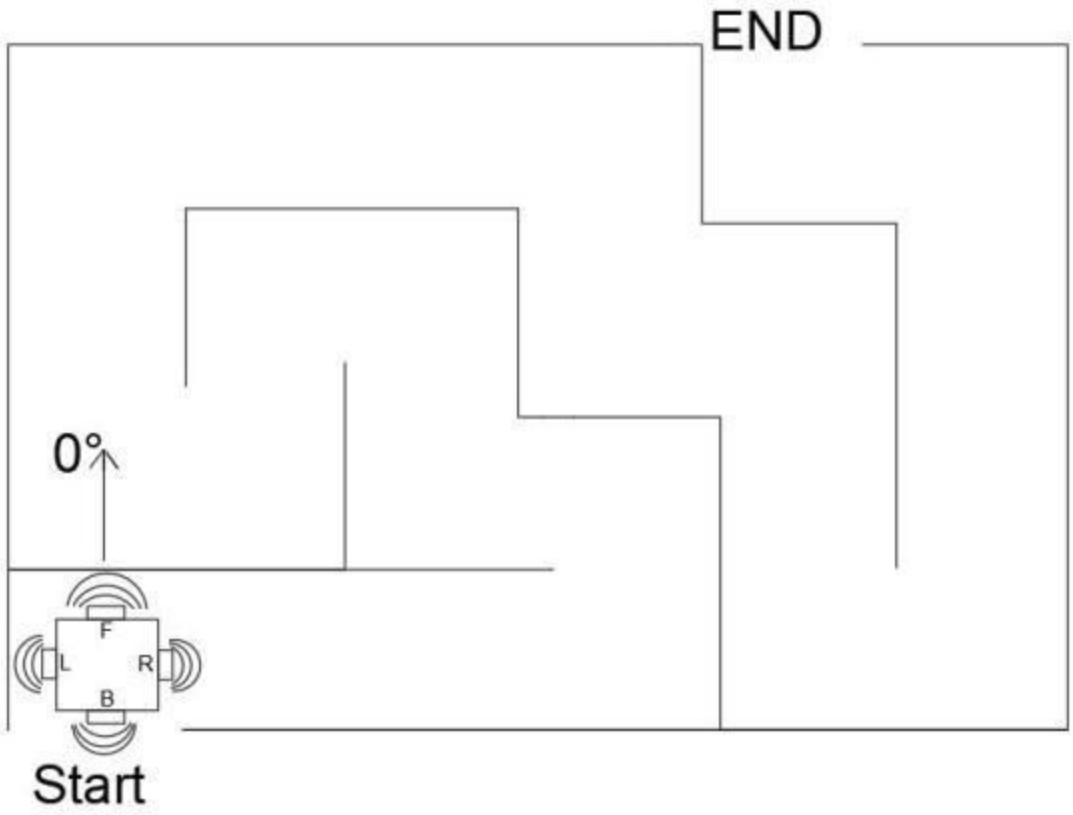
RM Task

Ultrasonic Sensors measure the distance between the bot and an obstacle. Your bot has 4 ultrasonic sensors and needs to navigate through an obstacle course (refer image).



You have the **following functions** to use:

- **DistanceFromLeftSensor ()** - returns the distance of the obstacle from the left Sensor.
- **DistanceFromRightSensor** () - returns the distance of the obstacle from the right sensor.
- **DistanceFromFrontSensor** () - returns the distance of the obstacle from the front sensor.
- **DistanceFromRearSensor** () - returns the distance of the obstacle from the rear sensor.
- **Memory ()** – Refer **question (b)** for an explanation.

- **Move(v,theta)** - Move the robot with velocity v (range is 0-255) at an angle theta. 0° would take the bot forward, 90° left, 180° backward and 270° right

  NOTE: When moving left or right, the bot's face doesn't change direction.

  (**A**) Write a program/algorithm to detect an obstacle using an ultrasonic sensor (an obstacle is detected when the distance between the bot and a wall is 10 cm). You are provided the direction the bot is traveling in (L - left, R - right, F - forward, B -backward). What should the bot do after detecting an obstacle?
  Hint: Use the Move function for the second part.

  (**B**) Assume the bot has "**memory**" i.e. it "remembers" which direction it was originally traveling in before stopping and after stopping, it won't go in that direction again (basically the last sensor that detected an obstacle).
  Eg: The bot in the diagram moves right before coming to a stop at the wall after detecting it. After stopping, it "remembers" it was moving right so it won't move left.

  Write a program/algorithm to find out which way the bot should move after stopping.
  Hint: Since you have already figured out how to detect a wall in part (a), you can use made-up functions like WallDetectedFront() which tell you if a wall was detected from a particular sensor.

  (**C**) Now comes the final stage. You get the direction in which the bot needs to go in from part (b), use the Move function to make the bot move in that direction. Use 30 as speed.