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Decision Making with Constraint Programming: Exercises 4

To Do - 1.

Objective: In this exercise we had to model the RCPSP problem and try to solve it using different search heuristics. The objective of RCPSP problem is to minimize the maximum value in $S_i + d_i$.

Comments: We used two type of search heuristics, and we observed that the search with the smallest start time isn't always the best solution.

In fact, we can see that with the first dataset, the use of default or the smallest search does not change too much the time and number of fails. For the second dataset the default search finds the optimum value in less than a second, but the smallest search is not as efficient and can't even find the minimum value under the time limit. With the third dataset, neither the default nor the smallest search can find a solution in the time limit.

Dataset	Default search			Smallest search		
	Fails	Time	makespan	Fails	Time	makespan
rscpspData1	13	367 msec	90	5	257 msec	90
rscpspData2	31.069	803 msec	53	-	>5 LIMIT TIME	54
rscpspData3	-	> 5 LIMIT TIME	82	-	>5 LIMIT TIME	75

To Do - 2.

Objective: In this exercise we had to model the JSP problem and try to solve it using different search heuristics. The objective of JSP is to minimize the makespan, the completion time of the last activity and minimize makespan.

Comment: Similarly, to previous exercise, we used two types of search heuristics.

In both datasets, smallest search can't find a solution in the time limit. We think that this happens because, in the smallest search, we are implementing a search that backtracks all the way to the root and then creates another branch and this might be quite inefficient with scheduling problems.

While, with the default search, in both datasets the solver can find the optimum makespan, probably because the solver can recognize it as a scheduling problem.

Dataset	Default search			Smallest search		
	Fails	Time	makespan	Fails	Time	makespan
Jobshop1	86	283 msec	663	-	>5 LIMIT TIME	669
Jobshop2	1.934.762	51s 337msec	826	-	>5 LIMIT TIME	921