Storing Groceries
b-it-bots @Home

Planning & Scheduling
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Project: Storing Groceries - Overview

- **Assumptions**
  - **Partially observable domain**
  - **Incomplete information**
- **Basic Setup:** the robot has to store groceries placed on a table in a nearby cupboard. The cupboard has three shelves and a door which is closed at the beginning. The robot has one gripper which is empty at the beginning. The robot can also be equipped with a tray to carry more items. (See the rulebook whose link is in the final slide for more details).
- **Tasks:** Model the domain and initial state for each test case.

Project: Storing Groceries - Testcases

- **Case 1:** S0 contains one object on the table. The object is known and located on the table. The location of the table and the cupboard are known. The cupboard door is closed at the beginning. Place the items on any shelf.
- **Case 2:** S0 contains *n objects** on the table. The objects are known and located on the table. *The table and the cupboard have to be located*. The cupboard door is closed at the beginning. Place the items on any shelf.

* Assume *n* is 2 to start with and then increase it to 5.

Project: Storing Groceries - Testcases

- **Case 3:** S0 contains *n* objects on the table. The objects are *unknown*** and have to be identified to be on the table.The table and the cupboard have to be located. The cupboard door is closed at the beginning. Place the objects on any shelf.

- **Case 4:** S0 contains *n* objects on the table. The objects are unknown and have to be identified to be on the table. *Each object belongs to a certain categories*. The table and the cupboard have to be located. *The cupboard is unknown and has to be explored first*. *Each shelf holds objects of a certain category*. *Place the objects on the shelf according to their category*. The cupboard door is closed at the beginning.

* Unknown means that a perception action needs to be taken to detect which objects are on a table.

Project: Storing Groceries - Grading

Description	Points
Choose an HTN planner and get it to run.	5
Model the domain for case 1(operators, methods, decomposition) that results in this plan.	10
Create the planning problem for case 1 to test your domain model	10
Generate plans for this planning problem	5
Refactor your domain to **generate plans** for the planning problem 2	5
Extend your domain to handle case 3 and generate plans for it	10
Extend your domain to handle case 4 and generate plans for it.	15
Modify the problem and the planner to provide explanations of planning failures 25 (failed preconditions, for which methods or operators, etc.).	10

*We want to test **correctness**, **scalability**, ability to **handle various situations**.*

Project: Storing Groceries - Deliverables

- A **report** (.pdf): Stating why you chose a particular planner.
  - Challenges you had installing and running it (include installation instructions & simple script to run each test)
  - An analysis of your results (number of plans generated, time it took to generate them, any difficulties, quality of the plans, anything else you think is of interest).
- A **folder/problem/setting** (i.e. 4 folders in total) which includes the planning problem, the model of your domain and the generated plans.
- A 10-minute **presentation** summarizing your project.

Project: Additional Information & Resources

- Plan for case 1 (table1 is a category of table)

```
[ 1 ]   (!goto jenny cupboard1 table1)
[ 2 ]   (!pick jenny table1 table1_1 coke2)
[ 3 ]   (!goto jenny table1 cupboard1)
[ 4 ]   (!place jenny cupboard1 shelf1_1 coke2)
```

- Paper on HTN planning An Overview of Hierarchical Task Network Planning, Ilce Georgievski and Marco Aiello, 2018.

- Storing groceries Robocup 2018 rules for further information:

  http://www.robocupathome.org/rules