A - Automatic Patrols

We need to patrol the planet to keep it safe, but don't have time to do it ourselves. Learn how to get your robot to steer itself automatically!

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INTRODUCTION

We need to patrol the planet to keep it safe, but don't have time to do it ourselves. Learn how to get your robot to steer itself automatically!

Step 1

Autonomous Robots

- Autonomous robots are **very important** in advanced factories!

- Watch the video to see some of **Amazon's** autonomous transport robots moving products around the warehouse.

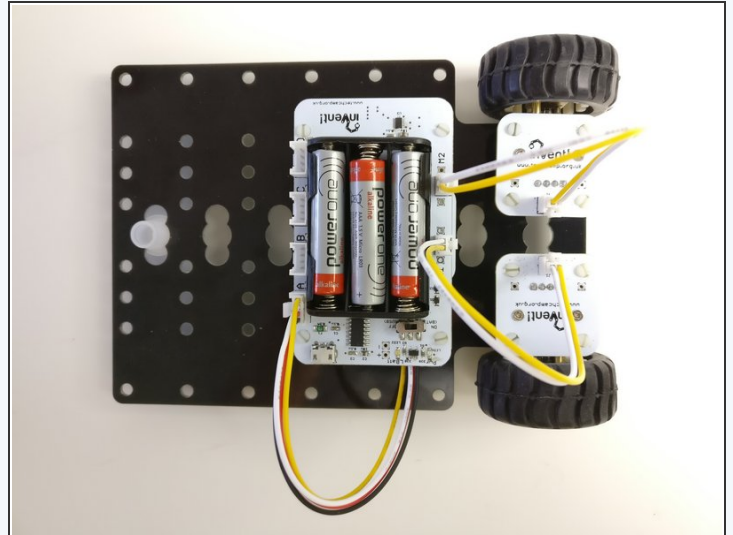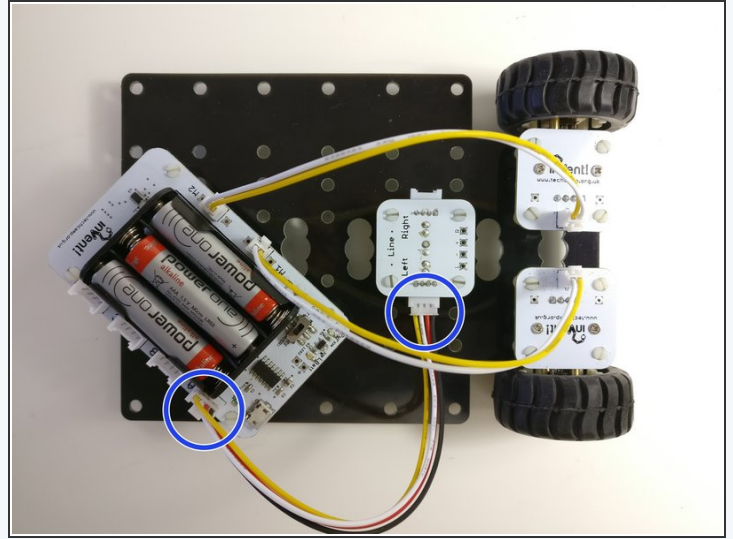- **Think how many people** would be required to do the job of the robots!

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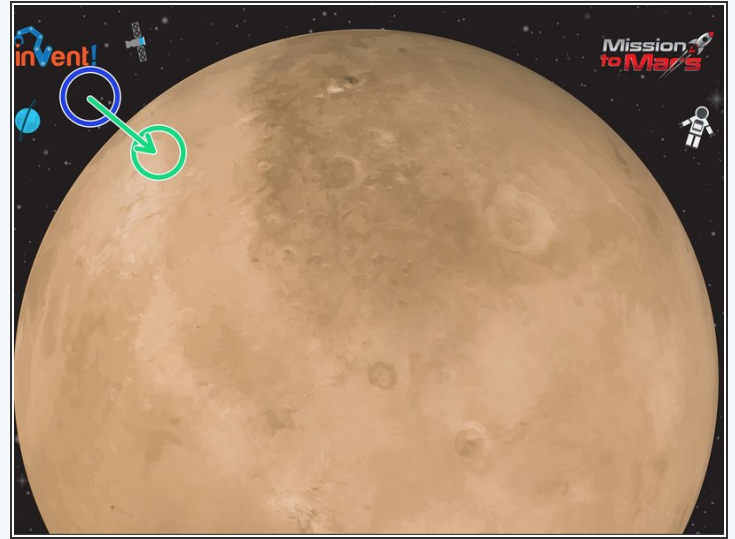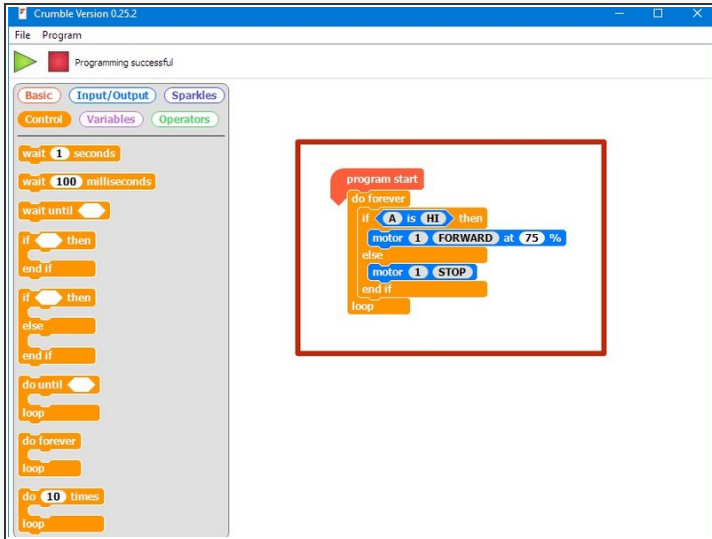
Assemble your robot!

- We're going to make our own autonomous robot to **patrol the outside of the planet.**

- **Assemble** your robot like the picture!

- You will need the **line sensor module** for this lesson. For best results, mount your line sensor underneath your junior main board as shown

- Just connect the **left sensor** to **A** for now.

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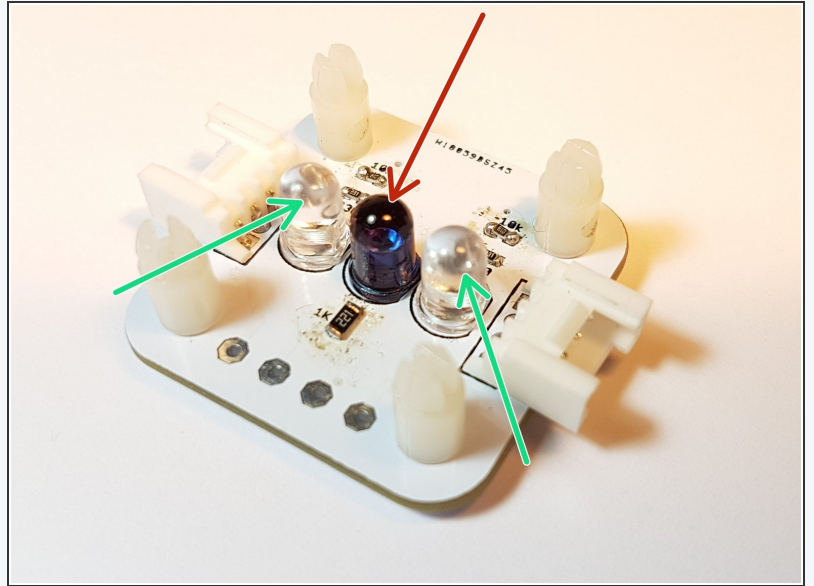
Test the line sensor

- How does the line sensor work? Let's write a **test program** to find out.

- **Build** the test program in the picture. Can you **guess** what it will do?

- **Program** your robot and place it on the activity mat, **outside the planet** - the motor should be **off.**

- Then, try moving it **onto** the planet - the **motor should start turning!**

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Step 4

How does it work?

- Turn the robot over and look at the **bottom** of the line sensor. You should see **3 LEDs.**

- The centre LED is an **infrared emitter** - just like on your TV remote control! It shines infrared light downwards **all the time.**

- The two outer LEDs are **infrared receivers** - they can **sense infrared light.**

- When the robot is on a **black surface,** infrared light is **not reflected** and so the receivers give a **LO** signal.

- On a **white surface**, the light is **reflected** and so the receivers give a **HI** signal.

- Using the signal from the sensors (HI or LO), we can **detect what colour surface to robot is on!**
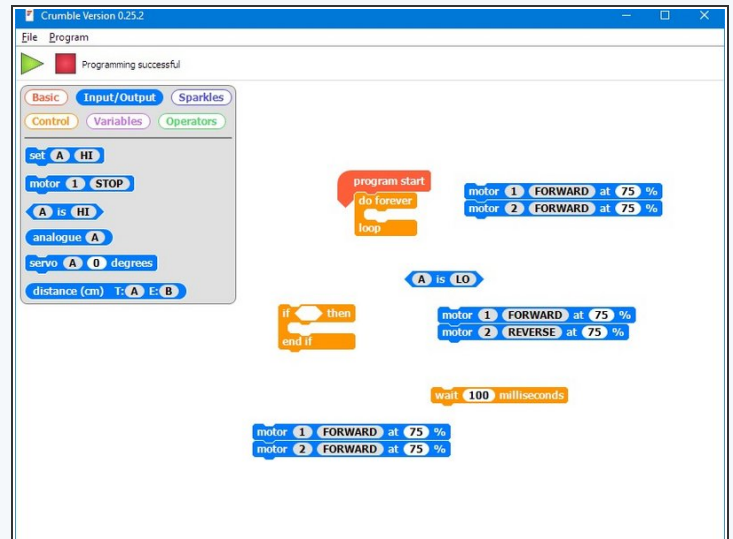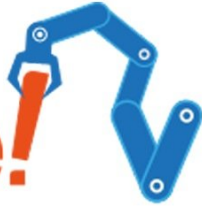
Step 5

Don't drive off the planet!

- Let's use the line sensor to stop the robot from **driving off** the planet.

- Don't forget - the sensor is **HI** on **white** backgrounds, and **LO** on **black** backgrounds.

- Put the code blocks in the picture into a program that makes the robot:

  - Drive **forward**

  - **Stop** IF it drives off the planet (when the background is **black**)
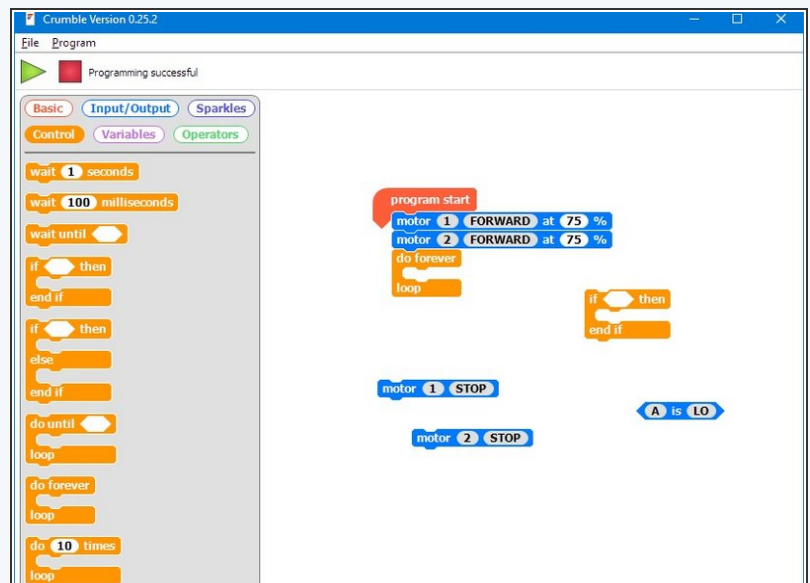
Patrolling the Planet

- Now we have everything we need to drive around the edge of the planet **automatically!**

- To do this, your program needs to:
  - Drive **forwards**

  - **Check** the sensor

  - If the sensor is **LO,** we are about to drive off the planet! **Turn slightly** towards the **middle of the planet** and then go **forwards** again.

- Your robot should drive around the edge of the planet, without getting lost. There is a **hint** of the blocks you need in the picture if you need help!

- Try and make your robot drive around the planet as **smoothly** as you can.

Orbiting the Planet

- Currently, the robot tries to **stay** on the white and **avoid** the black.

- Can you change the code so the robot **orbits** the planet by staying on the black, and turning **away** from the white?

- Hint: instead of normally going forwards, you will need to **normally be turning towards the centre of the planet.**

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