Homework 4

Intro to Robotics

For the following programming questions, you should use Python. You will need to use Coppeliasim.

You cannot use any motion planner library. But you can use collision detection API/library.

1. (50 pts) Implement the RRT algorithm and apply the algorithm to planning motion for a UR5 robot in a provided scene. The scene (looks like the example in Figure 1) and a set of start and goal end effector positions and orientations are provided in separated files.

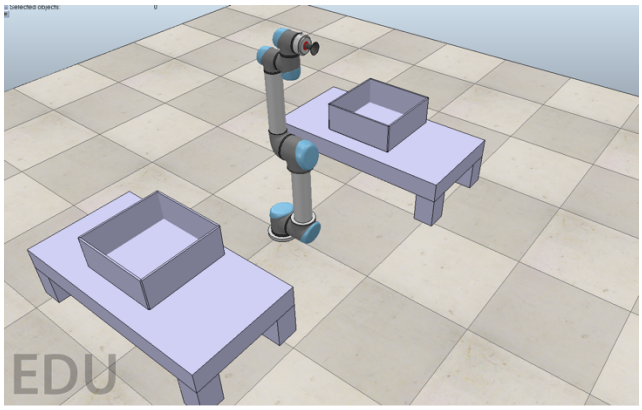

Figure 1. Possible scene.

Submission should include:
A test script that has a start pose and a goal pose, calls your RRT function, and shows the robot goes to those landmarks generated by RRT (you can use the movement function provided in CoppeliaSim)
Your RRT function
A video showing the robot's motion

2. (50 pts) Implement a six dimensional Interpolating Polynomials (Lecture 13) to move the UR5 robot from the start to the goal by following the computed trajectory.
Hint: Give each segment an equal amount of time.

Submission should include:
A test script that has a start pose and a goal pose, calls your RRT function, and shows the robot goes to those landmarks generated by RRT with the trajectory generated by your function
A video showing the robot's motion