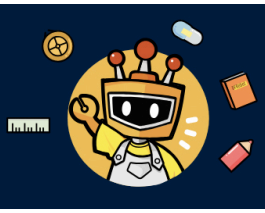


THE SYMBOLIC ELEMENT

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:

- **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 12** Ensure sustainable consumption and production patterns.
- **Goals 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 INTERNET OF THINGS TECHNOLOGY (IoT)

- Internet of Things (IoT) is about things that have the ability to connect with other things, and connect to networks, via the Internet.
- IoT integrated with e-textiles brings innovative opportunities that blend technology with style and functionality.
- E-textiles can incorporate LEDs, conductive threads, or embedded sensors to create garments that respond to touch, movement, or environmental conditions.
- IoT-enabled clothing can collect data about the wearer's preferences, to offer personalised recommendations for fashion choices or styling tips.

THE MISSION: USE IOT TO INCORPORATE LEDS, CONDUCTIVE THREADS, AND EMBEDDED SENSORS TO COMMUNICATE BETWEEN GARMENTS

Question: (In your opinion) What are LEDs?
Please write down your answer below:

Answer:

Question: (In your opinion) How can we integrate LEDs in a garment?
Please write down your answer below:

Answer:

Question: How can two garments communicate with each other and coordinate their LEDs?
Please write down your answer below:

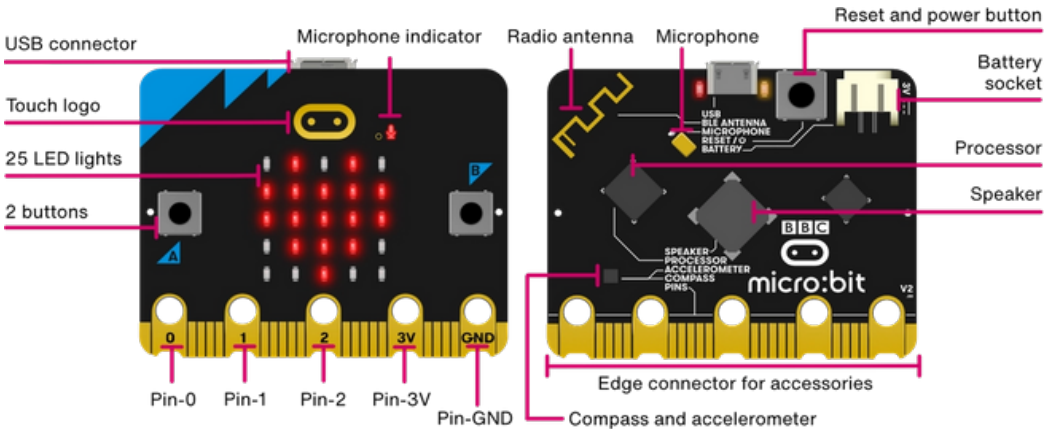
Answer:

THE MISSION: INTEGRATING LIGHTING WITHIN A GARMENT

IoT-enabled garments can enhance the experience of fashion shows by integrating with lighting, or music. For instance, garments that change appearance based on audience input.

STAGE ONE: SEWING THE LEDS ON THE GARMENT (DONE IN ADVANCE)

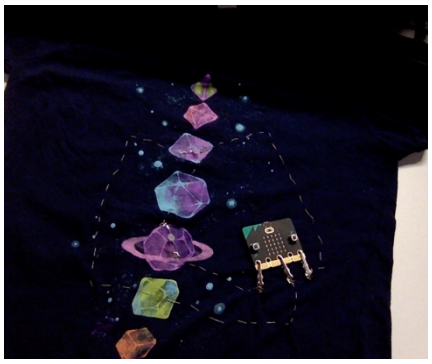
1. A BBC micro:bit: A pocket-sized computer (see the picture below for more details).



2. The E-Textile Kit for the BBC micro:bit, which is a specialised electronics kit designed to integrate the BBC micro:bit controller with electronic textiles (e-textiles) including LEDs. The E-Textile Kit includes the following:

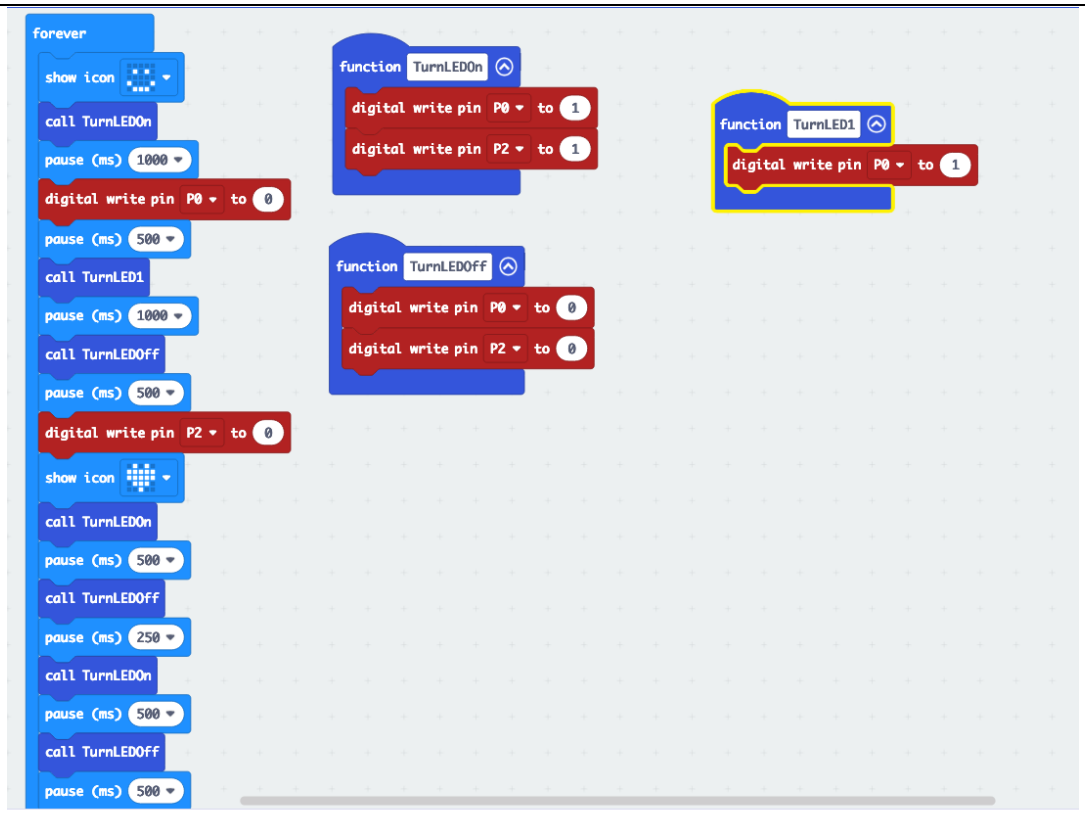
- Conductive Thread: Special thread that conducts electricity, allowing you to sew electrical connections into fabric.
- LEDs (Light Emitting Diodes): Small lights that can be sewn into fabric to create illuminated designs or indicators.
- Battery Pack: Typically includes a battery holder and connector for powering your e-textiles projects.

3. Sew the LEDs on two pieces of garment, where we decide to place the components of LEDs, on our fabric and we consider how they will interact and where we need to sew connections. We have carried out this step for you, for health and safety reasons (this step involved using a needle).



STAGE TWO: PROGRAM THE LEDS ON ONE GARMENT

Below, we have the coding building blocks that can program the LEDs that we sewed in the blue shirt. 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: What do you think *digital write pin P0 to 1* does and what do you think *digital write pin P0 to 0* does?
Please write down your answer below:
Answer:

Question: What do the functions *TurnLEDOn*, *TurnLED1*, and *TurnLEDOff* in the code in the above picture do?
Please write down your answer below:
Answer:

4. Let's program the micro:bit with the code above and see what it does.
   To do that, please follow these 3 steps:

   Step 1: Go to https://makecode.microbit.org/S31383-37487-75266-39063

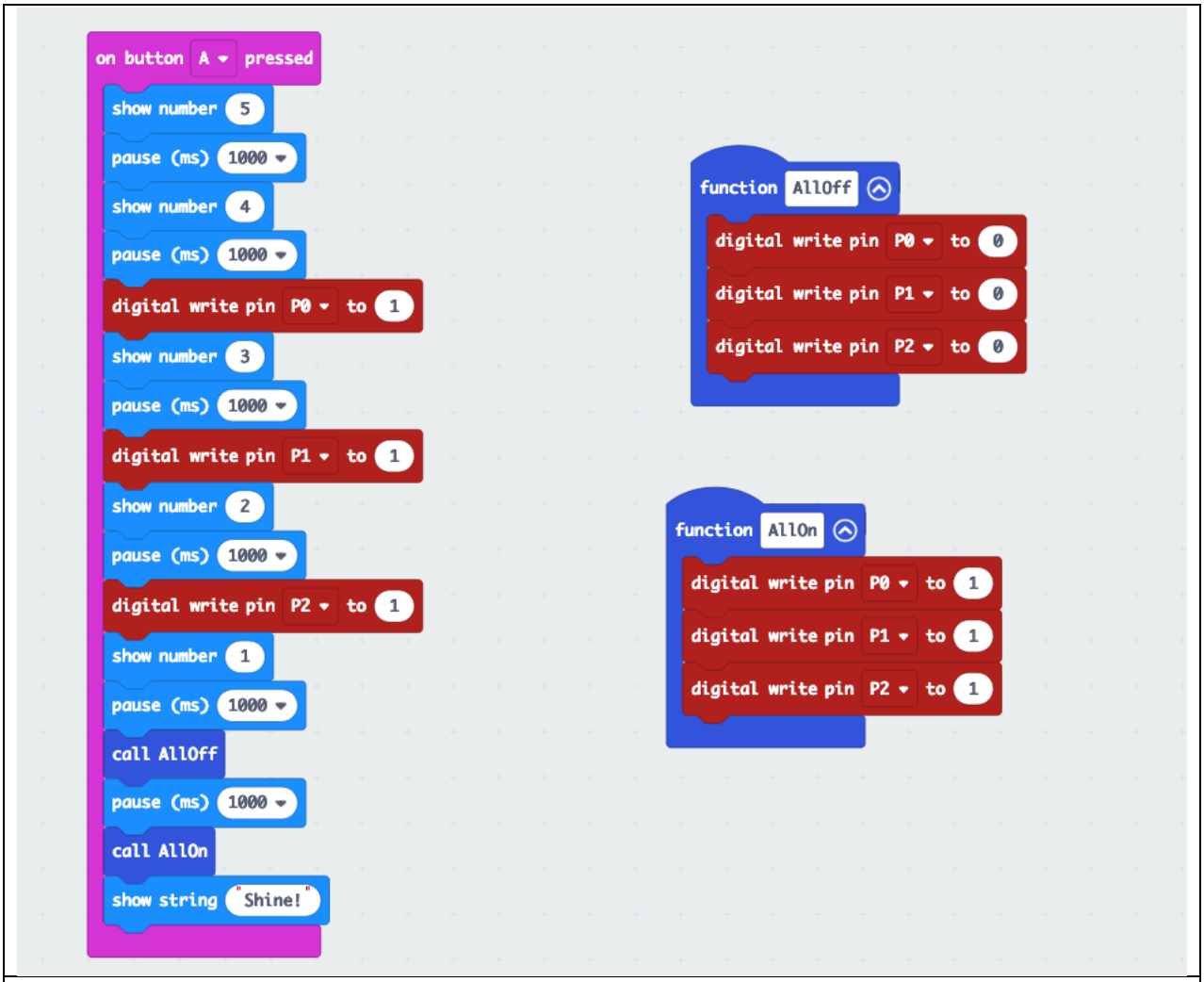
   Step 2: Click on the *Edit* button.

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

Question: Ask the student ambassador to attach the battery to the BBC micro:bit attached to the blue shirt. What do you notice?
Please write down your answer below.
(Please ask the **student ambassador** to disconnect the battery from the BBC: micro:bit after you write your answer.)

STAGE THREE: PROGRAM THE LEDS ON THE SECOND GARMENT

Below, we have the coding building blocks that can program the LEDs that we sewed on the white shirt. Read the code below and answer the following questions.



Question: What do the functions *AllOn* and *AllOff* in the code in the above picture do?
Please write down your answer below:

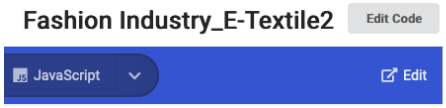
Answer:

Question: In the above code, there is an event called *on button A pressed*. 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 A button of the BBC micro:bit. Looking at the code, make a guess: What do you think will happen when the user presses the A button?
Please write down your answer below:
Answer:

1. Let's program the with the code above and see what it does.
   To do that, please follow these three steps:

   Step 1: Go to https://makecode.microbit.org/S38234-08072-01129-74273

   Step 2: Click on the *Edit* button.

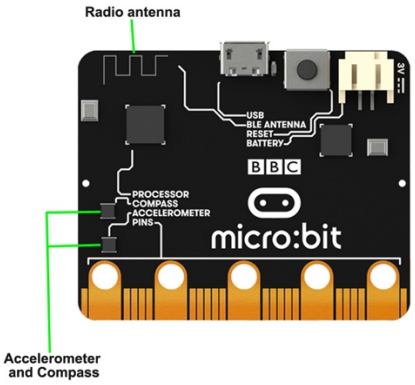


   Step 3: Download your project and copy/install it into the BBC micro:bit attached to the blue shirt.

Question: Ask the student ambassador to attach the battery to the BBC micro:bit attached to the white shirt. What do you notice?
Please write down your answer below.
(Please ask the **student ambassador** to disconnect the battery from the BBC: micro:bit after you write your answer.)

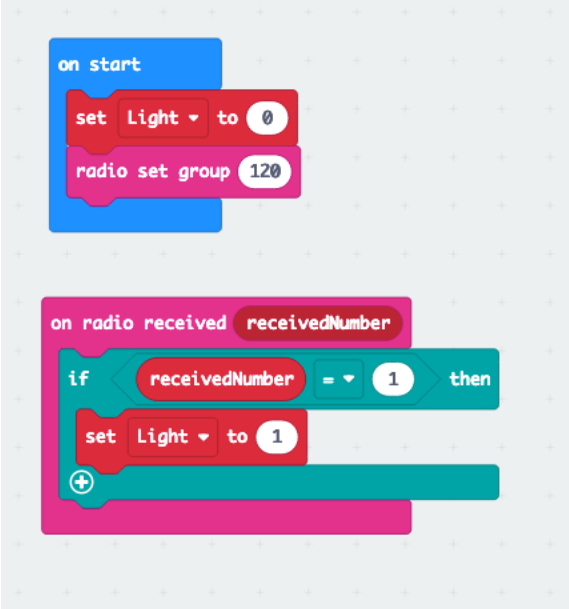
STAGE FOUR: PROGRAM THE LEDS ON THE FIRST GARMENT TO LIGHT UP ONCE YOU PRESS THE A BUTTON ON SECOND GARMENT.

1. We going to create communication between the two garments, for that we will use the radio functionally inside the BBC micro:bits attached to the shirts. Radio transmission is a way of sending and receiving messages: BBC micro:bits attached to the Egg:Bits can use radio waves to communicate with each other.

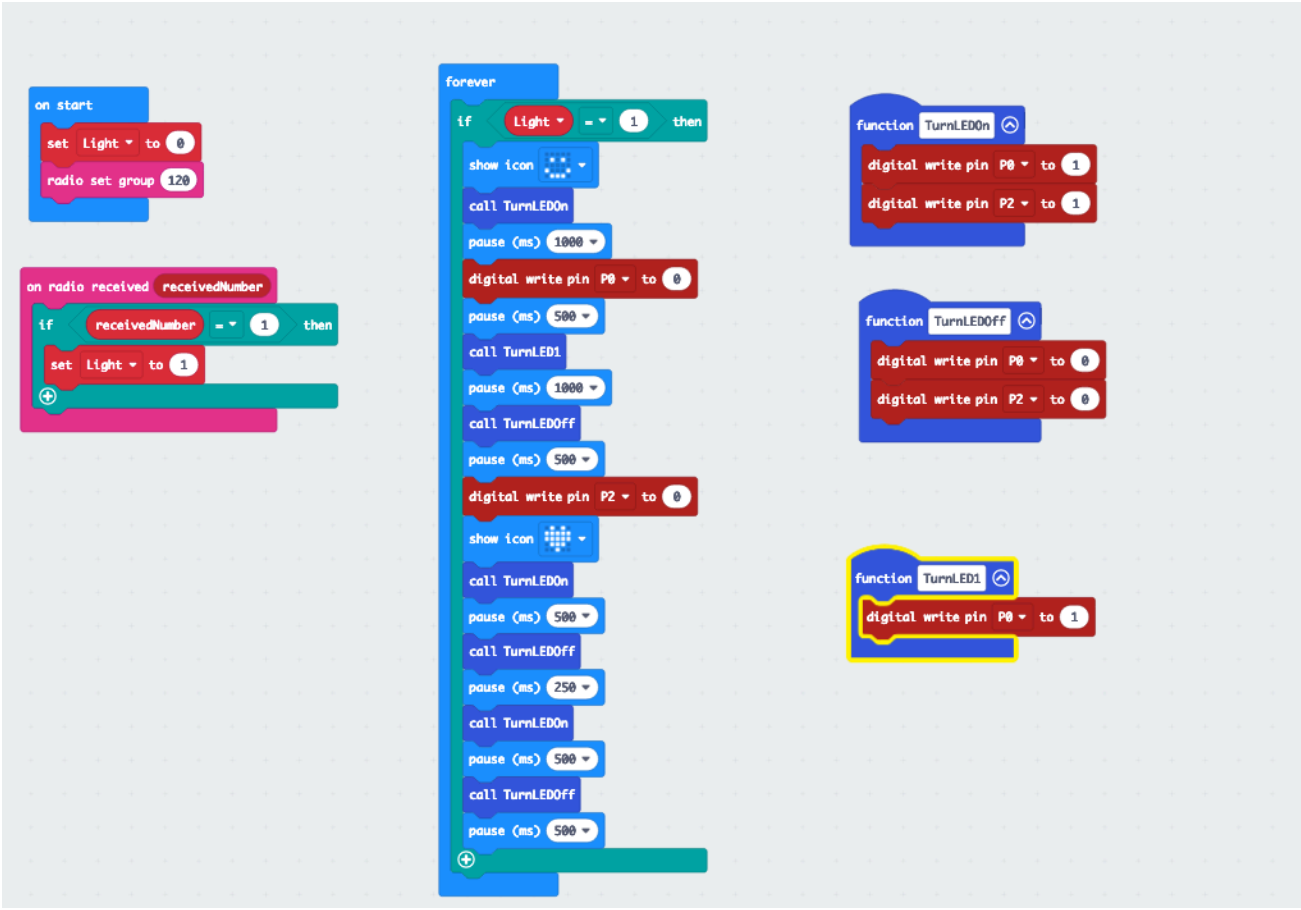


Step 1. For the BBC micro:bit attached to the blue shirt (which in this case the receiver), you need to edit the code written on this website https://makecode.microbit.org/S31383-37487-75266-39063

Step 2. Click the edit button and add code that creates radio communication, see the screenshot below.



Step 3: Inside the *forever* block, add an *if condition* statement. See the screenshot below:

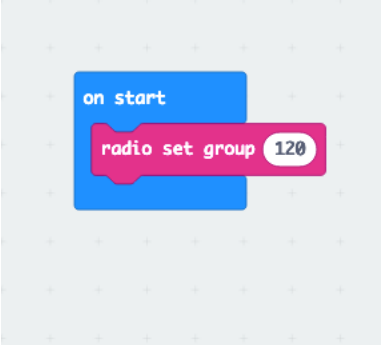


Step 5. Now, download the code and copy it to the micro:bit attached to the blue shirt.

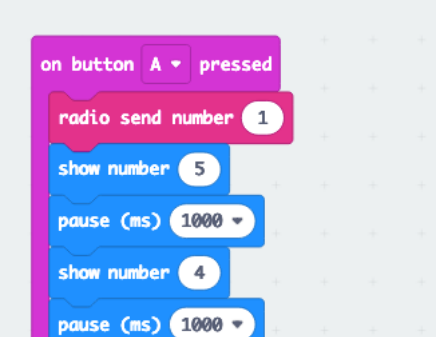
Question: What do you notice?

Step 6. For the BBC micro:bit attached to the white shirt (which in this case is the sender), you need to edit the code written on this website https://makecode.microbit.org/S38234-08072-01129-74273 and make the BBC micro:bit attached to the white shirt send a message.

Step 7. Click the *Edit* button and add code that creates radio communication. See the screenshot below.



Step 8. Then, inside the *on button A pressed* block, add a code to send a number 1 to the receiver micro:bit on the blue shirt. See the screenshot below.



Step 9. Now, download the code and copy it to the micro:bit attached to the white shirt.

Question: Press the A button on the BBC micro:bit attached to the white shirt. What do you notice?