Project – GolfBot

Overview

The main goal of this challenge is to build an autonomous fork lift robot that can navigate a maze and score golf balls in colored bins efficiently, accurately and fast.

Project Details

The maze is a 4x6 cell maze. An example configuration is shown in Figure 1. Cell coordinates for the starting position, and bin positions will be provided 2 minutes before the project demonstration time. Four bins will be present in the maze at road ends. The maze wall configuration will be as announced in class. Teams can hardcode the wall configuration in their program.

Competition Procedure

1. Navigate the maze only using only the shortest paths.
2. deposit one golf ball at each bin color using the sequence Red, Green, Blue, then White.
3. Once one sequence is complete, a new sequence can be started if time permits (total allowable time is 3 minutes).
4. Each successfully scored golf ball will count as 10 points.

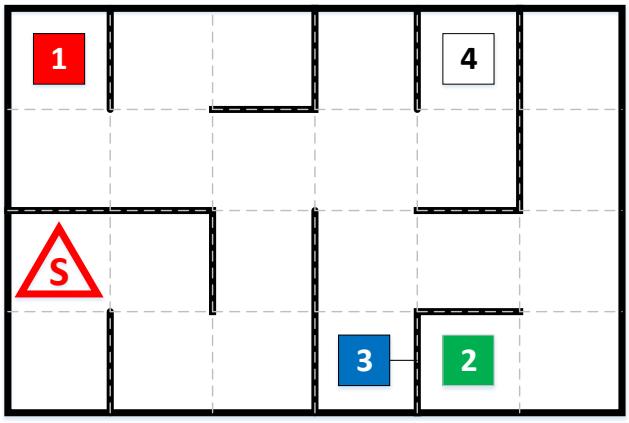


Figure 1: An example 4x6 maze configuration, S: Starting Position, 1,2, 3 and 4 are bin positions

Project Constraints:

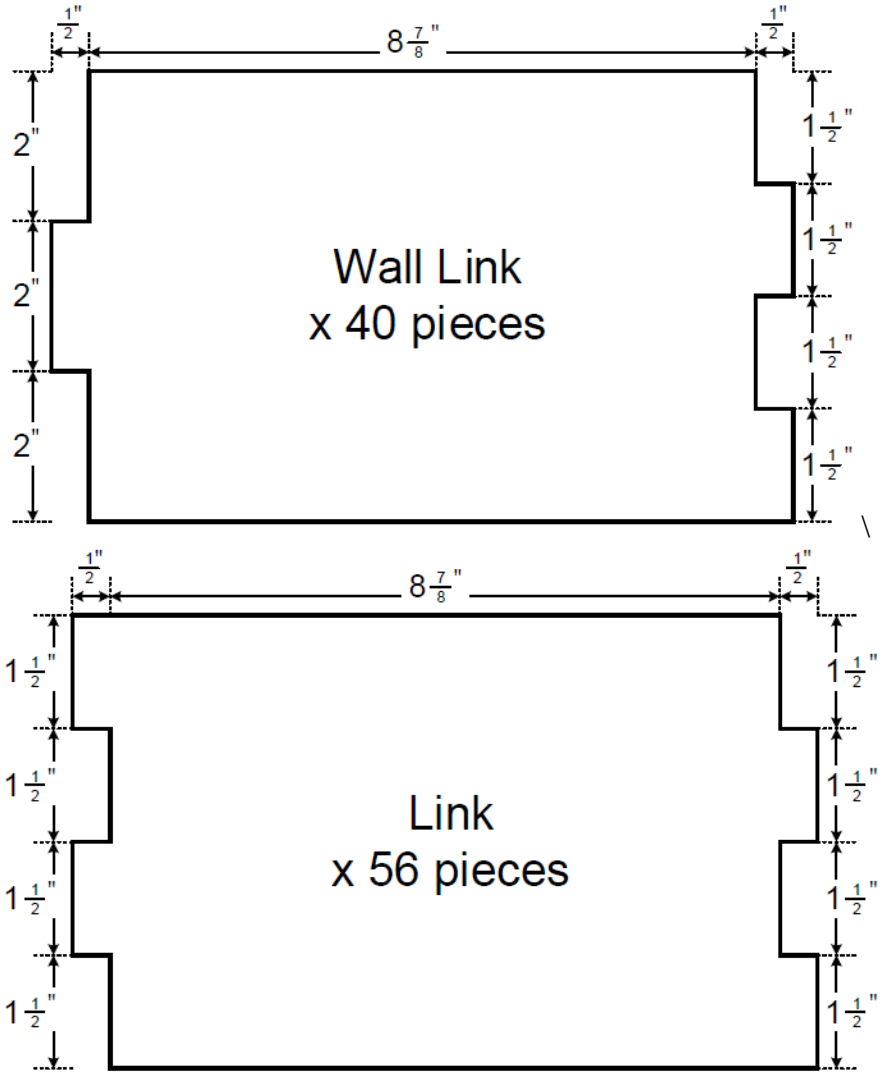
1. Maximum allowed time for the competition is 3 minutes
2. The maze wall organization must be modelled using 2 dimensional arrays of structures as discussed in class, the robot should keep track of its orientation and position in the maze at all times. Orientation and position (row, col) should be continuously displayed on the EV3 LCD screen.
3. Upon reaching a bin, the robot should play a sound tone of 300 Hz for 2 seconds (or indicated on the screen, if sound is malfunctioning). Upon finishing one sequence, a 500

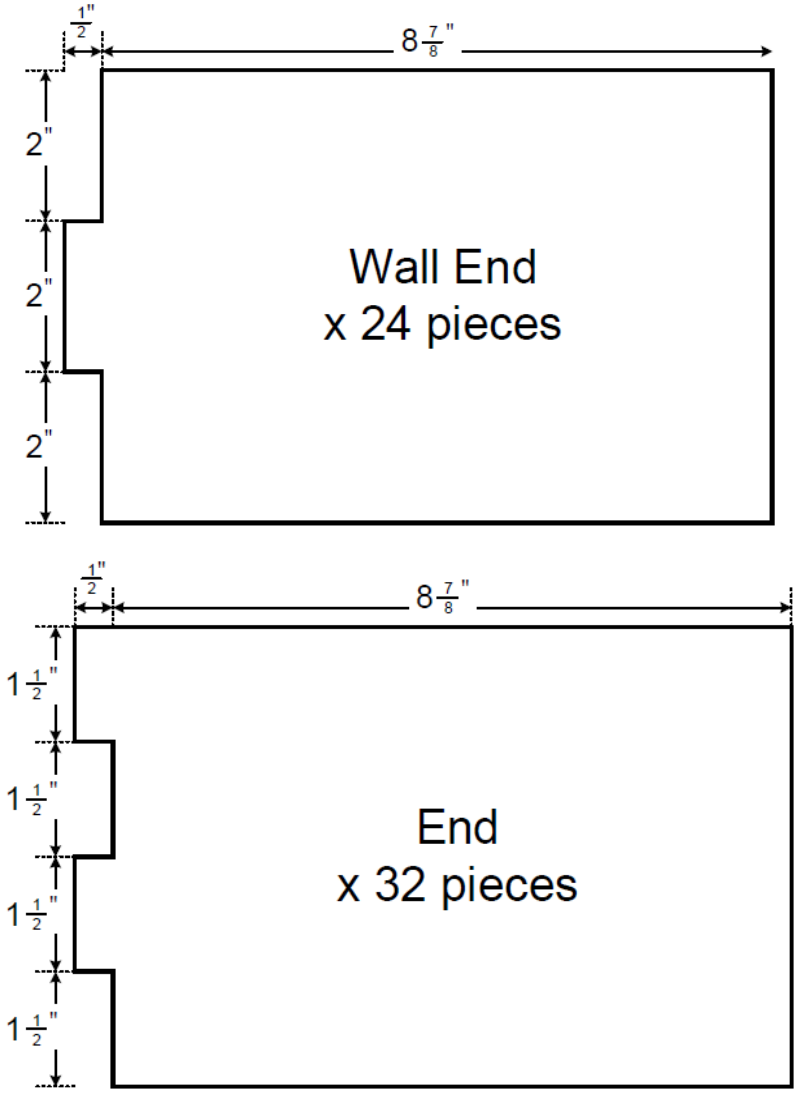
Hz tone should be played for 2 seconds (or indicated on the screen, if sound is malfunctioning).

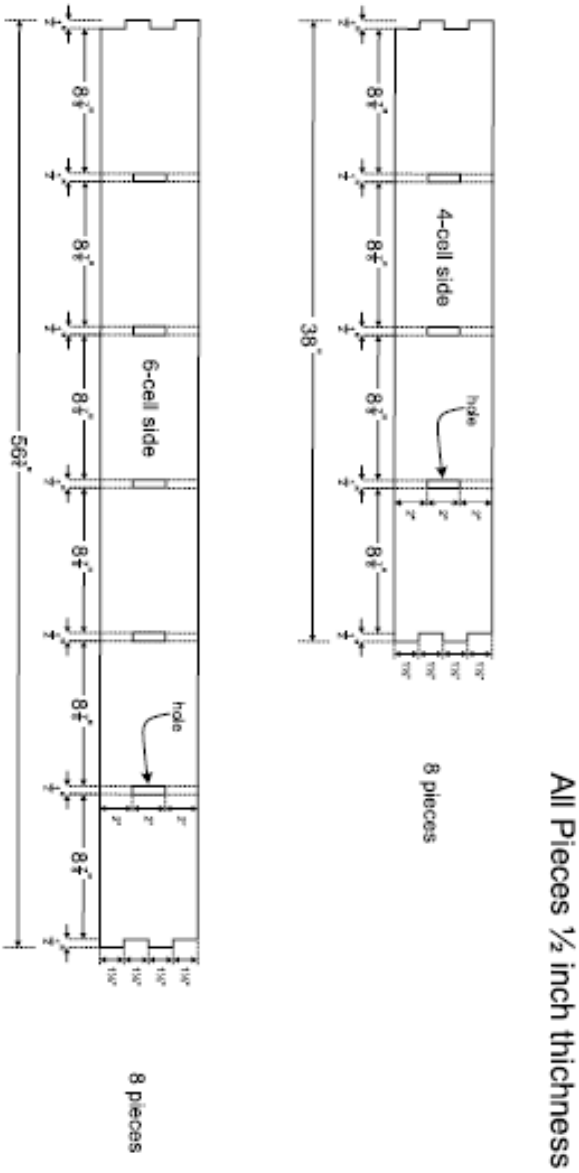
4. An efficient robot should only follow the shortest path leading to each bin scoring golf balls accurately in the shortest time as per the bin color sequence (e.g. R, G, B, W, R, G, B, W).
5. Mechanical design will be judged based on integrity, robustness, accuracy (gear ratio), stability, speed, and payload capacity
6. Software design will be judged based on efficiency, speed, readability, portability and organization

Maze wall design,

All walls are 0.5” in thickness, Maze outer walls are always present.




1/2"
8 7/8"
2"
2"
2"
Wall End
x 24 pieces
1/2"
8 7/8"
1 1/2"
1 1/2"
1 1/2"
1 1/2"
End
x 32 pieces


All Pieces ½ inch thichness
4-cell side
38"
8½"
hole
8 pieces
6-cell side
56"
8 pieces