THE SYMBOLIC ELEMENT

Your group's symbolic element is **FIRE**, which represents energy, transformation, and passion. In the context of the **United Nations Sustainable Development Goals (UN SDGs)**, Fire can symbolise transition and technological advancements and renewable energy sources aimed at addressing environmental challenges.

This worksheet addresses the following UN SDGs within the Transportation industry:

- **Goals 3** Ensure healthy lives and promote well-being for all at all ages.
- **Goals 7** Ensure access to affordable, reliable, sustainable and modern energy for all.
- **Goals 11** Make cities and human settlements inclusive, safe, resilient and sustainable.
- **Goals 17** Revitalize the global partnership for sustainable development.

THE TRANSPORTATION INDUSTRY

In the transportation industry, technologies such as Artificial Intelligence (AI), Robotics, Internet of Things (IoT), Big Data, and VR, can be used to provide efficiency, safety, and sustainability in the transportation sector.

AI	Robotics	Internet of Things

EXTENDED READING:
Artificial Intelligence (AI): AI optimises traffic light timings to reduce congestion. Example: Adaptive traffic signals in London improve traffic flow.

Robotics: Robots deliver packages efficiently. Example: Starship Technologies' delivery robots autonomously navigate sidewalks to deliver goods in cities.

Internet of Things (IoT): IoT devices track vehicle health and location. Example: UPS uses IoT sensors for real-time fleet management and maintenance alerts.

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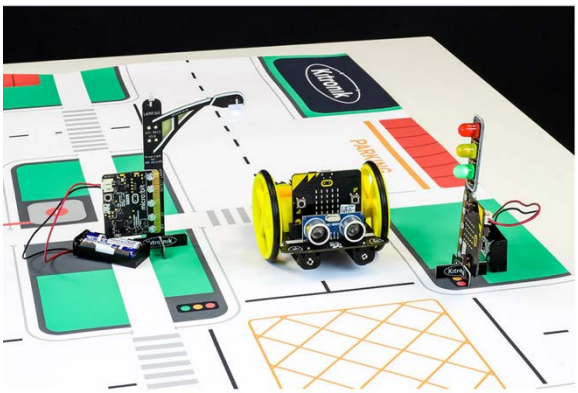
THE ROBOTICS TECHNOLOGY

- Robotics technology can be used in the transportation industry in the form of autonomous cars.
- Autonomous cars are driverless cars that are capable of operating with reduced or no human input.
- Autonomous cars can improve accessibility for people who have to rely on others for mobility.



THE MISSION: CREATE A SIMPLE AUTONOMOUS CAR

Question: What helps the driver see around the car?
Please write down you answer below:

Answer:

Question: What helps the car move?
Please write down you answer below:

Answer:

Question: How does a car turn left?
Please write down you answer below:

Answer:

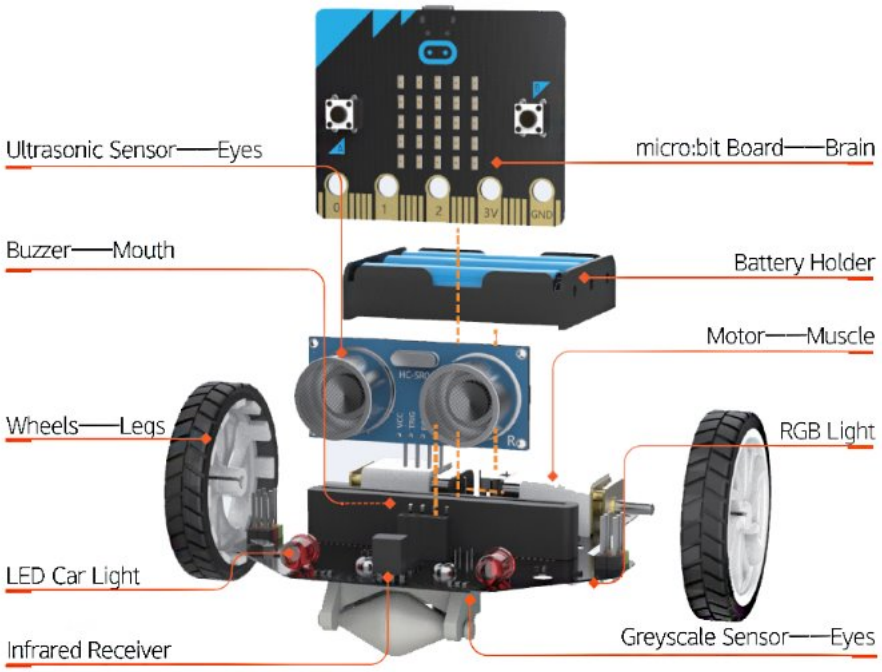
THE MISSION: CREATE A SIMPLE AUTONOMOUS CAR

Accidents are often caused by driver fatigue, lack of attention, or incorrect behaviour. This means that almost 99% of all accidents are due to human error. Autonomous cars can be made more efficient, and the accident rate can be reduced.

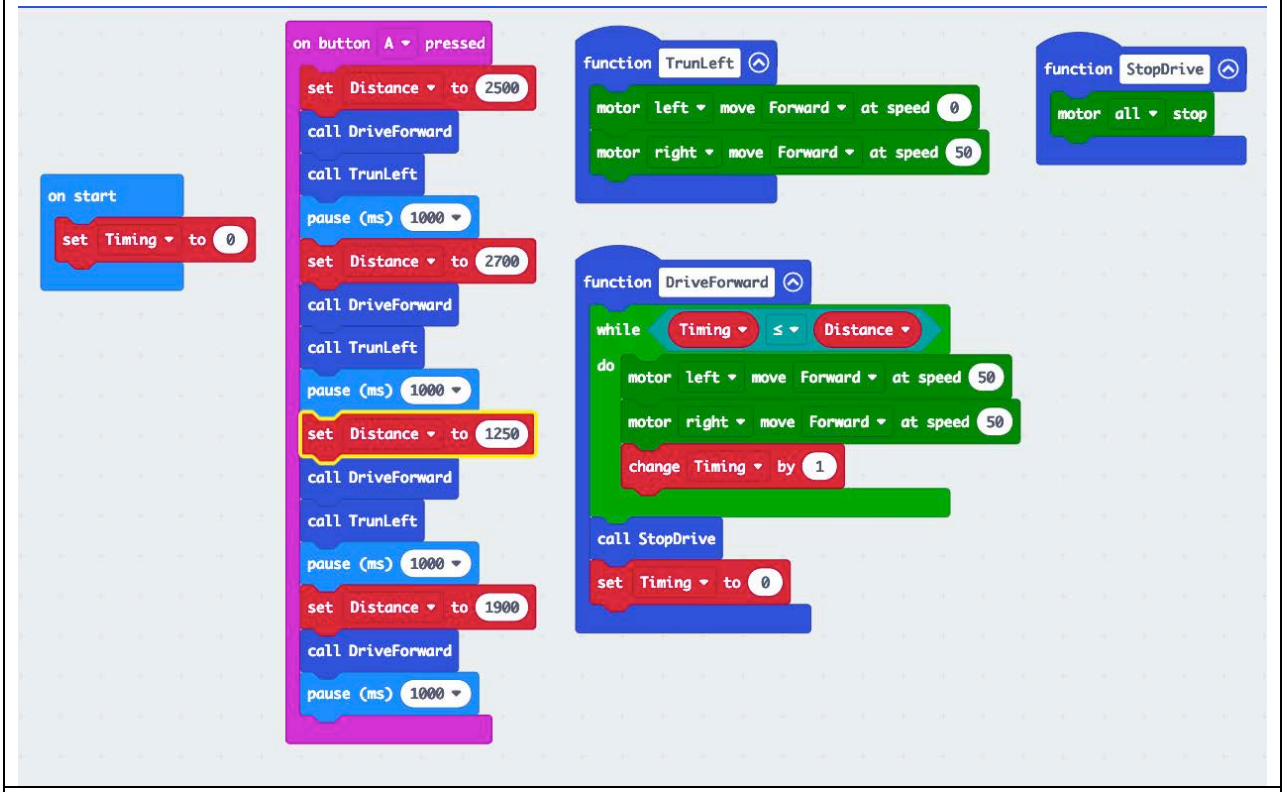
STAGE ONE: USE ROBOTICS PROGRAMMING TO CREATE A SIMPLE DEMO OF AN AUTONOMOUS CAR

1. We will use a mini two-wheeled robot car called a Maqueen. Which can be controlled using the micro:bit board. The Maqueen has the following specifications:

- It has two motors (left and right), which allows you to control the Maqueen's speed and movement.
- An ultrasonic sensor, which allows you to read the distance between the senor and the obstacle ahead.
- A line-tracking sensor.



2. Below we have the coding building blocks that program the car to move in certain directions. The code uses **functions**, which are "self-contained" modules of code that accomplish a specific task. Read the code below and the answer the following questions.



Question: "Timing" in the code above is a variable. Variable form a way of storing information in a computer program. In the code above, what does the "Timing" variable do for us?
Please write down you answer below:

Answer:

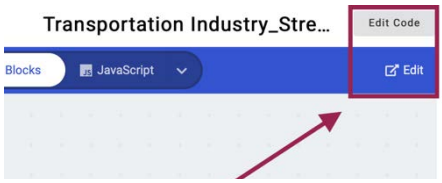
Question: What do the functions "DriveForward", "TurnLeft" and "StopDrive" in the code in the above picture do?
Please write down you answer below:

Answer:

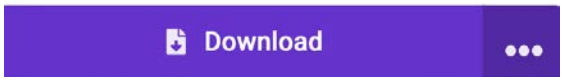
3. Let's program the with the code above. To do that, please follow these five steps:

Step 1: Go to https://makecode.microbit.org/S32956-36485-01660-67924

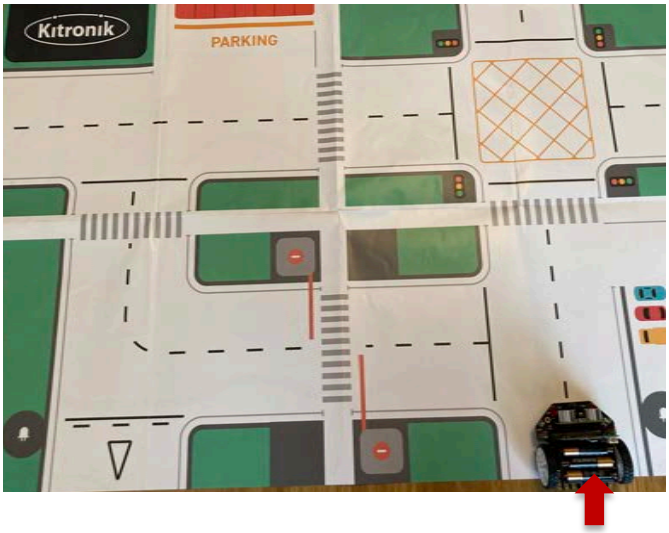
Step 2: Click on the **Edit** button.



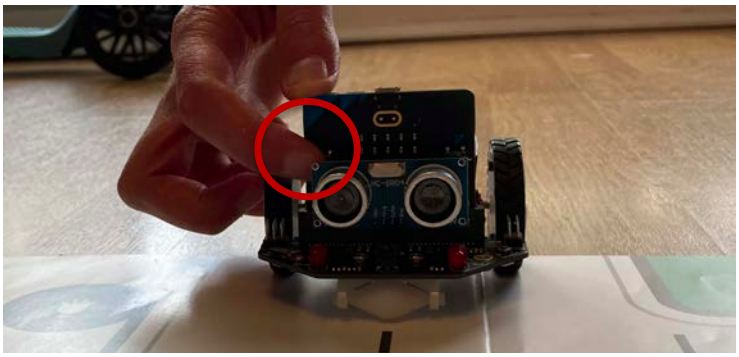
Step 3: Download your project and copy/install it into the BBC micro:bit attached to the Maqueen robot.



Step 4: Now, place the Maqueen car on the map given to you, on the specific location shown in the picture below.



Step 5: Turn on the power button on the back of the Maqueen, and then press the **A button** on the BBC micro: bit board

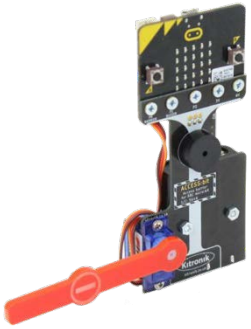


Question: Can you draw the path that the Maqueen car traverses? (*Caution: sometimes, hairs and dust get stuck in the Maqueen car's wheels; please ask for the student ambassador's help if you notice the Mcqueen car behaves strangely.*)
Please draw down you answer below:

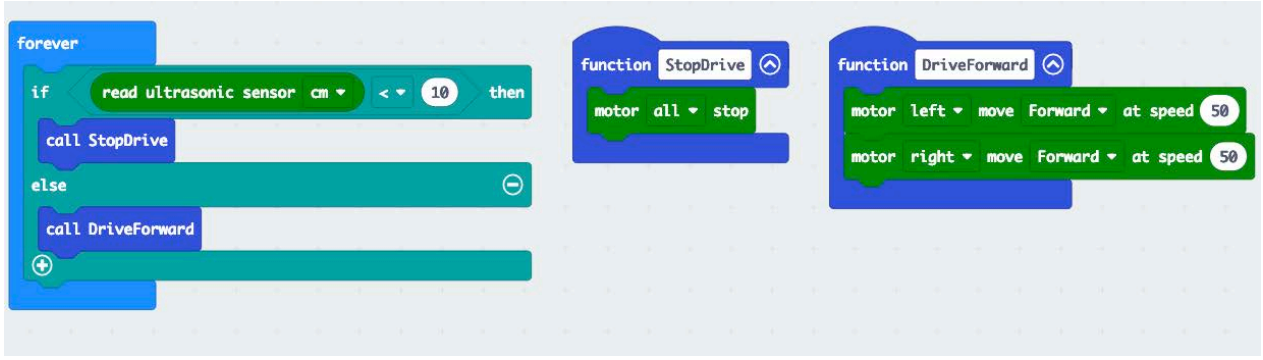
Answer:

STAGE TWO: USING ROBOTICS PROGRAMMING TO CREATE AN AUTONOMOUS CAR THAT STOPS AT A BARRIER

1. We will use the ACCESS:bit barrier to use as an obstacle, and program the barrier control. The ACCESS:bit barrier is attached to a servo. The BBC micro:bit can tell the servo how to move, allowing it to make the barrier go up and down.



2. Below we have the coding building blocks that program the Maqueen's ultrasonic sensor, which allows you to read the distance of the senor and the obstacle ahead. On the right side, write down what the code shown below does.



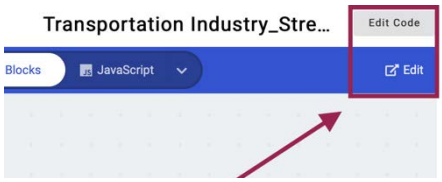
Question: Write down what the code shown above does.
Please write down you answer below:

Answer:

3. Let's program the micro:bit with the code above. To do that, please follow these four steps:

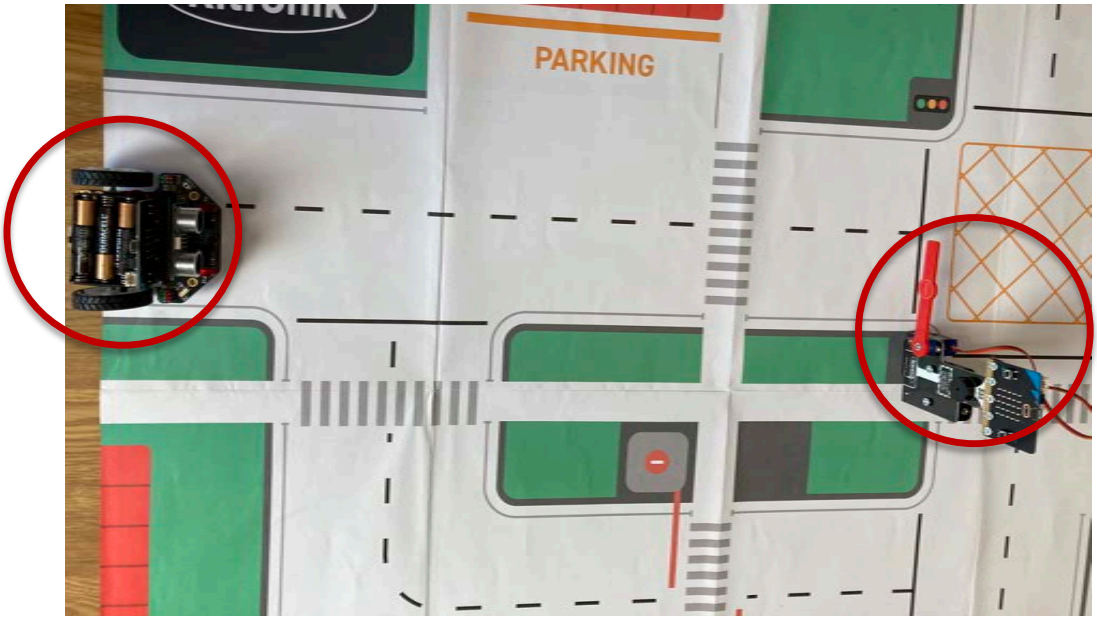
Step 1: Go https://makecode.microbit.org/S33740-13566-13780-59786

Step 2: Click on the **Edit** button



Step 3: Download your project and copy/install it into the BBC micro:bit attached to the Maqueen robot.

Step 4: Now, place the Maqueen car and the ACCESS:bit on the map given to you, on the specific locations shown in the picture below.



Step 5: Turn on the power button at the back of the Maqueen car.