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Übungen zur Vorlesung
Praktikum KI-Basierte Robotersteuerung

General Problem Solver

1. The task is to implement a General Problem Solver. Based on a library of actions, a given world state and a goal state, it should calculate a sequence of actions that lead from the world state to the goal state.

   The domain is a simple world consisting of six locations (*at-home*, *at-shop*, *at-uni*, *at-station-1*, *at-station-2*, *at-station-3*). The actions include going to these locations as well as *buy-ticket*, *buy-stuff* and *hear-lecture*. Every action is defined by its name, a list of preconditions, an add list and a delete list. An action is only applicable if all its preconditions are met in a world state. Applying an action means adding all entries of the add list to the world state and removing all entries of the delete list from it.

   The code template contains the complete definition of the actions (see file *domain-praktikum.lisp*. The solution should contain an implementation of the function *solve* in the file *gps.lisp*. Of course, it is allowed to implement helper functions. The solution should be independent of the domain, i.e. it should be possible to operate on a different list of actions without changing the *solve* function.

   A few example problems that should be solved:

   ```
   (solve :current-state '(at-home have-money)
          :goal-state '(be-smart))
   (solve :current-state '(at-home have-money have-money)
          :goal-state '(have-stuff))
   (solve :current-state '(at-home have-money have-money)
          :goal-state (have-stuff be-smart))
   ```

The code template can be found on the course homepage. After downloading and extracting it, the *ASDF file* needs to be linked. Perform the following steps (assuming that gps.tar.bz got extracted on the top-level of your home directory):

```
mkdir -f ~/asdf-systems
ln -s ~/gps/gps.asd ~/asdf-systems/gps.asd
```

The directory *asdf-systems* needs to be registered in the lisp variable *asdf:*central-registry**. Create the file ~/.sbclrc and put the following lines into it:

```
(require 'asdf)

(push #P"/path/to/asdf-systems/" asdf:*central-registry*)
```

Don't forget the trailing slash at the end of the directory. It is important.

Now you can load your code in lisp by executing:

```
(asdf:oos 'asdf:load-op :gps)
```

You can always re-execute the code in Emacs to reload all your changes.