A-maze-ing Race Project Report

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Written by:

sim yu jie A018;Sujay A018;Rohan A018;rusdi A0183320R;Ryan Tan a018;Shannon Lee a018

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OUTLINE:

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* Software
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  + Colour sensor
  + IR scanner
  + Microphone
  + Line detector
* Hardware
  + Bandpass filter
  + IR scanner

**Introduction:**

**Software:**

Movement

The general movement functions for turns were fine-tuned after numerous tests, uploaded into the mBot to prevent crashes.

Colour sensor

To solve the waypoint challenges of the maze, the RGB LEDs were used to detect colour and make the appropriate movement. Values were collected when red, green, blue, and no light was shown and used to differentiate between the test colours. The challenge is determined to be white, if red, green, and blue values are all high; it is black if the values are all low. Green was distinguished if the green value was higher than both red and blue; and blue would have blue values higher than red and green. Finally, for red and orange, there was much testing involved to distinguish between the two. In certain lighting, the values for orange was almost the same as the ones for red in a different light setting. The solution was to read in the no-light value as the ambient light. If the ambient light was lower than the specified value, the red value had to be increased before separating into red or orange. Then according to the colour determined, the pre-set movement functions were used to direct the robot in the correct direction.

Sound Sensor

We defined two different pins, known as A0 and A1, as the input pins from the sound sensor on the mBot. The program for the sound sensor is relatively straight-forward – read and store the value obtained by the pins A0 and A1 and compare them to determine the louder of the two. To check for similar loudness, we defined a **threshold loudness**, where if abs(fa – fb) is below this threshold, they are determined to be of relatively equal loudness.