

1. **Discourse Planning:** In class we briefly discussed that decompositional planning can be used to plan narrative discourse. Define decompositional planning operators to tell a murder mystery story (e.g. consisting of a "show body", "show investigation", "show conclusion"). The concrete actions you should use are **convey-person(X)** ("tell the audience about a person X"), **convey-event(Y)** "tell the audience about an event Y" and **convey-fact(Z)** ("tell the audience about a fact Z"). Since there is no standardized syntax for describing such decompositions, use whatever you find suitable.

For the following problems, use the PyHOP planner from <https://bitbucket.org/dananau/pyhop/src/default/>. To present your solution, either email me the code, bring a laptop or bring a flash drive.

2. **Blocksworld:** Download the PyHOP planner and look at the blocksworld implementation. Define a PyHOP planning problem with 5 blocks, **a,b,c,d** and **e**, that are stacked in one large stack in order (**a** on top, **e** on bottom), with a goal of having **d** on the table. Which plan does PyHOP return?

3. **Elevator Domain:** Encode the elevator domain (with 5 floors and 3 passengers) in PyHOP: Define what a state looks like, and write operators for **up**, **down**, **board**, and **depart**. Test the domain on some simple examples (since you don't have methods yet, you won't be able to solve entire planning problems).

4. **Elevator Domain:** Add the necessary methods to be able to solve entire planning problems in the elevator domain, then use PyHOP to solve a problem where **p1** is on **f1** and wants to go to **f4**, **p2** is on **f4** and wants to go to **f0**, and **p3** is on **f2** and wants to go to **f5**.

5. **Multiagent Elevator Domain:** Imagine we have two elevators in a building with 5 floors. Six people are waiting for elevators and we split them up with 3 people per elevator, resulting in planning problems **elevators-00-strips/s3-3.pddl** and **elevators-00-strips/s3-4.pddl** from the classical domains repository <https://bitbucket.org/planning-researchers/classical-domains/src/master/classical/> . Find a solution for each of the two planning problems. Write down the two plans in two columns side-by-side, with one action per line (the idea is that actions that are next to each other happen at the same time). Are there any redundancies between the two plans? How many actions do the elevators execute in total? Would there be a more efficient solution?