October Challenge: Lunar Transporter

Robotics Curriculum
IT Adventures

Lunar Challenge Overview

Welcome to the Moon! You are part of the first generation to call this rocky, grey body “home.” You and your team have just landed, and have started unpacking. However, during the landing, the rocket unfortunately hit some debris and lost some cargo. It’s all around, but one of the most vital pieces was the Lunar RVR. You found the vehicle, but its control panel has fallen off. It also appears that the memory was wiped from exposure to excess radiation during the journey here. The RVR is vital for transporting your equipment (and yourself) to your intended base location. Therefore, it is vital that you fix it as quickly as possible.

Challenge Details

Your goal is to create a program to solve your challenge, using what you’ve learned thus far. You must create a program that does the following:

- It must make three trips, going forwards and backwards (to the future base location and back to the rocket) each time
- It must be programmed to follow the path and avoid the obstacles as laid out by the previous rough mapping (last page)
- The RVR will be carrying sensitive and volatile materials, so go slower when heading to the base
- It should be implemented efficiently (with as little code as possible) to ensure that the RVR moves efficiently
- The astronauts riding along should be able to control whether it is going forwards or backwards, using the I/O available on the micro:bit
- Lastly, make sure to indicate where you are heading - the LED array on the micro:bit would be a good way to indicate this

As you’re programming this, keep in mind what you’ve learned. How would I/O come into play here? Could loops work for efficiency? What kind of Boolean logic might apply?

Extra Challenge Details

Congratulations! You've gotten yourself and your equipment to the base. The next step is to add on to the RVR program to go to the mine location (see the map on the next page). Keep in mind the following requirements and limitations:

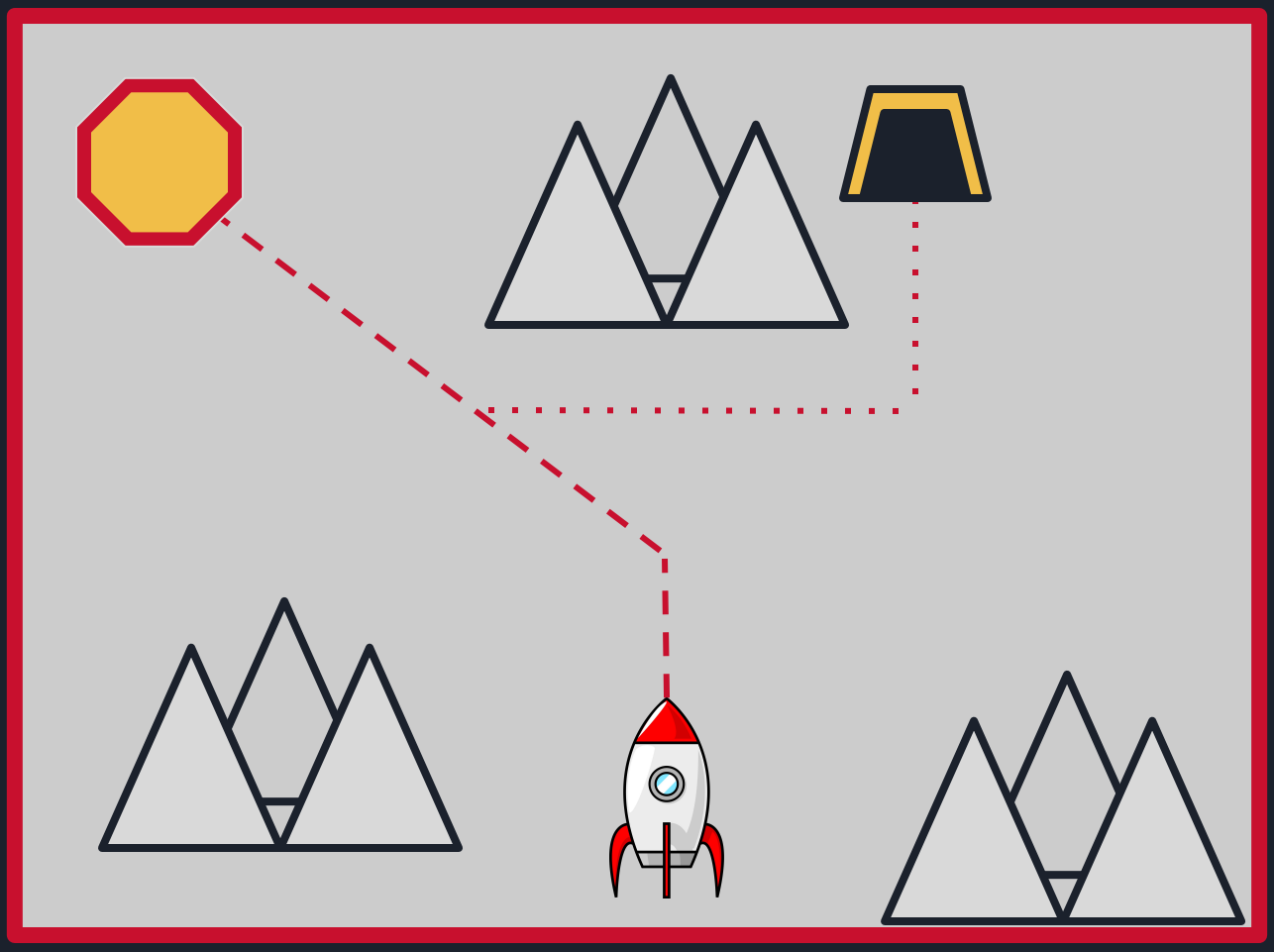
- You'll still want to be able to go to the rocket, so now you have to be able to go to 3 total locations
    - Hint: Instead of just going forwards and backwards, consider programming the RVR to go to any location from any other location. This can still be done with 2 buttons
- You will still be carrying volatile cargo, so on your way to the base from either the mine or the rocket, keep that in mind when you set your speed.

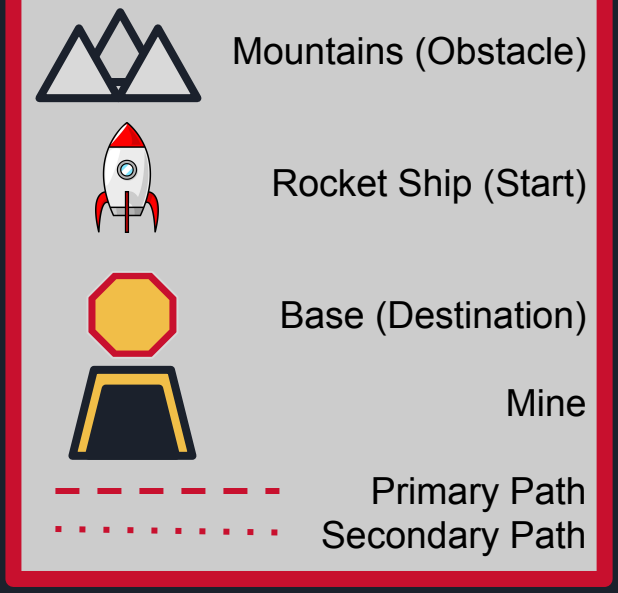
Physical Set Up

Prepare the room that you are in for this challenge. Consider moving desks and chairs to represent the physical barriers that you would be facing, and lay down masking tape (or something similar) to highlight what your starting and ending points are. Being able to represent this environment will help with testing and proving that your code is meeting the challenge.

Last but not least, have fun and good luck!

Lunar Map




Key
Mountains (Obstacle)
Rocket Ship (Start)
Base (Destination)
Mine
Primary Path
Secondary Path