Online Simulation Report

1. Line Following

Here we are using two IR sensors in the front side of the robot in 35mm gap between them. If left IR sensor detect the white line, the robot will slightly turn left and if right IR sensor detect the white line, the robot will slightly turn right.

2. Segmented Wall Following

In this part, robot will use the ultrasonic sensor in the left side. It will continue to keep the 7cm distance from the left wall. Robot will turn left, when the distance increase and turn right, if the distance decrease in-order to maintain the same distance. If the ultrasonic reading increases suddenly very high above 400mm, it will continue in the same direction as earlier.

After reaching the black box, the segmented wall following task will be stopped and line following will be initialized.

3. Color Detection

By using the RGB sensor, detect the color. If current detected color is wrong, then rotate by 180 degrees then follow the line following algorithm along with color detection. If the detected color is right continuing to move in that direction.

4. Segmented Line Following

After the right color detection, initialize the line following algorithm. If the RGB sensor goes to black

5. Obstacle Avoidance

Here robots will use ultrasonic sensor to detect the obstacles. Especially when leaving the chess board. If the ultrasonic reading is less than the length of a square robot cannot move in the direction. Otherwise according to the length, it can move in the direction.

6. **Pick the rook at a7 and go along a6, a5… and if the king is not detected come to earlier position and go as b7,c7,… like that. (When moving keep both bottom left side and ultrasonic sensor at arm at same alignment)**

7. **King Detection**

> *Since all the chess pieces are less than 50cm, we are placing an ultrasonic sensor around 52cm at robot arm. If the two both below and above ultrasonic sensor readings are similar with 5-8cm difference then we can detect the king.*

8. **After detecting, the king's place the rook at the box, where robot is now. Then exit the chess board using obstacle avoidance technique.**

9. **Box Detection and Picking**

> *Here we use ultrasonic sensor to detect the location of the box and pick it up.*

10. **After picking up a box, leave the cage**

> *Once it picks the box it will use the wall following algorithm and if we suddenly get high ultrasonic reading that is the exit for the robot in the cage.*

11. **Detect the broken part and place the box**

> *After climbing the inclined path robot will locate the place to put the box using ultrasonic sensor.*

12. **After placing the box, go back and pick up the other box, repeat the same procedure until placing the box in left broken part.**

13. **After placing two boxes continue to move in the bridge along with line following task until detect the black box.**