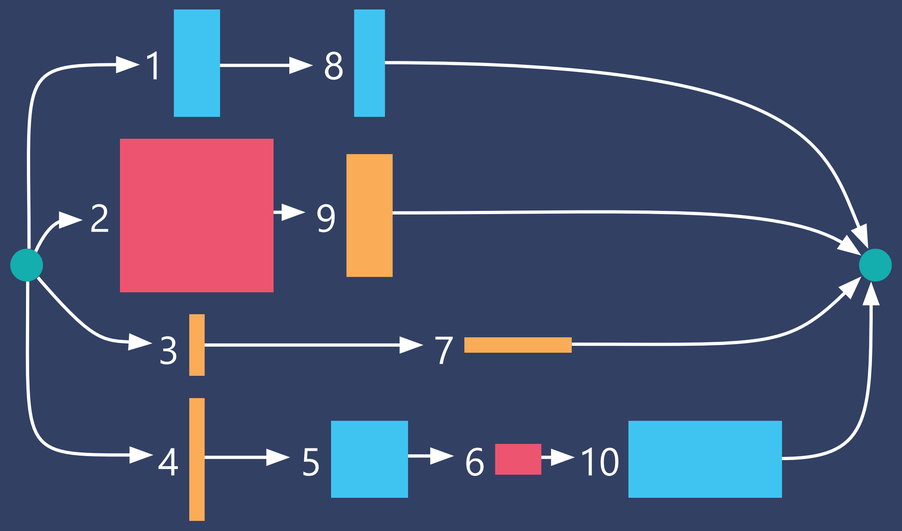
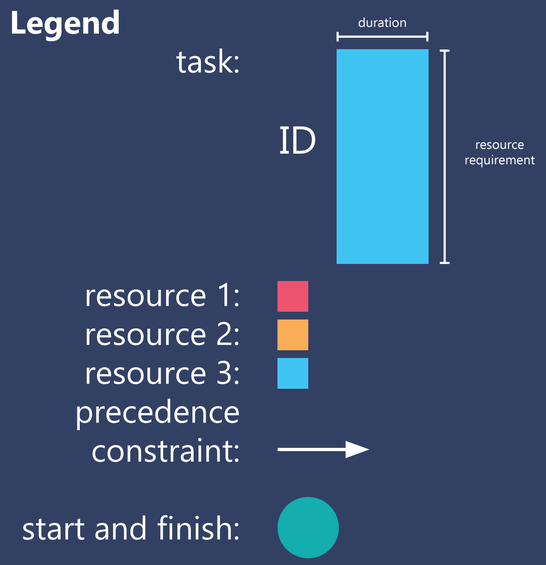
Heuristic SAT solver for project scheduling with task preemption



Example project task network
Source: Adapted from [1]



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Resource constraint project scheduling
- a project has multiple tasks
- each task needs an amount of specific resource
- each task has a duration
- tasks have precedence constraints
- all tasks must be scheduled
- objective is to try and find the shortest schedule

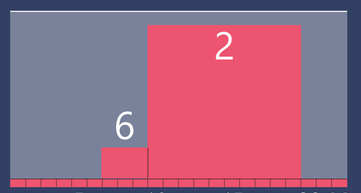
Preemption and setup times
- a task can be put on hold before it finishes
- each preemption is penalized (setup time)

This still needs to be written in a way that is fitting for a poster
Three different algorithm structures are going to be made for this research.

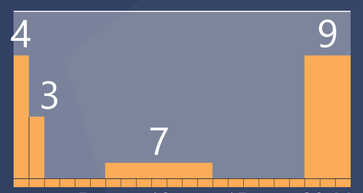
1. A heuristic algorithm
2. CNF encoding of the PRCPSP-ST variant and standard MAX-SAT solver
3. Same encoding but MAX-SAT solver will use a heuristic for task selection

Over the last few weeks the heuristic algorithm was made and it produces schedules from problem instances withing reasanoble time.

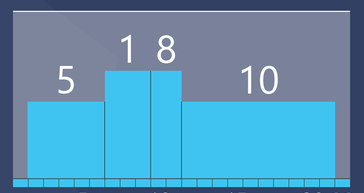
Example is below where the schedule time can be reduced by a timeslot.



Resource 1



Resource 2

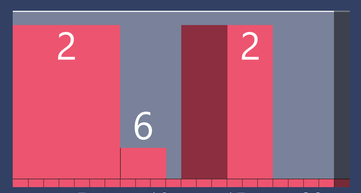


Resource 3

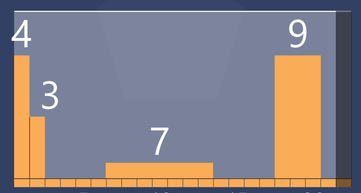
The heuristic algorithm is based on an iterated greedy algorithm.
It starts by any possible schedule.
Next is removing a few tasks
Then trying to reinsert the tasks into all possible places and checking the schedule duration
Select the location with the shortest duration and continue with the next removed task
Repeat until all tasks are reinserted

This overall process can be repeated until a timelimit is reached.

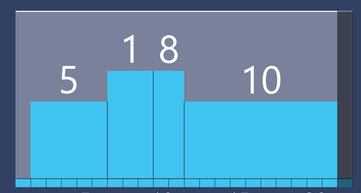
Benchmarks for this first algorithm need to be run and should be shown here instead of the algorithm explanation.



Resource 1



Resource 2



Resource 3