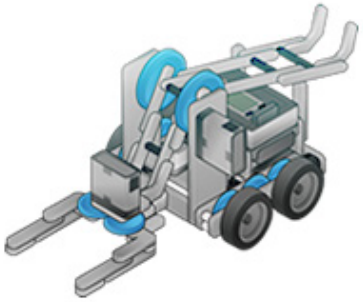


Introduction to Programming

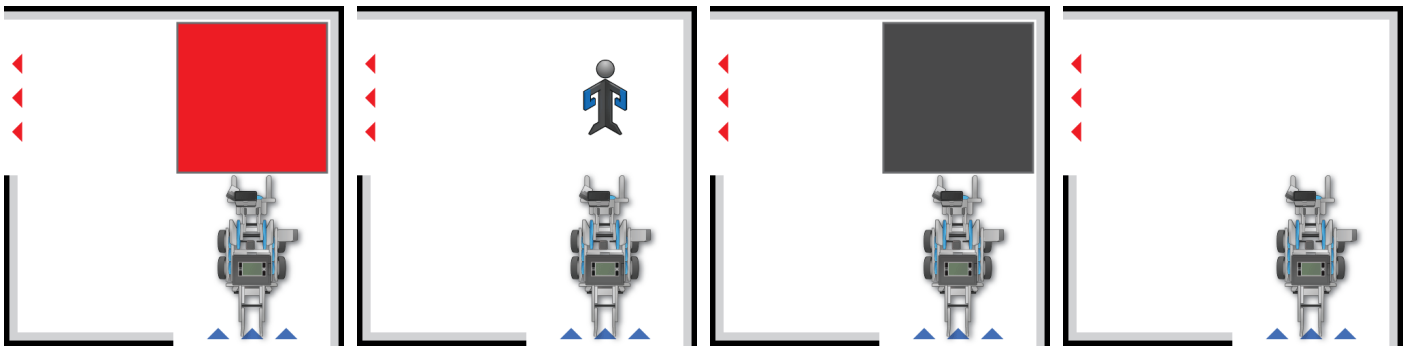
VEX IQ®

Search and Rescue Challenge

In this challenge, you will use everything you've learned to create a rescue robot that will enter a 4-room building. The robot must perform 4 unique actions for 4 unique rooms, that will be randomized in order to simulate a hazardous area where you can never know what will be encountered. The robot must complete all 4 rooms, and return to the starting point.

Final Challenge Board Setup

- The rooms' basic shapes are all identical.
- The building walls do not need to move when the rooms are randomized!
- Each room either contains one of three props or contains nothing at all.



Room 1: Fire

A sizeable square of red electrical tape on the ground. For easier portability, you can attach most of the tape to an index card or paperboard, and only attach/detach the edges from the table.

Room 2: Rescue

A piece of PVC pipe, toilet paper tube, or a VEX IQ cube. The "standing" part of the person (tube, body) must be tall enough for the distance sensor to detect.

Room 3: Walled

Any solid piece that blocks the robot's travel. Can be a piece of tape, if nothing else is available. The robot must be able to get around the obstacle, so make sure that there is enough space at the end.

Room 4: Clear

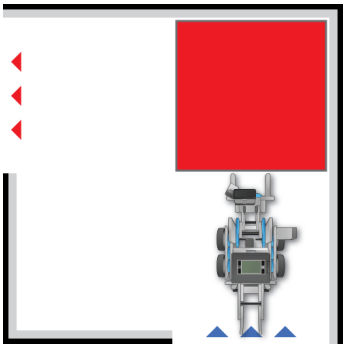
One room will not contain any props for this challenge.

PHASE 1

Before you build a robot that can complete objectives of all 4 rooms at once, demonstrate that your robot can complete each rooms, one at a time.

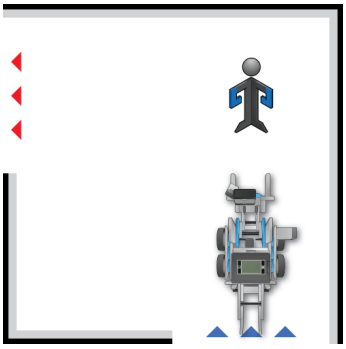
- Write a seperate program for each room.
- Robot can enter either entrance of the room.
- Robot must exit the room completing the objective.

Room Objectives



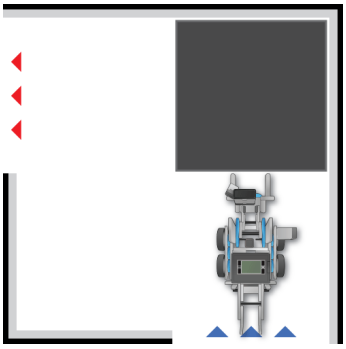
PROGRAM 1: Fire Room

Run over ‘fire’ area with the rear end of the robot



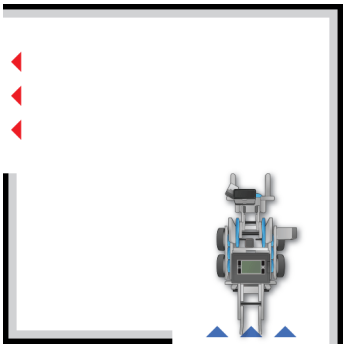
PROGRAM 2: Rescue Room

Pick up the survivor with the arm



PROGRAM 3: Walled Room

Maneuver around the obstacle in the this room



PROGRAM 4: Clear Room

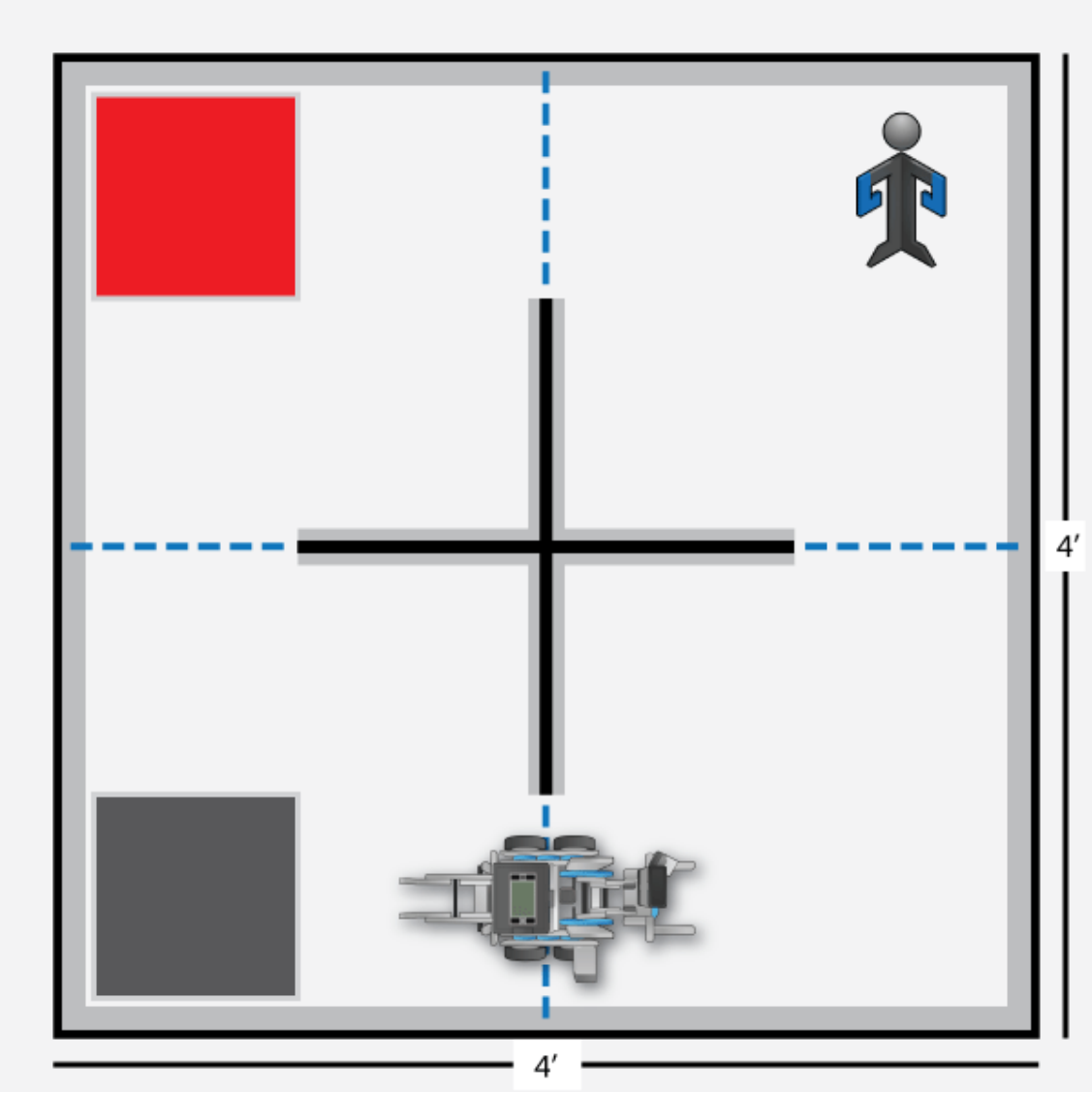
Light up the LED to the color ‘orange’ then exit room

PHASE 2

Combine your robot's capabilities in Phase 1, and build a robot that can distinguish and complete all 4 rooms in one run.

- Write 1 program that will (have your robot) travel all 4 rooms.
- The location of the rooms will be randomized each run.
- The robot can start at any doorway (blue-dotted line), oriented to go either clockwise or vice versa.
- The robot cannot travel through any of the marked walls at any time during its run.
- The operator may not choose between different programs based on the configuration - the robot must always run the same program.

Final Challenge Objective



Hints:

- Use the robot's sensors to determine which room it is in.
- Because every room has the same layout, treat every room the same.
- Write out plans for the program in advance.
- Use the robot's sensors to keep your robot from drifting too far off course over time.