THE SYMBOLIC ELEMENT

Your group's symbolic element is **WOOD**, which represents **growth, vitality, and regeneration**. In the context of the **United Nations Sustainable Development Goals (UN SDGs)**, wood can symbolise innovations aimed at addressing sensible production and recycling.

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

- **Goal 3** Ensure healthy lives and promote well-being for all at all ages.
- **Goal 7** Ensure access to affordable, reliable, sustainable, and modern energy for all.
- **Goal 12** Ensure sustainable consumption and production patterns.
- **Goal 17** Revitalise global partnership for sustainable development.

THE FASHION INDUSTRY

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

AI	Robotics	Internet of Things

EXTENDED READING:

Artificial Intelligence (AI): AI predicts fashion trends by analysing social media and sales data. Example: Stitch Fix uses AI to personalise styling recommendations for customers.

Robotics: Robotics automates garment production, increasing efficiency. Example: Sewbot by SoftWear Automation assembles T-shirts autonomously, reducing production time and costs.

Internet of Things (IoT): IoT tracks inventory and reduces waste. Example: Zara uses RFID tags to manage stock levels and streamline supply chains.

THE ARTIFICIAL INTELLIGENCE (AI) TECHNOLOGY

- AI technology can be used in interactive clothing, such as creating garments that respond to environmental factors.
- AI technology can be used in interactive jewellery, which are wearable pieces that incorporate AI technology to engage with the wearer or their environment in dynamic ways.
- For example, interactive jewellery can be recycled to reduce environmental impact.
- Moreover, jewellery can be designed to be multifunctional or upgradable, which helps reduce waste by extending the product's lifespan.

THE MISSION: TO USE WEARABLE DEVICES FOR INTERACTIVE JEWELLERY

Question: (In your opinion) How is it possible to create an interactive necklace that matches the wearer's clothing?
Please write down your answer below.

Answer:

Question: (In your opinion) How is it possible to integrate coloured LEDs in the interactive necklace (see the image on the side)?
Please write down your answer below.

Answer:

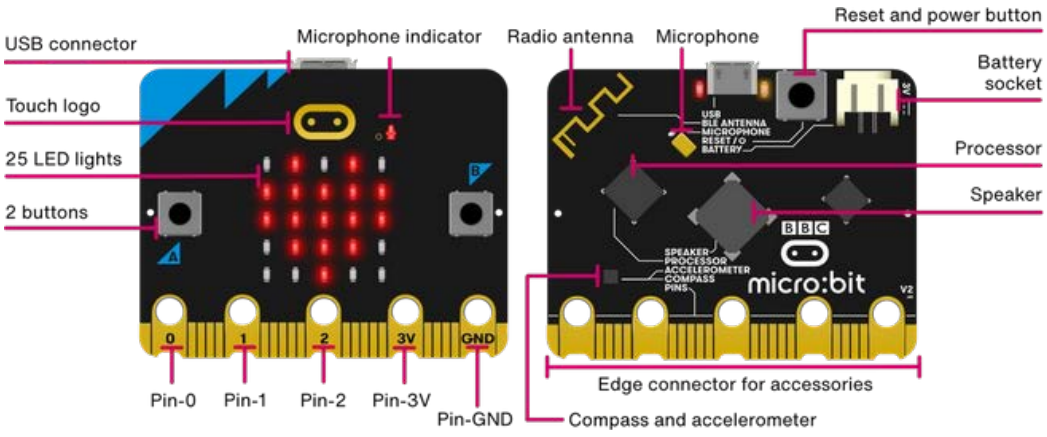
Question: (In your opinion) How can the wearer/user change the colours of the interactive necklace to their liking or mood?
Please write down your answer below:

Answer:

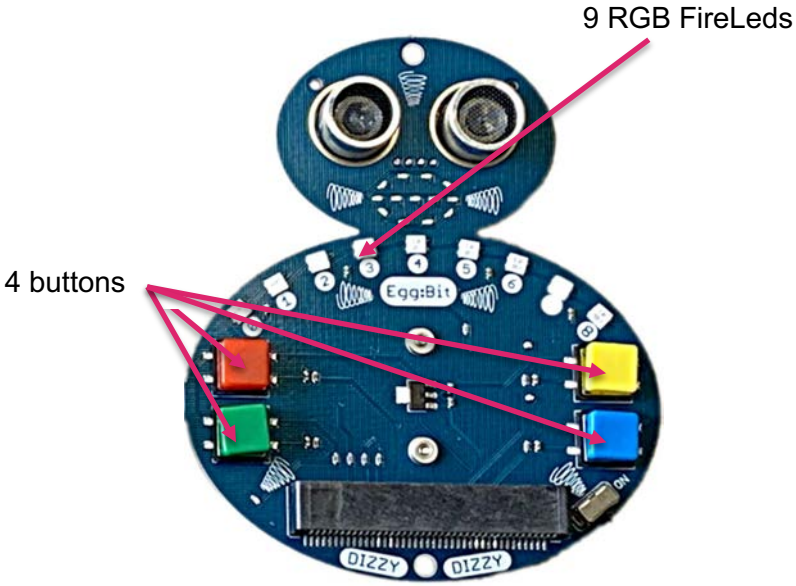
STAGE ONE: USING AI TO CREATE AN INTERACTIVE NECKLACE

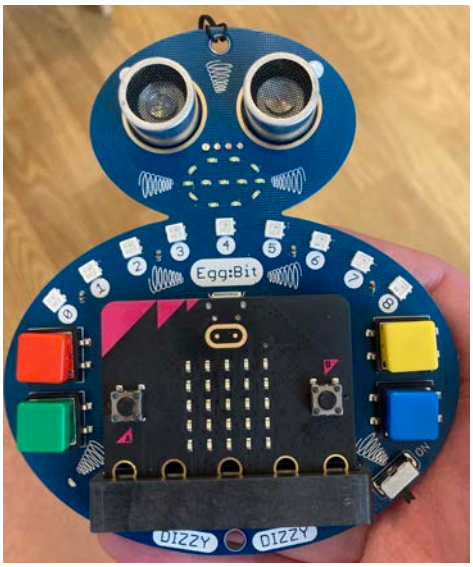
We will use a simple form of AI called a *finite state machine (FSM)* to program a button that allows the wearer of the necklace to change the LED colours to match their cloth, mood, or style. For that, we will need:

1. A BBC micro:bit: A pocket-sized computer (see the picture below for more details). We will use the radio functionally inside the BBC micro:bit.



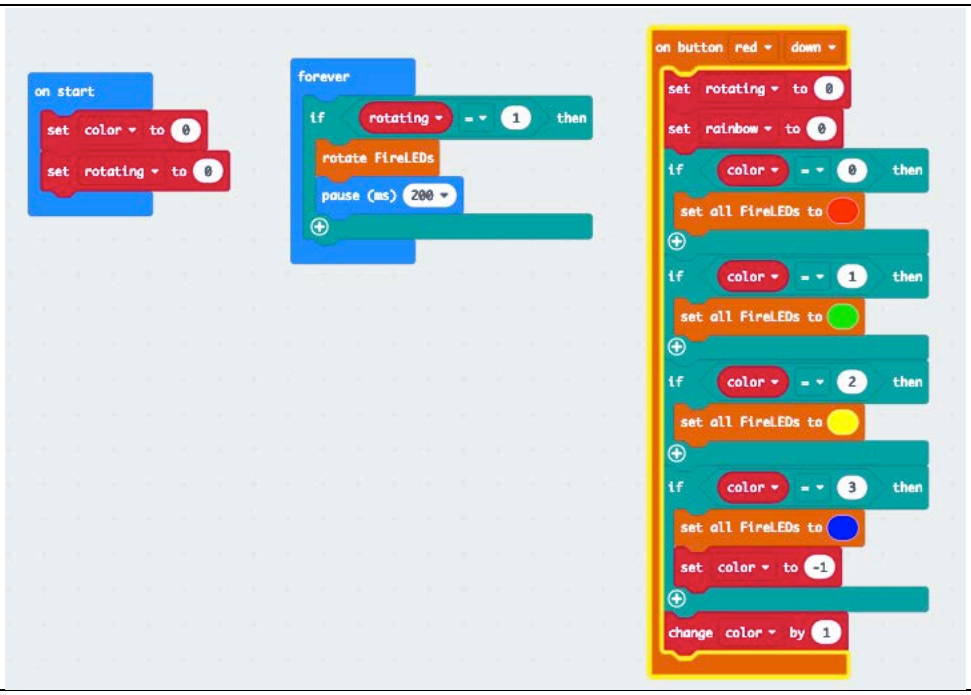
2. An Egg:Bit: A lightweight, wearable device with emotive face, four buttons, and 9 RGB (Red, Green, Blue) FireLeds. The Egg:Bit is a wearable device that works with the BBC micro:bit. We will use the four buttons in the Egg:Bit to allow the wearer to interact with the LEDs.





3. We will use the buttons of the Egg:Bit to change the colour of the FireLeds to the wearer's liking. This can be done through programming the the BBC micro:bit attached to the Egg:Bit.

4. Below we have the coding building blocks that can program the red button of the Egg:Bit. The code uses **variables**, where a **variable** represents a place in which you can **store** information in a computer program. Read the code below and answer the following questions.

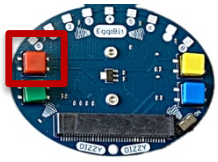


Question: "colour" and "rotating" in the code above are variables. What do the "colour" and "rotating" variables do for us?
Please write down you answer below:

Answer:

Question: In the above code, there is an event called "on button red down". In programming, an event is an action that the software can recognise and respond to. Events can be triggered by various sources, such as user interactions. In this case, the event is when the user presses the red button of the Egg:Bit (see the image below). Looking at the code, make a guess: what do you think will happen when the user presses the red button?
Please write down you answer below:

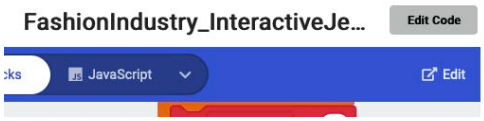
Answer:



5. Let's program the micro:bit with the code above to see what it does.
   To do that, please follow these five steps:

   Step 1: Go to https://makecode.microbit.org/S81553-93433-56136-65937

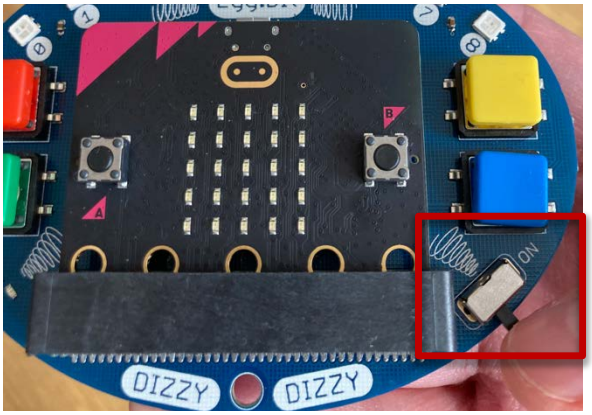
   Step 2: Click on the *Edit* button.



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

Question: Turn on the power button on the Egg:bit (see the picture).Then, press the red button once, then press it again and again. What do you notice?

Please write down your answer below.
(Please turn off the power button after you write your answer.)

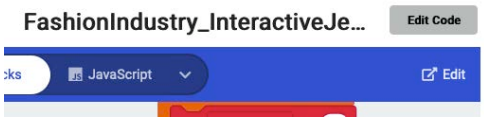


STAGE TWO: PROGRAM THE INTERACTIVE NECKLACE TO REFLECT YOUR MOOD.

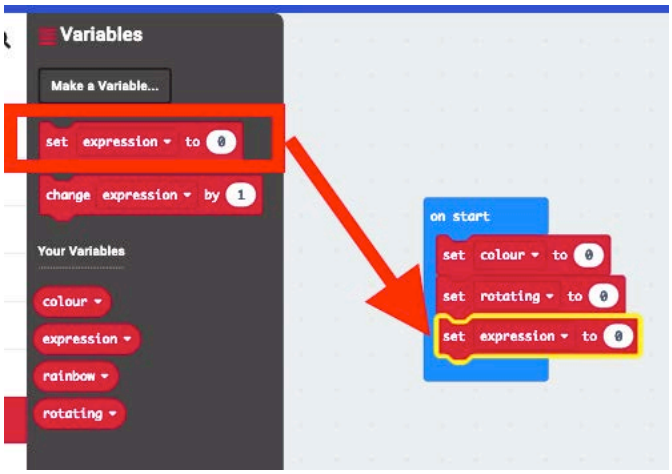
1. We will program the BBC micro:bit to navigate through different facial expressions on the Egg:bit when the user presses on the blue button. To do that, please follow these five steps.

Step 1: Go to https://makecode.microbit.org/S35568-54366-73233-06451

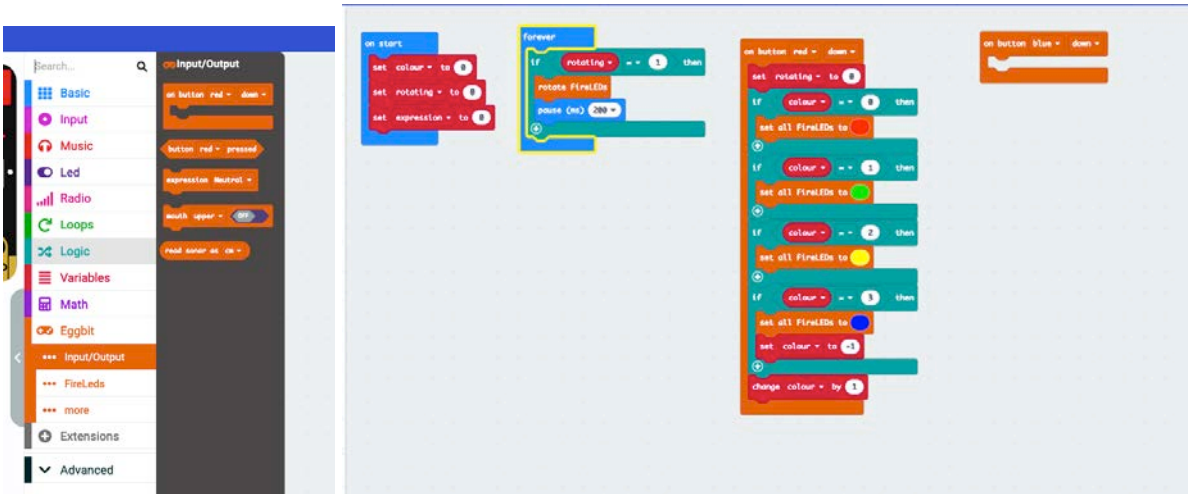
Step 2: Click on the *Edit* button.



Step 3: Then, from the **variable** menu, drag and drop the "**set expression to 0**" inside the **on start** block (see the screenshot below).

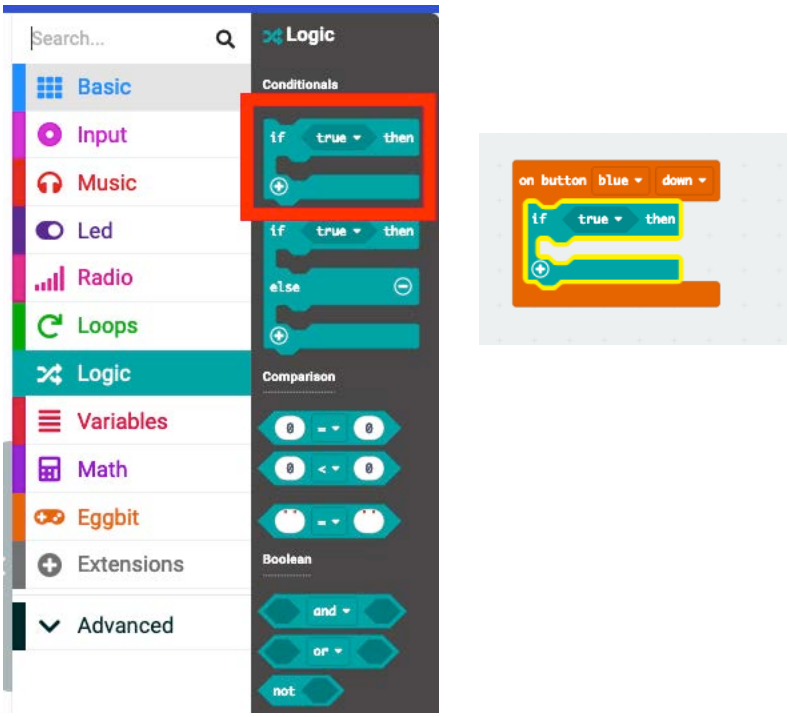


Step 4: Then, from the **Input/Output** menu within the **Eggbit** menu, drag and drop the "**on button red down**", and then change *red* to *blue*. This means that we now indicate a new event that the program has to respond to when the user/wearer presses the blue button (see the screenshot below).

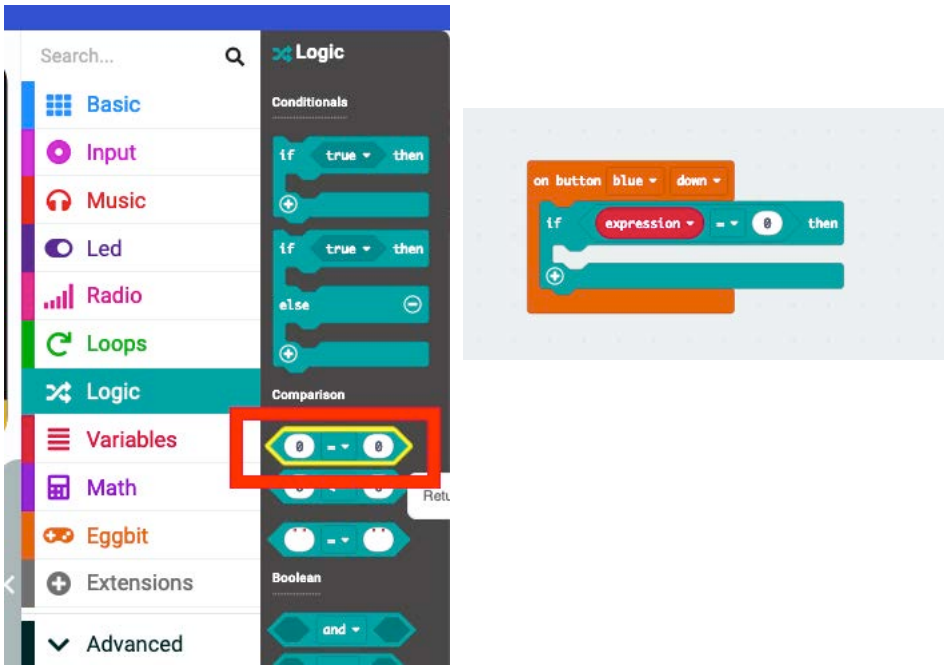


Step 5: Now, we will need to create a simple finite state machine, where each state corresponds to a mood, and where the state changes when you press the blue button. When you press the blue button for the first time, the variable **expression** is 0 and the displayed mood on the Egg:Bit would be Neutral. That can be done using an *if statement* that checks if the variable **expression** is 0, which corresponds to the expression on the Egg:Bit being **Neutral**.

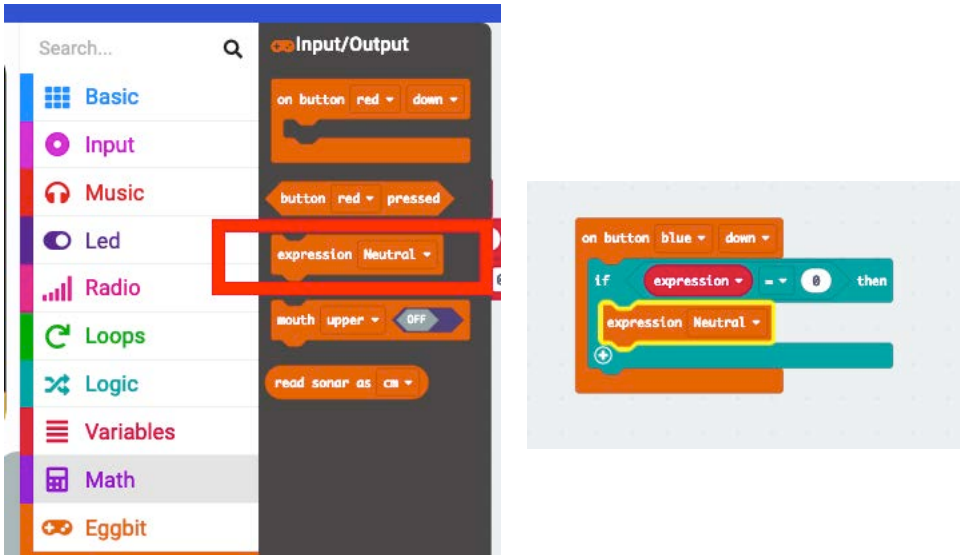
Step 6: To do that, you need to drag and drop from the logic menu the if command (see the screenshot below), inside the **on button blue down**.



Step 7: After that from the **logic** menu, drag and drop the **comparison** command (see the screenshot below), inside the **if *true* then** block**.** Then drag the variable **expression** in the left side of the comparison (see screenshot below).



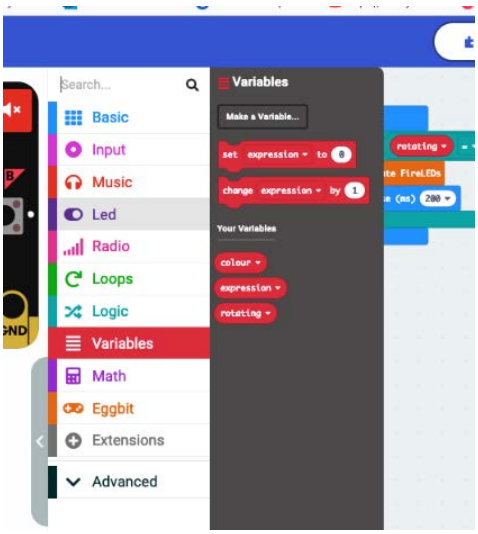
Step 8: Inside the **if** statement, drag and drop from the **Input/Output** menu of **Eggbit** menu, the **expression Neutral** command (see the screenshot below).



Step 9: Continue in a similar fashion for all other values of **expression** (see the screenshot below).

Step 10: Now, once you done with all the expression, inside the **last else if** command, when the variable **expression** is equal to **7**, and set the **expression variable to -1** to be able to cycle through the expression again when you reach the last value for **expression** (see the screenshot below).

Step 11: Finally at the end of the **if** block, increase the value of the expression by 1 every time you press the blue button. You can do that by drag and drop the **change expression by 1** command from the **variable** menu inside the **on button blue down** at the end (see the screenshot below).



Step 12: Download your project and copy it into the BBC micro:bit attached to the Egg:Bit.

Question: Turn on the power button on the Egg:Bit (see the picture). Then, press the blue button once and look at mouth section of the Egg:Bit, then press it again and again.
What do you notice?
Please write down your answer below.
(Please turn off the power button after you write your answer.)