

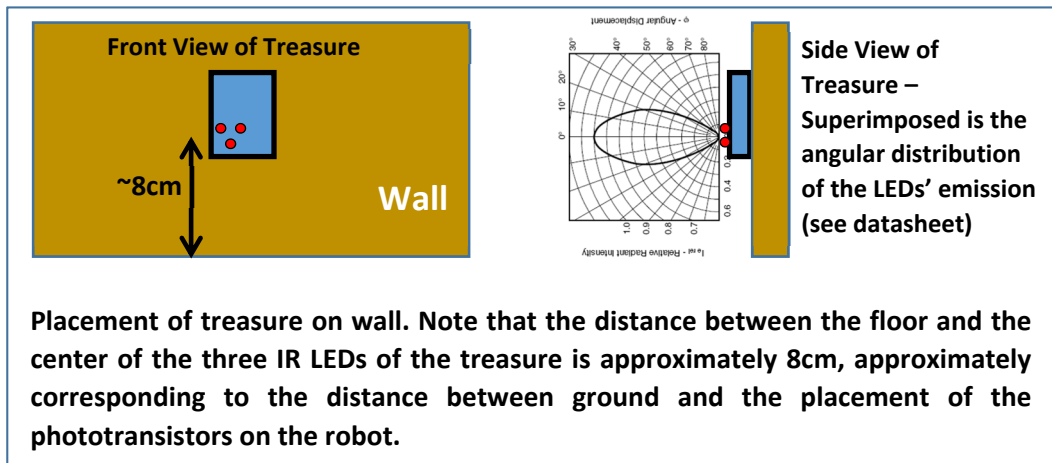
Final Demo Rules & Info

General Behavioral Rules

- Any kind of cheating will result in an immediate fail of the final demo for the team at fault.
- No screaming, arguing, angry behavior, impoliteness or rudeness will be tolerated whatsoever and could result in your team's immediate fail for the final demo.

About the Treasures

- There will be two treasures placed at different locations in the maze.
- Your robot will be able to measure only one treasure at a time without risk of interference from the other treasure.
- There will not be a treasure in the starting square.
- Each treasure will have its three LEDs blinking at a fixed frequency chosen between approximately 1kHz and 25kHz
- Each treasure will be fixed from a wall as shown below and emitting its IR light horizontally away from itself:



- The IR LEDs are aligned so that they emit light straight ahead of each of them, and each LED's radiation pattern is such that even at ± 20 degrees (in 3D) from its center it is still 65% of the maximum emitted intensity right in front of the LED (see datasheet).

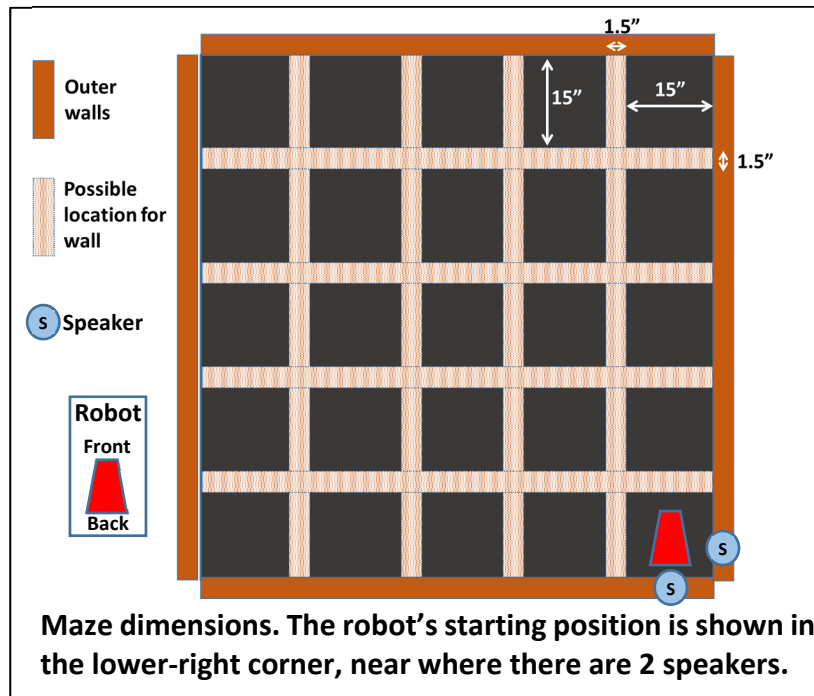
About the sound detection at the beginning

- Your Final Demo round begins with your robot in place in the starting position, stationary and motionless, "listening."
- Your base station will also be at the ready. It is a good idea (it's up to you) that upon setting your robot in its starting position and pressing the RESET button that it initiates an RF communication with the base station and displays 000.0 (or something else) on the base station display. Large rechargeable 5V batteries will be available during the Demo for you to connect your base station Nano to.

- A melody will be played and your robot will start navigating (almost exactly when) it first hears the trigger note of the frequency of 950 Hz.
- When the melody is finished and your robot hasn't started moving, you can press the override button (only after the melody is finished!) to signify your robot to start navigating (point penalty applies)
- Each note in the melody will be played for at least one second continuously
- The trigger note of 950 Hz will be played ONLY ONCE in the melody
- Other frequencies (notes) will be spaced by at least 100 Hz from the 950 Hz trigger frequency, and no frequencies below 500 Hz will be played to avoid harmonics that could be played at 950 Hz

FINAL DEMO

- The final demos will take place during the week of 06 December in the lab (PH 427). Each team will have a 20-minute slot for the demo: the first 5 minutes will be for setting up your robot and base station, the next 10 minutes will be for the actual demo (maze navigation and treasures locating), and the last 5 minutes (or longer, as needed) will be for the dismantling of your team's robot and placement of the components appropriately.
- There will be an online sign-up sheet available near the end of November where each team will sign up for a 20-minute slot.
- Your team will be allowed in the lab only at the beginning of your team's time slot to get your robot & base station and get them ready (no programming allowed), and you can leave the lab when your robot is fully dismantled (don't forget to get your dismantling points by letting a TA know that you're leaving!).
- There will be two (maybe 3 depending on space) identical mazes at the final demo, allowing for the simultaneous maze-mapping of two (maybe 3 depending on space) robots. There will be two speakers located in the robot's starting corner as shown in the next figure:

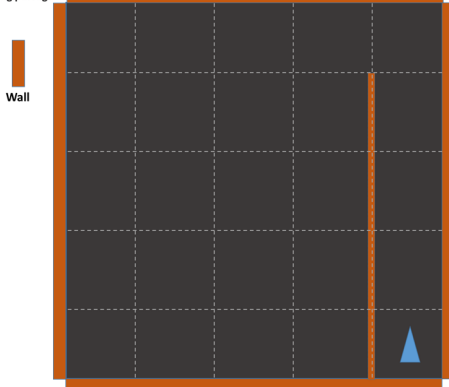


- There will be at least two staff members overlooking each maze and the base station from start to finish of your demo.
- Once your robot will have found the second treasure and its frequency is successfully displayed on the base station, it can stop navigating. The end of the navigation by your robot will also be indicated by blinking the robot's Nano's onboard LED with ON for ½ second, OFF for ½ second and so on.
- The maximum time given to find the two treasures is 10 minutes.
- You cannot physically interact with your robot (e.g., create shadows, use hands for distance detection, etc.) and your base station unless to:
 - Press the microphone override button when the melody is finished playing
 - Remove your robot from a comprising situation (e.g., stuck against a wall, stuck in a loop, ...) to replace it where it was OR restart at the beginning (the clock keeps going!).

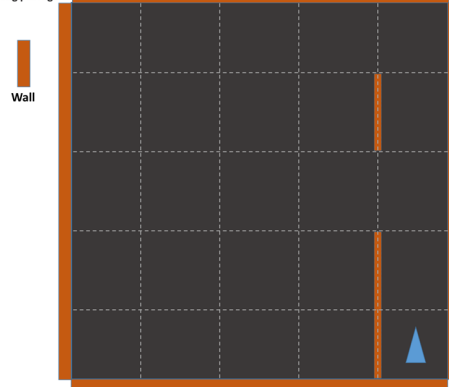
Notes about the maze:

1. There can be long (>15"), from the point of view of the robot, corridors in which the robot can navigate, as shown here:

Example of long passage

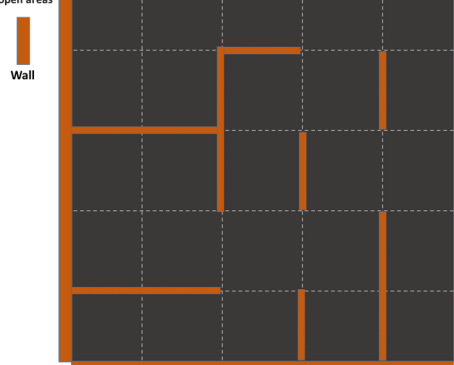


Example of long passage

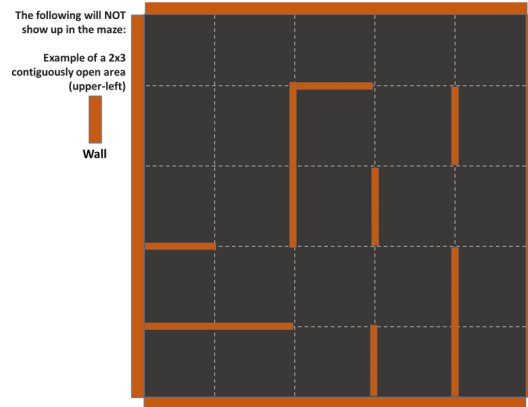


2. The largest "contiguously" open area will be 2 squares X 2 squares, as shown in the example below (which has two 2x2 squares, one in the upper-left, and the other one underneath the first one):

Example of two 2x2 contiguously open areas



3. Here is therefore an example of a large 2x3 area that will NOT appear in the maze (it's in the upper-left):



The Grading Rubric that will be used at the Final Demo is in a separate document posted on Canvas.

In all of this document, the Grading Rubric indicates where points apply and where deductions can also apply.