

PROBLEM SET 1: CONFLICT-DIRECTED A*

INTRODUCTION

In this problem set, you'll be implementing conflict-directed A* and using it to find the most-likely mode assignments of the Boolean polycell example we discussed in lecture.

This problem set will be implemented in Python 2 (please don't use Python 3). For this assignment, we'll be providing you with an IPython / Jupyter notebook, which you can run either through our course virtual machine (VM). While it is possible to run this problem natively on your computer, it's not recommended. We'll also be using this VM throughout the semester, sometimes with software with strange dependencies that's hard to install, so it's highly recommend you use it now and get things set up.

Note! We *strongly* recommend you read the “Conflict Directed A*: A Gentle Introduction” paper on the course site. It presents Conflict-directed A* from a slightly different approach, and will greatly help you on this problem set.

INSTALLING THE COGNITIVE ROBOTICS VM

Please make sure you have enough space on your computer (around 4 GB) before proceeding.

Install the latest version of Virtual Box on your computer:

<https://www.virtualbox.org>

(VMWare will also probably work fine, although we haven't tested it).

Once installed, please download the VM. It's available in the "Related Resources" section.

Once downloaded, open up the VM file above you just downloaded with Virtualbox. It will import the VM, which could take several moments. Once done, you're ready to start the VM!

USING THE COGNITIVE ROBOTICS VM

Our virtual machine comes pre-installed with some useful things, such as IPython / Jupyter notebook, which starts automatically. The VM will automatically log you in, but here is the username and password:

Username: student

Password: student

Every time you start the VM, or whenever the TA asks you to, you should update it. This is accomplished by double clicking the terminal icon on the Desktop, and then running:

```
sudo update_cognitive_robotics
```

This magical command will make sure that everything is up to date in your VM, possibly pulling in new dependencies, code, or bug fixes.

To start Jupyter / IPython notebook, double click the icon on the Desktop (the notebook server starts automatically in the background of this VM). Voila!

FAMILIARIZE YOURSELF WITH JUPYTER NOTEBOOK

Please familiarize yourself with Jupyter notebook, if you're not already:

<https://jupyter.readthedocs.org/en/latest/>

There are also plenty of tutorials online, such as this one:

<https://nbviewer.jupyter.org/github/jupyter/notebook/blob/master/docs/source/examples/Notebook/Running%20Code.ipynb>

We've also included some example notebooks for you to play around with before the problem set if you want.

IMPLEMENT CONFLICT-DIRECTED A*

Open up the Problem Set 1 in the VM in Jupyter notebook, and follow the instructions from there!

When you're done, please .zip up the entire "ProblemSet1" directory and submit it on the course site.

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