

A - Rock Field Navigation

Using some switch sensors and clever coding, let's make your robot safely navigate the Martian rock fields!

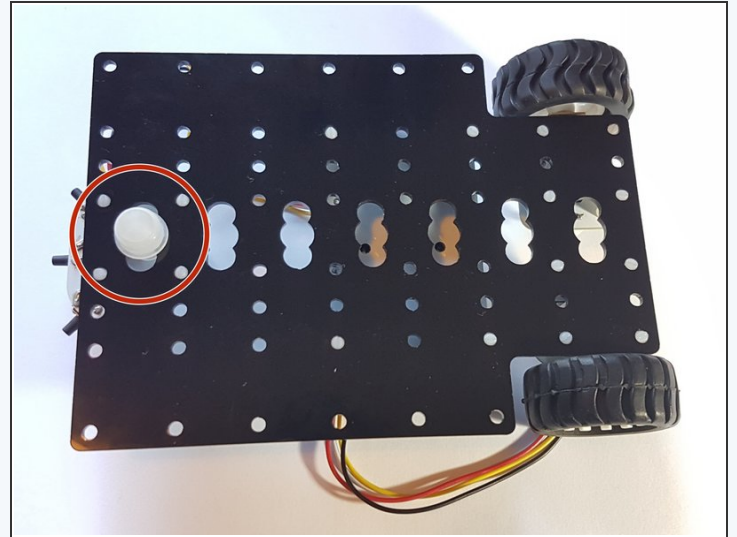
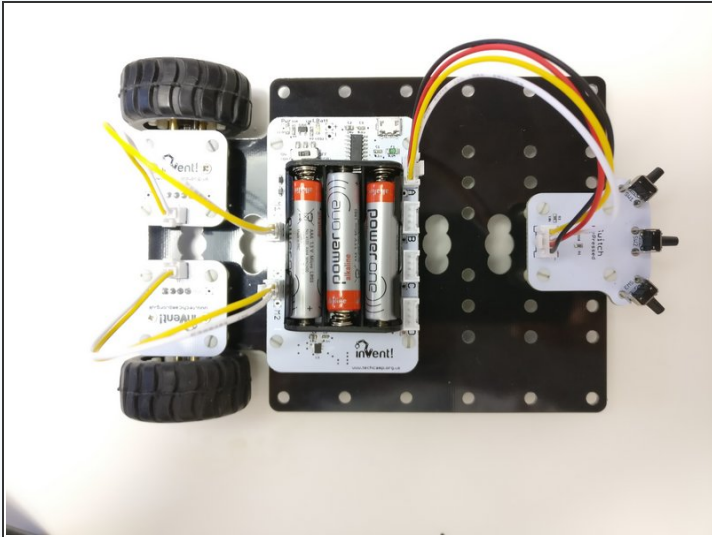


INTRODUCTION

Using some switch sensors and clever coding, let's make your robot safely navigate the Martian rock fields!

Step 1

Setup Your Robot

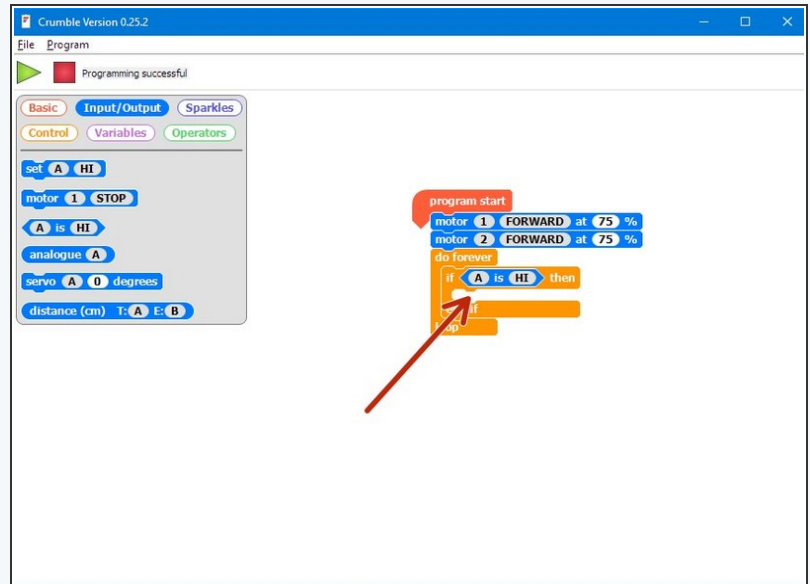


- Setup your robot like in the picture!
- Make sure the switch module is at the front, and in the **middle** of the baseboard.
- The left motor should be plugged into **M1**, the right motor into **M2** and the switch into **A**.
- The trackball should be **directly under the switch**!

Step 2

Detect an Obstacle

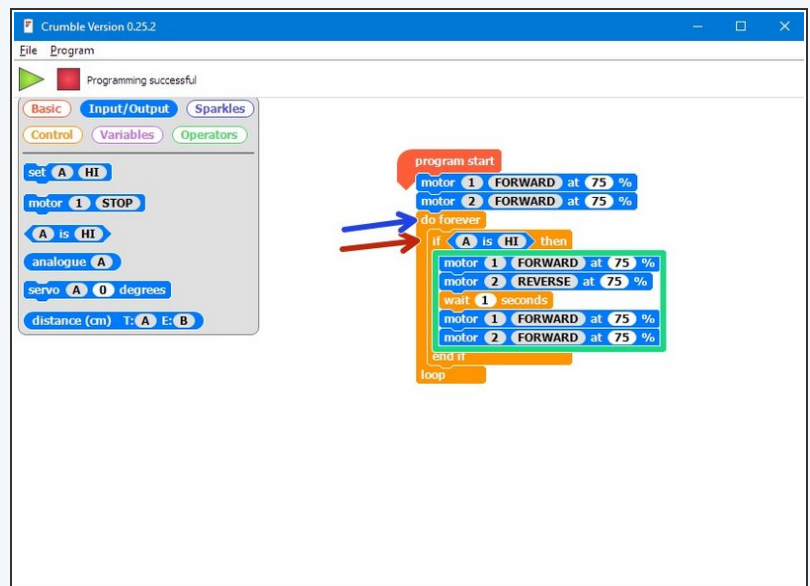
- The Martian surface is very rocky - there are lots of things the robot would get stuck on if it just drove forward. We are going to use switches to **detect** obstacles, and try to drive around them.
- For now, let's make a program to drive forward, and **stop** if we hit an obstacle.
- **Add some blocks** inside the IF block conclusion to **stop** the robot when an obstacle is hit.
- **Test your program** using **your hand** as an obstacle!



Step 3

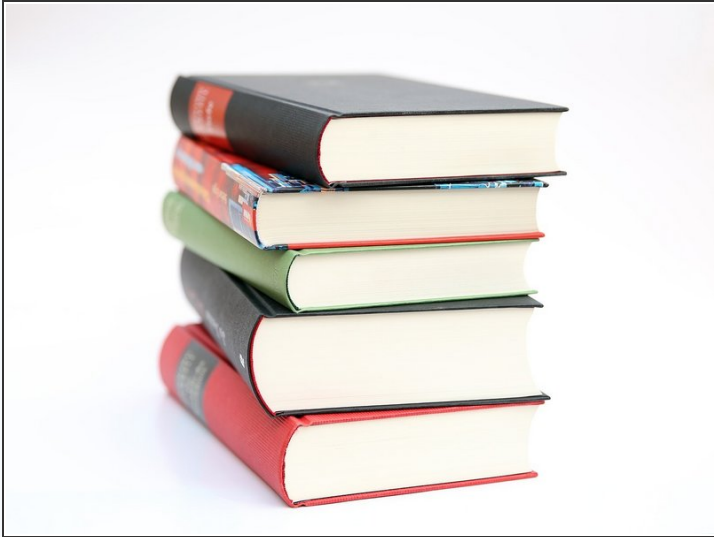
Simple Evasion

- Now we can detect obstacles, let's make our robot **turn out of the way** and keep trying to go **forward**:
- If the switch is **pressed** (HI), we must have hit an obstacle
- When we hit an obstacle, **turn**, then drive **forward** again
- When driving forwards, **always check** to see if we have hit another obstacle!
- Edit your program and **test it out with your hand**!



Step 4

Setup the Rock field



- Now let's **make a rock field** on your Mars surface - you can use anything, so long as it is solid and tall enough to touch the switches when they are on your robot. Check out the pictures for some ideas!
- Make sure there is **enough room between your obstacles** so your robot can still get through.
- You might find your robot pushes light obstacles out of the way - you can always **tape them down** if you want.
- **Test** your evasion program in the rock field - what do you think will happen? Will it make it to the other side?



Step 5

Better Evasion

- You might find that your robot **gets stuck** when it hits a real obstacle, as it doesn't **reverse** a bit first when it hits something.
- For this challenge, change your program so when it hits an obstacle, your robot **reverses slightly, turns a small amount**, then goes **forward** again.
- **Test it out** in your rock field - you will need to **adjust** how far it **reverses** and **how much it turns** to get it working well!



Step 6

Evasion Race

- For an extra challenge, let's add some **feedback** to our robot so it can tell us what its doing.
- **Add the LED module** to your robot and plug it into two letters.
- Add blocks to your program so that:
 - When driving forwards, the **green LED** is on.
 - When an obstacle is hit and the robot is reversing and turning, the **red LED** is on.

