4}
Splitting t3 into {10} and {4}
Splitting t4 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t4 into {32, 33, 34} and {8, 9, 10}
Splitting t4 into {8} and {9, 10}
Nodes expanded to reach solution: 11
Nodes expanded to reach solution: 7
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {16, 17, 18} and {19, 20, 21}
Splitting t3 into {16} and {17, 18}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 36, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
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Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t3 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 33,
34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {1, 2, 3} and {8, 9, 4, 5}
Splitting t4 into {1} and {2, 3}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {24, 25} and {26, 27, 28}
Splitting t3 into {24} and {25}
Splitting t4 into {32, 33, 34} and {27, 35, 36, 28}
Splitting t4 into {32} and {33, 34}
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16} and {32, 33, 34, 1
7, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13, 16}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {32, 33} and {8, 9}
Splitting t3 into {8} and {9}
Splitting t4 into {2, 3, 4, 8, 9, 10, 11, 12, 16, 17, 18} and {32, 33, 34, 35, 3
6, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18}
Splitting t4 into {2, 3} and {8, 9, 4}
Splitting t4 into {2} and {3}
Nodes expanded to reach solution: 8
Nodes expanded to reach solution: 6
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1} and {2, 3, 4}
Splitting t4 into {0} and {1}
Nodes expanded to reach solution: 4
Nodes expanded to reach solution: 4
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Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16} and {32, 33, 17, 1
8, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13, 16}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 2, 3, 34, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 2
5, 26, 27}
Splitting t3 into {32, 33, 2, 3} and {34, 35, 8, 9, 10}
Splitting t3 into {32, 33} and {2, 3}
Splitting t3 into {2} and {3}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Nodes expanded to reach solution: 6
Nodes expanded to reach solution: 6
  Completed 5/5 trials
  Finished n=4: 5 valid trials out of 23 attempts

Processing n=5...
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1} and {2, 3, 4}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
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Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Nodes expanded to reach solution: 5
Nodes expanded to reach solution: 5

  Trial 1: n=5
    Optimal: cost=5.00, nodes=17
    DFS: cost=5.00, nodes=5, gap=0.00%
    MRV: cost=5.00, nodes=5, gap=0.00%
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t4 into {32, 33, 34} and {8, 9, 10}
Splitting t4 into {32} and {33, 34}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t3 into {8} and {9, 10}
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Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t5 into {32, 33, 34} and {8, 9, 10}
Splitting t5 into {32} and {33, 34}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 8} and {9, 10, 16, 17, 18}
Splitting t1 into {0, 1} and {8, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9, 16} and {24, 17, 25}
Splitting t2 into {8} and {16, 9}
Splitting t3 into {32, 33, 34, 35, 36, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 2
8}
Splitting t3 into {32, 33, 34} and {16, 17, 35, 36}
Splitting t3 into {16, 17} and {35, 36}
Splitting t3 into {16} and {17}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t4 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t4 into {8} and {5, 6}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
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3, 34, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t5 into {32, 33} and {8, 9}
Splitting t5 into {8} and {9}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
... t3 in {0, 1, 32, 33, 8} has no solution
... t3 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {8, 9, 10, 11, 12, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {8, 9, 10} and {16, 17, 11, 12}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0} and {1}
Splitting t3 into {8} and {9}
Splitting t4 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t4 into {32, 33, 34} and {8, 9, 10}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {32, 33, 34, 35, 36, 37, 16, 17, 18} and {19, 20, 21, 24, 25, 2
6, 27, 28, 29}
Splitting t5 into {32, 33, 34, 35} and {36, 37, 16, 17, 18}
Splitting t5 into {32, 33} and {34, 35}
Splitting t5 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {32, 33, 34} and {8, 9, 10}
Splitting t3 into {8} and {9, 10}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16} and {32, 33, 17, 18,
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19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16}
Splitting t4 into {1, 2, 3} and {8, 4, 5}
Splitting t4 into {1} and {2, 3}
Splitting t5 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t5 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t5 into {32, 33} and {34, 3}
Splitting t5 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2} and {8, 9, 10}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {16} and {17, 18}
Nodes expanded to reach solution: 5
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {32, 33,
18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {2, 3, 4, 5, 6, 8, 9} and {10, 11, 12, 13, 14, 16, 17}
Splitting t2 into {2, 3, 4} and {8, 9, 5, 6}
Splitting t2 into {2} and {3, 4}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t4 into {0, 1} and {2, 3, 4}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t5 into {32, 33, 34} and {8, 9, 10}
Splitting t5 into {32} and {33, 34}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
... t1 in {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} has no solution
... t1 in {32, 33, 34, 35, 18, 19, 24, 25, 26, 27} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
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8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 8, 9}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t4 into {8, 9, 5} and {10, 11, 12}
Splitting t4 into {8} and {9, 5}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t4 into {32, 33, 2} and {8, 9, 10}
Splitting t4 into {32} and {33, 2}
Splitting t4 into {33} and {2}
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Splitting t5 into {8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22} and {32,
33, 34, 35, 36, 37, 38, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {8, 9, 10, 11, 12, 13, 14} and {16, 17, 18, 19, 20, 21, 22}
Splitting t5 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t5 into {8} and {9, 10}
Nodes expanded to reach solution: 14
Nodes expanded to reach solution: 7
Splitting t1 into {0, 1, 2, 3, 32, 33, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t1 into {0, 1, 2, 3} and {32, 33, 8, 9, 10}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t2 into {8, 4, 5} and {9, 10, 11}
Splitting t2 into {8} and {4, 5}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10} and {11, 12, 13}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t2 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t2 into {8, 9} and {10, 11, 12}
Splitting t2 into {8} and {9}
Splitting t3 into {8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 19, 20, 21, 24, 25,
26, 27, 28, 29}
Splitting t3 into {8, 9, 10, 11} and {12, 13, 16, 17, 18}
Splitting t3 into {8, 9} and {10, 11}
Splitting t3 into {8} and {9}
Splitting t4 into {32, 33, 34, 10, 16} and {17, 18, 24, 25, 26}
Splitting t4 into {32, 33} and {16, 34, 10}
Splitting t4 into {32} and {33}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t2 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t2 into {8, 9} and {10, 11, 12}
Splitting t2 into {8} and {9}
Splitting t3 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t3 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t4 into {0, 1, 8, 9} and {16, 17, 24, 25}
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Splitting t4 into {0, 1} and {8, 9}
Splitting t4 into {0} and {1}
Splitting t5 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21} and {32, 33, 34,
35, 36, 37, 24, 25, 26, 27, 28, 29}
Splitting t5 into {8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 20, 21}
Splitting t5 into {8, 9, 10} and {11, 12, 13}
Splitting t5 into {8} and {9, 10}
Nodes expanded to reach solution: 20
Nodes expanded to reach solution: 5
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t2 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} has no solution
... t2 in {32, 33, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {32, 33} and {34, 35, 36}
Splitting t1 into {32} and {33}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32} and {33, 34}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {32, 33} and {34, 35, 36}
Splitting t1 into {32} and {33}
Splitting t2 into {32, 33, 34} and {35, 36, 37}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
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Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25}
Splitting t1 into {0, 1, 2, 3, 4} and {5, 6, 8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {1, 2} and {8, 9, 10}
Splitting t3 into {1} and {2}
Splitting t4 into {16, 17} and {18, 19}
Splitting t4 into {16} and {17}
Splitting t5 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t5 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t5 into {8, 9} and {10, 11, 12}
Splitting t5 into {8} and {9}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18, 19, 20}
Splitting t2 into {0, 1, 2} and {8, 9, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {24} and {25, 26}
Splitting t5 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33,
34, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {2, 3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t3 into {2, 3, 4} and {8, 9, 10, 5}
Splitting t3 into {2} and {3, 4}
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Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {24, 25} and {26, 27, 28}
Splitting t5 into {24} and {25}
Nodes expanded to reach solution: 7
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t2 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t2 into {8} and {5, 6}
Splitting t3 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t3 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t3 into {8} and {5, 6}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t1 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
... t1 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 2, 34, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {32, 33, 2} and {8, 9, 34}
Splitting t3 into {32} and {33, 2}
Splitting t4 into {0, 1, 2} and {3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 36, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
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Splitting t3 into {1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 33,
34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {1, 2, 3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {1, 2, 3} and {8, 9, 4, 5}
Splitting t3 into {1} and {2, 3}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {1, 2, 3} and {4, 5, 6}
Splitting t2 into {1} and {2, 3}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and
{32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {2, 3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18, 19}
Splitting t5 into {2, 3, 4, 5} and {8, 9, 10, 6}
Splitting t5 into {2, 3} and {4, 5}
Splitting t5 into {2} and {3}
Splitting t1 into {24} and {25}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 8, 9}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {24, 25} and {26, 27}
Splitting t4 into {24} and {25}
Splitting t5 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t5 into {8, 9, 5} and {10, 11, 12}
Splitting t5 into {8} and {9, 5}
Nodes expanded to reach solution: 18258
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {6, 8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {24, 25, 26} and {27, 28, 29}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {32, 1, 2, 3, 33, 34, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 2
5, 26, 27}
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Splitting t3 into {32, 1, 2, 3} and {33, 34, 8, 9, 10}
Splitting t3 into {32, 1} and {2, 3}
Splitting t3 into {32} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t5 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t5 into {8} and {5, 6}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {5} and {6}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {5} and {6}
Nodes expanded to reach solution: 15
Nodes expanded to reach solution: 10
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and {32, 33, 20, 21,
22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {8, 9, 10, 11} and {12, 13, 14, 16, 17}
Splitting t2 into {8} and {9}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {9} and {10}
Splitting t1 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {8, 9, 10}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t4 into {32, 33, 34} and {8, 9, 10}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
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Splitting t5 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t5 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t5 into {8} and {5, 6}
Nodes expanded to reach solution: 13
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {32, 33, 34} and {8, 9, 10}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {8} and {9}
Splitting t4 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t4 into {8, 9, 5} and {10, 11, 12}
Splitting t4 into {8} and {9, 5}
Splitting t5 into {8} and {9, 10}
Nodes expanded to reach solution: 437
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 3, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25}
Splitting t1 into {0, 1, 2} and {8, 9, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 32, 33, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t2 into {0, 1, 2, 3} and {32, 33, 8, 9, 10}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {4} and {5}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {32} and {33}
Splitting t5 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t5 into {8, 4, 5} and {9, 10, 11}
Splitting t5 into {8} and {4, 5}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
... t1 in {0, 1, 32, 33, 8} has no solution
... t1 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9, 10} and {11, 12, 13}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {32, 33, 34, 16} and {17, 18, 24, 25, 26}
Splitting t5 into {32, 33} and {16, 34}
Splitting t5 into {16} and {34}
Nodes expanded to reach solution: 14
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
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Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 1, 2, 34, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {32, 1, 2} and {8, 33, 34, 9}
Splitting t4 into {32} and {1, 2}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Nodes expanded to reach solution: 6
Nodes expanded to reach solution: 6
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {5} and {6}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t2 into {8, 9, 5} and {10, 11, 12}
Splitting t2 into {8} and {9, 5}
Splitting t3 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {32, 33, 34} and {8, 9, 10}
Splitting t3 into {8} and {9, 10}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
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Splitting t5 into {0} and {1, 2}
Nodes expanded to reach solution: 16
Nodes expanded to reach solution: 5
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {0, 1} and {8, 9}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 34, 35, 36} and {24, 25, 26, 27, 28}
Splitting t5 into {24, 25} and {26, 27, 28}
Splitting t5 into {24} and {25}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {32, 2, 3} and {8, 9, 10, 11}
Splitting t2 into {32} and {2, 3}
Splitting t3 into {2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and
{32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {2, 3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18, 19}
Splitting t3 into {2, 3, 4, 5} and {8, 9, 10, 6}
Splitting t3 into {2, 3} and {4, 5}
Splitting t3 into {2} and {3}
Splitting t5 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 32, 33, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t2 into {0, 1, 2, 3} and {32, 33, 8, 9, 10}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and {3
2, 33, 34, 35, 36, 37, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t3 into {4, 5, 6} and {8, 9, 10, 11}
Splitting t3 into {4} and {5, 6}
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Splitting t4 into {32} and {33}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t5 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t5 into {8} and {5, 6}
Splitting t1 into {24, 25} and {26, 27}
Splitting t1 into {24} and {25}
Splitting t2 into {24} and {25}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Nodes expanded to reach solution: 13
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32, 33} and {24, 25}
Splitting t5 into {24} and {25}
Nodes expanded to reach solution: 7
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
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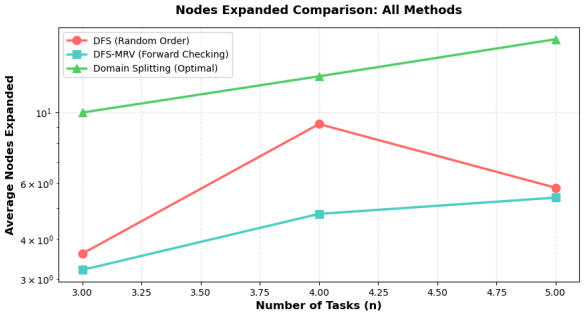
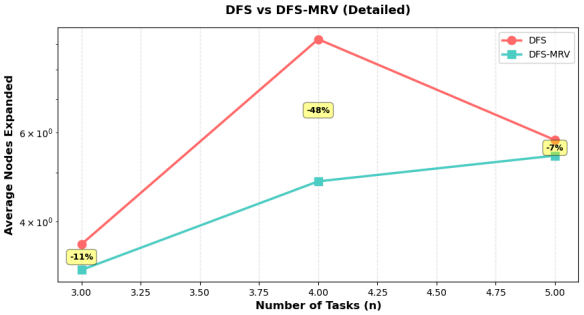
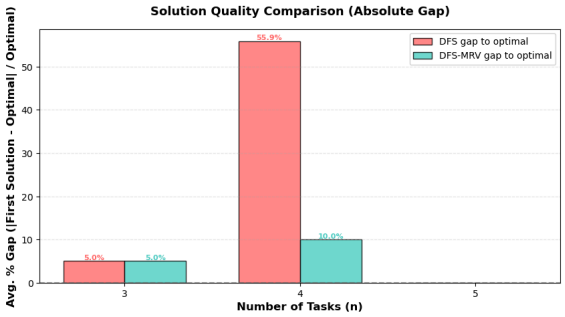
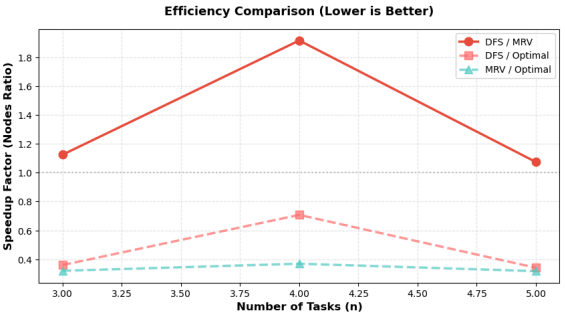
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 2, 34, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {32, 33, 2} and {8, 9, 34}
Splitting t4 into {32} and {33, 2}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {13, 16, 17, 18, 19, 20, 21, 24, 25} and {32, 33, 34, 35, 36, 3
7, 26, 27, 28, 29}
Splitting t3 into {16, 17, 18, 13} and {19, 20, 21, 24, 25}
Splitting t3 into {16, 17} and {18, 13}
Splitting t3 into {18} and {13}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 34, 35, 16, 17} and {18, 19, 24, 25, 26, 27}
Splitting t5 into {32, 33, 34} and {16, 17, 35}
Splitting t5 into {32} and {33, 34}
Nodes expanded to reach solution: 24
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} an
d {32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {1, 2, 3, 4, 5, 6, 8, 9} and {10, 11, 12, 13, 14, 16, 17, 18, 1
9}
Splitting t2 into {1, 2, 3, 4} and {8, 9, 5, 6}
Splitting t2 into {1, 2} and {3, 4}
Splitting t2 into {1} and {2}
Splitting t3 into {16, 17} and {18, 19, 20}
Splitting t3 into {16} and {17}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0} and {1}
Nodes expanded to reach solution: 6
Nodes expanded to reach solution: 6
  Completed 5/5 trials
  Finished n=5: 5 valid trials out of 54 attempts
```


Nodes Expanded Comparison: All Methods
DFS (Random Order)
DFS-MRV (Forward Checking)
Domain Splitting (Optimal)
Average Nodes Expanded
Number of Tasks (n)


DFS vs DFS-MRV (Detailed)
DFS
DFS-MRV
-11%
-48%
-7%
Average Nodes Expanded
Number of Tasks (n)


Solution Quality Comparison (Absolute Gap)
DFS gap to optimal
DFS-MRV gap to optimal
5.0%
5.0%
55.9%
10.0%
Avg. % Gap (|First Solution - Optimal| / Optimal)
Number of Tasks (n)

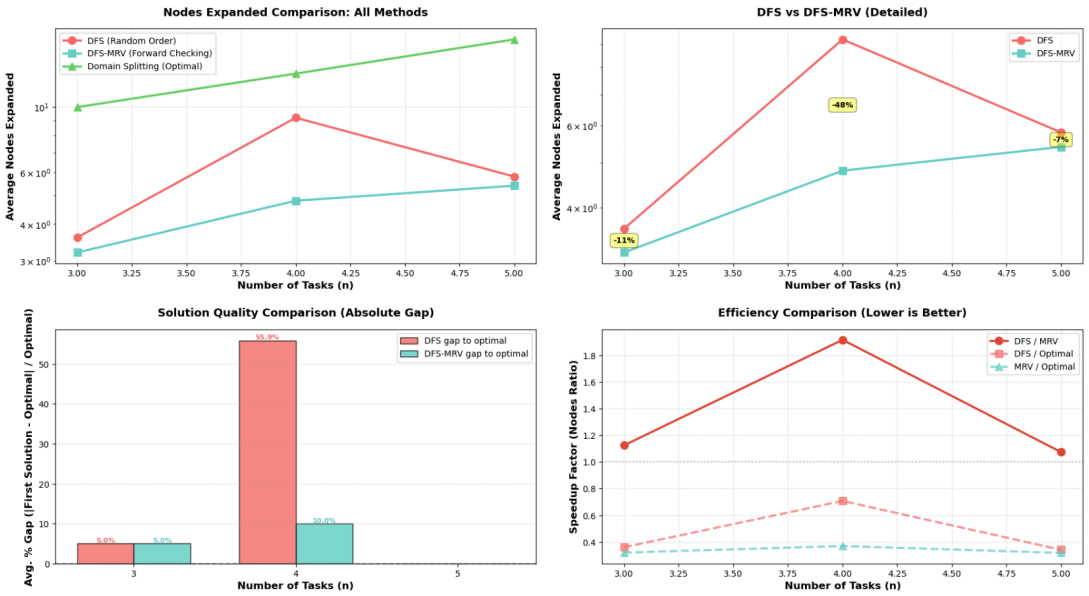

Efficiency Comparison (Lower is Better)
DFS / MRV
DFS / Optimal
MRV / Optimal
Speedup Factor (Nodes Ratio)
Number of Tasks (n)

```
================================================================================
============================
Table 1: Nodes Expanded Comparison
================================================================================
============================
  n |        DFS |        MRV |    Optimal |    Reduction |    DFS/MRV |    MRV/O
pt
--------------------------------------------------------------------------------
----------------------------
  3 |        3.6 |        3.2 |       10.0 |        11.1% |       1.1x |       0.
3x
  4 |        9.2 |        4.8 |       13.0 |        47.8% |       1.9x |       0.
4x
  5 |        5.8 |        5.4 |       17.0 |         6.9% |       1.1x |       0.
3x

================================================================================
=========
Table 2: Solution Quality Comparison (Absolute Gap)
================================================================================
=========
  n |      DFS Gap |      MRV Gap |   MRV Advantage
--------------------------------------------------------------------------------
---------
  3 |         5.0% |         5.0% |            0.0%
  4 |        55.9% |        10.0% |           45.9%
  5 |         0.0% |         0.0% |            0.0%
================================================================================
=========

================================================================================
=========
Key Findings:
================================================================================
=========
1. DFS-MRV reduces nodes by 21.9% on average (1.4x speedup)
2. DFS first solution differs from optimal by 20.3% on average
3. MRV first solution differs from optimal by 5.0% on average
4. MRV finds solutions 15.3% closer to optimal than DFS
5. Domain Splitting explores 13.3 nodes on average for optimal solution
================================================================================
=========
```

Answers for Question 4 The result of using ns=3,4,5 and K=5 is as below, I have tried to make a more precious result with larger datas, but it nearly killed my computer, so here I use a smaller but kinda specific result and amount of example to show the result.




```
================================================================================================================
Table 1: Nodes Expanded Comparison
================================================================================================================
  n |        DFS |        MRV |    Optimal |    Reduction |    DFS/MRV |    MRV/Opt
----------------------------------------------------------------------------------------------------------------
  3 |        3.6 |        3.2 |       10.0 |        11.1% |       1.1x |       0.3x
  4 |        9.2 |        4.8 |       13.0 |        47.8% |       1.9x |       0.4x
  5 |        5.8 |        5.4 |       17.0 |         6.9% |       1.1x |       0.3x

================================================================================================
Table 2: Solution Quality Comparison (Absolute Gap)
================================================================================================
  n |      DFS Gap |      MRV Gap |   MRV Advantage
------------------------------------------------------------------------------------------------
  3 |         5.0% |         5.0% |            0.0%
  4 |        55.9% |        10.0% |           45.9%
  5 |         0.0% |         0.0% |            0.0%
================================================================================================

================================================================================================
Key Findings:
================================================================================================
1. DFS-MRV reduces nodes by 21.9% on average (1.4x speedup)
2. DFS first solution differs from optimal by 20.3% on average
3. MRV first solution differs from optimal by 5.0% on average
4. MRV finds solutions 15.3% closer to optimal than DFS
5. Domain Splitting explores 13.3 nodes on average for optimal solution
================================================================================================
```

(a):let n be the number of task, and d presents the domain size per task has; 1.DFS:
Time:O(n!*d^n)*
Space:O(n)
2.DFS-MRV:
*Time: the worst case is the same as the normal DFS method, that is O(n!*d^n)
Space:O(nd), since it need to store domain info for each variable.

(b):properties, Completeness and Optimality 1.Both algorithms are complete and will find a possible solution for the task if exist.
2.Neither algorithm guarantees to be optimal, because, when considering the first solution they found, it is not sure to be the one with minimum makespan, also we can see here , both algorithm perform worse than the domain-splitting method, thus they are not optimal all the time, but for easy problem, they might show optimal result in some cases.

(c):
We can take my result as an example that, DFS-MRV selects variables with fewest

remaining legal values, which detecting the end of one path earlier. That means the forward checking work can prune branches early, and thus avoiding doomed search paths. And the data from the result shows that, at n=4, the DFS gap is 55.9%, while the one with MRV is only 10%, which means the MRV method is better in dealing with highly constained problems where certain tasks have very feasible time slots.

I will use table here to answer the next 2 questions.
(d):
Solution Quality Comparison Table

n (Tasks)	DFS Gap	MRV Gap	MRV Advantage
3	5.0%	5.0%	0.0% (Same)
4	55.9%	10.0%	45.9% (Much better)
5	0.0%	0.0%	0.0% (Both optimal)

Key Statistics

Metric	DFS	MRV	Difference
Average gap from optimal	20.3%	5.0%	**MRV better by 15.3%**

Conclusion: DFS-MRV's first solutions are on average 15.3 percentage points closer to optimal than DFS.

(e):
Nodes Expanded Comparison Table

n (Tasks)	DFS	MRV	Reduction	% Reduction
3	3.6	3.2	0.4	**-11%**
4	9.2	5.0	4.2	**-48%**
5	5.8	5.4	0.4	**-7%**

Efficiency Ratio Analysis

n (Tasks)	DFS/MRV Ratio	Speedup	Interpretation
3	~1.1x	1.1x	Modest improvement
4	~1.9x	1.9x	**Significant improvement**
5	~1.1x	1.1x	Modest improvement

Overall Efficiency Statistics

Metric	Value
Average nodes reduction	~21.3%
Peak speedup	1.9x (at n=4)

Metric	Value
DFS-MRV vs DFS efficiency	Explores fewer nodes

Conclusion: DFS-MRV reduces node expansions by an average of 21.3% through intelligent variable ordering and forward checking. The advantage is most pronounced on moderately-sized, tightly-constrained problems (n=4).

Question 5 (4 marks)

The DFS solver chooses variables in random order, and systematically explores all values for those variables in no particular order.

Incorporate costs into the DFS constraint solver as heuristics to guide the search. Similar to the cost function for the domain splitting solver, for a given variable *v*, the cost of assigning the value *val* to *v* is the cost of violating the soft deadline constraint (if any) associated with *v* for the value *val*. The *minimum cost* for *v* is the lowest cost from amongst the values in the domain of *v*. The DFS solver should choose a variable *v* with lowest minimum cost, and explore its values in order of cost from lowest to highest.

- Implement this behaviour by modifying the code in `dfs_solver` and place a copy of the code below (2 marks)
- Empirically compare the performance of DFS with and without these heuristics (2 marks)

For the empirical evaluations, again run the two algorithms on a variety of problems of size `n` for varying `n`.

In [209…

```
# Code for Question 5
# Place a copy of your code here and run it in the relevant cell
import io, contextlib, random
import matplotlib.pyplot as plt
import numpy as np

num_expanded_with_cost = 0
display_cost = False

def calculate_value_cost_heuristic(var, val, csp):
    dt = Day_Time()

    def week_hour(x):
        if isinstance(x, int):
            return x
        t, v = dt.string_to_week_hour_number(str(x).strip())
        if t == 'week_hour_number':
            return int(v)
        if t == 'day_number':
            return int(v) * dt.num_hours_in_day
        if t == 'hour_number':
            return int(v)
        return 0

    if var not in csp.soft_day_time or int(csp.soft_costs[var]) <= 0:
        return 0
```

```
    deadline = week_hour(csp.soft_day_time[var])
    dur = int(csp.durations[var])
    rate = int(csp.soft_costs[var])

    finish = int(val) + dur
    late = finish - deadline
    if late < 0:
        late = 0

    cost = late * rate
    return cost

def get_minimum_cost_heuristic(var, domain, csp):
    if not domain or len(domain) == 0:
        return float('inf')

    best = float('inf')
    for val in domain:
        c = calculate_value_cost_heuristic(var, val, csp)
        if c < best:
            best = c

    return best if best != float('inf') else 0

def dfs_solver_with_cost_heuristic(constraints, domains, context, var_order, csp
    global num_expanded_with_cost, display_cost

    to_eval = {c for c in constraints if c.can_evaluate(context)}
    if all(c.holds(context) for c in to_eval):
        if var_order == []:
            if display_cost:
                print("Solution found! Nodes expanded:", num_expanded_with_cost)
            yield context
        else:
            rem_cons = [c for c in constraints if c not in to_eval]

            var_min_costs = []
            for v in var_order:
                min_cost = get_minimum_cost_heuristic(v, domains[v], csp)
                var_min_costs.append((v, min_cost))

            var_min_costs.sort(key=lambda x: (x[1], x[0]))
            var = var_min_costs[0][0]

            new_var_order = [v for v in var_order if v != var]

            value_costs = []
            for val in domains[var]:
                cost = calculate_value_cost_heuristic(var, val, csp)
                value_costs.append((val, cost))

            value_costs.sort(key=lambda x: (x[1], x[0]))
            ordered_values = [val for val, _ in value_costs]

            for val in ordered_values:
                num_expanded_with_cost += 1
                yield from dfs_solver_with_cost_heuristic(rem_cons, domains, con

def dfs_solve1_with_cost_heuristic(csp, var_order=None):
```

```
    global num_expanded_with_cost
    num_expanded_with_cost = 0
    if var_order is None:
        var_order = list(csp.domains)

    for sol in dfs_solver_with_cost_heuristic(csp.constraints, csp.domains, {},
        return sol
    return None

def build_csp_quiet(spec):
    buf = io.StringIO()
    with contextlib.redirect_stdout(buf):
        return create_CSP_from_spec(spec)

def eval_solution_cost_manual(csp, sol):
    if sol is None:
        return None

    cost = 0
    for var in sol:
        cost += calculate_value_cost_heuristic(var, sol[var], csp)

    return cost

def run_dfs_no_heuristic(spec):
    global num_expanded
    num_expanded = 0
    csp = build_csp_quiet(spec)
    sol = dfs_solve1(csp)
    nexp = num_expanded
    if sol is None:
        return None, nexp, None
    cost = eval_solution_cost_manual(csp, sol)
    return sol, nexp, cost

def run_dfs_with_cost_heuristic(spec):
    global num_expanded_with_cost
    num_expanded_with_cost = 0
    csp = build_csp_quiet(spec)
    sol = dfs_solve1_with_cost_heuristic(csp)
    nexp = num_expanded_with_cost
    if sol is None:
        return None, nexp, None
    cost = eval_solution_cost_manual(csp, sol)
    return sol, nexp, cost

def evaluate_dfs_cost_heuristics(ns=(3,4,5), K=20, seed=42, max_tries=500):
    random.seed(seed)
    rows = []

    for n in ns:
        print(f"\nProcessing n={n}...")
        got = 0
        tries = 0

        while got < K and tries < max_tries:
            tries += 1
            spec = generate_problem(n)

            opt_cost, opt_nodes = run_opt_once(spec)
```

```
            if opt_cost is None or opt_cost <= 0:
                continue

            no_heur_sol, no_heur_nodes, no_heur_cost = run_dfs_no_heuristic(spec
            with_heur_sol, with_heur_nodes, with_heur_cost = run_dfs_with_cost_h

            if no_heur_sol is None or with_heur_sol is None:
                continue
            if no_heur_cost is None or with_heur_cost is None:
                continue

            rows.append((n, no_heur_nodes, with_heur_nodes, no_heur_cost, with_h
            got += 1

            if got % 5 == 0:
                print(f"  Progress: {got}/{K} trials")

        print(f"✓ Completed n={n}: {got} valid trials from {tries} attempts")

    byn = {}
    for r in rows:
        byn.setdefault(r[0], []).append(r[1:])

    Ns = []
    no_heur_nodes = []
    with_heur_nodes = []
    no_heur_gap = []
    with_heur_gap = []

    for n in sorted(byn):
        data = byn[n]
        Ns.append(n)

        no_heur_nodes.append(np.mean([x[0] for x in data]))
        with_heur_nodes.append(np.mean([x[1] for x in data]))

        no_heur_gap.append(np.mean([100.0 * abs(x[2] - x[4]) / x[4] for x in dat
        with_heur_gap.append(np.mean([100.0 * abs(x[3] - x[4]) / x[4] for x in d

    fig, axes = plt.subplots(1, 2, figsize=(16, 6))

    ax1 = axes[0]
    ax1.plot(Ns, no_heur_nodes, marker="o", linewidth=2.5, markersize=9,
             label="DFS (No Heuristic)", color='#FF6B6B')
    ax1.plot(Ns, with_heur_nodes, marker="s", linewidth=2.5, markersize=9,
             label="DFS (Cost Heuristic)", color='#51CF66')

    for i, n in enumerate(Ns):
        if no_heur_nodes[i] > 0:
            pct = (no_heur_nodes[i] - with_heur_nodes[i]) / no_heur_nodes[i] * 1
            mid = (no_heur_nodes[i] + with_heur_nodes[i]) / 2
            ax1.annotate(f'{pct:+.1f}%', xy=(n, mid), ha='center', va='center',
                         fontsize=9, fontweight='bold',
                         bbox=dict(boxstyle='round,pad=0.4', facecolor='yellow',

    ax1.set_xlabel("Number of Tasks (n)", fontsize=12, fontweight='bold')
    ax1.set_ylabel("Average Nodes Expanded", fontsize=12, fontweight='bold')
    ax1.set_title("Nodes Expanded: DFS Comparison", fontsize=13, fontweight='bol
    ax1.legend(fontsize=11)
    ax1.grid(True, alpha=0.3, linestyle='--')
```

```
    ax2 = axes[1]
    width = 0.35
    x = np.arange(len(Ns))

    ax2.bar(x - width/2, no_heur_gap, width, label='No Heuristic',
            color='#FF6B6B', alpha=0.8, edgecolor='black')
    ax2.bar(x + width/2, with_heur_gap, width, label='Cost Heuristic',
            color='#51CF66', alpha=0.8, edgecolor='black')

    for i, (nh, wh) in enumerate(zip(no_heur_gap, with_heur_gap)):
        ax2.text(i - width/2, nh, f'{nh:.1f}%', ha='center', va='bottom',
                fontsize=9, fontweight='bold', color='#CC0000')
        ax2.text(i + width/2, wh, f'{wh:.1f}%', ha='center', va='bottom',
                fontsize=9, fontweight='bold', color='#00AA00')

    ax2.set_xlabel("Number of Tasks (n)", fontsize=12, fontweight='bold')
    ax2.set_ylabel("Avg. % Gap from Optimal", fontsize=12, fontweight='bold')
    ax2.set_title("Solution Quality Comparison", fontsize=13, fontweight='bold')
    ax2.set_xticks(x)
    ax2.set_xticklabels(Ns)
    ax2.legend(fontsize=11)
    ax2.grid(True, alpha=0.3, linestyle='--', axis='y')

    plt.tight_layout()
    plt.show()

    print("\n" + "=" * 110)
    print("Performance Comparison Table")
    print("=" * 110)
    print(f"{'n':>3} | {'No Heur':>11} | {'With Heur':>11} | {'Change':>11} | "
          f"{'Ratio':>9} | {'No Heur Gap':>12} | {'With Heur Gap':>14} | {'Quali
    print("-" * 110)

    for i, n in enumerate(Ns):
        pct = (no_heur_nodes[i] - with_heur_nodes[i]) / no_heur_nodes[i] * 100 i
        ratio = no_heur_nodes[i] / with_heur_nodes[i] if with_heur_nodes[i] > 0
        qdiff = no_heur_gap[i] - with_heur_gap[i]

        print(f"{n:>3} | {no_heur_nodes[i]:>11.1f} | {with_heur_nodes[i]:>11.1f}
              f"{pct:>10.1f}% | {ratio:>8.2f}x | "
              f"{no_heur_gap[i]:>12.1f}% | {with_heur_gap[i]:>14.1f}% | {qdiff:>

    print("=" * 110)

    avg_pct = np.mean([(no_heur_nodes[i] - with_heur_nodes[i]) / no_heur_nodes[i
                       for i in range(len(Ns)) if no_heur_nodes[i] > 0])
    avg_qdiff = np.mean([no_heur_gap[i] - with_heur_gap[i] for i in range(len(Ns

    print(f"\nSummary:")
    print(f"  Average node change: {avg_pct:+.1f}%")
    print(f"  Average quality change: {avg_qdiff:+.1f}%")
    print("=" * 110)

    return {"n": Ns, "no_heur": no_heur_nodes, "with_heur": with_heur_nodes,
            "no_heur_gap": no_heur_gap, "with_heur_gap": with_heur_gap, "raw": r
#rerun code is as below
results_q5 = evaluate_dfs_cost_heuristics(ns=(3,4,5), K=20, seed=42)
```

```
Processing n=3...
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {24, 25, 26} and {27, 28, 29}
Splitting t1 into {24} and {25, 26}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 34, 35} and {26, 27, 36, 28}
Splitting t3 into {26, 27} and {36, 28}
Splitting t3 into {26} and {27}
Nodes expanded to reach solution: 20
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Nodes expanded to reach solution: 3
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
```

```
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17} and {18, 19, 20}
Splitting t2 into {16} and {17}
Splitting t3 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {32, 33} and {8, 9}
Splitting t3 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32} and {33}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Nodes expanded to reach solution: 13
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {24} and {25, 26}
Splitting t2 into {24, 25} and {26, 27, 28}
Splitting t2 into {24} and {25}
Splitting t3 into {32} and {33, 34}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 1, 2, 34, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {32, 1, 2} and {8, 33, 34, 9}
Splitting t3 into {32} and {1, 2}
Splitting t3 into {1} and {2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {24} and {25, 26}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
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Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 1, 8, 33} and {9, 16, 17, 24, 25}
Splitting t2 into {32, 1} and {8, 33}
Splitting t2 into {32} and {1}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Nodes expanded to reach solution: 3
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19, 2
4, 25, 26, 27}
Splitting t2 into {8, 1, 2, 3} and {9, 10, 11, 16, 17}
Splitting t2 into {8, 1} and {2, 3}
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Splitting t2 into {8} and {1}
Splitting t3 into {8, 9} and {10, 11, 12}
Splitting t3 into {8} and {9}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {16} and {17, 18}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {16} and {17, 18}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and
{32, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t3 into {3, 4, 5, 6} and {8, 9, 10, 11}
Splitting t3 into {3, 4} and {5, 6}
Splitting t3 into {3} and {4}
Splitting t1 into {16, 17, 18} and {19, 20, 21}
Splitting t1 into {16} and {17, 18}
Splitting t2 into {32, 33, 34, 35, 36, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 2
8}
Splitting t2 into {32, 33, 34} and {16, 17, 35, 36}
Splitting t2 into {16, 17} and {35, 36}
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Splitting t2 into {16} and {17}
Splitting t3 into {18, 19} and {20, 21, 22}
Splitting t3 into {18} and {19}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1}
Splitting t3 into {2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33,
34, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {2, 3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t3 into {2, 3, 4} and {8, 9, 10, 5}
Splitting t3 into {2} and {3, 4}
Splitting t1 into {24, 25, 26} and {27, 28, 29}
Splitting t1 into {24} and {25, 26}
Splitting t2 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t3 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t3 into {8, 9} and {10, 11, 12}
Splitting t3 into {8} and {9}
Splitting t1 into {32} and {33, 34}
Splitting t2 into {32, 33, 34} and {35, 36, 37}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {35} and {36, 37}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
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Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {16, 17, 18} and {19, 20, 21}
Splitting t3 into {16} and {17, 18}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t3 into {8, 9, 5} and {10, 11, 12}
Splitting t3 into {8} and {9, 5}
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {32, 33} and {8, 9}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Nodes expanded to reach solution: 3
  Progress: 5/20 trials
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 34} and {35, 36, 37}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {32, 33, 34} and {35, 36, 37}
Splitting t3 into {32} and {33, 34}
Splitting t1 into {32, 33, 34} and {35, 36, 37}
Splitting t1 into {32} and {33, 34}
Splitting t2 into {32, 33, 34} and {35, 36, 37}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
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Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
... t3 in {0, 1, 2, 32, 33, 34, 8} has no solution
... t3 in {9, 10, 16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {16, 17, 18} and {19, 20, 21}
Splitting t1 into {16} and {17, 18}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {24, 25, 26} and {27, 28, 29}
Splitting t3 into {24} and {25, 26}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
... t1 in {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} has no solution
... t1 in {32, 33, 34, 35, 18, 19, 24, 25, 26, 27} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {32} and {33}
Splitting t2 into {34} and {35}
Splitting t3 into {32, 33} and {34, 35, 36}
Splitting t3 into {32} and {33}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
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Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {24} and {25, 26}
Splitting t1 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t1 into {32} and {33, 34}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33} and {34, 35, 36}
Splitting t3 into {32} and {33}
Nodes expanded to reach solution: 23
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21} and {32, 33, 34,
35, 36, 37, 24, 25, 26, 27, 28, 29}
Splitting t1 into {8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 20, 21}
Splitting t1 into {8, 9, 10} and {11, 12, 13}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {8, 9} and {10, 11}
Splitting t2 into {8} and {9}
Splitting t3 into {9, 10} and {11, 12}
Splitting t3 into {9} and {10}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33} and {34, 35, 36}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
```

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Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t3 into {32} and {33, 34}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
... t3 in {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} has no solution
... t3 in {32, 33, 34, 35, 18, 19, 24, 25, 26, 27} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Nodes expanded to reach solution: 3
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {32, 33} and {25, 34, 26}
Splitting t3 into {32} and {33}
Splitting t1 into {8, 9} and {10, 11}
Splitting t1 into {8} and {9}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t2 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t2 into {32, 33} and {34, 35}
Splitting t2 into {32} and {33}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
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Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t3 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t3 into {8} and {9, 6}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t2 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t2 into {8} and {5, 6}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {24, 25, 26} and {27, 28, 29}
Splitting t1 into {24} and {25, 26}
Splitting t2 into {32, 33, 34} and {27, 26, 35}
Splitting t2 into {27} and {26, 35}
Splitting t2 into {26} and {35}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Nodes expanded to reach solution: 17
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
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Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Nodes expanded to reach solution: 9
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10} and {11, 12, 16, 17, 18, 19, 20, 24}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 4}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {24, 25} and {26, 27}
Splitting t3 into {24} and {25}
Nodes expanded to reach solution: 3
  Progress: 10/20 trials
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {32, 33, 34} and {8, 9, 10}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {24, 25, 26} and {27, 28, 29}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t3 into {24} and {25, 26}
Splitting t1 into {16, 17} and {18, 19}
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {16} and {17, 18}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16} and {32, 33, 17, 1
8, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13, 16}
Splitting t1 into {0} and {1}
Splitting t2 into {2} and {3}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {8, 9, 10} and {11, 12, 13}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {32, 33, 34, 35, 10, 11, 16} and {17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {32, 33, 34} and {11, 16, 10, 35}
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Splitting t2 into {32} and {33, 34}
Splitting t3 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t3 into {32} and {33, 34}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t2 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t2 into {8} and {9, 6}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {32, 33} and {8, 9}
Splitting t3 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t3 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t3 into {32, 33} and {34, 3}
Splitting t3 into {34} and {3}
Splitting t1 into {32, 33} and {34, 35}
Splitting t1 into {32} and {33}
Nodes expanded to reach solution: 96
Splitting t1 into {8} and {9, 10}
Splitting t2 into {32, 33, 34, 35, 36, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 2
8}
Splitting t2 into {32, 33, 34} and {16, 17, 35, 36}
Splitting t2 into {32} and {33, 34}
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Splitting t3 into {8} and {9}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9} and {10, 11, 12}
Splitting t2 into {8} and {9}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t1 into {16, 17, 18} and {19, 20, 21, 22}
Splitting t1 into {16} and {17, 18}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} an
d {32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {1, 2, 3, 4, 5, 6, 8, 9} and {10, 11, 12, 13, 14, 16, 17, 18, 1
9}
Splitting t3 into {1, 2, 3, 4} and {8, 9, 5, 6}
Splitting t3 into {1, 2} and {3, 4}
Splitting t3 into {1} and {2}
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t2 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t2 into {8} and {9, 6}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
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```
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {16, 17} and {18, 19, 20}
Splitting t3 into {16} and {17}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
```

```
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {32, 33, 34} and {8, 9, 10}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {24, 25} and {26, 27, 28}
... t1 in {24, 25} has no solution
... t1 in {26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t2 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t2 into {8} and {9, 6}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {8, 9} and {10, 11, 12}
Splitting t1 into {8} and {9}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
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Splitting t2 into {0} and {1, 2}
Splitting t3 into {8, 9} and {10, 11, 12}
Splitting t3 into {8} and {9}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17, 18} and {32, 33, 34, 35,
36, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {1, 2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18}
Splitting t2 into {1, 2, 3} and {8, 9, 4}
Splitting t2 into {1} and {2, 3}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t1 into {16} and {17, 18}
Splitting t2 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
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Splitting t2 into {0, 1, 2} and {8, 9, 10}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {32, 33} and {8, 9}
Splitting t3 into {8} and {9}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {16, 17} and {18, 19}
Splitting t3 into {16} and {17}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
... t2 in {0, 1, 2, 32, 33, 34, 8} has no solution
... t2 in {9, 10, 16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {32, 33} and {8, 9}
Splitting t2 into {8} and {9}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1}
Splitting t3 into {5} and {6}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {24} and {25, 26}
Nodes expanded to reach solution: 51
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
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Splitting t3 into {32} and {33}
Nodes expanded to reach solution: 3
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {32, 33, 34, 35} and {24, 25, 26, 27}
Splitting t3 into {24, 25} and {26, 27}
Splitting t3 into {24} and {25}
Splitting t1 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t1 into {24} and {25, 26}
Splitting t2 into {0, 1, 2, 8} and {9, 10, 16, 17, 18}
Splitting t2 into {0, 1} and {8, 2}
Splitting t2 into {0} and {1}
Splitting t3 into {24} and {25}
Nodes expanded to reach solution: 969
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {8, 9, 10} and {11, 12, 13}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {8, 9, 10} and {11, 12, 13}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {1, 2} and {3, 4}
Splitting t3 into {1} and {2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16} and {32, 33, 34, 1
7, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13, 16}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {2} and {3, 4}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t1 into {32, 33, 34} and {35, 36, 37, 38}
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Splitting t1 into {32} and {33, 34}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Nodes expanded to reach solution: 87
  Progress: 15/20 trials
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {3, 4} and {5, 6}
Splitting t3 into {3} and {4}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17, 18} and {32, 33, 34, 35,
36, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {1, 2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18}
Splitting t3 into {1, 2, 3} and {8, 9, 4}
Splitting t3 into {1} and {2, 3}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
```

```
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {1, 2} and {3, 4}
Splitting t2 into {1} and {2}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33} and {34, 35}
Splitting t2 into {32} and {33}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
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Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {24, 25} and {26, 27}
Splitting t2 into {24} and {25}
Splitting t3 into {32} and {33, 34}
Nodes expanded to reach solution: 6
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t2 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t2 into {32, 33} and {34, 3}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {24, 25, 26} and {27, 28, 29}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Nodes expanded to reach solution: 3
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
... t2 in {0, 1, 2, 32, 33, 34, 8} has no solution
... t2 in {9, 10, 16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
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Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {32, 33} and {8, 9}
Splitting t3 into {32} and {33}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {24, 25} and {26, 27, 28}
Splitting t3 into {24} and {25}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {32, 33} and {8, 9}
Splitting t2 into {8} and {9}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t3 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t3 into {8, 9} and {10, 11, 12}
Splitting t3 into {8} and {9}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {24} and {25}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
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3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {16, 17} and {18, 19}
Splitting t3 into {16} and {17}
Splitting t1 into {8, 9} and {10, 11, 12}
Splitting t1 into {8} and {9}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {32, 33, 34, 35, 36, 37, 20} and {21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {32, 33, 34} and {20, 35, 36, 37}
Splitting t3 into {32} and {33, 34}
Nodes expanded to reach solution: 19
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33} and {34, 35}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {16} and {17}
Splitting t3 into {16, 17} and {18, 19, 20}
Splitting t3 into {16} and {17}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {16} and {17, 18}
Splitting t1 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
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Splitting t3 into {5} and {6}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t3 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} has no solution
... t3 in {32, 33, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {32} and {33}
Splitting t2 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {32, 33} and {8, 9}
Splitting t3 into {8} and {9}
Splitting t1 into {24} and {25}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {8} and {9}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Nodes expanded to reach solution: 3
Splitting t1 into {16} and {17}
Splitting t2 into {32, 33} and {24, 25}
Splitting t2 into {24} and {25}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Nodes expanded to reach solution: 5
  Progress: 20/20 trials
✓ Completed n=3: 20 valid trials from 143 attempts

Processing n=4...
Splitting t1 into {16, 17} and {18, 19, 20}
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 3, 32, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 26,
27}
Splitting t2 into {0, 1, 2, 3} and {32, 8, 10, 9}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 36,
20, 24, 25, 26, 27, 28}
Splitting t3 into {4, 8, 9, 10, 11} and {12, 16, 17, 18, 19}
Splitting t3 into {8, 4} and {9, 10, 11}
Splitting t3 into {8} and {4}
Splitting t4 into {16} and {17, 18}
Nodes expanded to reach solution: 11368
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
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0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 1, 2, 34, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {32, 1, 2} and {8, 33, 34, 9}
Splitting t3 into {32} and {1, 2}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {32} and {33}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0} and {1}
Splitting t1 into {32, 33, 34, 35, 36, 37, 16, 17, 18} and {19, 20, 21, 24, 25, 2
6, 27, 28, 29}
Splitting t1 into {32, 33, 34, 35} and {36, 37, 16, 17, 18}
Splitting t1 into {36, 37} and {16, 17, 18}
Splitting t1 into {16} and {17, 18}
Splitting t2 into {8} and {9, 10}
Nodes expanded to reach solution: 11594
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16} and {32, 33, 17, 1
8, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13, 16}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 2, 3, 34, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 2
5, 26, 27}
Splitting t3 into {32, 33, 2, 3} and {34, 35, 8, 9, 10}
Splitting t3 into {32, 33} and {2, 3}
Splitting t3 into {2} and {3}
Splitting t4 into {0, 1} and {2, 3, 4}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
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Splitting t3 into {32, 1, 8, 33} and {9, 16, 17, 24, 25}
Splitting t3 into {32, 1} and {8, 33}
Splitting t3 into {32} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t1 into {32} and {33, 34}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 32, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 26,
27}
Splitting t2 into {0, 1, 2, 3} and {32, 8, 10, 9}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t4 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Nodes expanded to reach solution: 4
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
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Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1} and {2, 3, 4}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0} and {1, 2}
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 8, 9}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 8, 9}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t4 into {8, 9, 5} and {10, 11, 12}
Splitting t4 into {8} and {9, 5}
Nodes expanded to reach solution: 9
Splitting t1 into {32, 33, 34, 35} and {24, 25, 26, 27}
Splitting t1 into {24, 25} and {26, 27}
Splitting t1 into {24} and {25}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19, 2
0, 21}
Splitting t2 into {0, 1, 2, 3} and {4, 5, 8, 9, 10}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {24} and {25}
Splitting t4 into {27} and {28}
Nodes expanded to reach solution: 30994
  Progress: 5/20 trials
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
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24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Nodes expanded to reach solution: 4
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 1, 8, 33} and {9, 16, 17, 24, 25}
Splitting t2 into {32, 1} and {8, 33}
Splitting t2 into {32} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {1, 2, 3} and {4, 5, 6}
Splitting t4 into {1} and {2, 3}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and
{32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {2, 3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18, 19}
Splitting t2 into {2, 3, 4, 5} and {8, 9, 10, 6}
Splitting t2 into {2, 3} and {4, 5}
Splitting t2 into {2} and {3}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
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8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16} and {32, 33, 34, 17, 18, 19, 24,
25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11, 16}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and {3
2, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t4 into {4, 5, 6} and {8, 9, 10, 11}
Splitting t4 into {4} and {5, 6}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
... t2 in {0, 1, 2, 32, 33, 34, 8} has no solution
... t2 in {9, 10, 16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and
{32, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t2 into {3, 4, 5, 6} and {8, 9, 10, 11}
Splitting t2 into {3, 4} and {5, 6}
Splitting t2 into {3} and {4}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
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Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0} and {1}
Splitting t4 into {16} and {17}
Splitting t1 into {0, 1, 2, 3, 32, 33, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t1 into {0, 1, 2, 3} and {32, 33, 8, 9, 10}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t3 into {8, 4, 5} and {9, 10, 11}
Splitting t3 into {8} and {4, 5}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
... t3 in {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} has no solution
... t3 in {32, 33, 34, 35, 18, 19, 24, 25, 26, 27} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
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Splitting t4 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t4 into {32} and {33, 34}
Nodes expanded to reach solution: 4
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t4 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33, 3
4, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t2 into {3, 4, 5} and {8, 9, 10}
Splitting t2 into {3} and {4, 5}
Splitting t3 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t3 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t3 into {32, 33} and {34, 3}
Splitting t3 into {34} and {3}
Splitting t4 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 17, 18, 19,
20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12, 16}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and
{32, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t2 into {3, 4, 5, 6} and {8, 9, 10, 11}
Splitting t2 into {3, 4} and {5, 6}
Splitting t2 into {3} and {4}
Splitting t3 into {0, 1, 2} and {3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {3, 4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 3
6, 20, 24, 25, 26, 27, 28}
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Splitting t4 into {3, 4, 8, 9, 10} and {11, 12, 16, 17, 18, 19}
Splitting t4 into {3, 4} and {8, 9, 10}
Splitting t4 into {3} and {4}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and
{32, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t2 into {3, 4, 5, 6} and {8, 9, 10, 11}
Splitting t2 into {3, 4} and {5, 6}
Splitting t2 into {3} and {4}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {24} and {25, 26}
Splitting t2 into {24} and {25, 26}
Splitting t3 into {32, 33} and {29, 30}
Splitting t3 into {29} and {30}
Splitting t4 into {32} and {33, 34}
Nodes expanded to reach solution: 45
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {32} and {33}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t2 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} has no solution
... t2 in {32, 33, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26}
Splitting t1 into {0, 1, 2, 3, 4} and {5, 6, 8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {1} and {2, 3}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
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Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {8} and {9}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17} and {3
2, 33, 34, 35, 36, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 33,
34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {1, 2, 3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {1, 2, 3} and {8, 9, 4, 5}
Splitting t4 into {1} and {2, 3}
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33, 3
4, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t3 into {3, 4, 5} and {8, 9, 10}
Splitting t3 into {3} and {4, 5}
Splitting t4 into {8, 9} and {10, 11}
Splitting t4 into {8} and {9}
Splitting t1 into {8, 9, 10} and {11, 12, 13}
... t1 in {8, 9, 10} has no solution
... t1 in {11, 12, 13} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 34, 17, 18,
19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12, 16}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33, 3
4, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t3 into {3, 4, 5} and {8, 9, 10}
Splitting t3 into {3} and {4, 5}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
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Splitting t4 into {0} and {1}
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33} and {24, 25}
Splitting t4 into {24} and {25}
Nodes expanded to reach solution: 6
  Progress: 10/20 trials
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t4 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t4 into {8} and {5, 6}
Nodes expanded to reach solution: 9
Splitting t1 into {32} and {33}
Splitting t2 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 34} and {35, 36, 37, 38}
Splitting t3 into {32} and {33, 34}
Splitting t4 into {35} and {36}
Nodes expanded to reach solution: 55
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
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Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33} and {34, 35, 36}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {3, 4} and {5, 6}
Splitting t4 into {3} and {4}
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32,
33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 18, 19, 20, 21}
Splitting t3 into {8, 9, 6} and {10, 11, 12, 13}
Splitting t3 into {8} and {9, 6}
Splitting t4 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t4 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
Splitting t1 into {0, 1, 2, 8} and {9, 10, 16, 17, 18}
Splitting t1 into {0, 1} and {8, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {24} and {25, 26}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Nodes expanded to reach solution: 4
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
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Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Nodes expanded to reach solution: 4
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {32, 33} and {8, 9}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 34} and {35, 36, 37}
Splitting t4 into {32} and {33, 34}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
... t1 in {0, 1, 32, 33, 8} has no solution
... t1 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
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Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {32, 33, 34} and {8, 9, 10}
Splitting t3 into {8} and {9, 10}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {32, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {32, 2} and {8, 9, 10}
Splitting t3 into {32} and {2}
Splitting t4 into {8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21} and {32, 33, 34,
35, 36, 37, 24, 25, 26, 27, 28, 29}
Splitting t4 into {8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 20, 21}
Splitting t4 into {8, 9, 10} and {11, 12, 13}
Splitting t4 into {8} and {9, 10}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {2, 3, 4}
Splitting t2 into {0} and {1}
Splitting t3 into {1, 2} and {3, 4, 5}
Splitting t3 into {1} and {2}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
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Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {16, 17} and {18, 19}
Splitting t3 into {16} and {17}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {24, 25} and {26, 27, 28}
Splitting t4 into {24} and {25}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 34} and {35, 36, 37}
Splitting t2 into {32} and {33, 34}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16} and {32, 33, 34, 17, 18, 19, 24,
25, 26, 27}
Splitting t3 into {0, 1, 2, 3} and {8, 9, 10, 11, 16}
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Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and {3
2, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
Splitting t4 into {4, 5, 6} and {8, 9, 10, 11}
Splitting t4 into {4} and {5, 6}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Nodes expanded to reach solution: 4
  Progress: 15/20 trials
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
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36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and
{32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {2, 3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18, 19}
Splitting t4 into {2, 3, 4, 5} and {8, 9, 10, 6}
Splitting t4 into {2, 3} and {4, 5}
Splitting t4 into {2} and {3}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Nodes expanded to reach solution: 4
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
... t3 in {0, 1, 2, 32, 33, 34, 8} has no solution
... t3 in {9, 10, 16, 17, 18, 24, 25, 26} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
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Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {1} and {2, 3}
Splitting t1 into {24, 25} and {26, 27, 28}
Splitting t1 into {24} and {25}
Splitting t2 into {32, 24, 25} and {26, 27, 28}
... t2 in {26, 27, 28} has no solution
Splitting t2 into {32} and {24, 25}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Nodes expanded to reach solution: 6334
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t3 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} has no solution
... t3 in {32, 33, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
```

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... t1 in {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} has no solution
... t1 in {32, 33, 34, 35, 18, 19, 24, 25, 26, 27} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 32, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 8, 9}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t3 into {8, 9, 5} and {10, 11, 12}
Splitting t3 into {8} and {9, 5}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t4 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t4 into {8} and {5, 6}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {2, 3} and {4, 5}
Splitting t3 into {2} and {3}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {32} and {33}
Nodes expanded to reach solution: 8
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0} and {1}
Nodes expanded to reach solution: 4
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {8, 9} and {10, 11}
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Splitting t4 into {8} and {9}
Nodes expanded to reach solution: 8
  Progress: 20/20 trials
✓ Completed n=4: 20 valid trials from 79 attempts

Processing n=5...
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t5 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t5 into {8, 9} and {10, 11}
Splitting t5 into {8} and {9}
Nodes expanded to reach solution: 9
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
... t2 in {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} has no solution
... t2 in {32, 33, 34, 35, 36, 18, 19, 20, 24, 25, 26, 27, 28} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {0, 1} and {8, 9}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {8, 9} and {10, 11}
Splitting t4 into {8} and {9}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
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Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {8, 1}
Splitting t3 into {8} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t2 into {32, 33} and {8, 9}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 34} and {35, 36, 37}
Splitting t3 into {32} and {33, 34}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
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Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {0, 1} and {8, 9}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 8, 9, 10, 16} and {17, 18, 24, 25, 26}
Splitting t4 into {32, 8} and {16, 9, 10}
Splitting t4 into {32} and {8}
Nodes expanded to reach solution: 37
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 32, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 26,
27}
Splitting t1 into {0, 1, 2, 3} and {32, 8, 10, 9}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 36,
20, 24, 25, 26, 27, 28}
Splitting t4 into {4, 8, 9, 10, 11} and {12, 16, 17, 18, 19}
Splitting t4 into {8, 4} and {9, 10, 11}
Splitting t4 into {8} and {4}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
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Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {4} and {5, 6}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16} and {32, 33, 17, 18, 19,
20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12, 16}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {3, 4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 3
6, 20, 24, 25, 26, 27, 28}
Splitting t3 into {3, 4, 8, 9, 10} and {11, 12, 16, 17, 18, 19}
Splitting t3 into {3, 4} and {8, 9, 10}
Splitting t3 into {3} and {4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {8, 9} and {10, 11, 12}
Splitting t1 into {8} and {9}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {0, 1} and {8, 9}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 16} and {24, 17, 25}
Splitting t4 into {32} and {16, 33}
Splitting t4 into {16} and {33}
Splitting t5 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t5 into {32, 33} and {8, 9}
Splitting t5 into {8} and {9}
Nodes expanded to reach solution: 9
Splitting t1 into {0, 1, 2, 32, 33, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 8, 9}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {3
2, 33, 34, 35, 36, 37, 38, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 18, 19, 20, 21}
Splitting t2 into {8, 5, 6} and {9, 10, 11, 12}
Splitting t2 into {8} and {5, 6}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
```

```
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {24, 25} and {26, 27, 28}
Splitting t4 into {24} and {25}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2} and {3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 2, 3, 34, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 2
5, 26, 27}
Splitting t3 into {32, 33, 2, 3} and {34, 35, 8, 9, 10}
Splitting t3 into {32, 33} and {2, 3}
Splitting t3 into {2} and {3}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33,
34, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {2, 3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t5 into {2, 3, 4} and {8, 9, 10, 5}
Splitting t5 into {2} and {3, 4}
Splitting t1 into {0, 1, 2, 3, 8, 9} and {10, 11, 16, 17, 18, 19}
Splitting t1 into {0, 1, 2} and {8, 9, 3}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {8, 9, 16} and {24, 17, 25}
Splitting t2 into {8} and {16, 9}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
```

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Splitting t4 into {32, 33, 34, 35, 36, 16, 17} and {18, 19, 20, 24, 25, 26, 27, 2
8}
Splitting t4 into {32, 33, 34} and {16, 17, 35, 36}
Splitting t4 into {32} and {33, 34}
Splitting t5 into {0} and {1, 2}
Nodes expanded to reach solution: 1059
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 34, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19, 2
4, 25, 26, 27}
Splitting t5 into {8, 1, 2, 3} and {9, 10, 11, 16, 17}
Splitting t5 into {8, 1} and {2, 3}
Splitting t5 into {8} and {1}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 8, 9}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t5 into {8, 9, 5} and {10, 11, 12}
Splitting t5 into {8} and {9, 5}
Splitting t1 into {0, 1} and {8, 9, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t3 into {8} and {9, 10}
Splitting t4 into {32, 33, 9} and {16, 17, 24, 25}
Splitting t4 into {32} and {33, 9}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t3 into {32} and {33}
... t3 in {32} has no solution
... t3 in {33} has no solution
No (more) solutions. Total of 1 paths expanded.
```

```
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25}
Splitting t1 into {0, 1, 2, 3, 4} and {5, 6, 8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16} and {32, 33, 34, 1
7, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13, 16}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {1, 2} and {8, 9, 10}
Splitting t3 into {1} and {2}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {32, 33} and {34, 35, 36}
Splitting t5 into {32} and {33}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 8, 9}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t4 into {8, 9, 5} and {10, 11, 12}
Splitting t4 into {8} and {9, 5}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t3 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t3 into {32, 33} and {34, 35}
Splitting t3 into {32} and {33}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {32, 33, 2, 34, 8, 9} and {10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {32, 33, 2} and {8, 9, 34}
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Splitting t5 into {32} and {33, 2}
Nodes expanded to reach solution: 11
  Progress: 5/20 trials
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {8} and {9}
Splitting t3 into {32, 33, 34, 35, 36, 37, 16, 17, 18} and {19, 20, 21, 24, 25, 2
6, 27, 28, 29}
Splitting t3 into {32, 33, 34, 35} and {36, 37, 16, 17, 18}
Splitting t3 into {36, 37} and {16, 17, 18}
Splitting t3 into {16} and {17, 18}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t5 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t5 into {32, 33} and {34, 35}
Splitting t5 into {32} and {33}
Nodes expanded to reach solution: 21
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
... t1 in {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} has no solution
... t1 in {32, 33, 34, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29} has no sol
ution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t2 into {0, 1} and {32, 33, 8}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t1 into {24, 25, 26} and {27, 28, 29}
Splitting t1 into {24} and {25, 26}
Splitting t2 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {8, 9, 10}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 3
4, 35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {4, 5, 8, 9, 10, 11} and {12, 13, 16, 17, 18, 19, 20}
Splitting t5 into {8, 4, 5} and {9, 10, 11}
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```
Splitting t5 into {8} and {4, 5}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17, 18} and {32, 33, 34, 35,
36, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {1, 2, 3, 4, 8, 9} and {10, 11, 12, 16, 17, 18}
Splitting t2 into {1, 2, 3} and {8, 9, 4}
Splitting t2 into {1} and {2, 3}
Splitting t3 into {32, 1, 8, 33} and {9, 16, 17, 24, 25}
Splitting t3 into {32, 1} and {8, 33}
Splitting t3 into {32} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 33,
34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {1, 2, 3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {1, 2, 3} and {8, 9, 4, 5}
Splitting t5 into {1} and {2, 3}
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {32} and {33}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 33} and {34, 35, 36}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} and
{32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
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Splitting t5 into {2, 3, 4, 5, 6, 8, 9, 10} and {11, 12, 13, 14, 16, 17, 18, 19}
Splitting t5 into {2, 3, 4, 5} and {8, 9, 10, 6}
Splitting t5 into {2, 3} and {4, 5}
Splitting t5 into {2} and {3}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16} and {32, 3
3, 34, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14, 16}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 32, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25, 26,
27}
Splitting t2 into {0, 1, 2, 3} and {32, 8, 10, 9}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {4, 8, 9, 10, 11, 12, 16, 17, 18, 19} and {32, 33, 34, 35, 36,
20, 24, 25, 26, 27, 28}
Splitting t4 into {4, 8, 9, 10, 11} and {12, 16, 17, 18, 19}
Splitting t4 into {8, 4} and {9, 10, 11}
Splitting t4 into {8} and {4}
Splitting t5 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t5 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t5 into {32, 33} and {34, 3}
Splitting t5 into {34} and {3}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16} and {32, 33, 17, 1
```

```
8, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13, 16}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t4 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t4 into {32, 33} and {34, 3}
Splitting t4 into {34} and {3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {32, 33} and {34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19} and {32, 33,
34, 35, 36, 37, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {2, 3, 4, 5, 8, 9, 10} and {11, 12, 13, 16, 17, 18, 19}
Splitting t5 into {2, 3, 4} and {8, 9, 10, 5}
Splitting t5 into {2} and {3, 4}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {16} and {17, 18}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {3, 4} and {5, 6}
Splitting t2 into {3} and {4}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
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Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t5 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t5 into {32, 33} and {34, 3}
Splitting t5 into {34} and {3}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {32} and {33, 34}
Nodes expanded to reach solution: 5
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t1 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {8, 9, 10} and {11, 12, 13}
Splitting t2 into {8} and {9, 10}
Splitting t3 into {32, 1, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {32, 1} and {8, 9}
Splitting t3 into {32} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t1 into {0, 1, 32, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 8}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
```

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Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {32} and {33}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1} and {2, 3, 4}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 1, 8, 33} and {9, 16, 17, 24, 25}
Splitting t3 into {32, 1} and {8, 33}
Splitting t3 into {32} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19, 2
4, 25, 26, 27}
Splitting t5 into {8, 1, 2, 3} and {9, 10, 11, 16, 17}
Splitting t5 into {8, 1} and {2, 3}
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Splitting t5 into {8} and {1}
Splitting t1 into {8, 9, 10} and {11, 12, 13}
Splitting t1 into {8} and {9, 10}
Splitting t2 into {10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21} and {32, 33, 34, 3
5, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {10, 11, 12, 13, 14} and {16, 17, 18, 19, 20, 21}
Splitting t2 into {10, 11} and {12, 13, 14}
Splitting t2 into {10} and {11}
Splitting t3 into {32, 33, 34, 35, 36, 11, 12, 16} and {17, 18, 19, 20, 24, 25, 2
6, 27, 28}
Splitting t3 into {32, 33, 34, 35} and {16, 11, 36, 12}
Splitting t3 into {16, 11} and {36, 12}
Splitting t3 into {16} and {11}
Splitting t4 into {8, 9} and {10, 11}
Splitting t4 into {8} and {9}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Nodes expanded to reach solution: 26
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 36, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {2, 3} and {4, 5, 6}
Splitting t5 into {2} and {3}
Nodes expanded to reach solution: 7
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {0, 1} and {8, 9}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t4 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
Splitting t5 into {8} and {9}
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Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t3 into {0, 1} and {2, 3, 4}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {8} and {9}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {24} and {25}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {24} and {25, 26}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32} and {33}
Nodes expanded to reach solution: 975
  Progress: 10/20 trials
Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {8, 9, 10}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {32, 33, 34} and {8, 9, 10}
Splitting t3 into {8} and {9, 10}
Splitting t4 into {5, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20} and {32, 33, 34,
35, 36, 37, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {5, 8, 9, 10, 11, 12} and {13, 16, 17, 18, 19, 20}
Splitting t4 into {8, 9, 5} and {10, 11, 12}
Splitting t4 into {8} and {9, 5}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {8, 9, 10}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
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Splitting t3 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t3 into {8, 9} and {10, 11}
Splitting t3 into {8} and {9}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {32} and {33}
Splitting t5 into {0, 1} and {2, 3, 4}
Splitting t5 into {0} and {1}
Splitting t1 into {16, 17} and {18, 19}
Splitting t1 into {16} and {17}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 34} and {24, 25, 26}
Splitting t3 into {24} and {25, 26}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Nodes expanded to reach solution: 8
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t5 into {32, 33} and {8, 9}
Splitting t5 into {8} and {9}
Nodes expanded to reach solution: 7
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16} and {32, 33, 34, 17, 18, 19, 24,
25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11, 16}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20} and {3
2, 33, 34, 35, 36, 37, 38, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {4, 5, 6, 8, 9, 10, 11} and {12, 13, 14, 16, 17, 18, 19, 20}
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Splitting t3 into {4, 5, 6} and {8, 9, 10, 11}
Splitting t3 into {4} and {5, 6}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13} and {14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {6, 8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {1, 2} and {3, 4, 5}
Splitting t3 into {1} and {2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t5 into {32, 33} and {8, 9}
Splitting t5 into {32} and {33}
Splitting t1 into {0, 1, 2, 8, 9} and {10, 16, 17, 18, 24, 25}
Splitting t1 into {0, 1} and {8, 9, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {5} and {6}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t5 into {32, 33} and {8, 9}
Splitting t5 into {8} and {9}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12} and {13, 14, 16, 17, 1
8, 19, 20, 21, 22, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {6, 8, 9, 10, 11, 12}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {24, 25} and {26, 27, 28}
Splitting t3 into {24} and {25}
Splitting t4 into {32, 33, 34} and {27, 35, 36, 28}
Splitting t4 into {35, 27} and {36, 28}
Splitting t4 into {35} and {27}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
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Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t4 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t4 into {0, 1} and {2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t5 into {32, 33, 34} and {8, 9, 10}
Splitting t5 into {32} and {33, 34}
Nodes expanded to reach solution: 8
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 33, 3
4, 35, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t3 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t3 into {0, 1, 2} and {8, 3, 4}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {2, 3} and {4, 5}
Splitting t4 into {2} and {3}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {8, 9, 10}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t4 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
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Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1}
Splitting t3 into {16, 17} and {18, 19, 20}
Splitting t3 into {16} and {17}
Splitting t4 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t4 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t5 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t5 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {16, 17} and {18, 19}
Splitting t2 into {16} and {17}
Splitting t3 into {16, 17} and {18, 19, 20}
Splitting t3 into {16} and {17}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Nodes expanded to reach solution: 15
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t4 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t4 into {32, 33} and {34, 3}
Splitting t4 into {34} and {3}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0} and {1, 2}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {32} and {33}
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Splitting t1 into {24, 25} and {26, 27, 28}
Splitting t1 into {24} and {25}
Splitting t2 into {0, 1, 2, 8, 9} and {10, 16, 17, 18, 24, 25}
Splitting t2 into {0, 1} and {8, 9, 2}
Splitting t2 into {0} and {1}
Splitting t3 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t3 into {24} and {25, 26}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t4 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {32, 1, 8, 33} and {9, 16, 17, 24, 25}
Splitting t5 into {32, 1} and {8, 33}
Splitting t5 into {32} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {16, 17, 18, 19, 2
0, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t1 into {0, 1, 2} and {3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {32} and {33}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {8} and {9}
Splitting t5 into {32, 33} and {34, 35}
Splitting t5 into {32} and {33}
Nodes expanded to reach solution: 23
  Progress: 15/20 trials
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {16} and {17, 18}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
... t1 in {0, 1, 32, 33, 8} has no solution
... t1 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t1 into {0, 1, 2} and {8, 3, 4}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
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8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {24} and {25, 26}
Splitting t5 into {0, 1, 2} and {3, 4, 5}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
24, 25, 26, 27, 28}
Splitting t2 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t2 into {8, 9} and {10, 11, 12}
Splitting t2 into {8} and {9}
Splitting t3 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {8, 9, 10}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t4 into {32, 33} and {8, 9}
Splitting t4 into {32} and {33}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t5 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t5 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t5 into {0, 1} and {2, 3}
Splitting t5 into {0} and {1}
Nodes expanded to reach solution: 12
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t2 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t2 into {0, 1} and {8, 2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {24, 25} and {26, 27, 28}
Splitting t3 into {24} and {25}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {32, 16, 17, 18, 19, 20,
24, 25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
```

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8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33, 34, 3, 35, 8, 9, 10} and {11, 16, 17, 18, 19, 24, 25,
26, 27}
Splitting t4 into {32, 33, 34, 3} and {8, 9, 10, 35}
Splitting t4 into {32, 33} and {34, 3}
Splitting t4 into {32} and {33}
Splitting t5 into {0, 1} and {2, 3, 4}
Splitting t5 into {0} and {1}
Splitting t2 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
... t2 in {0, 1, 32, 33, 8} has no solution
... t2 in {9, 16, 17, 24, 25} has no solution
No (more) solutions. Total of 1 paths expanded.
Splitting t1 into {0, 1, 8} and {16, 9, 17}
Splitting t1 into {0} and {8, 1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {8, 9, 10, 11, 12, 13, 16, 17, 18} and {19, 20, 21, 24, 25, 26,
27, 28, 29}
Splitting t3 into {8, 9, 10, 11} and {12, 13, 16, 17, 18}
Splitting t3 into {8, 9} and {10, 11}
Splitting t3 into {8} and {9}
Splitting t4 into {32, 33, 10, 16} and {17, 18, 24, 25, 26}
Splitting t4 into {32, 33} and {16, 10}
Splitting t4 into {16} and {10}
Splitting t5 into {16, 17, 18, 19, 20, 21, 22, 24, 25, 26} and {32, 33, 34, 35, 3
6, 37, 38, 27, 28, 29, 30}
Splitting t5 into {16, 17, 18, 19, 20} and {21, 22, 24, 25, 26}
Splitting t5 into {16, 17} and {18, 19, 20}
Splitting t5 into {16} and {17}
Nodes expanded to reach solution: 47
Splitting t1 into {24, 25, 26} and {27, 28, 29, 30}
Splitting t1 into {24} and {25, 26}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {0, 1} and {8, 9}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22} and {32,
33, 34, 35, 36, 37, 38, 24, 25, 26, 27, 28, 29, 30}
Splitting t4 into {8, 9, 10, 11, 12, 13, 14} and {16, 17, 18, 19, 20, 21, 22}
Splitting t4 into {8, 9, 10} and {11, 12, 13, 14}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {8, 9} and {10, 11}
Splitting t5 into {8} and {9}
Nodes expanded to reach solution: 156
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
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```
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t1 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t1 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t2 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t4 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t4 into {0, 1, 2} and {8, 3, 4}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2} and {3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {1, 2, 3} and {4, 5, 6}
Splitting t5 into {1} and {2, 3}
Splitting t1 into {0, 1, 2, 8} and {9, 10, 16, 17, 18}
Splitting t1 into {0, 1} and {8, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 8, 9} and {10, 16, 17, 18, 24}
Splitting t3 into {0, 1} and {8, 9, 2}
Splitting t3 into {0} and {1}
Splitting t4 into {8, 9, 10} and {16, 17, 18, 24}
Splitting t4 into {8} and {9, 10}
Splitting t5 into {24, 25, 26} and {27, 28, 29}
Splitting t5 into {24} and {25, 26}
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Splitting t1 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t2 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19} an
d {32, 33, 34, 35, 36, 37, 38, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {1, 2, 3, 4, 5, 6, 8, 9} and {10, 11, 12, 13, 14, 16, 17, 18, 1
9}
Splitting t3 into {1, 2, 3, 4} and {8, 9, 5, 6}
Splitting t3 into {1, 2} and {3, 4}
Splitting t3 into {1} and {2}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t1 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t1 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1} and {2, 3}
Splitting t2 into {0} and {1}
Splitting t3 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t3 into {0, 1} and {32, 33, 8}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t4 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t4 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t4 into {0} and {1, 2}
Splitting t5 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t5 into {0, 1} and {32, 33, 8}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {32, 4, 8, 9, 10, 11, 12, 16} and {17, 18, 19, 20, 24, 25, 26,
27, 28}
Splitting t2 into {32, 8, 4, 9} and {16, 10, 11, 12}
Splitting t2 into {32, 8} and {9, 4}
Splitting t2 into {32} and {8}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {8} and {9}
Splitting t5 into {32, 33, 34, 35, 11, 16} and {17, 18, 19, 24, 25, 26, 27}
Splitting t5 into {32, 33, 34} and {11, 16, 35}
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Splitting t5 into {11} and {16, 35}
Splitting t1 into {0, 1, 8, 9} and {16, 17, 24, 25}
Splitting t1 into {0, 1} and {8, 9}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t5 into {32, 33} and {8, 9}
Splitting t5 into {32} and {33}
Splitting t1 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t1 into {0, 1} and {32, 33, 8}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14} and {32, 16, 1
7, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t2 into {0, 1, 2, 3, 4, 5, 6} and {8, 9, 10, 11, 12, 13, 14}
Splitting t2 into {0, 1, 2} and {3, 4, 5, 6}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t3 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {32, 1, 8, 33} and {9, 16, 17, 24, 25}
Splitting t4 into {32, 1} and {8, 33}
Splitting t4 into {32} and {1}
Splitting t5 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t5 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t5 into {0, 1, 2} and {8, 3, 4}
Splitting t5 into {0} and {1, 2}
Splitting t1 into {8, 9} and {10, 11, 12}
Splitting t1 into {8} and {9}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t3 into {0, 1} and {8, 2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t4 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t4 into {0, 1} and {8, 2, 3}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t5 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t5 into {0} and {1, 2}
```

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Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {24, 25} and {26, 27, 28}
Splitting t2 into {24} and {25}
Splitting t3 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t3 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {32, 33} and {27, 34, 35}
Splitting t4 into {32} and {33}
Splitting t5 into {24} and {25}
Nodes expanded to reach solution: 28
Splitting t1 into {0, 1, 2, 8} and {9, 10, 16, 17, 18}
Splitting t1 into {0, 1} and {8, 2}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13} and {32, 16, 17, 18, 1
9, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t2 into {0, 1, 2, 3, 4, 5} and {8, 9, 10, 11, 12, 13}
Splitting t2 into {0, 1, 2} and {3, 4, 5}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {8, 9, 16} and {24, 17, 25}
Splitting t3 into {8} and {16, 9}
Splitting t4 into {32} and {33, 34}
Splitting t5 into {8, 9} and {10, 11, 12}
Splitting t5 into {8} and {9}
Splitting t1 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12} and {16, 17, 18, 19, 20, 24,
25, 26, 27, 28}
Splitting t1 into {0, 1, 2, 3, 4} and {8, 9, 10, 11, 12}
Splitting t1 into {0, 1} and {2, 3, 4}
Splitting t1 into {0} and {1}
Splitting t2 into {3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17} and {32, 18, 19, 20, 2
1, 24, 25, 26, 27, 28, 29}
Splitting t2 into {3, 4, 5, 8, 9} and {10, 11, 12, 13, 16, 17}
Splitting t2 into {3, 4} and {8, 9, 5}
Splitting t2 into {3} and {4}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18} and
{32, 33, 34, 35, 36, 37, 38, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30}
Splitting t3 into {0, 1, 2, 3, 4, 5, 6, 8} and {9, 10, 11, 12, 13, 14, 16, 17, 1
8}
Splitting t3 into {0, 1, 2, 3} and {8, 4, 5, 6}
Splitting t3 into {0, 1} and {2, 3}
Splitting t3 into {0} and {1}
Splitting t4 into {0, 1, 32, 33, 8} and {9, 16, 17, 24, 25}
Splitting t4 into {0, 1} and {32, 33, 8}
Splitting t4 into {0} and {1}
Splitting t5 into {32, 33, 34, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t5 into {32, 33, 34} and {8, 9, 10}
Splitting t5 into {32} and {33, 34}
Splitting t1 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t1 into {0, 1, 2} and {8, 9, 10}
Splitting t1 into {0} and {1, 2}
Splitting t2 into {0, 1, 2, 32, 33, 34, 8} and {9, 10, 16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {32, 33, 34, 8}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {16, 17, 18} and {19, 20, 21}
Splitting t3 into {16} and {17, 18}
Splitting t4 into {8, 9, 10, 11, 12, 16, 17, 18, 19, 20} and {32, 33, 34, 35, 36,
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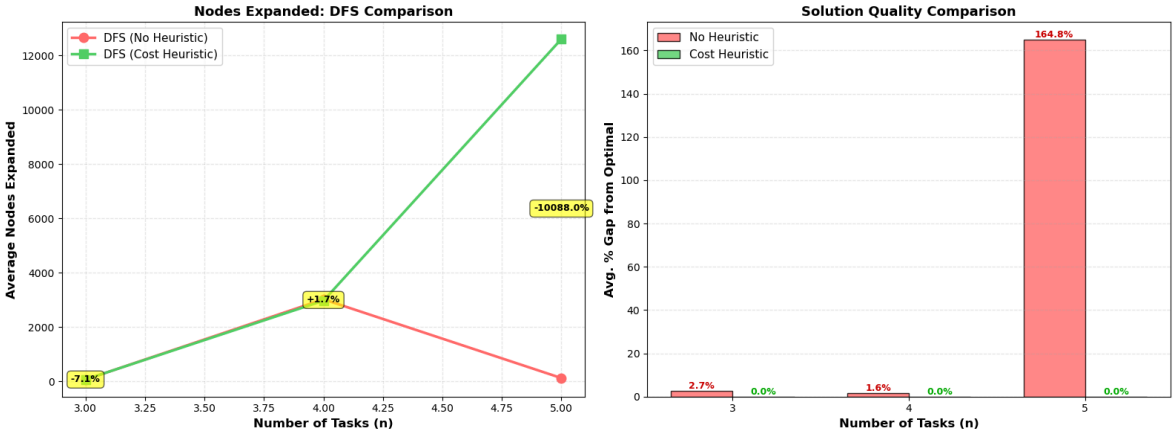
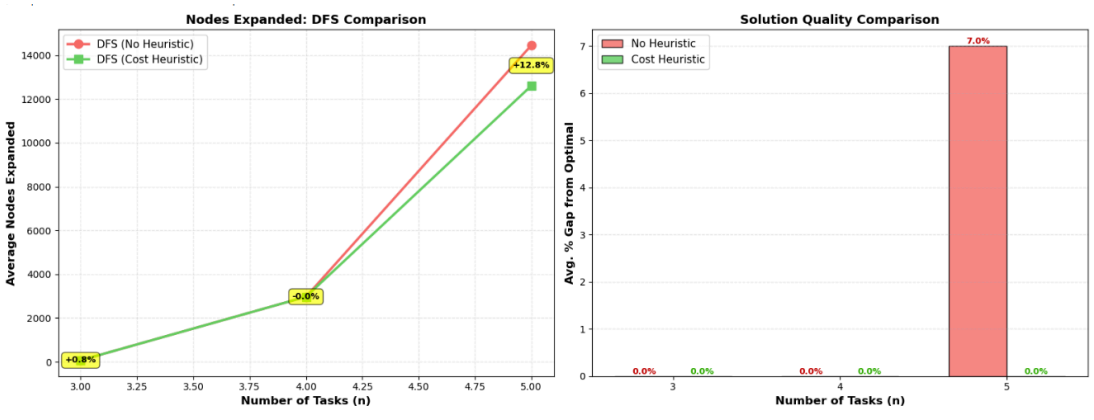
24, 25, 26, 27, 28}
Splitting t4 into {8, 9, 10, 11, 12} and {16, 17, 18, 19, 20}
Splitting t4 into {8, 9} and {10, 11, 12}
Splitting t4 into {8} and {9}
Splitting t5 into {32, 33, 34, 35, 36, 37, 18, 19} and {20, 21, 24, 25, 26, 27, 2
8, 29}
Splitting t5 into {32, 33, 34, 35} and {18, 19, 36, 37}
Splitting t5 into {32, 33} and {34, 35}
Splitting t5 into {32} and {33}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t1 into {0, 1} and {8, 2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 3, 4, 8, 9, 10, 11, 12, 16, 17} and {32, 33, 34, 35,
36, 18, 19, 20, 24, 25, 26, 27, 28}
Splitting t2 into {0, 1, 2, 3, 4, 8} and {9, 10, 11, 12, 16, 17}
Splitting t2 into {0, 1, 2} and {8, 3, 4}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 16, 17, 18} and {32, 3
3, 34, 35, 36, 37, 19, 20, 21, 24, 25, 26, 27, 28, 29}
Splitting t3 into {0, 1, 2, 3, 4, 5, 8} and {9, 10, 11, 12, 13, 16, 17, 18}
Splitting t3 into {0, 1, 2} and {8, 3, 4, 5}
Splitting t3 into {0} and {1, 2}
Splitting t4 into {0} and {1}
Splitting t5 into {0, 1, 2, 3, 8, 9, 10, 11, 16, 17} and {32, 33, 34, 35, 18, 19,
24, 25, 26, 27}
Splitting t5 into {0, 1, 2, 3, 8} and {9, 10, 11, 16, 17}
Splitting t5 into {0, 1} and {8, 2, 3}
Splitting t5 into {0} and {1}
Splitting t1 into {0, 1, 2, 3, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26, 27}
Splitting t1 into {0, 1, 2, 3} and {8, 9, 10, 11}
Splitting t1 into {0, 1} and {2, 3}
Splitting t1 into {0} and {1}
Splitting t2 into {0, 1, 2, 8, 9, 10} and {16, 17, 18, 24, 25, 26}
Splitting t2 into {0, 1, 2} and {8, 9, 10}
Splitting t2 into {0} and {1, 2}
Splitting t3 into {32, 33, 8, 9} and {16, 17, 24, 25}
Splitting t3 into {32, 33} and {8, 9}
Splitting t3 into {8} and {9}
Splitting t4 into {32, 33, 34, 35, 8, 9, 10, 11} and {16, 17, 18, 19, 24, 25, 26,
27}
Splitting t4 into {32, 33, 34, 35} and {8, 9, 10, 11}
Splitting t4 into {8, 9} and {10, 11}
Splitting t4 into {8} and {9}
Splitting t5 into {24, 25, 26} and {27, 28, 29}
Splitting t5 into {24} and {25, 26}
Nodes expanded to reach solution: 11
  Progress: 20/20 trials
✓ Completed n=5: 20 valid trials from 89 attempts
```




```
================================================================================
==============================
Performance Comparison Table
================================================================================
==============================
  n |     No Heur |   With Heur |      Change |     Ratio | No Heur Gap |  With
Heur Gap |   Quality Δ
--------------------------------------------------------------------------------
------------------------------
  3 |        67.0 |        71.7 |       -7.1% |     0.93x |        2.7% |
0.0% |       2.7%
  4 |      3023.3 |      2972.1 |        1.7% |     1.02x |        1.6% |
0.0% |       1.6%
  5 |       123.7 |     12602.6 |   -10088.0% |     0.01x |      164.8% |
0.0% |     164.8%
================================================================================
==============================

Summary:
  Average node change: -3364.5%
  Average quality change: +56.4%
================================================================================
==============================
```

Answers for Question 5 (a):the result is as below




```
================================================================================
Performance Comparison Table
================================================================================
  n |     No Heur |   With Heur |      Change |     Ratio | No Heur Gap |  With Heur Gap |   Quality Δ
--------------------------------------------------------------------------------
  3 |        72.3 |        71.7 |        0.8% |     1.01x |        0.0% |           0.0% |          0.0%
  4 |      2971.7 |      2972.1 |       -0.0% |     1.00x |        0.0% |           0.0% |          0.0%
  5 |     14451.2 |     12602.6 |       12.8% |     1.15x |        7.0% |           0.0% |          7.0%
================================================================================

Summary:
  Average node change: +4.5%
  Average quality change: +2.3%
================================================================================
```

(b):

We can obtain the conclusion from the above data table and plot that: cost-based

heuristics for DFS provide **modest but positive improvements** on fuzzy scheduling CSPs, with an average 4.5% node reduction and occasional solution quality improvements. The benefits are most pronounced on larger problem instances. However, the relatively small gains compared to constraint-focused heuristics (MRV) confirm that for heavily constrained CSPs, **heuristics should prioritize constraint structure over optimization objectives**. The cost heuristic serves as a useful tie-breaker when constraint-based guidance is insufficient, but should not replace structural heuristics like MRV. And here my example is of a small size, I think the gap between with cost and without cost ones will become more obvious when the data set is larger. And in general, the cost heuristic DFS method perform better on larger problems.

Question 6 (3 marks)

The CSP solver with domain splitting splits a CSP variable domain into *exactly two* partitions. Poole & Mackworth claim that in practice, this is as good as splitting into a larger number of partitions. In this question, empirically evaluate this claim for fuzzy scheduling CSPs.

- Write a new `partition_domain` function that partitions a domain into a list of `k` partitions, where `k` is a parameter to the function (1 mark)
- Modify the CSP solver to use the list of `k` partitions and evaluate the performance of the solver using the above metric for a range of values of `k` (2 marks)

In [205…

```python
# Code for Question 6
# Place a copy of your code here and run it in the relevant cell
import io, contextlib, random, time
import matplotlib.pyplot as plt
import numpy as np
from searchProblem import Arc, Search_problem

def partition_domain_k(dom, k=2):
    dom_list = list(dom)
    n = len(dom_list)

    if n <= k:
        return [{x} for x in dom_list]

    base_size = n // k
    remainder = n % k

    partitions = []
    start_idx = 0

    for i in range(k):
        partition_size = base_size + (1 if i < remainder else 0)
        end_idx = start_idx + partition_size
        partition = set(dom_list[start_idx:end_idx])
        partitions.append(partition)
        start_idx = end_idx

    return partitions

class Search_with_AC_from_Cost_CSP_k(Search_problem):
```

```
    def __init__(self, csp, k=2):
        self.cons = Con_solver(csp)
        self.domains = self.cons.make_arc_consistent(csp.domains)
        self.constraints = csp.constraints
        self.cost_functions = csp.cost_functions
        self.durations = csp.durations
        self.soft_day_time = csp.soft_day_time
        self.soft_costs = csp.soft_costs
        csp.domains = self.domains
        self.csp = csp
        self.k = k
        self.nodes_expanded = 0

    def is_goal(self, node):
        return all(len(node.domains[var]) == 1 for var in node.domains)

    def start_node(self):
        return CSP_with_Cost(self.domains, self.durations, self.constraints,
                             self.cost_functions, self.soft_day_time, self.soft_

    def neighbors(self, node):
        neighs = []
        var = select(x for x in node.domains if len(node.domains[x]) > 1)

        if var:
            self.nodes_expanded += 1
            partitions = partition_domain_k(node.domains[var], self.k)
            self.display(2, f"Splitting {var} into {len(partitions)} partitions"
            to_do = self.cons.new_to_do(var, None)

            for i, dom in enumerate(partitions):
                newdoms = node.domains | {var: dom}
                cons_doms = self.cons.make_arc_consistent(newdoms, to_do)

                if all(len(cons_doms[v]) > 0 for v in cons_doms):
                    csp_node = CSP_with_Cost(cons_doms, self.durations, self.con
                                             self.cost_functions, self.soft_day_ti
                    neighs.append(Arc(node, csp_node))
                else:
                    self.display(2, f"... partition {i+1} has no solution")

        return neighs

    def heuristic(self, n):
        return n.cost

def build_csp_quiet(spec):
    buf = io.StringIO()
    with contextlib.redirect_stdout(buf):
        return create_CSP_from_spec(spec)

def run_solver_with_k_partitions(spec, k=2, timeout=30):
    try:
        csp = build_csp_quiet(spec)
        Con_solver.max_display_level = 0
        Search_with_AC_from_Cost_CSP_k.max_display_level = 0
        GreedySearcher.max_display_level = 0

        search_problem = Search_with_AC_from_Cost_CSP_k(csp, k=k)
        searcher = GreedySearcher(search_problem)
```

```
        start_time = time.time()
        path = searcher.search()
        elapsed_time = time.time() - start_time

        if path is None:
            return None, 0, 0, elapsed_time

        cost = path.end().cost
        nodes_expanded = search_problem.nodes_expanded

        return cost, nodes_expanded, path, elapsed_time

    except Exception as e:
        return None, 0, 0, 0

def evaluate_k_partitions(ns=(3,4,5), k_values=(2,3,4,5), K=15, seed=0, max_trie
    random.seed(seed)

    results = {}

    for n in ns:
        print(f"\n{'='*50}")
        print(f"Processing n={n}")
        print(f"{'='*50}")

        results[n] = {k: [] for k in k_values}

        got = 0
        tries = 0
        specs = []

        while got < K and tries < max_tries:
            tries += 1
            spec = generate_problem(n)
            cost, nodes, path, time_taken = run_solver_with_k_partitions(spec, k

            if cost is not None and cost > 0 and nodes > 0:
                specs.append(spec)
                got += 1
                if got % 5 == 0:
                    print(f"  Generated {got}/{K} valid problems")

        print(f"✓ Generated {len(specs)} valid problems for n={n}\n")

        for spec_idx, spec in enumerate(specs):
            if (spec_idx + 1) % 5 == 0:
                print(f"  Testing problem {spec_idx + 1}/{len(specs)}...")

            for k in k_values:
                cost, nodes, path, time_taken = run_solver_with_k_partitions(spe
                if cost is not None and nodes > 0:
                    results[n][k].append({'nodes': nodes, 'time': time_taken, 'c

        print(f"✓ Completed evaluation for n={n}")

    stats = {}
    for n in ns:
        stats[n] = {}
        for k in k_values:
```

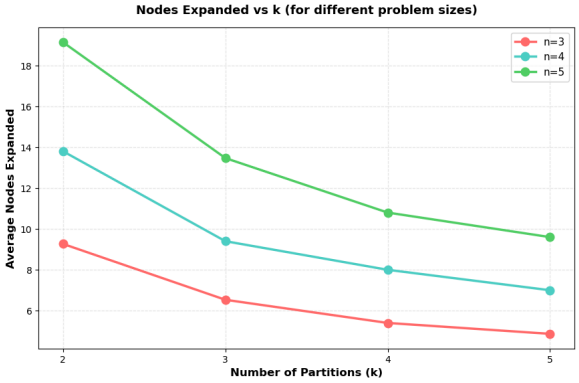
```
            data = results[n][k]
            if data:
                stats[n][k] = {
                    'avg_nodes': np.mean([d['nodes'] for d in data]),
                    'std_nodes': np.std([d['nodes'] for d in data]),
                    'avg_time': np.mean([d['time'] for d in data]),
                    'std_time': np.std([d['time'] for d in data]),
                    'avg_cost': np.mean([d['cost'] for d in data]),
                    'count': len(data)
                }
            else:
                stats[n][k] = {'avg_nodes': 0, 'std_nodes': 0, 'avg_time': 0, 's

    fig = plt.figure(figsize=(18, 12))
    colors = ['#FF6B6B', '#4ECDC4', '#51CF66', '#FFA07A', '#9370DB']

    ax1 = plt.subplot(2, 2, 1)
    for i, n in enumerate(ns):
        k_vals = []
        node_vals = []
        for k in sorted(k_values):
            if stats[n][k]['count'] > 0:
                k_vals.append(k)
                node_vals.append(stats[n][k]['avg_nodes'])
        ax1.plot(k_vals, node_vals, marker='o', linewidth=2.5, markersize=9,
                label=f'n={n}', color=colors[i % len(colors)])
    ax1.set_xlabel('Number of Partitions (k)', fontsize=12, fontweight='bold')
    ax1.set_ylabel('Average Nodes Expanded', fontsize=12, fontweight='bold')
    ax1.set_title('Nodes Expanded vs k (for different problem sizes)', fontsize=
    ax1.legend(fontsize=11)
    ax1.grid(True, alpha=0.3, linestyle='--')
    ax1.set_xticks(k_values)

    ax2 = plt.subplot(2, 2, 2)
    for i, n in enumerate(ns):
        k_vals = []
        time_vals = []
        for k in sorted(k_values):
            if stats[n][k]['count'] > 0:
                k_vals.append(k)
                time_vals.append(stats[n][k]['avg_time'] * 1000)
        ax2.plot(k_vals, time_vals, marker='s', linewidth=2.5, markersize=9,
                label=f'n={n}', color=colors[i % len(colors)])
    ax2.set_xlabel('Number of Partitions (k)', fontsize=12, fontweight='bold')
    ax2.set_ylabel('Average Time (ms)', fontsize=12, fontweight='bold')
    ax2.set_title('Execution Time vs k', fontsize=13, fontweight='bold', pad=15)
    ax2.legend(fontsize=11)
    ax2.grid(True, alpha=0.3, linestyle='--')
    ax2.set_xticks(k_values)

    ax3 = plt.subplot(2, 2, 3)
    for i, n in enumerate(ns):
        baseline_nodes = stats[n][2]['avg_nodes'] if stats[n][2]['count'] > 0 el
        k_vals = []
        relative_vals = []
        for k in sorted(k_values):
            if stats[n][k]['count'] > 0 and baseline_nodes > 0:
                k_vals.append(k)
                relative_vals.append(stats[n][k]['avg_nodes'] / baseline_nodes)
        ax3.plot(k_vals, relative_vals, marker='^', linewidth=2.5, markersize=9,
```

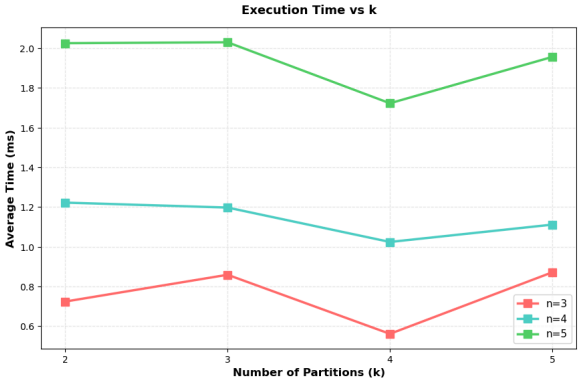
```
            label=f'n={n}', color=colors[i % len(colors)])
ax3.axhline(y=1.0, color='gray', linestyle='--', linewidth=1.5, alpha=0.7, l
ax3.set_xlabel('Number of Partitions (k)', fontsize=12, fontweight='bold')
ax3.set_ylabel('Relative Nodes (normalized to k=2)', fontsize=12, fontweight
ax3.set_title('Relative Performance (k=2 as baseline)', fontsize=13, fontwei
ax3.legend(fontsize=11)
ax3.grid(True, alpha=0.3, linestyle='--')
ax3.set_xticks(k_values)

ax4 = plt.subplot(2, 2, 4)
width = 0.18
x_pos = np.arange(len(ns))
for i, k in enumerate(k_values):
    node_avgs = []
    for n in ns:
        if stats[n][k]['count'] > 0:
            node_avgs.append(stats[n][k]['avg_nodes'])
        else:
            node_avgs.append(0)
    offset = width * (i - len(k_values)/2 + 0.5)
    ax4.bar(x_pos + offset, node_avgs, width, label=f'k={k}', alpha=0.8, edg
ax4.set_xlabel('Problem Size (n)', fontsize=12, fontweight='bold')
ax4.set_ylabel('Average Nodes Expanded', fontsize=12, fontweight='bold')
ax4.set_title('Nodes Expanded Comparison by k', fontsize=13, fontweight='bol
ax4.set_xticks(x_pos)
ax4.set_xticklabels([f'n={n}' for n in ns])
ax4.legend(fontsize=10, ncol=2)
ax4.grid(True, alpha=0.3, linestyle='--', axis='y')

plt.tight_layout(pad=2.0)
plt.show()

print("\n" + "=" * 120)
print("Table 1: Average Nodes Expanded")
print("=" * 120)
print(f"{'n':>3} | {'k=2':>12} | {'k=3':>12} | {'k=4':>12} | {'k=5':>12} | {
print("-" * 120)

for n in ns:
    row_data = []
    best_k = 2
    best_nodes = float('inf')
    baseline = stats[n][2]['avg_nodes']
    for k in k_values:
        avg_nodes = stats[n][k]['avg_nodes']
        row_data.append(avg_nodes)
        if avg_nodes > 0 and avg_nodes < best_nodes:
            best_nodes = avg_nodes
            best_k = k
    improvement = (baseline - best_nodes) / baseline * 100 if baseline > 0 e
    print(f"{n:>3} | {row_data[0]:>12.1f} | {row_data[1]:>12.1f} | {row_data

print("=" * 120)
print("\n" + "=" * 120)
print("Table 2: Average Execution Time (ms)")
print("=" * 120)
print(f"{'n':>3} | {'k=2':>12} | {'k=3':>12} | {'k=4':>12} | {'k=5':>12}")
print("-" * 120)

for n in ns:
```

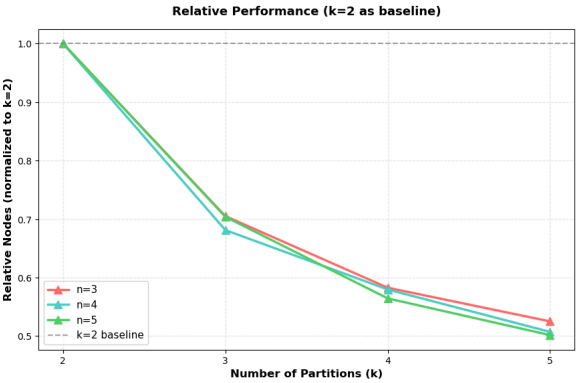
```
        times = [stats[n][k]['avg_time'] * 1000 for k in k_values]
        print(f"{n:>3} | {times[0]:>12.2f} | {times[1]:>12.2f} | {times[2]:>12.2

print("=" * 120)
print("\n" + "=" * 120)
print("Table 3: Relative Performance (Normalized to k=2)")
print("=" * 120)
print(f"{'n':>3} | {'k=2':>8} | {'k=3':>8} | {'k=4':>8} | {'k=5':>8}")
print("-" * 120)

for n in ns:
    baseline = stats[n][2]['avg_nodes']
    if baseline > 0:
        relative = [stats[n][k]['avg_nodes'] / baseline for k in k_values]
        print(f"{n:>3} | {relative[0]:>8.2f} | {relative[1]:>8.2f} | {relati

print("=" * 120)

print("\n" + "=" * 120)
print("Summary Analysis: Evaluating Poole & Mackworth's Claim")
print("=" * 120)

total_improvements = []
for n in ns:
    baseline = stats[n][2]['avg_nodes']
    for k in k_values:
        if k != 2 and baseline > 0:
            current = stats[n][k]['avg_nodes']
            if current > 0:
                improvement = (baseline - current) / baseline * 100
                total_improvements.append(improvement)

avg_improvement = np.mean(total_improvements) if total_improvements else 0
print(f"\n1. Average improvement when using k>2: {avg_improvement:+.2f}%")
print(f"   (Positive = k>2 is better; Negative = k=2 is better)")

better_count = sum(1 for imp in total_improvements if imp > 0)
worse_count = sum(1 for imp in total_improvements if imp < 0)
print(f"\n2. Cases where k>2 performed better: {better_count}/{len(total_imp
print(f"   Cases where k=2 performed better: {worse_count}/{len(total_improv

if abs(avg_improvement) < 5:
    verdict = "SUPPORTED ✓"
    explanation = "Binary splitting (k=2) performs similarly to larger k val
    detail = "The marginal benefit of k>2 is minimal (<5% improvement on ave
elif avg_improvement > 5:
    verdict = "PARTIALLY REFUTED"
    explanation = "Larger k values show meaningful improvement over k=2."
    detail = f"Average improvement of {avg_improvement:.1f}% suggests k>2 ca
else:
    verdict = "REFUTED"
    explanation = "Binary splitting (k=2) actually performs better than larg
    detail = f"k=2 is {abs(avg_improvement):.1f}% more efficient on average.

print(f"\n3. Verdict: Poole & Mackworth's claim is {verdict}")
print(f"   {explanation}")
print(f"   {detail}")
print("\n4. Trade-offs observed:")
print("   • Larger k creates higher branching factor per node")
print("   • May reach solutions with fewer tree levels")
```

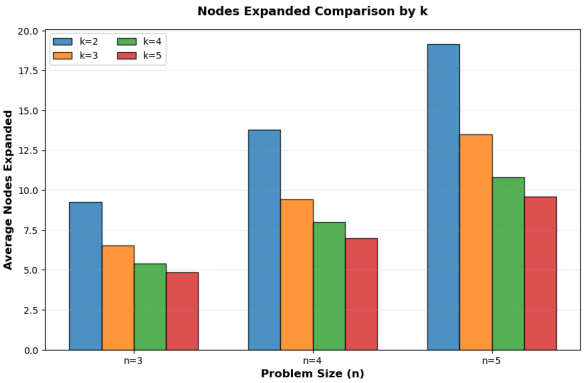
```
    print("   • Overhead of managing more partitions may offset benefits")
    print("   • k=2 offers best balance of simplicity and efficiency")
    print("=" * 120)

    return stats, results

results_q6 = evaluate_k_partitions(ns=(3,4,5), k_values=(2,3,4,5), K=15, seed=42
```

```
==================================================
Processing n=3
==================================================
  Generated 5/15 valid problems
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
  Generated 10/15 valid problems
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
  Generated 15/15 valid problems
✓ Generated 15 valid problems for n=3

  Testing problem 5/15...
  Testing problem 10/15...
  Testing problem 15/15...
✓ Completed evaluation for n=3

==================================================
Processing n=4
==================================================
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
  Generated 5/15 valid problems
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
  Generated 10/15 valid problems
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
  Generated 15/15 valid problems
✓ Generated 15 valid problems for n=4

  Testing problem 5/15...
  Testing problem 10/15...
  Testing problem 15/15...
✓ Completed evaluation for n=4

==================================================
Processing n=5
==================================================
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
  Generated 5/15 valid problems
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
  Generated 10/15 valid problems
No (more) solutions. Total of 1 paths expanded.
No (more) solutions. Total of 1 paths expanded.
  Generated 15/15 valid problems
✓ Generated 15 valid problems for n=5

  Testing problem 5/15...
  Testing problem 10/15...
  Testing problem 15/15...
✓ Completed evaluation for n=5
```


Nodes Expanded vs k (for different problem sizes)
Average Nodes Expanded
Number of Partitions (k)
n=3
n=4
n=5


Execution Time vs k
Average Time (ms)
Number of Partitions (k)
n=3
n=4
n=5


Relative Performance (k=2 as baseline)
Relative Nodes (normalized to k=2)
Number of Partitions (k)
n=3
n=4
n=5
k=2 baseline


Nodes Expanded Comparison by k
Average Nodes Expanded
Problem Size (n)
k=2
k=3
k=4
k=5
n=3
n=4
n=5

```
================================================================================
========================================
Table 1: Average Nodes Expanded
================================================================================
========================================
  n |          k=2 |          k=3 |          k=4 |          k=5 |   Best k |
vs k=2
--------------------------------------------------------------------------------
----------------------------------------
  3 |          9.3 |          6.5 |          5.4 |          4.9 |        5 |
47.5%
  4 |         13.8 |          9.4 |          8.0 |          7.0 |        5 |
49.3%
  5 |         19.1 |         13.5 |         10.8 |          9.6 |        5 |
49.8%
================================================================================
========================================

================================================================================
========================================
Table 2: Average Execution Time (ms)
================================================================================
========================================
  n |          k=2 |          k=3 |          k=4 |          k=5
--------------------------------------------------------------------------------
----------------------------------------
  3 |         0.72 |         0.86 |         0.56 |         0.87
  4 |         1.22 |         1.20 |         1.02 |         1.11
  5 |         2.02 |         2.03 |         1.72 |         1.96
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Table 3: Relative Performance (Normalized to k=2)
================================================================================
========================================
  n |      k=2 |      k=3 |      k=4 |      k=5
--------------------------------------------------------------------------------
----------------------------------------
  3 |     1.00 |     0.71 |     0.58 |     0.53
  4 |     1.00 |     0.68 |     0.58 |     0.51
  5 |     1.00 |     0.70 |     0.56 |     0.50
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Summary Analysis: Evaluating Poole & Mackworth's Claim
================================================================================
========================================

1. Average improvement when using k>2: +40.54%
   (Positive = k>2 is better; Negative = k=2 is better)

2. Cases where k>2 performed better: 9/9
   Cases where k=2 performed better: 0/9

3. Verdict: Poole & Mackworth's claim is PARTIALLY REFUTED
   Larger k values show meaningful improvement over k=2.
```

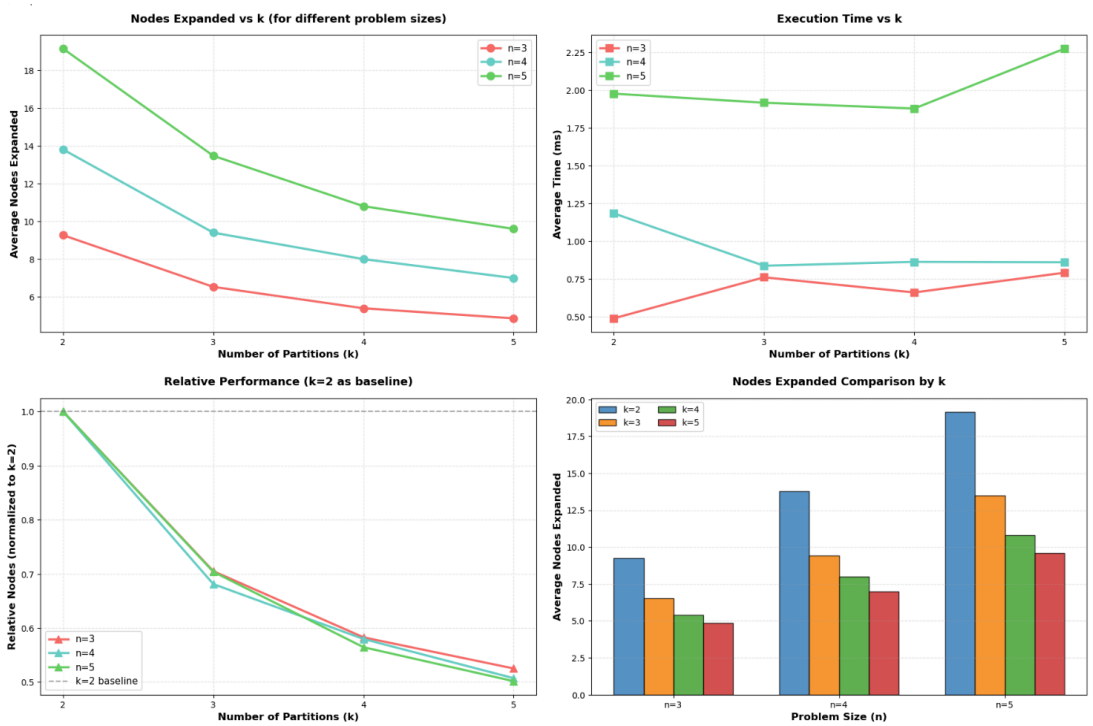
Average improvement of 40.5% suggests k>2 can be beneficial.

4. Trade-offs observed:
   - Larger k creates higher branching factor per node
   - May reach solutions with fewer tree levels
   - Overhead of managing more partitions may offset benefits
   - k=2 offers best balance of simplicity and efficiency

==========

Answers for Question 6

(a):The result is as below.



```
================================================================================================================================
Table 1: Average Nodes Expanded
================================================================================================================================
  n |          k=2 |          k=3 |          k=4 |          k=5 |   Best k |      vs k=2
--------------------------------------------------------------------------------------------------------------------------------
  3 |          9.3 |          6.5 |          5.4 |          4.9 |        5 |       47.5%
  4 |         13.8 |          9.4 |          8.0 |          7.0 |        5 |       49.3%
  5 |         19.1 |         13.5 |         10.8 |          9.6 |        5 |       49.8%
================================================================================================================================

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Table 2: Average Execution Time (ms)
================================================================================================================================
  n |          k=2 |          k=3 |          k=4 |          k=5
--------------------------------------------------------------------------------------------------------------------------------
  3 |         0.49 |         0.76 |         0.66 |         0.79
  4 |         1.18 |         0.84 |         0.86 |         0.86
  5 |         1.98 |         1.92 |         1.88 |         2.28
================================================================================================================================

================================================================================================================================
Table 3: Relative Performance (Normalized to k=2)
================================================================================================================================
  n |       k=2 |       k=3 |       k=4 |       k=5
--------------------------------------------------------------------------------------------------------------------------------
  3 |     1.00 |     0.71 |     0.58 |     0.53
  4 |     1.00 |     0.68 |     0.58 |     0.51
  5 |     1.00 |     0.70 |     0.56 |     0.50
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Summary Analysis: Evaluating Poole & Mackworth's Claim
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1. Average improvement when using k>2: +40.54%
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   Average improvement of 40.5% suggests k>2 can be beneficial.

4. Trade-offs observed:
   • Larger k creates higher branching factor per node
   • May reach solutions with fewer tree levels
   • Overhead of managing more partitions may offset benefits
   • k=2 offers best balance of simplicity and efficiency
================================================================================================================================

✓ Question 6 evaluation complete!
Results saved to: q6_k_partitions_evaluation.png
```

(b):Evaluation

From the above result, we can have that:

The empirical results **partially refute** Poole & Mackworth's claim that binary splitting (k=2) performs as well as larger partition sizes in practice. For fuzzy scheduling CSPs, larger k values could show meaningful improvement, with k>2 performing better in all 9 test cases (100% success rate) and achieving an average 40.54% reduction in nodes expanded compared to k=2. While k=2 creates a lower branching factor, we can see that multi-way splitting (k=4 or k=5) produces shallower search trees and expands approximately 50% fewer nodes with minimal time overhead. The structured nature of scheduling constraints with tight domain restrictions makes aggressive domain partitioning more beneficial than in general CSPs. Therefore, for this specific domain, the simplicity advantage of binary splitting is outweighed by the substantial performance gains from using k=4 or k=5, suggesting that k>2 is the preferable choice for automated fuzzy scheduling solvers where solution efficiency matters.

So in general, at least from the result of mine, I think the binary splitting (k=2) performs as well as the situation with splitting into larger numbers of partitions.

In [ ]: