Exercises and Assignment

Carmine Tommaso Recchiuto

A simple robotic Simulator in Python

ONLY IF YOU ARE NOT USING THE DOCKER IMAGE PROVIDED:

Open a shell and execute the following command:
$ sudo apt-get udpate
$ sudo apt-get install git
$ git clone https://github.com/CarmineD8/python_simulator

You have downloaded a simple robotic simulator. In order to run it, you should first install:

$ sudo apt-get install python-dev python-pip python-pygame

$ sudo pip install pypybox2d

IF YOU ARE USING THE DOCKER IMAGE PROVIDED:

Just go to /Desktop/ResearchTrack1/python_simulator/robot-sim

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Exercise

Indeed, the simulator requires three libraries: pygame, PyPyBox2D, and PyYAML. The easiest way to install these is through your distribution's package manager (but PyPyBox2D is only available through pip).

Now open a terminal shell, move to the *robot-sim* directory and run:

$**python2 run.py exercise1.py**

If everything works, you should see a mobile robot and some boxes.

Please follow the instructions at https://github.com/CarmineD8/python_simulator , and try to do the exercises 1

Exercise

Follow the instructions at https://github.com/CarmineD8/python_simulator , and try to do the exercises 2 and 3.

Check:

- the methods see(), grab(), and release () of the class Robot.

- the functions find_token()

- how to check if a marker is silver or golden? For each retrieved marker, the field info.marker_type may be MARKER_TOKEN_SILVER or MARKER_TOKEN_GOLDEN

A few additional things

Pseudocode: Pseudocode is an informal way of programming description that does not require any strict programming language syntax or underlying technology considerations.

Example:

```
If student's grade is greater than or equal to 60
        Print "passed"
else
        Print "failed"
```

A few additional things

Other example: Exercise 2

```
While True:
        find_markers_distance_and_rotation
        if no_marker_detected:
                exit
        else if dist < threshold:
                grab_marker
        else if robot_well_aligned:
                go_straight
        else if robot_on_the_left:
                turn_right
        else:
                turn_left
```
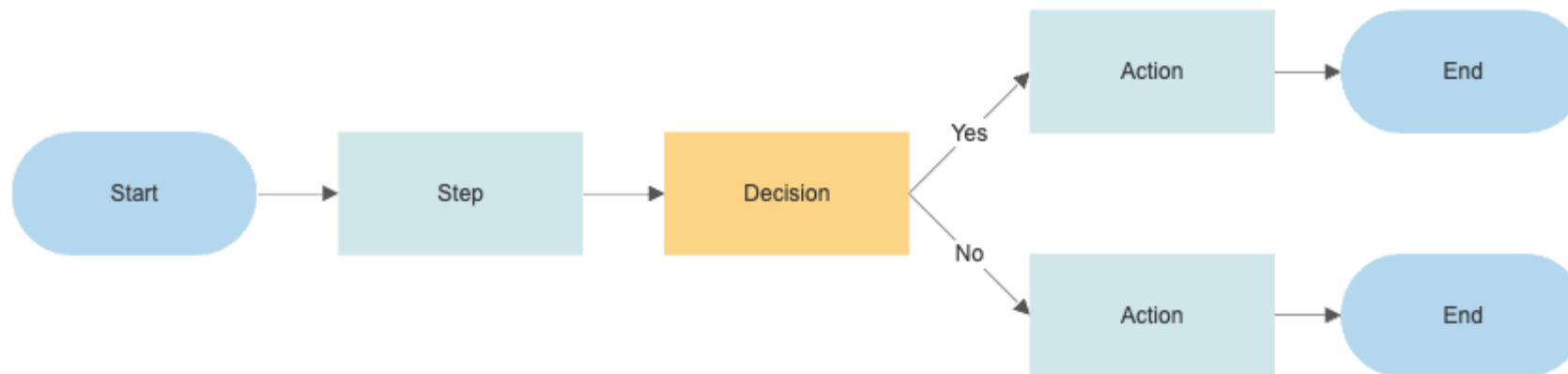
Use indentation and meaningful names!

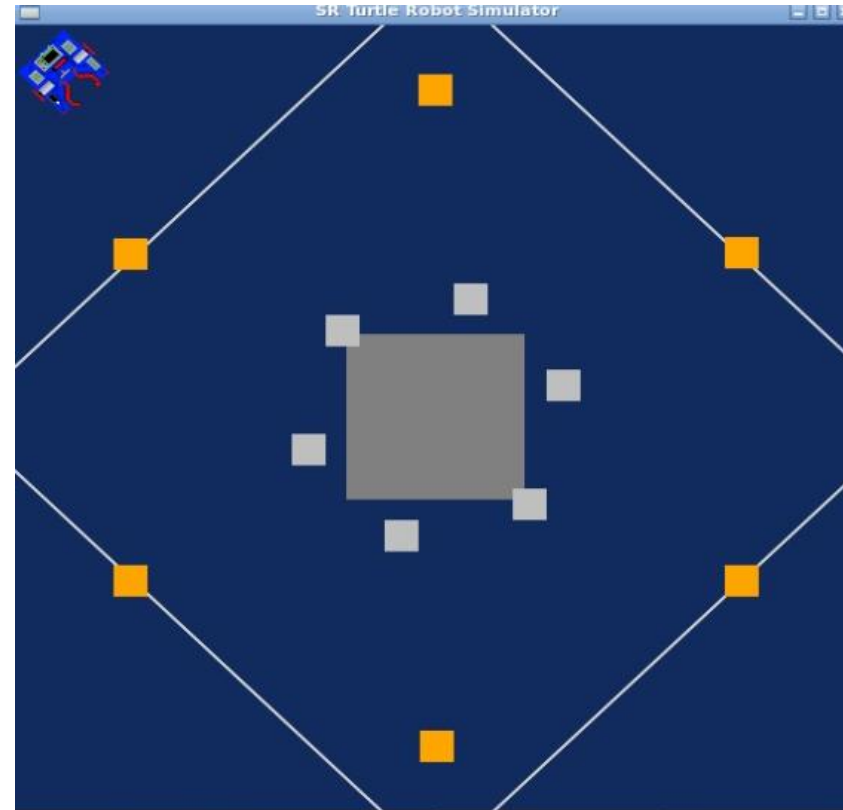# A few additional things

The same can be done by using a flowchart

Assignment

Clone the repository https://github.com/CarmineD8/python_simulator
and switch to the assignment22 branch and run:

python2 run.py assignment.py

You will see this environment:

Assignment

Write a python node that:

      - search a find a silver box in the environment
      - put this silver box close to a golden box

In the end you should try to have silver and golden boxes distributed in pairs.

Some hints:

      - you can use the code associated to each marker to know what are the boxes (both silver and golden) that have been already paired

      - you can reuse, maybe modiyfing them a little bit, the functions of the exercises that you have developed during the exercises.
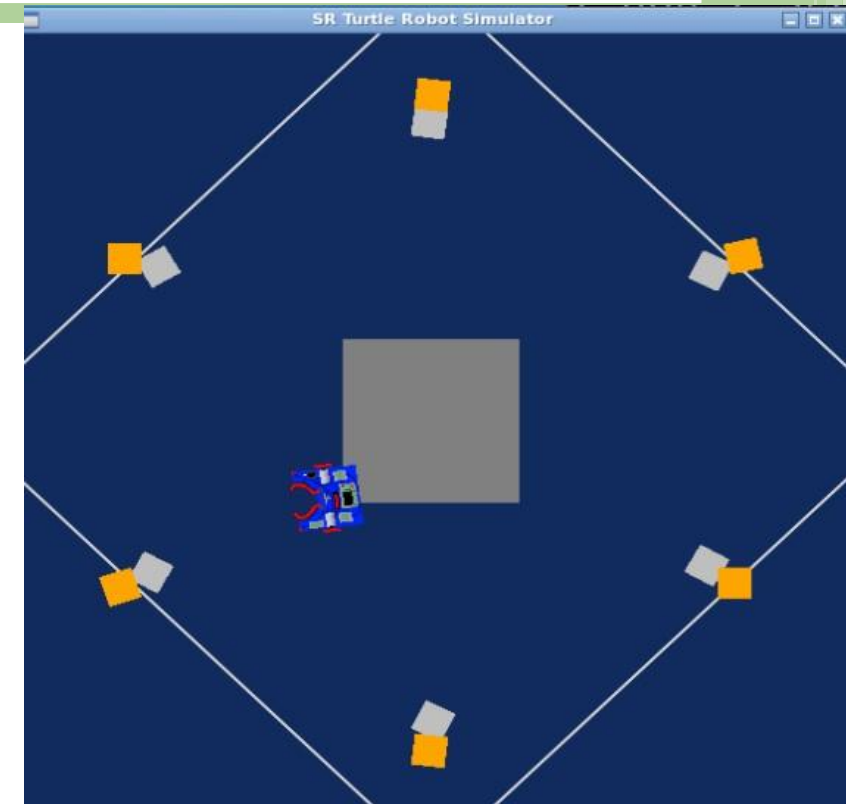
Assignment

Additional Requirements:

- Create a flowchart of your code, or describe it in pseudocode (Pseudocode Examples (unf.edu))

- Add some comments to the code

- Use functions to avoid having a single block of code

- Publish the new package on your own repository. The flowchart (or the pseudocode) should be added to the ReadMe of the repository. (consider using Markdown syntax to write your readme: Basic Syntax | Markdown Guide)

- **Deadline: 16/11/2022**

Evaluation

- Code performance

- Code structure and clarity

- Respect of the requirements

- Organization of the repository (e.g., README in which you describe what the code does (possibly with flowchart or pseudocode), how to run the code, possible improvements, …)

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