

## Homework 3: Planning (due October 24 before class)

Please read the rules for assignments on the course web page. Contact Andrew (kephart@cs.duke.edu) or Vince (conitzer@cs.duke.edu) with any questions.

In the course directory you can find the fast-forward planner (`ff`) as well as a “family domain” (`family-domain.pddl`), as well as some example problem instances: `family-1.pddl` asks for a plan to create a daughter, `family-2.pddl` asks for a plan to create an individual who is his own uncle, and `family-3.pddl` asks for a plan to create an individual who is his own father. As they say, “Don’t try this at home!” – but do read these files and call the planner on them to see what happens, e.g.,

```
./ff -o family-domain.pddl -f family-1.pddl
```

**1 (50 points).** Use the `ff` solver to find a plan to create an individual who is his own granduncle. ( $x$  is a granduncle of  $y$  if  $x$  is an uncle of a parent of  $y$ .) To do so, you should first **extend** `family-domain.pddl` to include a new predicate `is-granduncle-or-grandaunt-of` and a new action `conclude-granduncle-grandaunt`. Then, **create** a new problem instance `family-4.pddl` that asks for a plan to create an individual who is his own granduncle, and **run** the `ff` solver on it to produce an output file. Make sure to allocate enough objects (individuals who are not yet born). Finally, briefly **describe** the output plan in English.