Automated Planning - Lab 3

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3.1

Assignment: Which sequential planners generate plans that actually make use of all agents? Does it seem like there would be room for improvement?

Answer: The only planner freelunch seems to make use of every available uav. It definitely seems like there is room for improvement. When increasing the number of available uav:s most of the planners does not make use of it and hence the only effect is that the search space increases and it takes longer to find a cheap solution.

3.2

Assignment: Use several temporal satisficing planners to verify that reasonable plans are generated. Describe in your report how you ensured that rovers do not send multiple pieces of data at any given time.

Answer: We tried running yahsp3, itsat and temportal-fast-downward and they all created solutions that didn't send multiple packages of data at the same time. We used a predicate called 'free-to-send' to enable this behavior.

3.3 Evaluation of performance of temporal planners

As seen in table 1 Yahsp3 produces plans quicker than Temporal-fast-downward but they are longer. The effects of reducing the number of parameters is that the plan becomes better in terms of duration and it is found more quickly. The most significant effect was when reducing the number of locations. This is because several people will be at the same location and the most expensive action, in terms of time, is to fly to another location. Reducing the number of UAV:s results in plans being generated more quickly but the duration of the plans hardly improves, this is because it simply reduces the search space. Reducing the number of crates means that the number of goals will decrease as well which results in plans being generated much more quickly and being better in terms of duration.

Table 1: Results for task 3.3

Planner	UAV	Carriers	Locations	Persons	Crates	Goals	Time	Duration
Yahsp3	8	0	20	20	15	15	48	2048
Temporal-fast-downward	8	0	20	20	15	15	60	1030
Yahsp3	5	0	20	20	15	15	0.2	2038
Temporal-fast-downward	5	0	20	20	15	15	30	1030
Yahsp3	8	0	20	10	15	15	0.3	1446
Temporal-fast-downward	8	0	20	10	15	15	40	824
Yahsp3	8	0	10	20	15	15	0.16	1366
Temporal-fast-downward	8	0	10	20	15	15	30	318
Yahsp3	8	0	20	20	8	8	0.12	1190
Temporal-fast-downward	8	0	20	20	8	8	20	618

3.4

Assignment: Explain why it is a problem to enable multiple ground robots to be able to load crates onto carriers.

Answer: The main problem is that we checked the current capacity of the carrier was the same during the entire action. But if multiple robots should be able to load at the same time this had to be checked only at the start of the action so that the effect could be to increase the current capacity at the start of the action.
In other words change:
(over all (count ?carrier ?smallercount))
to:
(at start (count ?carrier ?smallercount))