CS 1301 Homework – Robo Key Control

Due: Friday October 10th, 2014

This is a pair programming assignment!

You are expected to work with the person you have been pared with in class, and you are **both** responsible for submitting the exact same code to T-Square. Follow good pair-programming practices by working together at a single computer and switching the driver/navigator role frequently.

Your pair may collaborate with other students in this class. Collaboration means talking through problems, assisting with debugging, explaining a concept, etc. You should not exchange code or write code for other pairs. Collaboration at a reasonable level will not result in substantially similar code.

For pair programming assignments, you and your partner should turn in identical assignments.

Files to submit: hw5.py

For help:

-TA Helpdesk – Schedule posted on class website

-Email TAs

-Piazza

Notes:

- **Don't forget to include the required comments and collaboration statement (as outlined on the course syllabus)**
- **Do not wait until the last minute** to do this assignment in case you run into problems.

- If you find a significant error in the homework assignment, please let a TA know immediately.

By now, you have had some experience with your robot. Whether it was avoiding walls or making it dance, you've been controlling your robot's movement though code. However, wouldn't it be cool if you could control your robot manually? We hope so, because this assignment will involve you making your robot move based on what keys are pressed on the keyboard.

For this assignment, you will be responsible for making your robot perform the following movements:

- Moving Forward/Backward
- Turning Left/Right
- Beeping

Using the Keyboard

In lecture, you have learned the concepts needed to implement keyboard use. Refer to the sample code, keyBallsCalico.py, if you have any questions on how keyboard input works.

Hint: Pay special attention to handleKeyPress and OnKeyPress functions.

Assignment Details

Part 1

You will be binding the following keys to robot movements:

Note: Through testing, we have found that for the robot to move in a quick and smooth manner, having the speed be 1 and the time be .1 is ideal. Please note that this is not set in stone, and if you find better numbers that work for your robot, use those instead!

Up Key – forward

Down Key – backward

Left Key – turnLeft

Right Key – turnRight

B key - beep

Part 2

Now that you have the robot moving with the keyboard, let’s incorporate some file i/o! For this part, your robot will write its movement and some data into a text file whenever it moves.

Whenever a key is pressed, record its corresponding movement to a file named **myMovements.txt**. In addition, for each key press, record the amount of time moved and the sensor value. Use the following equation for the sensor value:

SensorValue = Left Light Sensor/ (Right Light Sensor + Right Obstacle Sensor)

Note: This equation is entirely made up and doesn't mean anything!

If your robot beeps, you do not need to record the light sensor values...

For example, if you were to do the following sequence: Up, Up, Down, Down, Left, B, Right, your resulting **myMovements.txt** may look something like the following:

```
forward .1 .675
forward .1 .632
backward .1 .432
backward .1 .444
turnLeft .1 .214
beep .1
turnRight .1 .324
```

Part 3

Now that we have **myMovements.txt** created, let’s get some data from it. You should make a function called **collectData** that takes in **two parameters**, which are the name of the file you want to read and a direction (ex. Forward) as strings. The possible direction strings will be the same as recorded in the text file, i.e. "forward", "backward", "turnLeft", and "turnRight". This function should read the file and find the following data:

- How many seconds did the robot move (in all directions)
- How many times the robot beeped
- How many times did the robot move in the specific direction

The function should **return** a string in the following format:

The robot traveled for **x** seconds total, beeping **y** times. This robot moved ***direction*** a total of **z** times.

Part 4

Now that you can save how your robot moved previously, we want to "replay" the movements! Write a function called **replay** that takes in a file name as a string parameter. It should open the file (assume it is in the myMovements.txt file format) and replay the robots motion (and beeps)! So by recording a robot path through an obstacle course using the code for part2, you can record a set of robot commands in the myMovements.txt file that can be replayed to guide the robot through the same path without user input!

Rubric

Part 1	**25**
Robot moves forward with the Up key	6
Robot moves backward with the Down key	6
Robot turns left with the Left key	6
Robot turns right with the Right key	6
Robot Beeps with the B key	1
Part 2	**25**
File named myMovements.txt is created	5
Pressing a key correctly adds to the file	5
Sensor Value is calculated correctly	5
File is formatted properly	5
File is closed	5
Part 3	**25**
Function named collectData created	5

Accepts two parameter	2
Returns the correct string	3
Total amount of seconds calculated	5
Total number beeps calculated	5
Total number of <direction> calculated	5
Part 4	**25**
Replay function successfully replays the recording	25

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