anyware robotics

Problem descriptions:

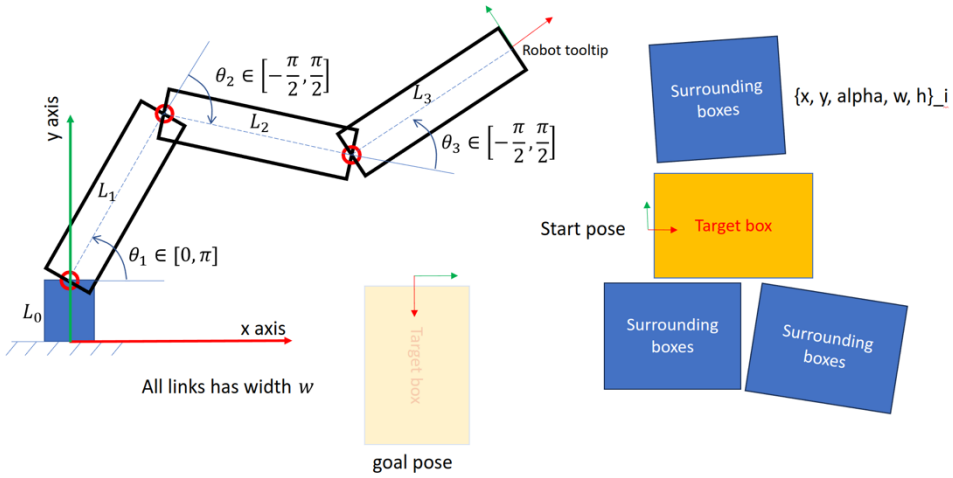
Problem: you are about to solve a motion planning problem. The robot is a 3DOF planar robot arm carrying a target box. The task is to move the target box from start pose to goal pose.

Robot arm: The planar robot arm has a base link and three box-shape links (link length is L1, L2, L3, width is w). Robot's action space is (theta_1, theta_2, theta_3), which means robot controls its states by controlling in joint space.

Environment: There is a target box represented by {x, y, alpha, w, h}_t surrounded by multiple surrounding boxes, each represented by {x, y, alpha, w, h}_i.

Task: Find a motion plan for the robot to move from start pose (x_s, y_s, theta_s) to goal pose (x_g, y_g, theta_g) carrying the target box. Avoiding collision with any surrounding boxes.

The scene is illustrated by this graph. You will specify all the values of the above variables yourself.



Requirements:

1. the robot should **avoid obstacle** 100%,
2. The robot motion in action space should be **continuous**.

Bonus:

1. The robot desires to have a minimum **clearance** guarantee with this obstacle.
2. The robot motion in action space is desired to be **smooth**.
3. The robot motion in action space is desired to be **efficient** (define efficiency yourself to be time or short).

Deliverable:

1. Write a C/C++ program to address the above requirements and Bonus (optional). You can use any tool you want.
2. Give a readme on how to run the code.

3. You will show the solution during the interview 24 hours (1 day) later from the time the program is given. You will send this code to Anyware Robotics for a generalization test. Therefore, keep the code in good shape, comments and use instructions.
4. Visualization is encouraged but not necessary.