Simulation Step 4 Model Verification v2

July 7, 2024

1 Prelude

[1]:
```
import matplotlib.pyplot as plt
import pulp
import math
import random
import pandas as pd
import numpy as np
import simpy
```

2 Utilities

2.1 Points and Distances

[2]:
```
def dist(p1, p2):
    (x1, y1) = p1
    (x2, y2) = p2
    return int(math.sqrt((x1-x2)**2+(y1-y2)**2))
```

2.2 PlotMap

[3]:
```
def label(i):
    return (label(i//26-1)+chr(65+i%26)) if i>25 else chr(65+i)
```

[4]:
```
def plotMap(G, T=[], P=[], w=None,
            style='r-o', lw=1, ms=3,
            styleT='go', msT=3,
            styleP='b-o', lwP=2, msP=3,
            stylePT='go', msPT=7,
            styleW='ro', msW=9,
            text=None, grid=False, labels=False, scale=False):

    V, E = G

    def round_down(x, level): return (x//level)*level
    def round_up(x, level): return (x//level+1)*level
```

```
    xmin = round_down(min([ x for (x, _) in V ]), 100)
    xmax = round_up(max([ x for (x, _) in V ]), 100)
    ymin = round_down(min([ y for (_, y) in V ]), 100)
    ymax = round_up(max([ y for (_, y) in V ]), 100)
    dx = xmax-xmin
    dy = ymax-ymin
    yoffset = (ymax-ymin)//10

    fig = plt.gcf()
    fig.set_size_inches(4, 4)
    plt.xlim(xmin, xmax)
    plt.ylim(ymin-yoffset, ymax)

    if not grid:
        plt.axis('off')

    for e in E:
        p1, p2 = e
        plt.plot( [ p1[0], p2[0] ],
                  [ p1[1], p2[1] ],
                  style, lw=lw, ms=ms)
    if scale:
        # plot 1000m scale
        ybar = ymin-0.9*yoffset
        D = [ (xmin, ybar+50), (xmin, ybar), (xmin+1000, ybar), (xmin+1000,␣
↪ybar+50) ]
        plt.plot( [ d[0] for d in D ], [ d[1] for d in D ], 'k-', lw=0.5)
        plt.text(xmin+500, ymin-0.7*yoffset, '1000m' ,␣
↪horizontalalignment='center', size=8)

    if labels:
        for i in range(len(V)):
            x, y = V[i]
            plt.text(x+0.0150*dx, y-0.0350*dy, label(i), size=8)

    for t in T:
        plt.plot( [ t[0] ], [ t[1] ],
                  styleT, ms=msT)

    plt.plot( [ p[0] for p in P ],
              [ p[1] for p in P ],
              styleP, lw=lwP, ms=msP)

    for p in P:
        if p in T:
            plt.plot( [ p[0] ], [ p[1] ],
                      stylePT, ms=msPT)
```

```
    if w is not None:
        plt.plot( [ w[0] ], [ w[1] ],
                      styleW, ms=msW)
    if text is not None:
        plt.text(xmax, ymin-0.7*yoffset, text, horizontalalignment='right',␣
↪size=8)
    if grid:
        plt.grid()
    plt.show()
```

2.3 Add Targets

[5]:
```
def addTargets(M, T):
    V, E = M
    E = E.copy()
    V = V.copy()
    for t in T:
        minD = math.inf
        minE = None
        for e in E:
            P, Q = e
            distT = dist(P, t)+dist(t, Q)-dist(P, Q)
            if distT < minD:
                minD = distT
                minE = e
        P, Q = minE
        E.remove( (P, Q) )
        E.append( (P, t) )
        E.append( (t, Q) )
        V.append(t)
    return V, E
```

2.4 Generate Central Warehouse Location

[6]:
```
from statistics import median

def generateWarehouseLocation(M):
    V, _ = M
    xc = median([ x for (x, y) in V ])
    yc = median([ y for (x, y) in V ])
    cloc = (xc, yc)
    minloc = V[0]
    mindist = dist(minloc, cloc)
    for i in range(1, len(V)):
        d = dist(V[i], cloc)
        if d<mindist:
            minloc = V[i]
```

```
            mindist = dist(V[i], cloc)
    return minloc
```

2.5 Time Handling (NEW)

Convention: In this project we measure simulation time in seconds. The simulation will start at 0:00. Time related methods will be added as they are needed.

`timestamp(t)` generates a timestamp string in the form `[dd] hh:mm:ss.d`

[7]:
```
def timestamp(t):
    t = round(t, 1)
    day = int(t)//(24*3600)
    t = t - day*24*3600
    hour = int(t)//3600
    t = t - hour*3600
    mins = int(t)//60
    t = t - mins*60
    secs = int(t)
    t = int(round((t-secs)*10,1))
    return f"[{day:2d}] {hour:02d}:{mins:02d}:{secs:02d}.{t:1d}"
```

[8]:
```
timestamp(24*3600*3+17*3600+615.1)
```

[8]:
```
'[ 3] 17:10:15.1'
```

[9]:
```
timestamp(24*3600*12+3*3600+122.96)
```

[9]:
```
'[12] 03:02:03.0'
```

[10]:
```
def day(now):
    return int(now//(24*3600))
```

[11]:
```
def nextHour(env, hour):
    beginningOfDay = int(env.now//(24*3600))*24*3600
    timeOfDay = env.now-beginningOfDay
    if hour*3600 > timeOfDay:
        return hour*3600 - timeOfDay
    else:
        return hour*3600 + 24*3600 - timeOfDay
```

3 Finding Shortest Path (as before)

[12]:
```
def pathLength(P):
    return 0 if len(P)<=1 else \
            dist(P[0], P[1])+pathLength(P[1:])
```

[13]:
```
def shortestPath(M, A, B):

    def h(p):
        return pathLength(p)+dist(p[-1],B)

    # candidates C are pairs of the path so far and
    # the heuristic function of that path,
    # sorted by the heuristic function, as maintained by
    # insert function
    def insert(C, p):
        hp = h(p)
        c = (p, hp)
        for i in range(len(C)):
            if C[i][1]>hp:
                return C[:i]+[c]+C[i:]
        return C+[c]

    V, E = M
    assert(A in V and B in V)
    C = insert([], [A])

    while len(C)>0:
        # take the first candidate out of the list of candidates
        path, _ = C[0]
        C = C[1:]
        if path[-1]==B:
            return path
        else:
            for (x, y) in E:
                if path[-1]==x and y not in path:
                    C = insert(C, path+[y])
                elif path[-1]==y and x not in path:
                    C = insert(C, path+[x])
    return None
```

4 Finding Short Delivery Route (as before)

4.1 Greedy Algorithm

[14]:
```
def FW(M):

    V, E = M

    n = len(V)
    d = [ [ math.inf for j in range(n) ] for i in range(n) ]
    p = [ [ None for j in range(n) ] for i in range(n) ]
```

```
    for (A, B) in E:
        a = V.index(A)
        b = V.index(B)
        d[a][b] = d[b][a] = dist(A, B)
        p[a][b] = [A, B]
        p[b][a] = [B, A]

    for i in range(n):
        d[i][i] = 0
        p[i][i] = [V[i]]

    for k in range(n):
        for i in range(n):
            for j in range(n):
                dk = d[i][k] + d[k][j]
                if d[i][j] > dk:
                    d[i][j] = dk
                    p[i][j] = p[i][k][:-1] + p[k][j]

    return d, p
```

[15]:
```
def createLoopG(M, T, timing=False):

    def makeLoop(L):
        loop = []
        for i in range(len(L)-1):
            A = L[i]
            B = L[i+1]
            a = V.index(A)
            b = V.index(B)
            sub = P[a][b]
            loop += sub if len(loop)==0 else sub[1:]
        return loop

    if timing:
        start_time = time.time()
        last_time = time.time()

    V, E = M
    D, P = FW(M)    # note these are the distances between all vertices in M
↪(and T)

    W = T[0]
    customers = T[1:]
    if len(T)==1:
        L = T
    elif len(T)<=3:
```

```
        L = T + [T[0]]
    else:
        L = T[:3]+[T[0]]
        T = T[3:]
        while len(T)>0:
            minExt = math.inf
            minInd = None
            selInd = None
            for k in range(len(T)):
                C = T[k]
                c = V.index(C)
                for i in range(0, len(L)-1):
                    A = L[i]
                    B = L[i+1]
                    a = V.index(A)
                    b = V.index(B)
                    ext = D[a][c] + D[c][b] - D[a][b]
                    if ext<minExt:
                        minExt, minInd, selInd = ext, i+1, k
            L = L[:minInd]+[T[selInd]]+L[minInd:]
            T = T[:selInd]+T[selInd+1:]

    if timing:
        print(f"createLoopH:    {time.time()-start_time:6.2f}s")

    return makeLoop(L)
```

5 Finding Optimal Delivery Route

5.1 Iterative Integer Programming

[16]:
```
def createTables(M, T):

    def reverse(P):
        return [ P[-i] for i in range(1,len(P)+1) ]

    def index(x, L):
        for i in range(len(L)):
            if x==L[i]:
                return i
        return None

    n = len(T)
    d = [ [ math.inf for t in T ] for t in T ]
    p = [ [ None for t in T ] for t in T ]
    for i in range(n):
        d[i][i] = 0
```

```
        p[i][i] = [ T[i] ]
    for i in range(n):
        for j in range(n):
            if p[i][j] is None:
                s = shortestPath(M, T[i], T[j])
                d[i][j] = d[j][i] = pathLength(s)
                p[i][j] = s
                p[j][i] = reverse(s)
                for m in range(len(s)-1):
                    smi = index(s[m], T)
                    if smi is None:
                        continue
                    for l in range(m+1, len(s)):
                        sli = index(s[l], T)
                        if sli is None:
                            continue
                        sub = s[m:l+1]
                        if p[smi][sli] is None:
                            p[smi][sli] = sub
                            p[sli][smi] = reverse(sub)
                            d[smi][sli] = d[sli][smi] = pathLength(sub)
    return d,p
```

[17]:
```
def roundtrips(x, n):

    def isElem(x, l):
        for i in range(len(l)):
            if l[i]==x:
                return True
        return False

    def startpoint(trips):
        for i in range(n):
            for t in trips:
                if isElem(i, t):
                    break
            else:
                return i

    def totalLength(trips):
        s=0
        for i in range(0, len(trips)):
            s += len(trips[i])-1
        return s

    trips = []
    while totalLength(trips)<n:
```

```
        start = startpoint(trips)
        trip = [ start ]
        i = start
        while len(trip) < n-totalLength(trips):
            for j in range(0, n):
                if pulp.value(x[i][j])==1:
                    trip.append(j)
                    i=j
                    break
            if pulp.value(x[trip[-1]][start])==1:
                trip.append(start)
                break
        trips.append(trip)
    return sorted(trips, key=lambda t: len(t), reverse=True)
```

[18]:
```
import time

def createLoop(M, T, timing=False):

    if timing:
        start_time = last_time = time.time()

    D, P = createTables(M, T)    # These are the distances between customers and␣
 ↪warehouse only

    if timing:
        print(f"createTables:   {time.time()-start_time:6.2f}s")
        last_time = time.time()

    n = len(T)
    # create variables
    x = pulp.LpVariable.dicts("x", ( range(n), range(n) ),
                              lowBound=0, upBound=1, cat=pulp.LpInteger)
    # create problem
    prob = pulp.LpProblem("Loop",pulp.LpMinimize)
    # add objective function
    prob += pulp.lpSum([ D[i][j]*x[i][j]
                              for i in range(n) for j in range(n) ])
    # add constraints
    constraints=0
    for j in range(n):
        prob += pulp.lpSum([ x[i][j] for i in range(n) if i!=j ]) ==1
    constraints += n
    for i in range(n):
        prob += pulp.lpSum([ x[i][j] for j in range(n) if i!=j ]) ==1
    constraints += n
    for i in range(n):
```

```
        for j in range(n):
            if i!=j:
                prob += x[i][j]+x[j][i] <= 1
                constraints += 1

    def cycles(k, n):
        if k==1:
            return [ [i] for i in range(0,n) ]
        else:
            sc=cycles(k-1, n)
            all=[]
            for c in sc:
                for i in range(0,n):
                    if c.count(i)==0:
                        all.append(c+[i])
            return all

    for k in range(3, 4):
        cycs=cycles(k,n)
        for c in cycs:
            c.append(c[0])
            prob+=pulp.lpSum([ x[c[i]][c[i+1]] for i in range(0,k)]) <= k-1
            constraints += 1

    # initialise solver
    solvers = pulp.listSolvers(onlyAvailable=True)
    solver = pulp.getSolver(solvers[0], msg=0, timeLimit=2)
    res = prob.solve(solver)

    if timing:
        print(f"Solver:         {time.time()-last_time:6.2f}s {constraints:6,d}␣
↪Constraints")
        last_time = time.time()

    trips = roundtrips(x, n)
    while len(trips)>1:
        longest = max([ len(t) for t in trips ])
        for t in trips:
            if len(t)<longest:
                prob += pulp.lpSum([ x[t[i]][t[i+1]] + x[t[i+1]][t[i]]
                                     for i in range(0,len(t)-1) ]) <=␣
↪len(t)-2
                constraints += 1
            else:
                longest = math.inf

        res = prob.solve(solver)
```

```
        if timing:
            print(f"Solver:         {time.time()-last_time:6.2f}s {constraints:
↪6,d} Constraints")
            last_time = time.time()

        trips = roundtrips(x, n)
    trip = trips[0]
    # print(trip)
    loop = []
    for k in range(len(trip)-1):
        sub = P[trip[k]][trip[k+1]]
        loop += sub if len(loop)==0 else sub[1:]

    if timing:
        print(f"createLoop:     {time.time()-start_time:6.2f}s")

    return loop
```

6 Class Recorder

We willl use a class Recorder as a reference point for capturing data during the simulation. There will be only one recorder. It will be created at the beginning of every simulation run. Every entity will carry a reference to the Recorder.

[19]:
```
import time

class Recorder:

    def __init__(self, env, M, W, C, days,
                 log=False, plot=False, timing=False):
        self.env = env
        self.M = M
        self.W = W
        self.C = C
        self.days = days
        self.log = log
        self.plot = plot

    def trace(self, event):
        if self.log:
            print(timestamp(self.env.now), event)

    def finish(self):
        # simulation is finished for good
        # by removing the simulation environment we can
        # pickle recorder
```

```
        self.env = None
```

7 Class Customer

[20]:
```
class Customer:

    def __init__(self, rec, id, location):
        self.rec = rec
        self.id = id
        self.location = location
        self.atHome = True
        self.answersDoor = False
        self.parcelsReceived = []
        rec.env.process(self.process())

    def __str__(self):
        return f"Customer {self.id:d} at {str(self.location):s}"

    def leaveHouse(self):
        assert(self.atHome and not self.answersDoor)
        # self.rec.trace(str(self)+" leaves house")
        self.atHome = False

    def returnHome(self):
        assert(not self.atHome)
        # self.rec.trace(str(self)+" returns home")
        self.atHome = True

    def answerDoor(self):
        if self.atHome:
            answerTime = random.expovariate(1/AVERAGE_TIME_ANSWER_DOOR)
            if answerTime < WAIT_TIME_IF_CUSTOMER_DOESNT_ANSWER_DOOR:
                yield self.rec.env.timeout(answerTime)
                self.rec.trace(str(self)+" answers door")
                self.answersDoor = True
            else:
                yield self.rec.env.
↪timeout(WAIT_TIME_IF_CUSTOMER_DOESNT_ANSWER_DOOR)
                self.rec.trace(str(self)+" to slow to answer the door")
                self.answersDoor = False
        else:
            yield self.rec.env.timeout(WAIT_TIME_IF_CUSTOMER_DOESNT_ANSWER_DOOR)
            self.rec.trace(str(self)+" not at home")
            self.answersDoot = False

    def acceptParcel(self, parcel):
```

```
        assert(self.answersDoor)
        self.parcelsReceived += [parcel]
        self.rec.trace(str(self)+" accepts "+str(parcel))

    def signOff(self):
        assert(self.answersDoor)
        self.rec.trace(str(self)+" signs off")
        self.answersDoor = False

    def process(self):
        yield self.rec.env.timeout(nextHour(self.rec.env, 8))
        while day(self.rec.env.now)<self.rec.days:
            # in a refinement we may use random times
            self.leaveHouse()
            returnTime = 22 if random.random()<CUSTOMER_NOT_AT_HOME else 18
            yield self.rec.env.timeout(nextHour(self.rec.env, returnTime))
            self.returnHome()
            yield self.rec.env.timeout(nextHour(self.rec.env, 8))
```

8 Class Parcel

Parcels follow through a sequence of states: - processing - in transit (from manufacture to distribution centre) - arrived in distribution centre - ready for delivery - out for delivery - customer not present - returned to distribution centre - delivered

[21]:
```
class Parcel:

    def __init__(self, rec, i, day, cust):
        self.rec = rec
        self.i = i
        self.arrival = day
        self.cust = cust
        self.status = [  ] # status record and
        self.timing = [  ] # timing

    def __str__(self):
        return f"Parcel {self.i:d} for cust {self.cust.id:d}"

    def index(self):
        return self.i

    def destination(self):
        return self.cust.location

    def __reg(self, state):
        self.status += [ state ]
        self.timing += [ self.rec.env.now ]
```

```
        self.rec.trace(str(self)+" "+state)

    def arrivedAtDeliveryCentre(self):
        self.__reg('arr at delivery centre')

    def outForDelivery(self):
        self.__reg('out for delivery')

    def returnFromDelivery(self):
        self.__reg('return from delivery')
```

9 Class Driver

[22]:
```
class Driver:

    def __init__(self, rec, DC):
        self.rec = rec
        self.DC = DC
        self.location = None
        self.parcels = None
        self.tour = None
        self.rec.env.process(self.process())

    # activity
    def __drive(self, target):
        assert(self.tour[0] == self.location)
        while self.location!=target:
            d = dist(self.location, self.tour[1])
            yield self.rec.env.timeout(d / AVERAGE_SPEED)
            self.location = self.tour[1]
            self.tour = self.tour[1:]
        assert(self.tour[0] == self.location == target)

    def arriveForWork(self):
        self.location = self.DC.W
        self.parcels = []
        self.returns = []
        self.tour = [ self.DC.W ]
        self.rec.trace("Driver arrives for work")

    def goesHome(self):
        self.location = None
        self.parcels = None
        self.returns = None
        self.tour = None
```

```
        self.rec.trace("Driver goes home")

    def leaveForDelivery(self, tour, parcels, addresses):
        self.tour, self.parcels = tour, parcels
        self.rec.trace(f"Driver leaves for delivery "
                       f"of {len(parcels):d} parcels "
                       f"to {len(addresses):d} customers")
        self.rec.trace(f"Length of delivery tour: {pathLength(tour):,d}m")
        if self.rec.plot:
            plotMap(self.rec.M, T=addresses, P=tour, w=tour[0],
                    text=f"Day {day(self.rec.env.now):d}:, {pathLength(tour):
↪,d}m")

    def process(self):
        yield self.rec.env.timeout(nextHour(self.rec.env, 18))
        while day(self.rec.env.now)<self.rec.days:
            self.arriveForWork()
            tour, parcels, addresses = self.DC.sendForDelivery()
            if len(parcels)==0:
                self.rec.trace("Nothing to do today")
            else:
                yield self.rec.env.timeout(PREP_TIME_PER_PARCEL*len(parcels))
                self.leaveForDelivery(tour, parcels, addresses)
                while len(self.parcels)>0:
                    # drive to customer
                    custLocation = self.parcels[0].destination()
                    cust = self.parcels[0].cust
                    self.rec.trace("Driver drives to "+str(cust))
                    yield from self.__drive(custLocation)
                    self.rec.trace("Driver arrived at "+str(cust))
                    # call at customer
                    yield from cust.answerDoor()

                    if cust.answersDoor:
                        while len(self.parcels)>0 and \
                                custLocation == self.parcels[0].destination():
                            cust.acceptParcel(self.parcels[0])
                            yield self.rec.env.timeout(random.expovariate(1/10))
                            self.parcels = self.parcels[1:]
                        cust.signOff()
                        yield self.rec.env.timeout(random.expovariate(1/10))
                    else:
                        while len(self.parcels)>0 and  \
                                custLocation == self.parcels[0].destination():
                            self.returns += [self.parcels[0]]
                            self.parcels = self.parcels[1:]
```

```
                # return to delivery centre
                self.rec.trace("Driver returns to delivery centre")
                yield from self.__drive(self.DC.W)
                self.rec.trace("Driver arrived at delivery centre")

                for parcel in self.returns:
                    self.DC.returnFromDelivery(parcel)
                    yield self.rec.env.timeout(RETURN_TIME_PER_PARCEL)

                leftOver = len(self.DC.parcels)+len(self.DC.leftOver)
                self.rec.trace(f"{leftOver:d} parcels left for next day")

            yield self.rec.env.timeout(600)

            self.goesHome()

            yield self.rec.env.timeout(nextHour(self.rec.env, 18))
```

10 Class Delivery Centre

[23]:
```
class DeliveryCentre:

    def __init__(self, rec, M, W):
        self.rec = rec
        self.M = M
        self.W = W
        self.limit = BIKE_RANGE

        self.leftOver = []    # list of parcels
        self.parcels = []     # list of parcels scheduled for delivery
        self.dest = []        # list of unique customer destinations
        self.tour = [self.W]  # tour planned for delivery

    def __accept(self, parcel):
        custLoc = parcel.destination()
        if custLoc not in self.dest:
            MT = addTargets(self.M, self.dest + [custLoc])
            SH = createLoopG(MT, [self.W] + self.dest + [custLoc])
            if pathLength(SH)<self.limit:
                self.parcels.append(parcel)
                self.dest += [custLoc]
                self.tour = SH
            else:
                self.leftOver.append(parcel)
        else:
            self.parcels.append(parcel)
```

```
    def acceptParcel(self, parcel):
        parcel.arrivedAtDeliveryCentre()
        self.__accept(parcel)

    def sendForDelivery(self):
        parcels = []
        tour = self.tour
        addresses = []

        # pick parcels in sequence to be delivered
        for i in range(1, len(tour)-1):
            dest = tour[i]
            for p in self.parcels:
                if p.destination() == dest and p not in parcels:
                    parcels += [p]
                    p.outForDelivery()
                    if dest not in addresses:
                        addresses += [dest]

        # arrange the left overs for next day
        L = self.leftOver
        self.tour = [self.W]
        self.parcels = []
        self.leftOver = []
        self.dest = []
        for p in L:
            self.__accept(p)

        return tour, parcels, addresses

    def returnFromDelivery(self, parcel):
        parcel.returnFromDelivery()
        self.__accept(parcel)

    def getInventory(self):
        return len(self.parcels)+len(self.leftOver)
```

11 Simulation

11.1 Parameters from Specification

The proportion of customers that for whatever are not at home or return home late

[24]:
```
CUSTOMER_NOT_AT_HOME = 0.1 # 10%
```

The maximum bike range. This is passed as parameter to the Delivery Centre and taken into account for the daily tour planning

[25]:
```
BIKE_RANGE = 40000
```

The time required for driving is based on the distance between way points at an average speed of 15km/h.

[26]:
```
AVERAGE_SPEED = 15/3.6
```

The **cumulative preparation time** (route planning and sorting of the parcels in the delivery order and packing the cargo-bike) is assumed to be 50 sec per parcel to be delivered.

[27]:
```
PREP_TIME_PER_PARCEL = 50
```

Additional assumption: The time to **process returned parcels** in the delivery centre is 30 sec per parce.

[28]:
```
RETURN_TIME_PER_PARCEL = 30
```

The average time to answer the door.

[29]:
```
AVERAGE_TIME_ANSWER_DOOR = 40
```

[30]:
```
WAIT_TIME_IF_CUSTOMER_DOESNT_ANSWER_DOOR = 60
```

11.2 Generate Input Data

[31]:
```
def generateDeliveries(p, C, days, seed=0):
    ## p is the average number of parcels per day per customer
    ## C is the number of customers to be served
    ## days is the number of days for which data are to be generated.
    random.seed(seed)
    deliveries = [ [ ] for _ in range(days) ]
    for c in range(C):
        arr = 0
        while True:
            arr += random.expovariate(p)
            day = int(arr)
            if day>=days:
                break
            deliveries[day].append(c)
    return deliveries
```

11.3 Simulation Routine

[32]:
```
def simulation(M, W, C, p=0.2, days=10, seed=0,
               log=False, plot=False, timing=False):

    random.seed(seed)
    D = generateDeliveries(p, len(C), days, seed)
```

```
    env = simpy.Environment()
    rec = Recorder(env, M, W, C, days,
                   log=log, plot=plot, timing=timing)

    print(f"Simulating delivery of {sum([len(d) for d in D]):d} parcels "
          f"over {len(D):d} days to {len(C):d} customers")

    CUSTOMERS = []
    for i in range(len(C)):
        CUSTOMERS.append(Customer(rec, i, C[i]))

    DC = DeliveryCentre(rec, M, W)
    Z = Driver(rec, DC)
    PARCELS = []

    def parcelGeneratorProcess(env, rec, D, C):
        for day in range(len(D)):
            yield env.timeout(nextHour(env, 17.00))
            for c in D[day]:
                cust = CUSTOMERS[c]
                parcel = Parcel(rec, len(PARCELS), day, cust)
                PARCELS.append(parcel)
                DC.acceptParcel(parcel)

    env.process(parcelGeneratorProcess(env, rec, D, C))
    env.run()

    rec.finish()

    if DC.getInventory()>0:
        print(f"Delivery Centre Inventory: {DC.getInventory():d} parcels")

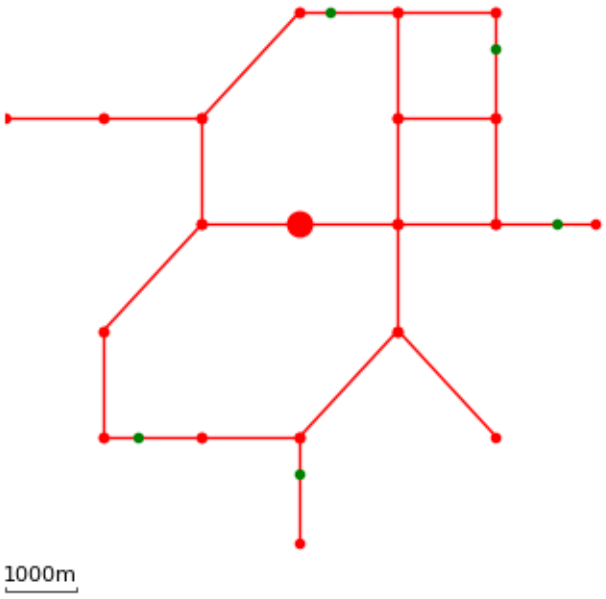
    return rec
```

11.4 Model Verification

[33]:
```
import pickle
with open('simpleData.pickled', 'rb') as f:
    M, C = pickle.load(f)
```

[34]:
```
W = generateWarehouseLocation(M)
```

[35]:
```
plotMap(M, T=C, w=W, scale=True)
```



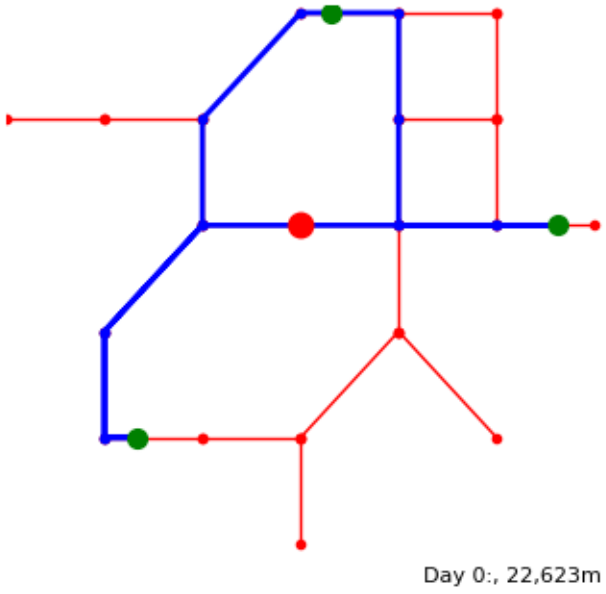
[36]:
```
rec1 = simulation(M, W, C, p=0.15, days=4, log=True)
```

```
Simulating delivery of 2 parcels over 4 days to 5 customers
[ 0] 18:00:00.0 Driver arrives for work
[ 0] 18:00:00.0 Nothing to do today
[ 0] 18:10:00.0 Driver goes home
[ 1] 18:00:00.0 Driver arrives for work
[ 1] 18:00:00.0 Nothing to do today
[ 1] 18:10:00.0 Driver goes home
[ 2] 18:00:00.0 Driver arrives for work
[ 2] 18:00:00.0 Nothing to do today
[ 2] 18:10:00.0 Driver goes home
[ 3] 17:00:00.0 Parcel 0 for cust 2 arr at delivery centre
[ 3] 17:00:00.0 Parcel 1 for cust 4 arr at delivery centre
[ 3] 18:00:00.0 Driver arrives for work
[ 3] 18:00:00.0 Parcel 0 for cust 2 out for delivery
[ 3] 18:00:00.0 Parcel 1 for cust 4 out for delivery
[ 3] 18:01:40.0 Driver leaves for delivery of 2 parcels to 2 customers
[ 3] 18:01:40.0 Length of delivery tour: 14,876m
[ 3] 18:01:40.0 Driver drives to Customer 2 at (4929, 7300)
[ 3] 18:22:21.0 Driver arrived at Customer 2 at (4929, 7300)
[ 3] 18:22:58.8 Customer 2 at (4929, 7300) answers door
[ 3] 18:22:58.8 Customer 2 at (4929, 7300) accepts Parcel 0 for cust 2
[ 3] 18:23:23.2 Customer 2 at (4929, 7300) signs off
[ 3] 18:23:57.2 Driver drives to Customer 4 at (8167, 4500)
[ 3] 18:48:06.3 Driver arrived at Customer 4 at (8167, 4500)
[ 3] 18:48:32.3 Customer 4 at (8167, 4500) answers door
```

```
[ 3] 18:48:32.3 Customer 4 at (8167, 4500) accepts Parcel 1 for cust 4
[ 3] 18:48:52.3 Customer 4 at (8167, 4500) signs off
[ 3] 18:48:55.3 Driver returns to delivery centre
[ 3] 19:03:35.4 Driver arrived at delivery centre
[ 3] 19:03:35.4 0 parcels left for next day
[ 3] 19:13:35.4 Driver goes home
```

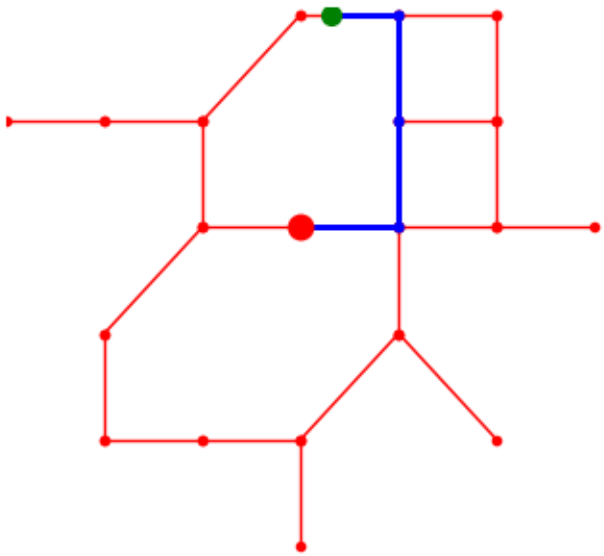
[37]:
```
rec2 = simulation(M, W, C, p=0.3, days=4, seed=1, log=True, plot=True)
```

```
Simulating delivery of 6 parcels over 4 days to 5 customers
[ 0] 17:00:00.0 Parcel 0 for cust 0 arr at delivery centre
[ 0] 17:00:00.0 Parcel 1 for cust 2 arr at delivery centre
[ 0] 17:00:00.0 Parcel 2 for cust 4 arr at delivery centre
[ 0] 17:00:00.0 Parcel 3 for cust 4 arr at delivery centre
[ 0] 18:00:00.0 Driver arrives for work
[ 0] 18:00:00.0 Parcel 0 for cust 0 out for delivery
[ 0] 18:00:00.0 Parcel 1 for cust 2 out for delivery
[ 0] 18:00:00.0 Parcel 2 for cust 4 out for delivery
[ 0] 18:00:00.0 Parcel 3 for cust 4 out for delivery
[ 0] 18:03:20.0 Driver leaves for delivery of 4 parcels to 3 customers
[ 0] 18:03:20.0 Length of delivery tour: 22,623m
```



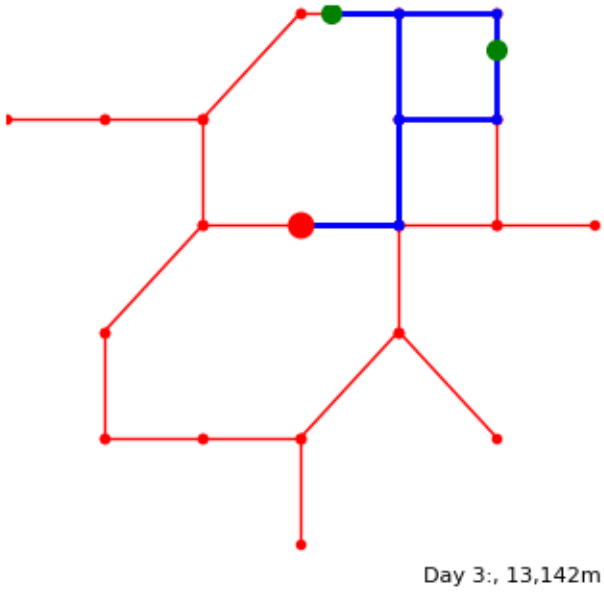

```
[ 0] 18:03:20.0 Driver drives to Customer 0 at (2176, 1700)
[ 0] 18:24:21.2 Driver arrived at Customer 0 at (2176, 1700)
[ 0] 18:24:31.6 Customer 0 at (2176, 1700) answers door
[ 0] 18:24:31.6 Customer 0 at (2176, 1700) accepts Parcel 0 for cust 0
[ 0] 18:25:00.6 Customer 0 at (2176, 1700) signs off
[ 0] 18:25:23.8 Driver drives to Customer 2 at (4929, 7300)
```

```
[ 0] 18:56:02.9 Driver arrived at Customer 2 at (4929, 7300)
[ 0] 18:57:02.9 Customer 2 at (4929, 7300) not at home
[ 0] 18:57:02.9 Driver drives to Customer 4 at (8167, 4500)
[ 0] 19:21:12.1 Driver arrived at Customer 4 at (8167, 4500)
[ 0] 19:21:13.3 Customer 4 at (8167, 4500) answers door
[ 0] 19:21:13.3 Customer 4 at (8167, 4500) accepts Parcel 2 for cust 4
[ 0] 19:21:13.6 Customer 4 at (8167, 4500) accepts Parcel 3 for cust 4
[ 0] 19:21:21.4 Customer 4 at (8167, 4500) signs off
[ 0] 19:21:49.3 Driver returns to delivery centre
[ 0] 19:36:29.4 Driver arrived at delivery centre
[ 0] 19:36:29.4 Parcel 1 for cust 2 return from delivery
[ 0] 19:36:59.4 1 parcels left for next day
[ 0] 19:46:59.4 Driver goes home
[ 1] 18:00:00.0 Driver arrives for work
[ 1] 18:00:00.0 Parcel 1 for cust 2 out for delivery
[ 1] 18:00:50.0 Driver leaves for delivery of 1 parcels to 1 customers
[ 1] 18:00:50.0 Length of delivery tour: 10,342m
```




```
[ 1] 18:00:50.0 Driver drives to Customer 2 at (4929, 7300)
[ 1] 18:21:31.0 Driver arrived at Customer 2 at (4929, 7300)
[ 1] 18:21:54.1 Customer 2 at (4929, 7300) answers door
[ 1] 18:21:54.1 Customer 2 at (4929, 7300) accepts Parcel 1 for cust 2
[ 1] 18:22:00.9 Customer 2 at (4929, 7300) signs off
[ 1] 18:22:03.6 Driver returns to delivery centre
[ 1] 18:42:44.6 Driver arrived at delivery centre
[ 1] 18:42:44.6 0 parcels left for next day
[ 1] 18:52:44.6 Driver goes home
```

```
[ 2] 18:00:00.0 Driver arrives for work
[ 2] 18:00:00.0 Nothing to do today
[ 2] 18:10:00.0 Driver goes home
[ 3] 17:00:00.0 Parcel 4 for cust 2 arr at delivery centre
[ 3] 17:00:00.0 Parcel 5 for cust 3 arr at delivery centre
[ 3] 18:00:00.0 Driver arrives for work
[ 3] 18:00:00.0 Parcel 4 for cust 2 out for delivery
[ 3] 18:00:00.0 Parcel 5 for cust 3 out for delivery
[ 3] 18:01:40.0 Driver leaves for delivery of 2 parcels to 2 customers
[ 3] 18:01:40.0 Length of delivery tour: 13,142m
```




```
[ 3] 18:01:40.0 Driver drives to Customer 2 at (4929, 7300)
[ 3] 18:22:21.0 Driver arrived at Customer 2 at (4929, 7300)
[ 3] 18:23:21.0 Customer 2 at (4929, 7300) to slow to answer the door
[ 3] 18:23:21.0 Driver drives to Customer 3 at (7300, 6825)
[ 3] 18:34:44.1 Driver arrived at Customer 3 at (7300, 6825)
[ 3] 18:34:49.2 Customer 3 at (7300, 6825) answers door
[ 3] 18:34:49.2 Customer 3 at (7300, 6825) accepts Parcel 5 for cust 3
[ 3] 18:34:53.3 Customer 3 at (7300, 6825) signs off
[ 3] 18:35:06.1 Driver returns to delivery centre
[ 3] 18:55:36.1 Driver arrived at delivery centre
[ 3] 18:55:36.1 Parcel 4 for cust 2 return from delivery
[ 3] 18:56:06.1 1 parcels left for next day
[ 3] 19:06:06.1 Driver goes home
Delivery Centre Inventory: 1 parcels
```

[38]:
```
rec3 = simulation(M, W, C, p=0.6, days=4, log=True)
```

```
Simulating delivery of 12 parcels over 4 days to 5 customers
[ 0] 17:00:00.0 Parcel 0 for cust 1 arr at delivery centre
[ 0] 17:00:00.0 Parcel 1 for cust 2 arr at delivery centre
[ 0] 18:00:00.0 Driver arrives for work
[ 0] 18:00:00.0 Parcel 0 for cust 1 out for delivery
[ 0] 18:00:00.0 Parcel 1 for cust 2 out for delivery
[ 0] 18:01:40.0 Driver leaves for delivery of 2 parcels to 2 customers
[ 0] 18:01:40.0 Length of delivery tour: 18,052m
[ 0] 18:01:40.0 Driver drives to Customer 1 at (4500, 1224)
[ 0] 18:22:41.2 Driver arrived at Customer 1 at (4500, 1224)
[ 0] 18:23:41.2 Customer 1 at (4500, 1224) to slow to answer the door
[ 0] 18:23:41.2 Driver drives to Customer 2 at (4929, 7300)
[ 0] 18:54:11.4 Driver arrived at Customer 2 at (4929, 7300)
[ 0] 18:54:57.5 Customer 2 at (4929, 7300) answers door
[ 0] 18:54:57.5 Customer 2 at (4929, 7300) accepts Parcel 1 for cust 2
[ 0] 18:55:03.9 Customer 2 at (4929, 7300) signs off
[ 0] 18:55:05.0 Driver returns to delivery centre
[ 0] 19:15:46.0 Driver arrived at delivery centre
[ 0] 19:15:46.0 Parcel 0 for cust 1 return from delivery
[ 0] 19:16:16.0 1 parcels left for next day
[ 0] 19:26:16.0 Driver goes home
[ 1] 17:00:00.0 Parcel 2 for cust 1 arr at delivery centre
[ 1] 17:00:00.0 Parcel 3 for cust 2 arr at delivery centre
[ 1] 17:00:00.0 Parcel 4 for cust 3 arr at delivery centre
[ 1] 17:00:00.0 Parcel 5 for cust 3 arr at delivery centre
[ 1] 17:00:00.0 Parcel 6 for cust 4 arr at delivery centre
[ 1] 18:00:00.0 Driver arrives for work
[ 1] 18:00:00.0 Parcel 0 for cust 1 out for delivery
[ 1] 18:00:00.0 Parcel 2 for cust 1 out for delivery
[ 1] 18:00:00.0 Parcel 6 for cust 4 out for delivery
[ 1] 18:00:00.0 Parcel 4 for cust 3 out for delivery
[ 1] 18:00:00.0 Parcel 5 for cust 3 out for delivery
[ 1] 18:00:00.0 Parcel 3 for cust 2 out for delivery
[ 1] 18:05:00.0 Driver leaves for delivery of 6 parcels to 4 customers
[ 1] 18:05:00.0 Length of delivery tour: 22,586m
[ 1] 18:05:00.0 Driver drives to Customer 1 at (4500, 1224)
[ 1] 18:26:01.2 Driver arrived at Customer 1 at (4500, 1224)
[ 1] 18:27:01.2 Customer 1 at (4500, 1224) to slow to answer the door
[ 1] 18:27:01.2 Driver drives to Customer 4 at (8167, 4500)
[ 1] 18:51:30.5 Driver arrived at Customer 4 at (8167, 4500)
[ 1] 18:51:42.6 Customer 4 at (8167, 4500) answers door
[ 1] 18:51:42.6 Customer 4 at (8167, 4500) accepts Parcel 6 for cust 4
[ 1] 18:51:58.9 Customer 4 at (8167, 4500) signs off
[ 1] 18:52:06.9 Driver drives to Customer 3 at (7300, 6825)
[ 1] 19:04:52.9 Driver arrived at Customer 3 at (7300, 6825)
[ 1] 19:04:53.5 Customer 3 at (7300, 6825) answers door
[ 1] 19:04:53.5 Customer 3 at (7300, 6825) accepts Parcel 4 for cust 3
[ 1] 19:05:06.2 Customer 3 at (7300, 6825) accepts Parcel 5 for cust 3
```

```
[ 1] 19:05:11.3 Customer 3 at (7300, 6825) signs off
[ 1] 19:05:28.7 Driver drives to Customer 2 at (4929, 7300)
[ 1] 19:16:51.8 Driver arrived at Customer 2 at (4929, 7300)
[ 1] 19:17:35.9 Customer 2 at (4929, 7300) answers door
[ 1] 19:17:35.9 Customer 2 at (4929, 7300) accepts Parcel 3 for cust 2
[ 1] 19:17:35.9 Customer 2 at (4929, 7300) signs off
[ 1] 19:17:42.7 Driver returns to delivery centre
[ 1] 19:38:23.7 Driver arrived at delivery centre
[ 1] 19:38:23.7 Parcel 0 for cust 1 return from delivery
[ 1] 19:38:53.7 Parcel 2 for cust 1 return from delivery
[ 1] 19:39:23.7 2 parcels left for next day
[ 1] 19:49:23.7 Driver goes home
[ 2] 17:00:00.0 Parcel 7 for cust 1 arr at delivery centre
[ 2] 17:00:00.0 Parcel 8 for cust 4 arr at delivery centre
[ 2] 18:00:00.0 Driver arrives for work
[ 2] 18:00:00.0 Parcel 0 for cust 1 out for delivery
[ 2] 18:00:00.0 Parcel 2 for cust 1 out for delivery
[ 2] 18:00:00.0 Parcel 7 for cust 1 out for delivery
[ 2] 18:00:00.0 Parcel 8 for cust 4 out for delivery
[ 2] 18:03:20.0 Driver leaves for delivery of 4 parcels to 2 customers
[ 2] 18:03:20.0 Length of delivery tour: 15,044m
[ 2] 18:03:20.0 Driver drives to Customer 1 at (4500, 1224)
[ 2] 18:24:21.2 Driver arrived at Customer 1 at (4500, 1224)
[ 2] 18:24:54.7 Customer 1 at (4500, 1224) answers door
[ 2] 18:24:54.7 Customer 1 at (4500, 1224) accepts Parcel 0 for cust 1
[ 2] 18:24:57.5 Customer 1 at (4500, 1224) accepts Parcel 2 for cust 1
[ 2] 18:25:31.7 Customer 1 at (4500, 1224) accepts Parcel 7 for cust 1
[ 2] 18:25:48.0 Customer 1 at (4500, 1224) signs off
[ 2] 18:25:53.9 Driver drives to Customer 4 at (8167, 4500)
[ 2] 18:50:23.2 Driver arrived at Customer 4 at (8167, 4500)
[ 2] 18:50:26.6 Customer 4 at (8167, 4500) answers door
[ 2] 18:50:26.6 Customer 4 at (8167, 4500) accepts Parcel 8 for cust 4
[ 2] 18:50:30.4 Customer 4 at (8167, 4500) signs off
[ 2] 18:50:37.5 Driver returns to delivery centre
[ 2] 19:05:17.6 Driver arrived at delivery centre
[ 2] 19:05:17.6 0 parcels left for next day
[ 2] 19:15:17.6 Driver goes home
[ 3] 17:00:00.0 Parcel 9 for cust 0 arr at delivery centre
[ 3] 17:00:00.0 Parcel 10 for cust 1 arr at delivery centre
[ 3] 17:00:00.0 Parcel 11 for cust 2 arr at delivery centre
[ 3] 18:00:00.0 Driver arrives for work
[ 3] 18:00:00.0 Parcel 9 for cust 0 out for delivery
[ 3] 18:00:00.0 Parcel 10 for cust 1 out for delivery
[ 3] 18:00:00.0 Parcel 11 for cust 2 out for delivery
[ 3] 18:02:30.0 Driver leaves for delivery of 3 parcels to 3 customers
[ 3] 18:02:30.0 Length of delivery tour: 20,852m
[ 3] 18:02:30.0 Driver drives to Customer 0 at (2176, 1700)
[ 3] 18:23:31.2 Driver arrived at Customer 0 at (2176, 1700)
```

```
[ 3] 18:24:31.2 Customer 0 at (2176, 1700) to slow to answer the door
[ 3] 18:24:31.2 Driver drives to Customer 1 at (4500, 1224)
[ 3] 18:35:43.2 Driver arrived at Customer 1 at (4500, 1224)
[ 3] 18:36:14.3 Customer 1 at (4500, 1224) answers door
[ 3] 18:36:14.3 Customer 1 at (4500, 1224) accepts Parcel 10 for cust 1
[ 3] 18:36:47.5 Customer 1 at (4500, 1224) signs off
[ 3] 18:36:56.7 Driver drives to Customer 2 at (4929, 7300)
[ 3] 19:07:27.0 Driver arrived at Customer 2 at (4929, 7300)
[ 3] 19:08:02.4 Customer 2 at (4929, 7300) answers door
[ 3] 19:08:02.4 Customer 2 at (4929, 7300) accepts Parcel 11 for cust 2
[ 3] 19:08:08.3 Customer 2 at (4929, 7300) signs off
[ 3] 19:08:17.4 Driver returns to delivery centre
[ 3] 19:28:58.4 Driver arrived at delivery centre
[ 3] 19:28:58.4 Parcel 9 for cust 0 return from delivery
[ 3] 19:29:28.4 1 parcels left for next day
[ 3] 19:39:28.4 Driver goes home
Delivery Centre Inventory: 1 parcels
```

[39]:
```
import pickle
with open('testData.pickled', 'rb') as f:
    MX, CX = pickle.load(f)
```

[40]:
```
WX = generateWarehouseLocation(MX)
```

[41]:
```
rec4 = simulation(MX, WX, CX, p=0.15, days=7, log=True)
```

```
Simulating delivery of 14 parcels over 7 days to 20 customers
[ 0] 18:00:00.0 Driver arrives for work
[ 0] 18:00:00.0 Nothing to do today
[ 0] 18:10:00.0 Driver goes home
[ 1] 18:00:00.0 Driver arrives for work
[ 1] 18:00:00.0 Nothing to do today
[ 1] 18:10:00.0 Driver goes home
[ 2] 17:00:00.0 Parcel 0 for cust 4 arr at delivery centre
[ 2] 17:00:00.0 Parcel 1 for cust 12 arr at delivery centre
[ 2] 17:00:00.0 Parcel 2 for cust 19 arr at delivery centre
[ 2] 18:00:00.0 Driver arrives for work
[ 2] 18:00:00.0 Parcel 0 for cust 4 out for delivery
[ 2] 18:00:00.0 Parcel 2 for cust 19 out for delivery
[ 2] 18:00:00.0 Parcel 1 for cust 12 out for delivery
[ 2] 18:02:30.0 Driver leaves for delivery of 3 parcels to 3 customers
[ 2] 18:02:30.0 Length of delivery tour: 18,677m
[ 2] 18:02:30.0 Driver drives to Customer 4 at (2821, 1578)
[ 2] 18:19:48.7 Driver arrived at Customer 4 at (2821, 1578)
[ 2] 18:20:48.7 Customer 4 at (2821, 1578) to slow to answer the door
[ 2] 18:20:48.7 Driver drives to Customer 19 at (7950, 4122)
[ 2] 18:51:47.5 Driver arrived at Customer 19 at (7950, 4122)
[ 2] 18:52:47.5 Customer 19 at (7950, 4122) to slow to answer the door
```

```
[ 2] 18:52:47.5 Driver drives to Customer 12 at (6061, 4500)
[ 2] 19:01:51.6 Driver arrived at Customer 12 at (6061, 4500)
[ 2] 19:02:51.6 Customer 12 at (6061, 4500) to slow to answer the door
[ 2] 19:02:51.6 Driver returns to delivery centre
[ 2] 19:20:12.5 Driver arrived at delivery centre
[ 2] 19:20:12.5 Parcel 0 for cust 4 return from delivery
[ 2] 19:20:42.5 Parcel 2 for cust 19 return from delivery
[ 2] 19:21:12.5 Parcel 1 for cust 12 return from delivery
[ 2] 19:21:42.5 3 parcels left for next day
[ 2] 19:31:42.5 Driver goes home
[ 3] 17:00:00.0 Parcel 3 for cust 2 arr at delivery centre
[ 3] 17:00:00.0 Parcel 4 for cust 3 arr at delivery centre
[ 3] 18:00:00.0 Driver arrives for work
[ 3] 18:00:00.0 Parcel 3 for cust 2 out for delivery
[ 3] 18:00:00.0 Parcel 4 for cust 3 out for delivery
[ 3] 18:00:00.0 Parcel 0 for cust 4 out for delivery
[ 3] 18:00:00.0 Parcel 2 for cust 19 out for delivery
[ 3] 18:00:00.0 Parcel 1 for cust 12 out for delivery
[ 3] 18:04:10.0 Driver leaves for delivery of 5 parcels to 5 customers
[ 3] 18:04:10.0 Length of delivery tour: 19,841m
[ 3] 18:04:10.0 Driver drives to Customer 2 at (1618, 4500)
[ 3] 18:11:05.7 Driver arrived at Customer 2 at (1618, 4500)
[ 3] 18:11:06.8 Customer 2 at (1618, 4500) answers door
[ 3] 18:11:06.8 Customer 2 at (1618, 4500) accepts Parcel 3 for cust 2
[ 3] 18:11:16.8 Customer 2 at (1618, 4500) signs off
[ 3] 18:11:26.2 Driver drives to Customer 3 at (2200, 3898)
[ 3] 18:16:10.3 Driver arrived at Customer 3 at (2200, 3898)
[ 3] 18:16:44.6 Customer 3 at (2200, 3898) answers door
[ 3] 18:16:44.6 Customer 3 at (2200, 3898) accepts Parcel 4 for cust 3
[ 3] 18:16:49.6 Customer 3 at (2200, 3898) signs off
[ 3] 18:16:54.2 Driver drives to Customer 4 at (2821, 1578)
[ 3] 18:27:12.5 Driver arrived at Customer 4 at (2821, 1578)
[ 3] 18:28:12.5 Customer 4 at (2821, 1578) to slow to answer the door
[ 3] 18:28:12.5 Driver drives to Customer 19 at (7950, 4122)
[ 3] 18:59:11.3 Driver arrived at Customer 19 at (7950, 4122)
[ 3] 19:00:11.3 Customer 19 at (7950, 4122) not at home
[ 3] 19:00:11.3 Driver drives to Customer 12 at (6061, 4500)
[ 3] 19:09:15.3 Driver arrived at Customer 12 at (6061, 4500)
[ 3] 19:09:16.8 Customer 12 at (6061, 4500) answers door
[ 3] 19:09:16.8 Customer 12 at (6061, 4500) accepts Parcel 1 for cust 12
[ 3] 19:09:17.0 Customer 12 at (6061, 4500) signs off
[ 3] 19:09:49.5 Driver returns to delivery centre
[ 3] 19:27:10.4 Driver arrived at delivery centre
[ 3] 19:27:10.4 Parcel 0 for cust 4 return from delivery
[ 3] 19:27:40.4 Parcel 2 for cust 19 return from delivery
[ 3] 19:28:10.4 2 parcels left for next day
[ 3] 19:38:10.4 Driver goes home
[ 4] 17:00:00.0 Parcel 5 for cust 6 arr at delivery centre
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[ 4] 17:00:00.0 Parcel 6 for cust 15 arr at delivery centre
[ 4] 17:00:00.0 Parcel 7 for cust 15 arr at delivery centre
[ 4] 17:00:00.0 Parcel 8 for cust 18 arr at delivery centre
[ 4] 18:00:00.0 Driver arrives for work
[ 4] 18:00:00.0 Parcel 0 for cust 4 out for delivery
[ 4] 18:00:00.0 Parcel 5 for cust 6 out for delivery
[ 4] 18:00:00.0 Parcel 6 for cust 15 out for delivery
[ 4] 18:00:00.0 Parcel 7 for cust 15 out for delivery
[ 4] 18:00:00.0 Parcel 2 for cust 19 out for delivery
[ 4] 18:00:00.0 Parcel 8 for cust 18 out for delivery
[ 4] 18:05:00.0 Driver leaves for delivery of 6 parcels to 5 customers
[ 4] 18:05:00.0 Length of delivery tour: 18,677m
[ 4] 18:05:00.0 Driver drives to Customer 4 at (2821, 1578)
[ 4] 18:22:18.7 Driver arrived at Customer 4 at (2821, 1578)
[ 4] 18:23:18.7 Customer 4 at (2821, 1578) to slow to answer the door
[ 4] 18:23:18.7 Driver drives to Customer 6 at (4142, 1050)
[ 4] 18:29:28.1 Driver arrived at Customer 6 at (4142, 1050)
[ 4] 18:30:28.1 Customer 6 at (4142, 1050) to slow to answer the door
[ 4] 18:30:28.1 Driver drives to Customer 15 at (7302, 3350)
[ 4] 18:49:36.7 Driver arrived at Customer 15 at (7302, 3350)
[ 4] 18:49:44.1 Customer 15 at (7302, 3350) answers door
[ 4] 18:49:44.1 Customer 15 at (7302, 3350) accepts Parcel 6 for cust 15
[ 4] 18:49:55.3 Customer 15 at (7302, 3350) accepts Parcel 7 for cust 15
[ 4] 18:50:29.3 Customer 15 at (7302, 3350) signs off
[ 4] 18:50:29.9 Driver drives to Customer 19 at (7950, 4122)
[ 4] 18:56:10.7 Driver arrived at Customer 19 at (7950, 4122)
[ 4] 18:56:55.8 Customer 19 at (7950, 4122) answers door
[ 4] 18:56:55.8 Customer 19 at (7950, 4122) accepts Parcel 2 for cust 19
[ 4] 18:57:14.5 Customer 19 at (7950, 4122) signs off
[ 4] 18:57:18.7 Driver drives to Customer 18 at (7816, 4500)
[ 4] 18:59:21.5 Driver arrived at Customer 18 at (7816, 4500)
[ 4] 18:59:33.1 Customer 18 at (7816, 4500) answers door
[ 4] 18:59:33.1 Customer 18 at (7816, 4500) accepts Parcel 8 for cust 18
[ 4] 18:59:42.2 Customer 18 at (7816, 4500) signs off
[ 4] 18:59:48.0 Driver returns to delivery centre
[ 4] 19:24:10.1 Driver arrived at delivery centre
[ 4] 19:24:10.1 Parcel 0 for cust 4 return from delivery
[ 4] 19:24:40.1 Parcel 5 for cust 6 return from delivery
[ 4] 19:25:10.1 2 parcels left for next day
[ 4] 19:35:10.1 Driver goes home
[ 5] 17:00:00.0 Parcel 9 for cust 2 arr at delivery centre
[ 5] 18:00:00.0 Driver arrives for work
[ 5] 18:00:00.0 Parcel 9 for cust 2 out for delivery
[ 5] 18:00:00.0 Parcel 0 for cust 4 out for delivery
[ 5] 18:00:00.0 Parcel 5 for cust 6 out for delivery
[ 5] 18:02:30.0 Driver leaves for delivery of 3 parcels to 3 customers
[ 5] 18:02:30.0 Length of delivery tour: 12,898m
[ 5] 18:02:30.0 Driver drives to Customer 2 at (1618, 4500)
```

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[ 5] 18:09:25.7 Driver arrived at Customer 2 at (1618, 4500)
[ 5] 18:10:25.7 Customer 2 at (1618, 4500) to slow to answer the door
[ 5] 18:10:25.7 Driver drives to Customer 4 at (2821, 1578)
[ 5] 18:25:28.1 Driver arrived at Customer 4 at (2821, 1578)
[ 5] 18:26:08.3 Customer 4 at (2821, 1578) answers door
[ 5] 18:26:08.3 Customer 4 at (2821, 1578) accepts Parcel 0 for cust 4
[ 5] 18:26:18.0 Customer 4 at (2821, 1578) signs off
[ 5] 18:26:30.5 Driver drives to Customer 6 at (4142, 1050)
[ 5] 18:32:39.9 Driver arrived at Customer 6 at (4142, 1050)
[ 5] 18:33:39.9 Customer 6 at (4142, 1050) not at home
[ 5] 18:33:39.9 Driver returns to delivery centre
[ 5] 18:57:08.0 Driver arrived at delivery centre
[ 5] 18:57:08.0 Parcel 9 for cust 2 return from delivery
[ 5] 18:57:38.0 Parcel 5 for cust 6 return from delivery
[ 5] 18:58:08.0 2 parcels left for next day
[ 5] 19:08:08.0 Driver goes home
[ 6] 17:00:00.0 Parcel 10 for cust 4 arr at delivery centre
[ 6] 17:00:00.0 Parcel 11 for cust 6 arr at delivery centre
[ 6] 17:00:00.0 Parcel 12 for cust 7 arr at delivery centre
[ 6] 17:00:00.0 Parcel 13 for cust 16 arr at delivery centre
[ 6] 18:00:00.0 Driver arrives for work
[ 6] 18:00:00.0 Parcel 9 for cust 2 out for delivery
[ 6] 18:00:00.0 Parcel 10 for cust 4 out for delivery
[ 6] 18:00:00.0 Parcel 5 for cust 6 out for delivery
[ 6] 18:00:00.0 Parcel 11 for cust 6 out for delivery
[ 6] 18:00:00.0 Parcel 13 for cust 16 out for delivery
[ 6] 18:00:00.0 Parcel 12 for cust 7 out for delivery
[ 6] 18:05:00.0 Driver leaves for delivery of 6 parcels to 5 customers
[ 6] 18:05:00.0 Length of delivery tour: 18,895m
[ 6] 18:05:00.0 Driver drives to Customer 2 at (1618, 4500)
[ 6] 18:11:55.7 Driver arrived at Customer 2 at (1618, 4500)
[ 6] 18:12:25.7 Customer 2 at (1618, 4500) answers door
[ 6] 18:12:25.7 Customer 2 at (1618, 4500) accepts Parcel 9 for cust 2
[ 6] 18:12:32.4 Customer 2 at (1618, 4500) signs off
[ 6] 18:12:40.6 Driver drives to Customer 4 at (2821, 1578)
[ 6] 18:27:43.0 Driver arrived at Customer 4 at (2821, 1578)
[ 6] 18:28:39.3 Customer 4 at (2821, 1578) answers door
[ 6] 18:28:39.3 Customer 4 at (2821, 1578) accepts Parcel 10 for cust 4
[ 6] 18:29:00.9 Customer 4 at (2821, 1578) signs off
[ 6] 18:29:07.7 Driver drives to Customer 6 at (4142, 1050)
[ 6] 18:35:17.1 Driver arrived at Customer 6 at (4142, 1050)
[ 6] 18:35:32.0 Customer 6 at (4142, 1050) answers door
[ 6] 18:35:32.0 Customer 6 at (4142, 1050) accepts Parcel 5 for cust 6
[ 6] 18:35:38.3 Customer 6 at (4142, 1050) accepts Parcel 11 for cust 6
[ 6] 18:35:54.9 Customer 6 at (4142, 1050) signs off
[ 6] 18:36:15.7 Driver drives to Customer 16 at (7477, 5650)
[ 6] 19:05:18.3 Driver arrived at Customer 16 at (7477, 5650)
[ 6] 19:06:18.3 Customer 16 at (7477, 5650) to slow to answer the door
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[ 6] 19:06:18.3 Driver drives to Customer 7 at (5182, 5650)
[ 6] 19:15:29.1 Driver arrived at Customer 7 at (5182, 5650)
[ 6] 19:16:29.1 Customer 7 at (5182, 5650) not at home
[ 6] 19:16:29.1 Driver returns to delivery centre
[ 6] 19:25:43.0 Driver arrived at delivery centre
[ 6] 19:25:43.0 Parcel 13 for cust 16 return from delivery
[ 6] 19:26:13.0 Parcel 12 for cust 7 return from delivery
[ 6] 19:26:43.0 2 parcels left for next day
[ 6] 19:36:43.0 Driver goes home
Delivery Centre Inventory: 2 parcels
```

[42]:
```
rec5 = simulation(MX, WX, CX, p=1.2, days=7, log=True)
```

```
Simulating delivery of 151 parcels over 7 days to 20 customers
[ 0] 17:00:00.0 Parcel 0 for cust 5 arr at delivery centre
[ 0] 17:00:00.0 Parcel 1 for cust 6 arr at delivery centre
[ 0] 17:00:00.0 Parcel 2 for cust 6 arr at delivery centre
[ 0] 17:00:00.0 Parcel 3 for cust 7 arr at delivery centre
[ 0] 17:00:00.0 Parcel 4 for cust 7 arr at delivery centre
[ 0] 17:00:00.0 Parcel 5 for cust 8 arr at delivery centre
[ 0] 17:00:00.0 Parcel 6 for cust 13 arr at delivery centre
[ 0] 17:00:00.0 Parcel 7 for cust 13 arr at delivery centre
[ 0] 17:00:00.0 Parcel 8 for cust 15 arr at delivery centre
[ 0] 17:00:00.0 Parcel 9 for cust 16 arr at delivery centre
[ 0] 17:00:00.0 Parcel 10 for cust 16 arr at delivery centre
[ 0] 17:00:00.0 Parcel 11 for cust 16 arr at delivery centre
[ 0] 17:00:00.0 Parcel 12 for cust 17 arr at delivery centre
[ 0] 17:00:00.0 Parcel 13 for cust 17 arr at delivery centre
[ 0] 17:00:00.0 Parcel 14 for cust 18 arr at delivery centre
[ 0] 17:00:00.0 Parcel 15 for cust 19 arr at delivery centre
[ 0] 18:00:00.0 Driver arrives for work
[ 0] 18:00:00.0 Parcel 0 for cust 5 out for delivery
[ 0] 18:00:00.0 Parcel 3 for cust 7 out for delivery
[ 0] 18:00:00.0 Parcel 4 for cust 7 out for delivery
[ 0] 18:00:00.0 Parcel 9 for cust 16 out for delivery
[ 0] 18:00:00.0 Parcel 10 for cust 16 out for delivery
[ 0] 18:00:00.0 Parcel 11 for cust 16 out for delivery
[ 0] 18:00:00.0 Parcel 6 for cust 13 out for delivery
[ 0] 18:00:00.0 Parcel 7 for cust 13 out for delivery
[ 0] 18:00:00.0 Parcel 12 for cust 17 out for delivery
[ 0] 18:00:00.0 Parcel 13 for cust 17 out for delivery
[ 0] 18:00:00.0 Parcel 14 for cust 18 out for delivery
[ 0] 18:00:00.0 Parcel 15 for cust 19 out for delivery
[ 0] 18:00:00.0 Parcel 8 for cust 15 out for delivery
[ 0] 18:00:00.0 Parcel 5 for cust 8 out for delivery
[ 0] 18:00:00.0 Parcel 1 for cust 6 out for delivery
[ 0] 18:00:00.0 Parcel 2 for cust 6 out for delivery
[ 0] 18:13:20.0 Driver leaves for delivery of 16 parcels to 10 customers
```

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[ 0] 18:13:20.0 Length of delivery tour: 26,192m
[ 0] 18:13:20.0 Driver drives to Customer 5 at (3350, 7580)
[ 0] 18:32:09.4 Driver arrived at Customer 5 at (3350, 7580)
[ 0] 18:32:28.5 Customer 5 at (3350, 7580) answers door
[ 0] 18:32:28.5 Customer 5 at (3350, 7580) accepts Parcel 0 for cust 5
[ 0] 18:32:49.3 Customer 5 at (3350, 7580) signs off
[ 0] 18:32:57.7 Driver drives to Customer 7 at (5182, 5650)
[ 0] 18:48:00.6 Driver arrived at Customer 7 at (5182, 5650)
[ 0] 18:48:22.0 Customer 7 at (5182, 5650) answers door
[ 0] 18:48:22.0 Customer 7 at (5182, 5650) accepts Parcel 3 for cust 7
[ 0] 18:48:27.1 Customer 7 at (5182, 5650) accepts Parcel 4 for cust 7
[ 0] 18:48:39.2 Customer 7 at (5182, 5650) signs off
[ 0] 18:48:44.6 Driver drives to Customer 16 at (7477, 5650)
[ 0] 18:57:55.4 Driver arrived at Customer 16 at (7477, 5650)
[ 0] 18:58:38.9 Customer 16 at (7477, 5650) answers door
[ 0] 18:58:38.9 Customer 16 at (7477, 5650) accepts Parcel 9 for cust 16
[ 0] 18:58:39.3 Customer 16 at (7477, 5650) accepts Parcel 10 for cust 16
[ 0] 18:58:45.2 Customer 16 at (7477, 5650) accepts Parcel 11 for cust 16
[ 0] 18:58:48.2 Customer 16 at (7477, 5650) signs off
[ 0] 18:58:49.9 Driver drives to Customer 13 at (6800, 4901)
[ 0] 19:04:32.2 Driver arrived at Customer 13 at (6800, 4901)
[ 0] 19:05:02.2 Customer 13 at (6800, 4901) answers door
[ 0] 19:05:02.2 Customer 13 at (6800, 4901) accepts Parcel 6 for cust 13
[ 0] 19:05:08.9 Customer 13 at (6800, 4901) accepts Parcel 7 for cust 13
[ 0] 19:05:17.1 Customer 13 at (6800, 4901) signs off
[ 0] 19:05:31.2 Driver drives to Customer 17 at (7575, 4500)
[ 0] 19:10:13.4 Driver arrived at Customer 17 at (7575, 4500)
[ 0] 19:11:13.4 Customer 17 at (7575, 4500) to slow to answer the door
[ 0] 19:11:13.4 Driver drives to Customer 18 at (7816, 4500)
[ 0] 19:12:11.3 Driver arrived at Customer 18 at (7816, 4500)
[ 0] 19:12:38.6 Customer 18 at (7816, 4500) answers door
[ 0] 19:12:38.6 Customer 18 at (7816, 4500) accepts Parcel 14 for cust 18
[ 0] 19:12:42.3 Customer 18 at (7816, 4500) signs off
[ 0] 19:12:48.6 Driver drives to Customer 19 at (7950, 4122)
[ 0] 19:14:51.5 Driver arrived at Customer 19 at (7950, 4122)
[ 0] 19:15:51.5 Customer 19 at (7950, 4122) to slow to answer the door
[ 0] 19:15:51.5 Driver drives to Customer 15 at (7302, 3350)
[ 0] 19:21:32.3 Driver arrived at Customer 15 at (7302, 3350)
[ 0] 19:22:32.3 Customer 15 at (7302, 3350) not at home
[ 0] 19:22:32.3 Driver drives to Customer 8 at (5650, 2783)
[ 0] 19:31:24.8 Driver arrived at Customer 8 at (5650, 2783)
[ 0] 19:32:24.8 Customer 8 at (5650, 2783) to slow to answer the door
[ 0] 19:32:24.8 Driver drives to Customer 6 at (4142, 1050)
[ 0] 19:42:40.9 Driver arrived at Customer 6 at (4142, 1050)
[ 0] 19:43:40.9 Customer 6 at (4142, 1050) to slow to answer the door
[ 0] 19:43:40.9 Driver returns to delivery centre
[ 0] 20:07:09.2 Driver arrived at delivery centre
[ 0] 20:07:09.2 Parcel 12 for cust 17 return from delivery
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[ 0] 20:07:39.2 Parcel 13 for cust 17 return from delivery
[ 0] 20:08:09.2 Parcel 15 for cust 19 return from delivery
[ 0] 20:08:39.2 Parcel 8 for cust 15 return from delivery
[ 0] 20:09:09.2 Parcel 5 for cust 8 return from delivery
[ 0] 20:09:39.2 Parcel 1 for cust 6 return from delivery
[ 0] 20:10:09.2 Parcel 2 for cust 6 return from delivery
[ 0] 20:10:39.2 7 parcels left for next day
[ 0] 20:20:39.2 Driver goes home
[ 1] 17:00:00.0 Parcel 16 for cust 0 arr at delivery centre
[ 1] 17:00:00.0 Parcel 17 for cust 1 arr at delivery centre
[ 1] 17:00:00.0 Parcel 18 for cust 3 arr at delivery centre
[ 1] 17:00:00.0 Parcel 19 for cust 5 arr at delivery centre
[ 1] 17:00:00.0 Parcel 20 for cust 5 arr at delivery centre
[ 1] 17:00:00.0 Parcel 21 for cust 6 arr at delivery centre
[ 1] 17:00:00.0 Parcel 22 for cust 7 arr at delivery centre
[ 1] 17:00:00.0 Parcel 23 for cust 8 arr at delivery centre
[ 1] 17:00:00.0 Parcel 24 for cust 8 arr at delivery centre
[ 1] 17:00:00.0 Parcel 25 for cust 9 arr at delivery centre
[ 1] 17:00:00.0 Parcel 26 for cust 11 arr at delivery centre
[ 1] 17:00:00.0 Parcel 27 for cust 13 arr at delivery centre
[ 1] 17:00:00.0 Parcel 28 for cust 14 arr at delivery centre
[ 1] 17:00:00.0 Parcel 29 for cust 14 arr at delivery centre
[ 1] 17:00:00.0 Parcel 30 for cust 14 arr at delivery centre
[ 1] 17:00:00.0 Parcel 31 for cust 15 arr at delivery centre
[ 1] 17:00:00.0 Parcel 32 for cust 15 arr at delivery centre
[ 1] 17:00:00.0 Parcel 33 for cust 16 arr at delivery centre
[ 1] 17:00:00.0 Parcel 34 for cust 18 arr at delivery centre
[ 1] 17:00:00.0 Parcel 35 for cust 19 arr at delivery centre
[ 1] 17:00:00.0 Parcel 36 for cust 19 arr at delivery centre
[ 1] 17:00:00.0 Parcel 37 for cust 19 arr at delivery centre
[ 1] 18:00:00.0 Driver arrives for work
[ 1] 18:00:00.0 Parcel 16 for cust 0 out for delivery
[ 1] 18:00:00.0 Parcel 17 for cust 1 out for delivery
[ 1] 18:00:00.0 Parcel 18 for cust 3 out for delivery
[ 1] 18:00:00.0 Parcel 22 for cust 7 out for delivery
[ 1] 18:00:00.0 Parcel 19 for cust 5 out for delivery
[ 1] 18:00:00.0 Parcel 20 for cust 5 out for delivery
[ 1] 18:00:00.0 Parcel 26 for cust 11 out for delivery
[ 1] 18:00:00.0 Parcel 27 for cust 13 out for delivery
[ 1] 18:00:00.0 Parcel 28 for cust 14 out for delivery
[ 1] 18:00:00.0 Parcel 29 for cust 14 out for delivery
[ 1] 18:00:00.0 Parcel 30 for cust 14 out for delivery
[ 1] 18:00:00.0 Parcel 12 for cust 17 out for delivery
[ 1] 18:00:00.0 Parcel 13 for cust 17 out for delivery
[ 1] 18:00:00.0 Parcel 34 for cust 18 out for delivery
[ 1] 18:00:00.0 Parcel 15 for cust 19 out for delivery
[ 1] 18:00:00.0 Parcel 35 for cust 19 out for delivery
[ 1] 18:00:00.0 Parcel 36 for cust 19 out for delivery
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[ 1] 18:00:00.0 Parcel 37 for cust 19 out for delivery
[ 1] 18:00:00.0 Parcel 8 for cust 15 out for delivery
[ 1] 18:00:00.0 Parcel 31 for cust 15 out for delivery
[ 1] 18:00:00.0 Parcel 32 for cust 15 out for delivery
[ 1] 18:00:00.0 Parcel 25 for cust 9 out for delivery
[ 1] 18:00:00.0 Parcel 5 for cust 8 out for delivery
[ 1] 18:00:00.0 Parcel 23 for cust 8 out for delivery
[ 1] 18:00:00.0 Parcel 24 for cust 8 out for delivery
[ 1] 18:00:00.0 Parcel 1 for cust 6 out for delivery
[ 1] 18:00:00.0 Parcel 2 for cust 6 out for delivery
[ 1] 18:00:00.0 Parcel 21 for cust 6 out for delivery
[ 1] 18:23:20.0 Driver leaves for delivery of 28 parcels to 15 customers
[ 1] 18:23:20.0 Length of delivery tour: 34,890m
[ 1] 18:23:20.0 Driver drives to Customer 0 at (1050, 4722)
[ 1] 18:33:25.3 Driver arrived at Customer 0 at (1050, 4722)
[ 1] 18:33:29.5 Customer 0 at (1050, 4722) answers door
[ 1] 18:33:29.5 Customer 0 at (1050, 4722) accepts Parcel 16 for cust 0
[ 1] 18:33:48.7 Customer 0 at (1050, 4722) signs off
[ 1] 18:33:53.8 Driver drives to Customer 1 at (1050, 5180)
[ 1] 18:35:43.7 Driver arrived at Customer 1 at (1050, 5180)
[ 1] 18:35:47.1 Customer 1 at (1050, 5180) answers door
[ 1] 18:35:47.1 Customer 1 at (1050, 5180) accepts Parcel 17 for cust 1
[ 1] 18:35:50.3 Customer 1 at (1050, 5180) signs off
[ 1] 18:35:56.4 Driver drives to Customer 3 at (2200, 3898)
[ 1] 18:45:40.0 Driver arrived at Customer 3 at (2200, 3898)
[ 1] 18:46:40.0 Customer 3 at (2200, 3898) to slow to answer the door
[ 1] 18:46:40.0 Driver drives to Customer 7 at (5182, 5650)
[ 1] 19:02:54.4 Driver arrived at Customer 7 at (5182, 5650)
[ 1] 19:03:54.4 Customer 7 at (5182, 5650) to slow to answer the door
[ 1] 19:03:54.4 Driver drives to Customer 5 at (3350, 7580)
[ 1] 19:18:57.3 Driver arrived at Customer 5 at (3350, 7580)
[ 1] 19:19:03.0 Customer 5 at (3350, 7580) answers door
[ 1] 19:19:03.0 Customer 5 at (3350, 7580) accepts Parcel 19 for cust 5
[ 1] 19:19:10.4 Customer 5 at (3350, 7580) accepts Parcel 20 for cust 5
[ 1] 19:19:20.9 Customer 5 at (3350, 7580) signs off
[ 1] 19:19:25.2 Driver drives to Customer 11 at (5650, 7250)
[ 1] 19:32:54.0 Driver arrived at Customer 11 at (5650, 7250)
[ 1] 19:33:54.0 Customer 11 at (5650, 7250) to slow to answer the door
[ 1] 19:33:54.0 Driver drives to Customer 13 at (6800, 4901)
[ 1] 19:47:53.7 Driver arrived at Customer 13 at (6800, 4901)
[ 1] 19:48:06.8 Customer 13 at (6800, 4901) answers door
[ 1] 19:48:06.8 Customer 13 at (6800, 4901) accepts Parcel 27 for cust 13
[ 1] 19:48:07.0 Customer 13 at (6800, 4901) signs off
[ 1] 19:48:07.4 Driver drives to Customer 14 at (7188, 4500)
[ 1] 19:51:16.8 Driver arrived at Customer 14 at (7188, 4500)
[ 1] 19:52:02.5 Customer 14 at (7188, 4500) answers door
[ 1] 19:52:02.5 Customer 14 at (7188, 4500) accepts Parcel 28 for cust 14
[ 1] 19:52:10.6 Customer 14 at (7188, 4500) accepts Parcel 29 for cust 14
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[ 1] 19:52:39.9 Customer 14 at (7188, 4500) accepts Parcel 30 for cust 14
[ 1] 19:53:07.8 Customer 14 at (7188, 4500) signs off
[ 1] 19:53:31.9 Driver drives to Customer 17 at (7575, 4500)
[ 1] 19:55:04.7 Driver arrived at Customer 17 at (7575, 4500)
[ 1] 19:55:06.4 Customer 17 at (7575, 4500) answers door
[ 1] 19:55:06.4 Customer 17 at (7575, 4500) accepts Parcel 12 for cust 17
[ 1] 19:55:20.3 Customer 17 at (7575, 4500) accepts Parcel 13 for cust 17
[ 1] 19:55:32.4 Customer 17 at (7575, 4500) signs off
[ 1] 19:55:43.0 Driver drives to Customer 18 at (7816, 4500)
[ 1] 19:56:40.9 Driver arrived at Customer 18 at (7816, 4500)
[ 1] 19:57:30.7 Customer 18 at (7816, 4500) answers door
[ 1] 19:57:30.7 Customer 18 at (7816, 4500) accepts Parcel 34 for cust 18
[ 1] 19:57:54.0 Customer 18 at (7816, 4500) signs off
[ 1] 19:58:04.2 Driver drives to Customer 19 at (7950, 4122)
[ 1] 20:00:07.1 Driver arrived at Customer 19 at (7950, 4122)
[ 1] 20:00:25.7 Customer 19 at (7950, 4122) answers door
[ 1] 20:00:25.7 Customer 19 at (7950, 4122) accepts Parcel 15 for cust 19
[ 1] 20:00:33.5 Customer 19 at (7950, 4122) accepts Parcel 35 for cust 19
[ 1] 20:00:35.8 Customer 19 at (7950, 4122) accepts Parcel 36 for cust 19
[ 1] 20:00:44.6 Customer 19 at (7950, 4122) accepts Parcel 37 for cust 19
[ 1] 20:00:44.7 Customer 19 at (7950, 4122) signs off
[ 1] 20:00:46.4 Driver drives to Customer 15 at (7302, 3350)
[ 1] 20:06:27.2 Driver arrived at Customer 15 at (7302, 3350)
[ 1] 20:06:43.4 Customer 15 at (7302, 3350) answers door
[ 1] 20:06:43.4 Customer 15 at (7302, 3350) accepts Parcel 8 for cust 15
[ 1] 20:06:59.0 Customer 15 at (7302, 3350) accepts Parcel 31 for cust 15
[ 1] 20:07:11.6 Customer 15 at (7302, 3350) accepts Parcel 32 for cust 15
[ 1] 20:07:15.8 Customer 15 at (7302, 3350) signs off
[ 1] 20:07:25.5 Driver drives to Customer 9 at (5650, 3175)
[ 1] 20:14:43.9 Driver arrived at Customer 9 at (5650, 3175)
[ 1] 20:14:45.6 Customer 9 at (5650, 3175) answers door
[ 1] 20:14:45.6 Customer 9 at (5650, 3175) accepts Parcel 25 for cust 9
[ 1] 20:14:47.4 Customer 9 at (5650, 3175) signs off
[ 1] 20:15:27.5 Driver drives to Customer 8 at (5650, 2783)
[ 1] 20:17:01.6 Driver arrived at Customer 8 at (5650, 2783)
[ 1] 20:17:15.3 Customer 8 at (5650, 2783) answers door
[ 1] 20:17:15.3 Customer 8 at (5650, 2783) accepts Parcel 5 for cust 8
[ 1] 20:17:20.3 Customer 8 at (5650, 2783) accepts Parcel 23 for cust 8
[ 1] 20:17:28.3 Customer 8 at (5650, 2783) accepts Parcel 24 for cust 8
[ 1] 20:17:31.7 Customer 8 at (5650, 2783) signs off
[ 1] 20:17:38.2 Driver drives to Customer 6 at (4142, 1050)
[ 1] 20:31:02.5 Driver arrived at Customer 6 at (4142, 1050)
[ 1] 20:31:13.4 Customer 6 at (4142, 1050) answers door
[ 1] 20:31:13.4 Customer 6 at (4142, 1050) accepts Parcel 1 for cust 6
[ 1] 20:31:13.9 Customer 6 at (4142, 1050) accepts Parcel 2 for cust 6
[ 1] 20:31:15.9 Customer 6 at (4142, 1050) accepts Parcel 21 for cust 6
[ 1] 20:31:23.3 Customer 6 at (4142, 1050) signs off
[ 1] 20:31:24.1 Driver returns to delivery centre
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[ 1] 20:54:52.4 Driver arrived at delivery centre
[ 1] 20:54:52.4 Parcel 18 for cust 3 return from delivery
[ 1] 20:55:22.4 Parcel 22 for cust 7 return from delivery
[ 1] 20:55:52.4 Parcel 26 for cust 11 return from delivery
[ 1] 20:56:22.4 4 parcels left for next day
[ 1] 21:06:22.4 Driver goes home
[ 2] 17:00:00.0 Parcel 38 for cust 0 arr at delivery centre
[ 2] 17:00:00.0 Parcel 39 for cust 1 arr at delivery centre
[ 2] 17:00:00.0 Parcel 40 for cust 1 arr at delivery centre
[ 2] 17:00:00.0 Parcel 41 for cust 3 arr at delivery centre
[ 2] 17:00:00.0 Parcel 42 for cust 4 arr at delivery centre
[ 2] 17:00:00.0 Parcel 43 for cust 5 arr at delivery centre
[ 2] 17:00:00.0 Parcel 44 for cust 7 arr at delivery centre
[ 2] 17:00:00.0 Parcel 45 for cust 8 arr at delivery centre
[ 2] 17:00:00.0 Parcel 46 for cust 10 arr at delivery centre
[ 2] 17:00:00.0 Parcel 47 for cust 10 arr at delivery centre
[ 2] 17:00:00.0 Parcel 48 for cust 11 arr at delivery centre
[ 2] 17:00:00.0 Parcel 49 for cust 13 arr at delivery centre
[ 2] 17:00:00.0 Parcel 50 for cust 14 arr at delivery centre
[ 2] 17:00:00.0 Parcel 51 for cust 14 arr at delivery centre
[ 2] 17:00:00.0 Parcel 52 for cust 15 arr at delivery centre
[ 2] 17:00:00.0 Parcel 53 for cust 19 arr at delivery centre
[ 2] 18:00:00.0 Driver arrives for work
[ 2] 18:00:00.0 Parcel 22 for cust 7 out for delivery
[ 2] 18:00:00.0 Parcel 44 for cust 7 out for delivery
[ 2] 18:00:00.0 Parcel 46 for cust 10 out for delivery
[ 2] 18:00:00.0 Parcel 47 for cust 10 out for delivery
[ 2] 18:00:00.0 Parcel 26 for cust 11 out for delivery
[ 2] 18:00:00.0 Parcel 48 for cust 11 out for delivery
[ 2] 18:00:00.0 Parcel 45 for cust 8 out for delivery
[ 2] 18:00:00.0 Parcel 52 for cust 15 out for delivery
[ 2] 18:00:00.0 Parcel 53 for cust 19 out for delivery
[ 2] 18:00:00.0 Parcel 50 for cust 14 out for delivery
[ 2] 18:00:00.0 Parcel 51 for cust 14 out for delivery
[ 2] 18:00:00.0 Parcel 49 for cust 13 out for delivery
[ 2] 18:00:00.0 Parcel 33 for cust 16 out for delivery
[ 2] 18:00:00.0 Parcel 43 for cust 5 out for delivery
[ 2] 18:00:00.0 Parcel 39 for cust 1 out for delivery
[ 2] 18:00:00.0 Parcel 40 for cust 1 out for delivery
[ 2] 18:00:00.0 Parcel 38 for cust 0 out for delivery
[ 2] 18:00:00.0 Parcel 42 for cust 4 out for delivery
[ 2] 18:00:00.0 Parcel 18 for cust 3 out for delivery
[ 2] 18:00:00.0 Parcel 41 for cust 3 out for delivery
[ 2] 18:16:40.0 Driver leaves for delivery of 20 parcels to 14 customers
[ 2] 18:16:40.0 Length of delivery tour: 35,256m
[ 2] 18:16:40.0 Driver drives to Customer 7 at (5182, 5650)
[ 2] 18:25:53.9 Driver arrived at Customer 7 at (5182, 5650)
[ 2] 18:25:56.6 Customer 7 at (5182, 5650) answers door
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[ 2] 18:25:56.6 Customer 7 at (5182, 5650) accepts Parcel 22 for cust 7
[ 2] 18:25:57.5 Customer 7 at (5182, 5650) accepts Parcel 44 for cust 7
[ 2] 18:26:11.4 Customer 7 at (5182, 5650) signs off
[ 2] 18:26:12.0 Driver drives to Customer 10 at (5650, 6203)
[ 2] 18:30:17.1 Driver arrived at Customer 10 at (5650, 6203)
[ 2] 18:30:17.4 Customer 10 at (5650, 6203) answers door
[ 2] 18:30:17.4 Customer 10 at (5650, 6203) accepts Parcel 46 for cust 10
[ 2] 18:30:22.4 Customer 10 at (5650, 6203) accepts Parcel 47 for cust 10
[ 2] 18:30:29.7 Customer 10 at (5650, 6203) signs off
[ 2] 18:30:35.6 Driver drives to Customer 11 at (5650, 7250)
[ 2] 18:34:46.9 Driver arrived at Customer 11 at (5650, 7250)
[ 2] 18:35:13.8 Customer 11 at (5650, 7250) answers door
[ 2] 18:35:13.8 Customer 11 at (5650, 7250) accepts Parcel 26 for cust 11
[ 2] 18:35:22.5 Customer 11 at (5650, 7250) accepts Parcel 48 for cust 11
[ 2] 18:35:33.9 Customer 11 at (5650, 7250) signs off
[ 2] 18:35:39.4 Driver drives to Customer 8 at (5650, 2783)
[ 2] 18:53:31.5 Driver arrived at Customer 8 at (5650, 2783)
[ 2] 18:53:49.9 Customer 8 at (5650, 2783) answers door
[ 2] 18:53:49.9 Customer 8 at (5650, 2783) accepts Parcel 45 for cust 8
[ 2] 18:54:34.5 Customer 8 at (5650, 2783) signs off
[ 2] 18:54:37.5 Driver drives to Customer 15 at (7302, 3350)
[ 2] 19:03:30.1 Driver arrived at Customer 15 at (7302, 3350)
[ 2] 19:04:30.1 Customer 15 at (7302, 3350) to slow to answer the door
[ 2] 19:04:30.1 Driver drives to Customer 19 at (7950, 4122)
[ 2] 19:10:10.9 Driver arrived at Customer 19 at (7950, 4122)
[ 2] 19:10:33.4 Customer 19 at (7950, 4122) answers door
[ 2] 19:10:33.4 Customer 19 at (7950, 4122) accepts Parcel 53 for cust 19
[ 2] 19:10:37.9 Customer 19 at (7950, 4122) signs off
[ 2] 19:10:38.5 Driver drives to Customer 14 at (7188, 4500)
[ 2] 19:15:12.1 Driver arrived at Customer 14 at (7188, 4500)
[ 2] 19:16:12.1 Customer 14 at (7188, 4500) to slow to answer the door
[ 2] 19:16:12.1 Driver drives to Customer 13 at (6800, 4901)
[ 2] 19:19:21.5 Driver arrived at Customer 13 at (6800, 4901)
[ 2] 19:20:09.9 Customer 13 at (6800, 4901) answers door
[ 2] 19:20:09.9 Customer 13 at (6800, 4901) accepts Parcel 49 for cust 13
[ 2] 19:20:33.3 Customer 13 at (6800, 4901) signs off
[ 2] 19:20:39.3 Driver drives to Customer 16 at (7477, 5650)
[ 2] 19:26:21.5 Driver arrived at Customer 16 at (7477, 5650)
[ 2] 19:27:06.7 Customer 16 at (7477, 5650) answers door
[ 2] 19:27:06.7 Customer 16 at (7477, 5650) accepts Parcel 33 for cust 16
[ 2] 19:27:08.0 Customer 16 at (7477, 5650) signs off
[ 2] 19:27:13.0 Driver drives to Customer 5 at (3350, 7580)
[ 2] 19:51:26.7 Driver arrived at Customer 5 at (3350, 7580)
[ 2] 19:52:26.7 Customer 5 at (3350, 7580) not at home
[ 2] 19:52:26.7 Driver drives to Customer 1 at (1050, 5180)
[ 2] 20:08:33.0 Driver arrived at Customer 1 at (1050, 5180)
[ 2] 20:08:42.3 Customer 1 at (1050, 5180) answers door
[ 2] 20:08:42.3 Customer 1 at (1050, 5180) accepts Parcel 39 for cust 1
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[ 2] 20:08:42.7 Customer 1 at (1050, 5180) accepts Parcel 40 for cust 1
[ 2] 20:09:12.2 Customer 1 at (1050, 5180) signs off
[ 2] 20:09:14.7 Driver drives to Customer 0 at (1050, 4722)
[ 2] 20:11:04.6 Driver arrived at Customer 0 at (1050, 4722)
[ 2] 20:11:10.9 Customer 0 at (1050, 4722) answers door
[ 2] 20:11:10.9 Customer 0 at (1050, 4722) accepts Parcel 38 for cust 0
[ 2] 20:11:13.1 Customer 0 at (1050, 4722) signs off
[ 2] 20:11:17.9 Driver drives to Customer 4 at (2821, 1578)
[ 2] 20:29:29.9 Driver arrived at Customer 4 at (2821, 1578)
[ 2] 20:30:01.5 Customer 4 at (2821, 1578) answers door
[ 2] 20:30:01.5 Customer 4 at (2821, 1578) accepts Parcel 42 for cust 4
[ 2] 20:30:03.1 Customer 4 at (2821, 1578) signs off
[ 2] 20:30:48.0 Driver drives to Customer 3 at (2200, 3898)
[ 2] 20:41:06.2 Driver arrived at Customer 3 at (2200, 3898)
[ 2] 20:42:06.2 Customer 3 at (2200, 3898) to slow to answer the door
[ 2] 20:42:06.2 Driver returns to delivery centre
[ 2] 20:49:06.7 Driver arrived at delivery centre
[ 2] 20:49:06.7 Parcel 52 for cust 15 return from delivery
[ 2] 20:49:36.7 Parcel 50 for cust 14 return from delivery
[ 2] 20:50:06.7 Parcel 51 for cust 14 return from delivery
[ 2] 20:50:36.7 Parcel 43 for cust 5 return from delivery
[ 2] 20:51:06.7 Parcel 18 for cust 3 return from delivery
[ 2] 20:51:36.7 Parcel 41 for cust 3 return from delivery
[ 2] 20:52:06.7 6 parcels left for next day
[ 2] 21:02:06.7 Driver goes home
[ 3] 17:00:00.0 Parcel 54 for cust 0 arr at delivery centre
[ 3] 17:00:00.0 Parcel 55 for cust 0 arr at delivery centre
[ 3] 17:00:00.0 Parcel 56 for cust 2 arr at delivery centre
[ 3] 17:00:00.0 Parcel 57 for cust 3 arr at delivery centre
[ 3] 17:00:00.0 Parcel 58 for cust 4 arr at delivery centre
[ 3] 17:00:00.0 Parcel 59 for cust 5 arr at delivery centre
[ 3] 17:00:00.0 Parcel 60 for cust 5 arr at delivery centre
[ 3] 17:00:00.0 Parcel 61 for cust 6 arr at delivery centre
[ 3] 17:00:00.0 Parcel 62 for cust 7 arr at delivery centre
[ 3] 17:00:00.0 Parcel 63 for cust 8 arr at delivery centre
[ 3] 17:00:00.0 Parcel 64 for cust 8 arr at delivery centre
[ 3] 17:00:00.0 Parcel 65 for cust 9 arr at delivery centre
[ 3] 17:00:00.0 Parcel 66 for cust 10 arr at delivery centre
[ 3] 17:00:00.0 Parcel 67 for cust 13 arr at delivery centre
[ 3] 17:00:00.0 Parcel 68 for cust 14 arr at delivery centre
[ 3] 17:00:00.0 Parcel 69 for cust 17 arr at delivery centre
[ 3] 17:00:00.0 Parcel 70 for cust 18 arr at delivery centre
[ 3] 17:00:00.0 Parcel 71 for cust 18 arr at delivery centre
[ 3] 17:00:00.0 Parcel 72 for cust 19 arr at delivery centre
[ 3] 17:00:00.0 Parcel 73 for cust 19 arr at delivery centre
[ 3] 17:00:00.0 Parcel 74 for cust 19 arr at delivery centre
[ 3] 18:00:00.0 Driver arrives for work
[ 3] 18:00:00.0 Parcel 18 for cust 3 out for delivery
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[ 3] 18:00:00.0 Parcel 41 for cust 3 out for delivery
[ 3] 18:00:00.0 Parcel 57 for cust 3 out for delivery
[ 3] 18:00:00.0 Parcel 56 for cust 2 out for delivery
[ 3] 18:00:00.0 Parcel 54 for cust 0 out for delivery
[ 3] 18:00:00.0 Parcel 55 for cust 0 out for delivery
[ 3] 18:00:00.0 Parcel 43 for cust 5 out for delivery
[ 3] 18:00:00.0 Parcel 59 for cust 5 out for delivery
[ 3] 18:00:00.0 Parcel 60 for cust 5 out for delivery
[ 3] 18:00:00.0 Parcel 62 for cust 7 out for delivery
[ 3] 18:00:00.0 Parcel 66 for cust 10 out for delivery
[ 3] 18:00:00.0 Parcel 67 for cust 13 out for delivery
[ 3] 18:00:00.0 Parcel 61 for cust 6 out for delivery
[ 3] 18:00:00.0 Parcel 58 for cust 4 out for delivery
[ 3] 18:00:00.0 Parcel 63 for cust 8 out for delivery
[ 3] 18:00:00.0 Parcel 64 for cust 8 out for delivery
[ 3] 18:00:00.0 Parcel 65 for cust 9 out for delivery
[ 3] 18:00:00.0 Parcel 52 for cust 15 out for delivery
[ 3] 18:00:00.0 Parcel 72 for cust 19 out for delivery
[ 3] 18:00:00.0 Parcel 73 for cust 19 out for delivery
[ 3] 18:00:00.0 Parcel 74 for cust 19 out for delivery
[ 3] 18:00:00.0 Parcel 70 for cust 18 out for delivery
[ 3] 18:00:00.0 Parcel 71 for cust 18 out for delivery
[ 3] 18:00:00.0 Parcel 69 for cust 17 out for delivery
[ 3] 18:00:00.0 Parcel 50 for cust 14 out for delivery
[ 3] 18:00:00.0 Parcel 51 for cust 14 out for delivery
[ 3] 18:00:00.0 Parcel 68 for cust 14 out for delivery
[ 3] 18:22:30.0 Driver leaves for delivery of 27 parcels to 16 customers
[ 3] 18:22:30.0 Length of delivery tour: 38,748m
[ 3] 18:22:30.0 Driver drives to Customer 3 at (2200, 3898)
[ 3] 18:29:30.5 Driver arrived at Customer 3 at (2200, 3898)
[ 3] 18:30:30.5 Customer 3 at (2200, 3898) to slow to answer the door
[ 3] 18:30:30.5 Driver drives to Customer 2 at (1618, 4500)
[ 3] 18:35:14.6 Driver arrived at Customer 2 at (1618, 4500)
[ 3] 18:36:14.6 Customer 2 at (1618, 4500) to slow to answer the door
[ 3] 18:36:14.6 Driver drives to Customer 0 at (1050, 4722)
[ 3] 18:39:24.2 Driver arrived at Customer 0 at (1050, 4722)
[ 3] 18:39:59.2 Customer 0 at (1050, 4722) answers door
[ 3] 18:39:59.2 Customer 0 at (1050, 4722) accepts Parcel 54 for cust 0
[ 3] 18:40:11.9 Customer 0 at (1050, 4722) accepts Parcel 55 for cust 0
[ 3] 18:40:28.3 Customer 0 at (1050, 4722) signs off
[ 3] 18:40:29.0 Driver drives to Customer 5 at (3350, 7580)
[ 3] 19:04:44.4 Driver arrived at Customer 5 at (3350, 7580)
[ 3] 19:04:47.9 Customer 5 at (3350, 7580) answers door
[ 3] 19:04:47.9 Customer 5 at (3350, 7580) accepts Parcel 43 for cust 5
[ 3] 19:05:08.2 Customer 5 at (3350, 7580) accepts Parcel 59 for cust 5
[ 3] 19:05:08.6 Customer 5 at (3350, 7580) accepts Parcel 60 for cust 5
[ 3] 19:05:11.2 Customer 5 at (3350, 7580) signs off
[ 3] 19:05:11.6 Driver drives to Customer 7 at (5182, 5650)
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[ 3] 19:20:14.5 Driver arrived at Customer 7 at (5182, 5650)
[ 3] 19:20:15.1 Customer 7 at (5182, 5650) answers door
[ 3] 19:20:15.1 Customer 7 at (5182, 5650) accepts Parcel 62 for cust 7
[ 3] 19:20:33.7 Customer 7 at (5182, 5650) signs off
[ 3] 19:20:37.7 Driver drives to Customer 10 at (5650, 6203)
[ 3] 19:24:42.7 Driver arrived at Customer 10 at (5650, 6203)
[ 3] 19:24:49.7 Customer 10 at (5650, 6203) answers door
[ 3] 19:24:49.7 Customer 10 at (5650, 6203) accepts Parcel 66 for cust 10
[ 3] 19:24:51.4 Customer 10 at (5650, 6203) signs off
[ 3] 19:25:02.0 Driver drives to Customer 13 at (6800, 4901)
[ 3] 19:34:50.5 Driver arrived at Customer 13 at (6800, 4901)
[ 3] 19:35:50.5 Customer 13 at (6800, 4901) to slow to answer the door
[ 3] 19:35:50.5 Driver drives to Customer 6 at (4142, 1050)
[ 3] 19:59:10.9 Driver arrived at Customer 6 at (4142, 1050)
[ 3] 19:59:39.0 Customer 6 at (4142, 1050) answers door
[ 3] 19:59:39.0 Customer 6 at (4142, 1050) accepts Parcel 61 for cust 6
[ 3] 20:00:02.2 Customer 6 at (4142, 1050) signs off
[ 3] 20:00:09.1 Driver drives to Customer 4 at (2821, 1578)
[ 3] 20:06:18.5 Driver arrived at Customer 4 at (2821, 1578)
[ 3] 20:06:52.6 Customer 4 at (2821, 1578) answers door
[ 3] 20:06:52.6 Customer 4 at (2821, 1578) accepts Parcel 58 for cust 4
[ 3] 20:07:04.0 Customer 4 at (2821, 1578) signs off
[ 3] 20:07:20.3 Driver drives to Customer 8 at (5650, 2783)
[ 3] 20:23:45.8 Driver arrived at Customer 8 at (5650, 2783)
[ 3] 20:24:42.5 Customer 8 at (5650, 2783) answers door
[ 3] 20:24:42.5 Customer 8 at (5650, 2783) accepts Parcel 63 for cust 8
[ 3] 20:25:29.1 Customer 8 at (5650, 2783) accepts Parcel 64 for cust 8
[ 3] 20:25:42.8 Customer 8 at (5650, 2783) signs off
[ 3] 20:26:06.5 Driver drives to Customer 9 at (5650, 3175)
[ 3] 20:27:40.5 Driver arrived at Customer 9 at (5650, 3175)
[ 3] 20:27:49.8 Customer 9 at (5650, 3175) answers door
[ 3] 20:27:49.8 Customer 9 at (5650, 3175) accepts Parcel 65 for cust 9
[ 3] 20:27:57.4 Customer 9 at (5650, 3175) signs off
[ 3] 20:28:06.6 Driver drives to Customer 15 at (7302, 3350)
[ 3] 20:35:25.0 Driver arrived at Customer 15 at (7302, 3350)
[ 3] 20:36:25.0 Customer 15 at (7302, 3350) to slow to answer the door
[ 3] 20:36:25.0 Driver drives to Customer 19 at (7950, 4122)
[ 3] 20:42:05.8 Driver arrived at Customer 19 at (7950, 4122)
[ 3] 20:42:32.2 Customer 19 at (7950, 4122) answers door
[ 3] 20:42:32.2 Customer 19 at (7950, 4122) accepts Parcel 72 for cust 19
[ 3] 20:42:47.8 Customer 19 at (7950, 4122) accepts Parcel 73 for cust 19
[ 3] 20:42:52.8 Customer 19 at (7950, 4122) accepts Parcel 74 for cust 19
[ 3] 20:43:01.6 Customer 19 at (7950, 4122) signs off
[ 3] 20:43:20.6 Driver drives to Customer 18 at (7816, 4500)
[ 3] 20:45:23.5 Driver arrived at Customer 18 at (7816, 4500)
[ 3] 20:46:23.5 Customer 18 at (7816, 4500) to slow to answer the door
[ 3] 20:46:23.5 Driver drives to Customer 17 at (7575, 4500)
[ 3] 20:47:21.4 Driver arrived at Customer 17 at (7575, 4500)
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[ 3] 20:48:04.2 Customer 17 at (7575, 4500) answers door
[ 3] 20:48:04.2 Customer 17 at (7575, 4500) accepts Parcel 69 for cust 17
[ 3] 20:48:04.2 Customer 17 at (7575, 4500) signs off
[ 3] 20:48:06.2 Driver drives to Customer 14 at (7188, 4500)
[ 3] 20:49:39.0 Driver arrived at Customer 14 at (7188, 4500)
[ 3] 20:50:07.3 Customer 14 at (7188, 4500) answers door
[ 3] 20:50:07.3 Customer 14 at (7188, 4500) accepts Parcel 50 for cust 14
[ 3] 20:50:10.3 Customer 14 at (7188, 4500) accepts Parcel 51 for cust 14
[ 3] 20:50:10.9 Customer 14 at (7188, 4500) accepts Parcel 68 for cust 14
[ 3] 20:50:30.6 Customer 14 at (7188, 4500) signs off
[ 3] 20:50:59.2 Driver returns to delivery centre
[ 3] 21:12:50.6 Driver arrived at delivery centre
[ 3] 21:12:50.6 Parcel 18 for cust 3 return from delivery
[ 3] 21:13:20.6 Parcel 41 for cust 3 return from delivery
[ 3] 21:13:50.6 Parcel 57 for cust 3 return from delivery
[ 3] 21:14:20.6 Parcel 56 for cust 2 return from delivery
[ 3] 21:14:50.6 Parcel 67 for cust 13 return from delivery
[ 3] 21:15:20.6 Parcel 52 for cust 15 return from delivery
[ 3] 21:15:50.6 Parcel 70 for cust 18 return from delivery
[ 3] 21:16:20.6 Parcel 71 for cust 18 return from delivery
[ 3] 21:16:50.6 8 parcels left for next day
[ 3] 21:26:50.6 Driver goes home
[ 4] 17:00:00.0 Parcel 75 for cust 0 arr at delivery centre
[ 4] 17:00:00.0 Parcel 76 for cust 0 arr at delivery centre
[ 4] 17:00:00.0 Parcel 77 for cust 1 arr at delivery centre
[ 4] 17:00:00.0 Parcel 78 for cust 1 arr at delivery centre
[ 4] 17:00:00.0 Parcel 79 for cust 2 arr at delivery centre
[ 4] 17:00:00.0 Parcel 80 for cust 3 arr at delivery centre
[ 4] 17:00:00.0 Parcel 81 for cust 3 arr at delivery centre
[ 4] 17:00:00.0 Parcel 82 for cust 5 arr at delivery centre
[ 4] 17:00:00.0 Parcel 83 for cust 7 arr at delivery centre
[ 4] 17:00:00.0 Parcel 84 for cust 8 arr at delivery centre
[ 4] 17:00:00.0 Parcel 85 for cust 8 arr at delivery centre
[ 4] 17:00:00.0 Parcel 86 for cust 8 arr at delivery centre
[ 4] 17:00:00.0 Parcel 87 for cust 10 arr at delivery centre
[ 4] 17:00:00.0 Parcel 88 for cust 10 arr at delivery centre
[ 4] 17:00:00.0 Parcel 89 for cust 12 arr at delivery centre
[ 4] 17:00:00.0 Parcel 90 for cust 13 arr at delivery centre
[ 4] 17:00:00.0 Parcel 91 for cust 16 arr at delivery centre
[ 4] 17:00:00.0 Parcel 92 for cust 16 arr at delivery centre
[ 4] 17:00:00.0 Parcel 93 for cust 16 arr at delivery centre
[ 4] 17:00:00.0 Parcel 94 for cust 16 arr at delivery centre
[ 4] 17:00:00.0 Parcel 95 for cust 16 arr at delivery centre
[ 4] 17:00:00.0 Parcel 96 for cust 17 arr at delivery centre
[ 4] 17:00:00.0 Parcel 97 for cust 17 arr at delivery centre
[ 4] 17:00:00.0 Parcel 98 for cust 18 arr at delivery centre
[ 4] 17:00:00.0 Parcel 99 for cust 19 arr at delivery centre
[ 4] 18:00:00.0 Driver arrives for work
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[ 4] 18:00:00.0 Parcel 82 for cust 5 out for delivery
[ 4] 18:00:00.0 Parcel 91 for cust 16 out for delivery
[ 4] 18:00:00.0 Parcel 92 for cust 16 out for delivery
[ 4] 18:00:00.0 Parcel 93 for cust 16 out for delivery
[ 4] 18:00:00.0 Parcel 94 for cust 16 out for delivery
[ 4] 18:00:00.0 Parcel 95 for cust 16 out for delivery
[ 4] 18:00:00.0 Parcel 67 for cust 13 out for delivery
[ 4] 18:00:00.0 Parcel 90 for cust 13 out for delivery
[ 4] 18:00:00.0 Parcel 84 for cust 8 out for delivery
[ 4] 18:00:00.0 Parcel 85 for cust 8 out for delivery
[ 4] 18:00:00.0 Parcel 86 for cust 8 out for delivery
[ 4] 18:00:00.0 Parcel 52 for cust 15 out for delivery
[ 4] 18:00:00.0 Parcel 99 for cust 19 out for delivery
[ 4] 18:00:00.0 Parcel 70 for cust 18 out for delivery
[ 4] 18:00:00.0 Parcel 71 for cust 18 out for delivery
[ 4] 18:00:00.0 Parcel 98 for cust 18 out for delivery
[ 4] 18:00:00.0 Parcel 96 for cust 17 out for delivery
[ 4] 18:00:00.0 Parcel 97 for cust 17 out for delivery
[ 4] 18:00:00.0 Parcel 89 for cust 12 out for delivery
[ 4] 18:00:00.0 Parcel 87 for cust 10 out for delivery
[ 4] 18:00:00.0 Parcel 88 for cust 10 out for delivery
[ 4] 18:00:00.0 Parcel 83 for cust 7 out for delivery
[ 4] 18:00:00.0 Parcel 18 for cust 3 out for delivery
[ 4] 18:00:00.0 Parcel 41 for cust 3 out for delivery
[ 4] 18:00:00.0 Parcel 57 for cust 3 out for delivery
[ 4] 18:00:00.0 Parcel 80 for cust 3 out for delivery
[ 4] 18:00:00.0 Parcel 81 for cust 3 out for delivery
[ 4] 18:00:00.0 Parcel 56 for cust 2 out for delivery
[ 4] 18:00:00.0 Parcel 79 for cust 2 out for delivery
[ 4] 18:00:00.0 Parcel 75 for cust 0 out for delivery
[ 4] 18:00:00.0 Parcel 76 for cust 0 out for delivery
[ 4] 18:00:00.0 Parcel 77 for cust 1 out for delivery
[ 4] 18:00:00.0 Parcel 78 for cust 1 out for delivery
[ 4] 18:27:30.0 Driver leaves for delivery of 33 parcels to 15 customers
[ 4] 18:27:30.0 Length of delivery tour: 33,970m
[ 4] 18:27:30.0 Driver drives to Customer 5 at (3350, 7580)
[ 4] 18:46:19.4 Driver arrived at Customer 5 at (3350, 7580)
[ 4] 18:46:21.4 Customer 5 at (3350, 7580) answers door
[ 4] 18:46:21.4 Customer 5 at (3350, 7580) accepts Parcel 82 for cust 5
[ 4] 18:46:27.7 Customer 5 at (3350, 7580) signs off
[ 4] 18:46:29.4 Driver drives to Customer 16 at (7477, 5650)
[ 4] 19:10:43.1 Driver arrived at Customer 16 at (7477, 5650)
[ 4] 19:10:44.4 Customer 16 at (7477, 5650) answers door
[ 4] 19:10:44.4 Customer 16 at (7477, 5650) accepts Parcel 91 for cust 16
[ 4] 19:10:54.0 Customer 16 at (7477, 5650) accepts Parcel 92 for cust 16
[ 4] 19:11:03.9 Customer 16 at (7477, 5650) accepts Parcel 93 for cust 16
[ 4] 19:11:05.0 Customer 16 at (7477, 5650) accepts Parcel 94 for cust 16
[ 4] 19:11:13.0 Customer 16 at (7477, 5650) accepts Parcel 95 for cust 16
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[ 4] 19:11:17.3 Customer 16 at (7477, 5650) signs off
[ 4] 19:11:22.1 Driver drives to Customer 13 at (6800, 4901)
[ 4] 19:17:04.3 Driver arrived at Customer 13 at (6800, 4901)
[ 4] 19:18:04.3 Customer 13 at (6800, 4901) not at home
[ 4] 19:18:04.3 Driver drives to Customer 8 at (5650, 2783)
[ 4] 19:31:08.7 Driver arrived at Customer 8 at (5650, 2783)
[ 4] 19:32:08.6 Customer 8 at (5650, 2783) answers door
[ 4] 19:32:08.6 Customer 8 at (5650, 2783) accepts Parcel 84 for cust 8
[ 4] 19:32:15.3 Customer 8 at (5650, 2783) accepts Parcel 85 for cust 8
[ 4] 19:32:36.6 Customer 8 at (5650, 2783) accepts Parcel 86 for cust 8
[ 4] 19:32:46.0 Customer 8 at (5650, 2783) signs off
[ 4] 19:32:52.3 Driver drives to Customer 15 at (7302, 3350)
[ 4] 19:41:44.9 Driver arrived at Customer 15 at (7302, 3350)
[ 4] 19:42:24.9 Customer 15 at (7302, 3350) answers door
[ 4] 19:42:24.9 Customer 15 at (7302, 3350) accepts Parcel 52 for cust 15
[ 4] 19:42:29.0 Customer 15 at (7302, 3350) signs off
[ 4] 19:42:30.4 Driver drives to Customer 19 at (7950, 4122)
[ 4] 19:48:11.2 Driver arrived at Customer 19 at (7950, 4122)
[ 4] 19:48:57.1 Customer 19 at (7950, 4122) answers door
[ 4] 19:48:57.1 Customer 19 at (7950, 4122) accepts Parcel 99 for cust 19
[ 4] 19:49:06.8 Customer 19 at (7950, 4122) signs off
[ 4] 19:49:22.3 Driver drives to Customer 18 at (7816, 4500)
[ 4] 19:51:25.2 Driver arrived at Customer 18 at (7816, 4500)
[ 4] 19:51:30.7 Customer 18 at (7816, 4500) answers door
[ 4] 19:51:30.7 Customer 18 at (7816, 4500) accepts Parcel 70 for cust 18
[ 4] 19:51:54.9 Customer 18 at (7816, 4500) accepts Parcel 71 for cust 18
[ 4] 19:52:11.0 Customer 18 at (7816, 4500) accepts Parcel 98 for cust 18
[ 4] 19:52:35.9 Customer 18 at (7816, 4500) signs off
[ 4] 19:52:56.5 Driver drives to Customer 17 at (7575, 4500)
[ 4] 19:53:54.3 Driver arrived at Customer 17 at (7575, 4500)
[ 4] 19:54:40.0 Customer 17 at (7575, 4500) answers door
[ 4] 19:54:40.0 Customer 17 at (7575, 4500) accepts Parcel 96 for cust 17
[ 4] 19:54:56.6 Customer 17 at (7575, 4500) accepts Parcel 97 for cust 17
[ 4] 19:55:03.9 Customer 17 at (7575, 4500) signs off
[ 4] 19:55:19.3 Driver drives to Customer 12 at (6061, 4500)
[ 4] 20:01:22.7 Driver arrived at Customer 12 at (6061, 4500)
[ 4] 20:01:31.1 Customer 12 at (6061, 4500) answers door
[ 4] 20:01:31.1 Customer 12 at (6061, 4500) accepts Parcel 89 for cust 12
[ 4] 20:01:46.3 Customer 12 at (6061, 4500) signs off
[ 4] 20:01:52.2 Driver drives to Customer 10 at (5650, 6203)
[ 4] 20:10:19.6 Driver arrived at Customer 10 at (5650, 6203)
[ 4] 20:11:16.1 Customer 10 at (5650, 6203) answers door
[ 4] 20:11:16.1 Customer 10 at (5650, 6203) accepts Parcel 87 for cust 10
[ 4] 20:11:22.2 Customer 10 at (5650, 6203) accepts Parcel 88 for cust 10
[ 4] 20:11:37.8 Customer 10 at (5650, 6203) signs off
[ 4] 20:11:38.5 Driver drives to Customer 7 at (5182, 5650)
[ 4] 20:15:43.6 Driver arrived at Customer 7 at (5182, 5650)
[ 4] 20:15:45.4 Customer 7 at (5182, 5650) answers door
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[ 4] 20:15:45.4 Customer 7 at (5182, 5650) accepts Parcel 83 for cust 7
[ 4] 20:16:12.6 Customer 7 at (5182, 5650) signs off
[ 4] 20:16:19.3 Driver drives to Customer 3 at (2200, 3898)
[ 4] 20:32:33.7 Driver arrived at Customer 3 at (2200, 3898)
[ 4] 20:33:33.7 Customer 3 at (2200, 3898) to slow to answer the door
[ 4] 20:33:33.7 Driver drives to Customer 2 at (1618, 4500)
[ 4] 20:38:17.8 Driver arrived at Customer 2 at (1618, 4500)
[ 4] 20:39:17.8 Customer 2 at (1618, 4500) to slow to answer the door
[ 4] 20:39:17.8 Driver drives to Customer 0 at (1050, 4722)
[ 4] 20:42:27.4 Driver arrived at Customer 0 at (1050, 4722)
[ 4] 20:43:11.4 Customer 0 at (1050, 4722) answers door
[ 4] 20:43:11.4 Customer 0 at (1050, 4722) accepts Parcel 75 for cust 0
[ 4] 20:43:19.9 Customer 0 at (1050, 4722) accepts Parcel 76 for cust 0
[ 4] 20:43:22.3 Customer 0 at (1050, 4722) signs off
[ 4] 20:43:23.3 Driver drives to Customer 1 at (1050, 5180)
[ 4] 20:45:13.2 Driver arrived at Customer 1 at (1050, 5180)
[ 4] 20:46:13.2 Customer 1 at (1050, 5180) to slow to answer the door
[ 4] 20:46:13.2 Driver returns to delivery centre
[ 4] 20:58:08.4 Driver arrived at delivery centre
[ 4] 20:58:08.4 Parcel 67 for cust 13 return from delivery
[ 4] 20:58:38.4 Parcel 90 for cust 13 return from delivery
[ 4] 20:59:08.4 Parcel 18 for cust 3 return from delivery
[ 4] 20:59:38.4 Parcel 41 for cust 3 return from delivery
[ 4] 21:00:08.4 Parcel 57 for cust 3 return from delivery
[ 4] 21:00:38.4 Parcel 80 for cust 3 return from delivery
[ 4] 21:01:08.4 Parcel 81 for cust 3 return from delivery
[ 4] 21:01:38.4 Parcel 56 for cust 2 return from delivery
[ 4] 21:02:08.4 Parcel 79 for cust 2 return from delivery
[ 4] 21:02:38.4 Parcel 77 for cust 1 return from delivery
[ 4] 21:03:08.4 Parcel 78 for cust 1 return from delivery
[ 4] 21:03:38.4 11 parcels left for next day
[ 4] 21:13:38.4 Driver goes home
[ 5] 17:00:00.0 Parcel 100 for cust 0 arr at delivery centre
[ 5] 17:00:00.0 Parcel 101 for cust 1 arr at delivery centre
[ 5] 17:00:00.0 Parcel 102 for cust 3 arr at delivery centre
[ 5] 17:00:00.0 Parcel 103 for cust 3 arr at delivery centre
[ 5] 17:00:00.0 Parcel 104 for cust 4 arr at delivery centre
[ 5] 17:00:00.0 Parcel 105 for cust 4 arr at delivery centre
[ 5] 17:00:00.0 Parcel 106 for cust 6 arr at delivery centre
[ 5] 17:00:00.0 Parcel 107 for cust 6 arr at delivery centre
[ 5] 17:00:00.0 Parcel 108 for cust 6 arr at delivery centre
[ 5] 17:00:00.0 Parcel 109 for cust 8 arr at delivery centre
[ 5] 17:00:00.0 Parcel 110 for cust 9 arr at delivery centre
[ 5] 17:00:00.0 Parcel 111 for cust 10 arr at delivery centre
[ 5] 17:00:00.0 Parcel 112 for cust 11 arr at delivery centre
[ 5] 17:00:00.0 Parcel 113 for cust 11 arr at delivery centre
[ 5] 17:00:00.0 Parcel 114 for cust 13 arr at delivery centre
[ 5] 17:00:00.0 Parcel 115 for cust 13 arr at delivery centre
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[ 5] 17:00:00.0 Parcel 116 for cust 13 arr at delivery centre
[ 5] 17:00:00.0 Parcel 117 for cust 14 arr at delivery centre
[ 5] 17:00:00.0 Parcel 118 for cust 15 arr at delivery centre
[ 5] 17:00:00.0 Parcel 119 for cust 15 arr at delivery centre
[ 5] 17:00:00.0 Parcel 120 for cust 15 arr at delivery centre
[ 5] 17:00:00.0 Parcel 121 for cust 16 arr at delivery centre
[ 5] 17:00:00.0 Parcel 122 for cust 17 arr at delivery centre
[ 5] 17:00:00.0 Parcel 123 for cust 19 arr at delivery centre
[ 5] 18:00:00.0 Driver arrives for work
[ 5] 18:00:00.0 Parcel 111 for cust 10 out for delivery
[ 5] 18:00:00.0 Parcel 121 for cust 16 out for delivery
[ 5] 18:00:00.0 Parcel 67 for cust 13 out for delivery
[ 5] 18:00:00.0 Parcel 90 for cust 13 out for delivery
[ 5] 18:00:00.0 Parcel 114 for cust 13 out for delivery
[ 5] 18:00:00.0 Parcel 115 for cust 13 out for delivery
[ 5] 18:00:00.0 Parcel 116 for cust 13 out for delivery
[ 5] 18:00:00.0 Parcel 106 for cust 6 out for delivery
[ 5] 18:00:00.0 Parcel 107 for cust 6 out for delivery
[ 5] 18:00:00.0 Parcel 108 for cust 6 out for delivery
[ 5] 18:00:00.0 Parcel 104 for cust 4 out for delivery
[ 5] 18:00:00.0 Parcel 105 for cust 4 out for delivery
[ 5] 18:00:00.0 Parcel 109 for cust 8 out for delivery
[ 5] 18:00:00.0 Parcel 110 for cust 9 out for delivery
[ 5] 18:00:00.0 Parcel 118 for cust 15 out for delivery
[ 5] 18:00:00.0 Parcel 119 for cust 15 out for delivery
[ 5] 18:00:00.0 Parcel 120 for cust 15 out for delivery
[ 5] 18:00:00.0 Parcel 123 for cust 19 out for delivery
[ 5] 18:00:00.0 Parcel 122 for cust 17 out for delivery
[ 5] 18:00:00.0 Parcel 117 for cust 14 out for delivery
[ 5] 18:00:00.0 Parcel 112 for cust 11 out for delivery
[ 5] 18:00:00.0 Parcel 113 for cust 11 out for delivery
[ 5] 18:00:00.0 Parcel 77 for cust 1 out for delivery
[ 5] 18:00:00.0 Parcel 78 for cust 1 out for delivery
[ 5] 18:00:00.0 Parcel 101 for cust 1 out for delivery
[ 5] 18:00:00.0 Parcel 100 for cust 0 out for delivery
[ 5] 18:00:00.0 Parcel 56 for cust 2 out for delivery
[ 5] 18:00:00.0 Parcel 79 for cust 2 out for delivery
[ 5] 18:00:00.0 Parcel 18 for cust 3 out for delivery
[ 5] 18:00:00.0 Parcel 41 for cust 3 out for delivery
[ 5] 18:00:00.0 Parcel 57 for cust 3 out for delivery
[ 5] 18:00:00.0 Parcel 80 for cust 3 out for delivery
[ 5] 18:00:00.0 Parcel 81 for cust 3 out for delivery
[ 5] 18:00:00.0 Parcel 102 for cust 3 out for delivery
[ 5] 18:00:00.0 Parcel 103 for cust 3 out for delivery
[ 5] 18:29:10.0 Driver leaves for delivery of 35 parcels to 16 customers
[ 5] 18:29:10.0 Length of delivery tour: 37,862m
[ 5] 18:29:10.0 Driver drives to Customer 10 at (5650, 6203)
[ 5] 18:42:29.0 Driver arrived at Customer 10 at (5650, 6203)
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[ 5] 18:43:20.2 Customer 10 at (5650, 6203) answers door
[ 5] 18:43:20.2 Customer 10 at (5650, 6203) accepts Parcel 111 for cust 10
[ 5] 18:43:21.1 Customer 10 at (5650, 6203) signs off
[ 5] 18:43:21.8 Driver drives to Customer 16 at (7477, 5650)
[ 5] 18:52:53.0 Driver arrived at Customer 16 at (7477, 5650)
[ 5] 18:53:53.0 Customer 16 at (7477, 5650) not at home
[ 5] 18:53:53.0 Driver drives to Customer 13 at (6800, 4901)
[ 5] 18:59:35.2 Driver arrived at Customer 13 at (6800, 4901)
[ 5] 18:59:53.0 Customer 13 at (6800, 4901) answers door
[ 5] 18:59:53.0 Customer 13 at (6800, 4901) accepts Parcel 67 for cust 13
[ 5] 18:59:53.3 Customer 13 at (6800, 4901) accepts Parcel 90 for cust 13
[ 5] 18:59:57.6 Customer 13 at (6800, 4901) accepts Parcel 114 for cust 13
[ 5] 18:59:57.7 Customer 13 at (6800, 4901) accepts Parcel 115 for cust 13
[ 5] 19:00:34.3 Customer 13 at (6800, 4901) accepts Parcel 116 for cust 13
[ 5] 19:00:51.4 Customer 13 at (6800, 4901) signs off
[ 5] 19:00:52.2 Driver drives to Customer 6 at (4142, 1050)
[ 5] 19:24:12.6 Driver arrived at Customer 6 at (4142, 1050)
[ 5] 19:25:12.6 Customer 6 at (4142, 1050) not at home
[ 5] 19:25:12.6 Driver drives to Customer 4 at (2821, 1578)
[ 5] 19:31:21.9 Driver arrived at Customer 4 at (2821, 1578)
[ 5] 19:32:21.9 Customer 4 at (2821, 1578) to slow to answer the door
[ 5] 19:32:21.9 Driver drives to Customer 8 at (5650, 2783)
[ 5] 19:48:47.4 Driver arrived at Customer 8 at (5650, 2783)
[ 5] 19:48:56.7 Customer 8 at (5650, 2783) answers door
[ 5] 19:48:56.7 Customer 8 at (5650, 2783) accepts Parcel 109 for cust 8
[ 5] 19:48:59.0 Customer 8 at (5650, 2783) signs off
[ 5] 19:49:10.2 Driver drives to Customer 9 at (5650, 3175)
[ 5] 19:50:44.3 Driver arrived at Customer 9 at (5650, 3175)
[ 5] 19:51:44.3 Customer 9 at (5650, 3175) to slow to answer the door
[ 5] 19:51:44.3 Driver drives to Customer 15 at (7302, 3350)
[ 5] 19:59:02.7 Driver arrived at Customer 15 at (7302, 3350)
[ 5] 19:59:08.0 Customer 15 at (7302, 3350) answers door
[ 5] 19:59:08.0 Customer 15 at (7302, 3350) accepts Parcel 118 for cust 15
[ 5] 19:59:08.1 Customer 15 at (7302, 3350) accepts Parcel 119 for cust 15
[ 5] 19:59:12.7 Customer 15 at (7302, 3350) accepts Parcel 120 for cust 15
[ 5] 19:59:12.9 Customer 15 at (7302, 3350) signs off
[ 5] 19:59:22.2 Driver drives to Customer 19 at (7950, 4122)
[ 5] 20:05:03.0 Driver arrived at Customer 19 at (7950, 4122)
[ 5] 20:06:03.0 Customer 19 at (7950, 4122) to slow to answer the door
[ 5] 20:06:03.0 Driver drives to Customer 17 at (7575, 4500)
[ 5] 20:09:03.7 Driver arrived at Customer 17 at (7575, 4500)
[ 5] 20:09:12.0 Customer 17 at (7575, 4500) answers door
[ 5] 20:09:12.0 Customer 17 at (7575, 4500) accepts Parcel 122 for cust 17
[ 5] 20:09:13.2 Customer 17 at (7575, 4500) signs off
[ 5] 20:09:17.4 Driver drives to Customer 14 at (7188, 4500)
[ 5] 20:10:50.3 Driver arrived at Customer 14 at (7188, 4500)
[ 5] 20:11:50.3 Customer 14 at (7188, 4500) to slow to answer the door
[ 5] 20:11:50.3 Driver drives to Customer 11 at (5650, 7250)
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[ 5] 20:28:59.4 Driver arrived at Customer 11 at (5650, 7250)
[ 5] 20:29:05.0 Customer 11 at (5650, 7250) answers door
[ 5] 20:29:05.0 Customer 11 at (5650, 7250) accepts Parcel 112 for cust 11
[ 5] 20:29:39.0 Customer 11 at (5650, 7250) accepts Parcel 113 for cust 11
[ 5] 20:29:43.5 Customer 11 at (5650, 7250) signs off
[ 5] 20:29:49.9 Driver drives to Customer 1 at (1050, 5180)
[ 5] 20:53:48.9 Driver arrived at Customer 1 at (1050, 5180)
[ 5] 20:54:48.9 Customer 1 at (1050, 5180) not at home
[ 5] 20:54:48.9 Driver drives to Customer 0 at (1050, 4722)
[ 5] 20:56:38.8 Driver arrived at Customer 0 at (1050, 4722)
[ 5] 20:56:52.7 Customer 0 at (1050, 4722) answers door
[ 5] 20:56:52.7 Customer 0 at (1050, 4722) accepts Parcel 100 for cust 0
[ 5] 20:57:20.4 Customer 0 at (1050, 4722) signs off
[ 5] 20:57:52.1 Driver drives to Customer 2 at (1618, 4500)
[ 5] 21:01:01.7 Driver arrived at Customer 2 at (1618, 4500)
[ 5] 21:01:42.1 Customer 2 at (1618, 4500) answers door
[ 5] 21:01:42.1 Customer 2 at (1618, 4500) accepts Parcel 56 for cust 2
[ 5] 21:01:44.1 Customer 2 at (1618, 4500) accepts Parcel 79 for cust 2
[ 5] 21:02:33.7 Customer 2 at (1618, 4500) signs off
[ 5] 21:02:34.8 Driver drives to Customer 3 at (2200, 3898)
[ 5] 21:07:18.9 Driver arrived at Customer 3 at (2200, 3898)
[ 5] 21:07:53.7 Customer 3 at (2200, 3898) answers door
[ 5] 21:07:53.7 Customer 3 at (2200, 3898) accepts Parcel 18 for cust 3
[ 5] 21:07:55.4 Customer 3 at (2200, 3898) accepts Parcel 41 for cust 3
[ 5] 21:08:18.2 Customer 3 at (2200, 3898) accepts Parcel 57 for cust 3
[ 5] 21:08:47.3 Customer 3 at (2200, 3898) accepts Parcel 80 for cust 3
[ 5] 21:09:03.7 Customer 3 at (2200, 3898) accepts Parcel 81 for cust 3
[ 5] 21:09:07.4 Customer 3 at (2200, 3898) accepts Parcel 102 for cust 3
[ 5] 21:09:10.2 Customer 3 at (2200, 3898) accepts Parcel 103 for cust 3
[ 5] 21:09:24.3 Customer 3 at (2200, 3898) signs off
[ 5] 21:09:27.7 Driver returns to delivery centre
[ 5] 21:16:28.2 Driver arrived at delivery centre
[ 5] 21:16:28.2 Parcel 121 for cust 16 return from delivery
[ 5] 21:16:58.2 Parcel 106 for cust 6 return from delivery
[ 5] 21:17:28.2 Parcel 107 for cust 6 return from delivery
[ 5] 21:17:58.2 Parcel 108 for cust 6 return from delivery
[ 5] 21:18:28.2 Parcel 104 for cust 4 return from delivery
[ 5] 21:18:58.2 Parcel 105 for cust 4 return from delivery
[ 5] 21:19:28.2 Parcel 110 for cust 9 return from delivery
[ 5] 21:19:58.2 Parcel 123 for cust 19 return from delivery
[ 5] 21:20:28.2 Parcel 117 for cust 14 return from delivery
[ 5] 21:20:58.2 Parcel 77 for cust 1 return from delivery
[ 5] 21:21:28.2 Parcel 78 for cust 1 return from delivery
[ 5] 21:21:58.2 Parcel 101 for cust 1 return from delivery
[ 5] 21:22:28.2 12 parcels left for next day
[ 5] 21:32:28.2 Driver goes home
[ 6] 17:00:00.0 Parcel 124 for cust 0 arr at delivery centre
[ 6] 17:00:00.0 Parcel 125 for cust 0 arr at delivery centre
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[ 6] 17:00:00.0 Parcel 126 for cust 2 arr at delivery centre
[ 6] 17:00:00.0 Parcel 127 for cust 4 arr at delivery centre
[ 6] 17:00:00.0 Parcel 128 for cust 5 arr at delivery centre
[ 6] 17:00:00.0 Parcel 129 for cust 5 arr at delivery centre
[ 6] 17:00:00.0 Parcel 130 for cust 5 arr at delivery centre
[ 6] 17:00:00.0 Parcel 131 for cust 6 arr at delivery centre
[ 6] 17:00:00.0 Parcel 132 for cust 6 arr at delivery centre
[ 6] 17:00:00.0 Parcel 133 for cust 8 arr at delivery centre
[ 6] 17:00:00.0 Parcel 134 for cust 8 arr at delivery centre
[ 6] 17:00:00.0 Parcel 135 for cust 8 arr at delivery centre
[ 6] 17:00:00.0 Parcel 136 for cust 11 arr at delivery centre
[ 6] 17:00:00.0 Parcel 137 for cust 12 arr at delivery centre
[ 6] 17:00:00.0 Parcel 138 for cust 13 arr at delivery centre
[ 6] 17:00:00.0 Parcel 139 for cust 14 arr at delivery centre
[ 6] 17:00:00.0 Parcel 140 for cust 14 arr at delivery centre
[ 6] 17:00:00.0 Parcel 141 for cust 14 arr at delivery centre
[ 6] 17:00:00.0 Parcel 142 for cust 16 arr at delivery centre
[ 6] 17:00:00.0 Parcel 143 for cust 16 arr at delivery centre
[ 6] 17:00:00.0 Parcel 144 for cust 16 arr at delivery centre
[ 6] 17:00:00.0 Parcel 145 for cust 17 arr at delivery centre
[ 6] 17:00:00.0 Parcel 146 for cust 18 arr at delivery centre
[ 6] 17:00:00.0 Parcel 147 for cust 18 arr at delivery centre
[ 6] 17:00:00.0 Parcel 148 for cust 19 arr at delivery centre
[ 6] 17:00:00.0 Parcel 149 for cust 19 arr at delivery centre
[ 6] 17:00:00.0 Parcel 150 for cust 19 arr at delivery centre
[ 6] 18:00:00.0 Driver arrives for work
[ 6] 18:00:00.0 Parcel 128 for cust 5 out for delivery
[ 6] 18:00:00.0 Parcel 129 for cust 5 out for delivery
[ 6] 18:00:00.0 Parcel 130 for cust 5 out for delivery
[ 6] 18:00:00.0 Parcel 136 for cust 11 out for delivery
[ 6] 18:00:00.0 Parcel 121 for cust 16 out for delivery
[ 6] 18:00:00.0 Parcel 142 for cust 16 out for delivery
[ 6] 18:00:00.0 Parcel 143 for cust 16 out for delivery
[ 6] 18:00:00.0 Parcel 144 for cust 16 out for delivery
[ 6] 18:00:00.0 Parcel 138 for cust 13 out for delivery
[ 6] 18:00:00.0 Parcel 117 for cust 14 out for delivery
[ 6] 18:00:00.0 Parcel 139 for cust 14 out for delivery
[ 6] 18:00:00.0 Parcel 140 for cust 14 out for delivery
[ 6] 18:00:00.0 Parcel 141 for cust 14 out for delivery
[ 6] 18:00:00.0 Parcel 145 for cust 17 out for delivery
[ 6] 18:00:00.0 Parcel 146 for cust 18 out for delivery
[ 6] 18:00:00.0 Parcel 147 for cust 18 out for delivery
[ 6] 18:00:00.0 Parcel 123 for cust 19 out for delivery
[ 6] 18:00:00.0 Parcel 148 for cust 19 out for delivery
[ 6] 18:00:00.0 Parcel 149 for cust 19 out for delivery
[ 6] 18:00:00.0 Parcel 150 for cust 19 out for delivery
[ 6] 18:00:00.0 Parcel 137 for cust 12 out for delivery
[ 6] 18:00:00.0 Parcel 110 for cust 9 out for delivery
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[ 6] 18:00:00.0 Parcel 133 for cust 8 out for delivery
[ 6] 18:00:00.0 Parcel 134 for cust 8 out for delivery
[ 6] 18:00:00.0 Parcel 135 for cust 8 out for delivery
[ 6] 18:00:00.0 Parcel 106 for cust 6 out for delivery
[ 6] 18:00:00.0 Parcel 107 for cust 6 out for delivery
[ 6] 18:00:00.0 Parcel 108 for cust 6 out for delivery
[ 6] 18:00:00.0 Parcel 131 for cust 6 out for delivery
[ 6] 18:00:00.0 Parcel 132 for cust 6 out for delivery
[ 6] 18:00:00.0 Parcel 104 for cust 4 out for delivery
[ 6] 18:00:00.0 Parcel 105 for cust 4 out for delivery
[ 6] 18:00:00.0 Parcel 127 for cust 4 out for delivery
[ 6] 18:00:00.0 Parcel 124 for cust 0 out for delivery
[ 6] 18:00:00.0 Parcel 125 for cust 0 out for delivery
[ 6] 18:00:00.0 Parcel 77 for cust 1 out for delivery
[ 6] 18:00:00.0 Parcel 78 for cust 1 out for delivery
[ 6] 18:00:00.0 Parcel 101 for cust 1 out for delivery
[ 6] 18:00:00.0 Parcel 126 for cust 2 out for delivery
[ 6] 18:32:30.0 Driver leaves for delivery of 39 parcels to 16 customers
[ 6] 18:32:30.0 Length of delivery tour: 31,347m
[ 6] 18:32:30.0 Driver drives to Customer 5 at (3350, 7580)
[ 6] 18:51:19.4 Driver arrived at Customer 5 at (3350, 7580)
[ 6] 18:51:34.9 Customer 5 at (3350, 7580) answers door
[ 6] 18:51:34.9 Customer 5 at (3350, 7580) accepts Parcel 128 for cust 5
[ 6] 18:51:37.2 Customer 5 at (3350, 7580) accepts Parcel 129 for cust 5
[ 6] 18:51:40.7 Customer 5 at (3350, 7580) accepts Parcel 130 for cust 5
[ 6] 18:51:47.0 Customer 5 at (3350, 7580) signs off
[ 6] 18:52:17.0 Driver drives to Customer 11 at (5650, 7250)
[ 6] 19:05:45.8 Driver arrived at Customer 11 at (5650, 7250)
[ 6] 19:06:45.8 Customer 11 at (5650, 7250) to slow to answer the door
[ 6] 19:06:45.8 Driver drives to Customer 16 at (7477, 5650)
[ 6] 19:20:28.3 Driver arrived at Customer 16 at (7477, 5650)
[ 6] 19:20:41.3 Customer 16 at (7477, 5650) answers door
[ 6] 19:20:41.3 Customer 16 at (7477, 5650) accepts Parcel 121 for cust 16
[ 6] 19:20:49.5 Customer 16 at (7477, 5650) accepts Parcel 142 for cust 16
[ 6] 19:21:01.1 Customer 16 at (7477, 5650) accepts Parcel 143 for cust 16
[ 6] 19:21:17.0 Customer 16 at (7477, 5650) accepts Parcel 144 for cust 16
[ 6] 19:21:22.9 Customer 16 at (7477, 5650) signs off
[ 6] 19:21:28.0 Driver drives to Customer 13 at (6800, 4901)
[ 6] 19:27:10.2 Driver arrived at Customer 13 at (6800, 4901)
[ 6] 19:28:10.2 Customer 13 at (6800, 4901) not at home
[ 6] 19:28:10.2 Driver drives to Customer 14 at (7188, 4500)
[ 6] 19:31:19.6 Driver arrived at Customer 14 at (7188, 4500)
[ 6] 19:32:18.0 Customer 14 at (7188, 4500) answers door
[ 6] 19:32:18.0 Customer 14 at (7188, 4500) accepts Parcel 117 for cust 14
[ 6] 19:32:23.6 Customer 14 at (7188, 4500) accepts Parcel 139 for cust 14
[ 6] 19:32:26.5 Customer 14 at (7188, 4500) accepts Parcel 140 for cust 14
[ 6] 19:32:32.5 Customer 14 at (7188, 4500) accepts Parcel 141 for cust 14
[ 6] 19:33:00.2 Customer 14 at (7188, 4500) signs off
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[ 6] 19:33:01.7 Driver drives to Customer 17 at (7575, 4500)
[ 6] 19:34:34.6 Driver arrived at Customer 17 at (7575, 4500)
[ 6] 19:34:59.4 Customer 17 at (7575, 4500) answers door
[ 6] 19:34:59.4 Customer 17 at (7575, 4500) accepts Parcel 145 for cust 17
[ 6] 19:35:09.6 Customer 17 at (7575, 4500) signs off
[ 6] 19:35:16.2 Driver drives to Customer 18 at (7816, 4500)
[ 6] 19:36:14.0 Driver arrived at Customer 18 at (7816, 4500)
[ 6] 19:36:23.1 Customer 18 at (7816, 4500) answers door
[ 6] 19:36:23.1 Customer 18 at (7816, 4500) accepts Parcel 146 for cust 18
[ 6] 19:36:23.1 Customer 18 at (7816, 4500) accepts Parcel 147 for cust 18
[ 6] 19:36:35.1 Customer 18 at (7816, 4500) signs off
[ 6] 19:36:44.8 Driver drives to Customer 19 at (7950, 4122)
[ 6] 19:38:47.7 Driver arrived at Customer 19 at (7950, 4122)
[ 6] 19:38:48.0 Customer 19 at (7950, 4122) answers door
[ 6] 19:38:48.0 Customer 19 at (7950, 4122) accepts Parcel 123 for cust 19
[ 6] 19:38:51.5 Customer 19 at (7950, 4122) accepts Parcel 148 for cust 19
[ 6] 19:39:06.2 Customer 19 at (7950, 4122) accepts Parcel 149 for cust 19
[ 6] 19:39:16.1 Customer 19 at (7950, 4122) accepts Parcel 150 for cust 19
[ 6] 19:39:23.9 Customer 19 at (7950, 4122) signs off
[ 6] 19:39:25.6 Driver drives to Customer 12 at (6061, 4500)
[ 6] 19:48:29.7 Driver arrived at Customer 12 at (6061, 4500)
[ 6] 19:49:18.7 Customer 12 at (6061, 4500) answers door
[ 6] 19:49:18.7 Customer 12 at (6061, 4500) accepts Parcel 137 for cust 12
[ 6] 19:49:25.1 Customer 12 at (6061, 4500) signs off
[ 6] 19:49:36.4 Driver drives to Customer 9 at (5650, 3175)
[ 6] 19:56:33.1 Driver arrived at Customer 9 at (5650, 3175)
[ 6] 19:57:33.1 Customer 9 at (5650, 3175) not at home
[ 6] 19:57:33.1 Driver drives to Customer 8 at (5650, 2783)
[ 6] 19:59:07.2 Driver arrived at Customer 8 at (5650, 2783)
[ 6] 20:00:07.2 Customer 8 at (5650, 2783) not at home
[ 6] 20:00:07.2 Driver drives to Customer 6 at (4142, 1050)
[ 6] 20:10:23.2 Driver arrived at Customer 6 at (4142, 1050)
[ 6] 20:11:20.3 Customer 6 at (4142, 1050) answers door
[ 6] 20:11:20.3 Customer 6 at (4142, 1050) accepts Parcel 106 for cust 6
[ 6] 20:11:23.0 Customer 6 at (4142, 1050) accepts Parcel 107 for cust 6
[ 6] 20:11:37.3 Customer 6 at (4142, 1050) accepts Parcel 108 for cust 6
[ 6] 20:11:40.6 Customer 6 at (4142, 1050) accepts Parcel 131 for cust 6
[ 6] 20:12:22.0 Customer 6 at (4142, 1050) accepts Parcel 132 for cust 6
[ 6] 20:12:23.3 Customer 6 at (4142, 1050) signs off
[ 6] 20:12:44.8 Driver drives to Customer 4 at (2821, 1578)
[ 6] 20:18:54.2 Driver arrived at Customer 4 at (2821, 1578)
[ 6] 20:19:54.2 Customer 4 at (2821, 1578) not at home
[ 6] 20:19:54.2 Driver drives to Customer 0 at (1050, 4722)
[ 6] 20:38:06.2 Driver arrived at Customer 0 at (1050, 4722)
[ 6] 20:38:07.8 Customer 0 at (1050, 4722) answers door
[ 6] 20:38:07.8 Customer 0 at (1050, 4722) accepts Parcel 124 for cust 0
[ 6] 20:38:10.8 Customer 0 at (1050, 4722) accepts Parcel 125 for cust 0
[ 6] 20:38:18.2 Customer 0 at (1050, 4722) signs off
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[ 6] 20:38:27.0 Driver drives to Customer 1 at (1050, 5180)
[ 6] 20:40:16.9 Driver arrived at Customer 1 at (1050, 5180)
[ 6] 20:40:37.1 Customer 1 at (1050, 5180) answers door
[ 6] 20:40:37.1 Customer 1 at (1050, 5180) accepts Parcel 77 for cust 1
[ 6] 20:40:38.1 Customer 1 at (1050, 5180) accepts Parcel 78 for cust 1
[ 6] 20:40:41.0 Customer 1 at (1050, 5180) accepts Parcel 101 for cust 1
[ 6] 20:40:44.4 Customer 1 at (1050, 5180) signs off
[ 6] 20:40:58.5 Driver drives to Customer 2 at (1618, 4500)
[ 6] 20:45:58.0 Driver arrived at Customer 2 at (1618, 4500)
[ 6] 20:46:58.0 Customer 2 at (1618, 4500) not at home
[ 6] 20:46:58.0 Driver returns to delivery centre
[ 6] 20:53:53.7 Driver arrived at delivery centre
[ 6] 20:53:53.7 Parcel 136 for cust 11 return from delivery
[ 6] 20:54:23.7 Parcel 138 for cust 13 return from delivery
[ 6] 20:54:53.7 Parcel 110 for cust 9 return from delivery
[ 6] 20:55:23.7 Parcel 133 for cust 8 return from delivery
[ 6] 20:55:53.7 Parcel 134 for cust 8 return from delivery
[ 6] 20:56:23.7 Parcel 135 for cust 8 return from delivery
[ 6] 20:56:53.7 Parcel 104 for cust 4 return from delivery
[ 6] 20:57:23.7 Parcel 105 for cust 4 return from delivery
[ 6] 20:57:53.7 Parcel 127 for cust 4 return from delivery
[ 6] 20:58:23.7 Parcel 126 for cust 2 return from delivery
[ 6] 20:58:53.7 10 parcels left for next day
[ 6] 21:08:53.7 Driver goes home
Delivery Centre Inventory: 10 parcels
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