If_I_Have_A_Robot_Arm Requirement Specification

If_I_Have_a_Robot_Arm is a 3D game for the player to explore and understand the motions of a robotic arm. It is not a game for entertainment purposes but for research and development of robotic systems. I will still call it a game instead of a robot simulator (the two are more synonymous than you think).

The objective is to use the robotic arm in the game to push the cubes and balls (to-be-delivered package) from random locations on the plane to a designated location (target).

Robotic arm:

1. Robotic arm object stem from turret base that fixed relative to the plane/game world
2. Each segment of the arm consists of at least a cylinder
3. The segments are connected by the shoulder, elbow, and wrist joints (does not have to be visually accurate)
4. The movement of each joint is limited to only one axis and the range is bounded. In other word each segment of the arm can only rotate within 360 degrees and cannot go through another segment.
5. The arm rotates by torque on the joint. Each segment is affected by gravity and by the adjacent joints. Note that this does not have to be physically accurate. It does need to allow enough generality to use physics simulator plugin in future iterations.

To-be-delivered package:

1. Cubes: stay still unless forces act on it.
2. Balls: can roll after force is applied.

The robotic arm, package, and game plane can interact with each other through collision, friction, and normal force.

The object will disappear when it reaches the target, and points will be added to the score board. When all the objects are moved to the target the player win.

Menus:

1. Main Menu: start game, help
2. Help: explains how to play game, the hotkeys for moving each joint
3. Pause Menu: same as Main Menu except that the start button become the continue button

Return to the Main Menu when the game ends. It is displayed in the main menu and stored in a separate file. The settings are also stored in a separate file and adjustable by developers. The configurations values are passed into every new game.

It’s for robots, so we will not implement sound for this game.