CSE 512 – Winter 2018 – Lab 2

Instructor: Kerstin Voigt
Tuesdays 1:30-3:20pm in JB 359

In this lab we will experience and examine a Python program that implements a simple **"wall following" robot** as described in the textbook (Nils Nilsson, Intro to AI, A New Synthesis).

Examining this program will also have you learn new Python constructs; e.g., we will see an example of object-oriented programming in Python.

Exercise 1: Start by obtaining copies of these files from the "Weekly Labs" content area of Blackboard.

- File `graphics.py` (a simply graphics library)
- File `dotbot_forever.py` (implementation of wall following robot)

Place both files into the same directory. Start the Python interpreter with `'idle'`, open file `dotbot_forever.py,` and run the program with 'Run'.

Follow the instructions as they appear in the graphics window. Discuss what you see, and go back to examining details of the program.

Exercise 2: Make a copy of file `dotbot_forever.py` and call it `dotbot_learn.py`. Clearly, the wall following behavior has been programmed into the robot. The goal of this exercise will be to modify the program so that wall following will not be pre-programmed into the robot, but the robot will have the ability to LEARN to follow the wall based on EXPERIENCE and FEEDBACK.

Start by deleting from your copy (dotbot_learn.py) the following DotBot member functions:

- def s1(self): … to def s7(self): …
- def x1(self):… to def x4(self): …
- def move_ccw(self):…

Also delete the lines code from `'k = 1000'` to … `'k -=1'` towards the end of the file.

Run `dotbot_learn.py` in order to see what the robot is still able to do… The program should still run and do "something."

Now it is time to be creative: How can we equip the robot with a simple ("very" simple) learning component that has the robot learn through experience (positive and negative) which moves to make so that the robot, once at a wall, will keep following the wall forever.

Your instructor will demonstrate a running program that exhibits this learning behavior. Seeing it, is likely going to give you ideas. Think about remembering positive and negative experiences, and how future actions may want to repeat positive experiences and avoid the negatives.

- Your **learning code** should appear as additional **member functions of class DotBot**

You are encouraged to develop and try out you own ideas. However, a good amount of help with the implementation of a simple learning robot will be provided in intervals throughout the lab session.

TO RECEIVE CREDIT FOR THIS LAB:

- Be visibly engaged in the relevant CSE 512 lab activities.
- Sign up on a weekly signup sheet that will start circulating around 3pm.