iaq3 zzv2 cps232

Robotic Manipulation Project 1

1 e) Test and debug your robot_interface server using the “rosservice”, “rosnode”, and “rostopic” commands. Give examples of how you used each command.

rosservice : We used rosservice to list our services. We saw that our services /moverobot and /getstate were listed.

rosnode : list : to find which nodes were running. At some points the nodes did not terminate when we believed they did. We used this command to see which were still running.

rostopic : we used pub to publish our command to controller so that it would start commanding the robot. We used the -1 flag so we only would send one command at a time. We also used echo to see that our state was being published.

2 a) Following our wise professor’s guidance, we used python baxter. We were able to give an endpoint and pose for the hand in the base frame and receive the inverse kinematics, returning a list of the values for each joint. We then moved our arm to these joint values. When the arm was far away from the goal position, we found that the inverse kinematics would fail. We used intermediate poses and multiple inverse kinematic calls to overcome this obstacle. The position we received was for the hand so we could use it directly.

2 e) We have made the robot work faster by using two arms. We wrote a concurrent system, using two inverse kinematic services. Our right and left arms work independently, yet wait for each other to get into a valid position using locks. In this way, one arm grabs the evens and one grabs the odds. They are staggered so while one is opening the gripper to place the block down on the table, the other is closing the gripper to grab the block from the top of the current stack and vice versa when stacking again. We also used an offset for the y component of the base because the end effectors of the arms were placed slightly different based on the limb.