IEEE Ottawa Robotics Competition
Compétition de robotique d'Ottawa d'IEEE

IBM LRT Detour Challenge

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Disclaimer

It is your responsibility to read and understand this document on a regular basis because we may update it from time to time.

IBM LRT Detour Challenge

Many road detours are appearing in Ottawa due to the construction of a new LRT (light rail train) system, which will be featured in this year's IBM LRT Detour Challenge. Your task is to program a self-driving robot that can navigate through road closures, sinkholes, or other detours within the City of Ottawa. All road closures will be represented by 3D printed blocks.

The number and location of road closures will change, so your self-driving robot should be able to navigate no matter what detours arise. Below are examples of self-driving robots you can use in this challenge. The red robot below was the robot used for this challenge last year. We will no longer be providing these; however, you can reuse it if you have it or build one yourself.
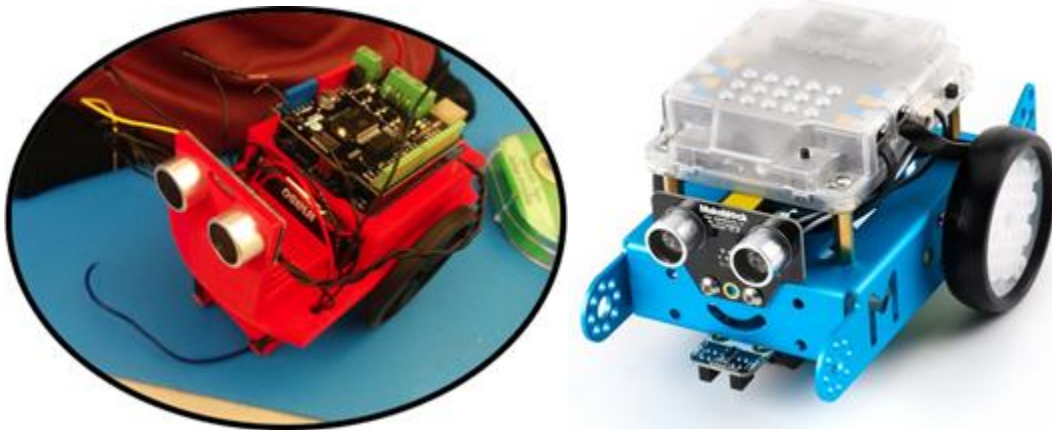
The robot we are recommending this year is the Makeblock mBot. The track has been changed to accommodate their larger size.

Challenge Rules

1. At the start of the challenge, you and your team will have come to the contest area, and you may not change your robot's program while you are competing.

2. Your robot will be placed in the START area in a specific position.

3. We will start timing your run when the team captain starts the robot.

4. Your robot will have 2 minutes to finish the city. Your robot must follow the black lines and avoid obstacles while going through the maze

5. There will be several different city layouts that your robot will go through. Each layout will have a different level of difficulty.

6. After your robot starts, the team captain will be the only one who can:
   a. Restart the robot from the START area when it hits an obstacle.
   b. Restart the robot from the START area if a judge thinks your robot has gone too far from the black lines.

7. The robot is only allowed one reset for each round. If the robot deviates from the line or hits an obstacle a second time, the round is ended and a time of two minutes is recorded.

8. **Seventy percent (70%) of your final score for the challenge will be based on the <u>average</u> time it takes for your robot to run through the city successfully (to the END area).**

9. Your team must complete a Technical Component to show your skills to us in terms of programming and documentation. This technical component is worth 30% of your final mark in the Challenge. All documents pertaining to the Arduino Challenge Technical Component can be found [here](#).

Judging & Scoring

1. The runs with all the obstacles will be modified on the day of the competition. There can be up to 10 obstacles at a given time.

2. All teams will gather at the competition area and remain there for the remainder of the round.

3. Judges will time and score your match.

4. All robots have 2 minutes to complete the maze. If the robot is unable to complete the maze within this time, a time of 2 minutes will be recorded for that particular trial.

5. The winner of the Challenge will be determined by your robot's average completion time and the mark you receive on the Technical Component. The team with the highest score will be the winner of the Challenge.

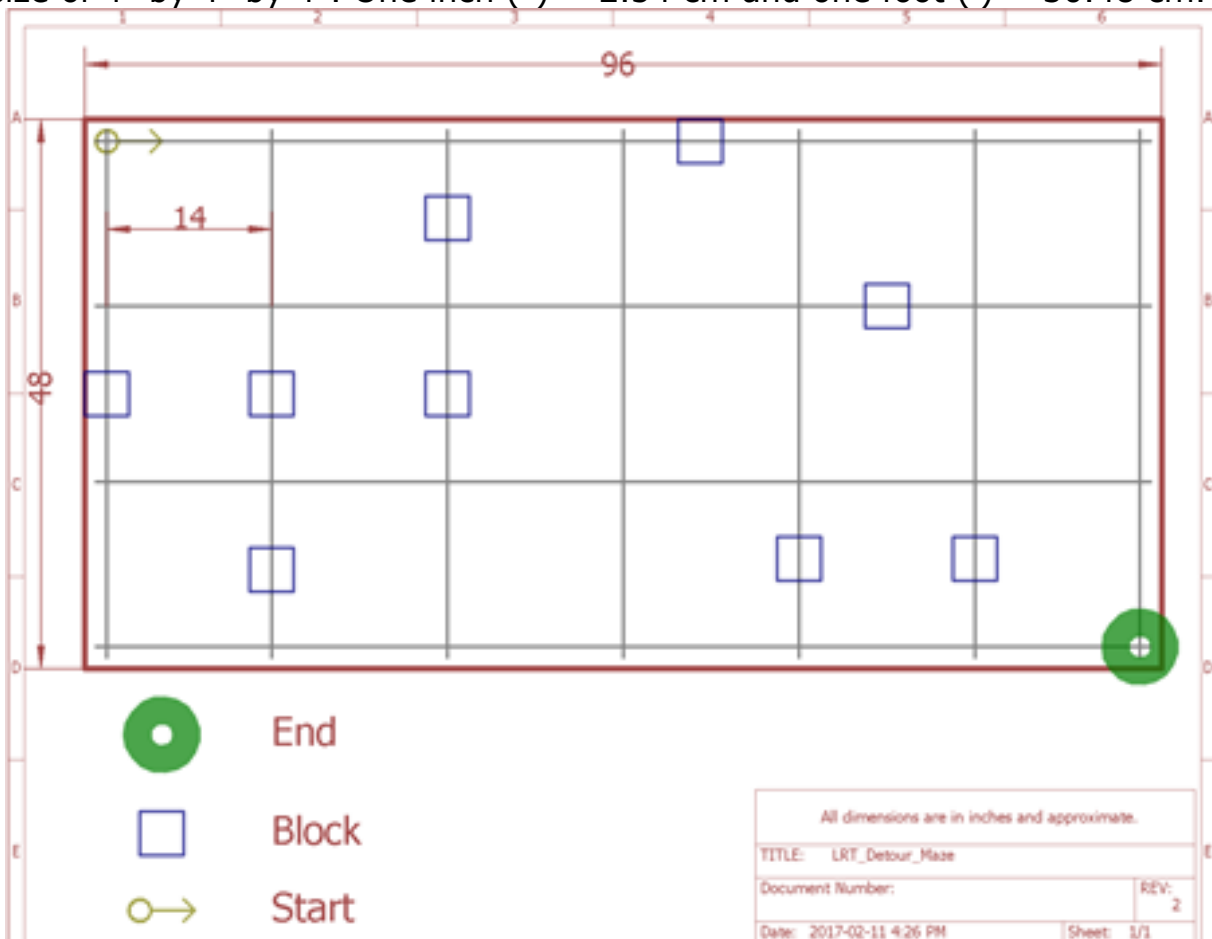6. Decisions of the judges are final.

IBM LRT Detour Challenge Starting Position

All robots will start at an intersection of the arena. The IR sensors will start after the intersection and the wheels will be behind the intersection.
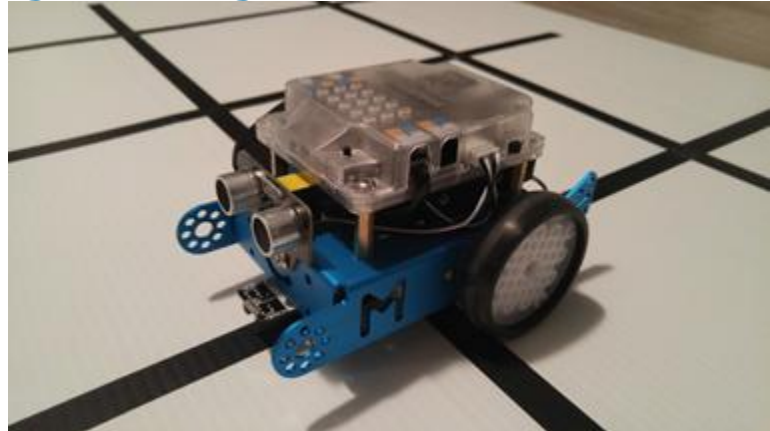
IBM LRT Detour Challenge Diagram

The dimensions of the entire challenge area are 96" by 48". The maze will be represented by black electrical tape which has been cut in half (3/8th inch) arranged in a grid of 14" by 14" squares. Obstacles will have an approximate size of 4" by 4" by 4". One inch (") = 2.54 cm and one foot (') = 30.48 cm.

Each square is 14" x 14"

The tape's thickness is 0.8 cm

The arena is 4 ft x 8 ft

10.5 cm

3 cm

2"

2"

Please note that these diagrams represent a model of the challenge and does not reflect the exact number and location of obstacles, which are subject to change on competition day.