Explore *our growing brain* by testing your reaction rate with the Micro:bit
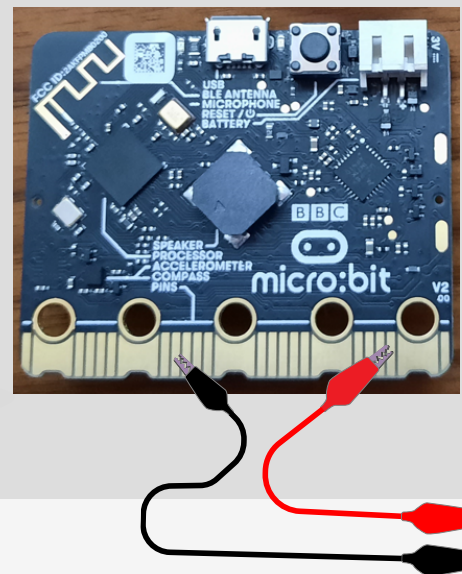
OUR GROWING BRAIN
Micro:bit Activity

MATERIALS

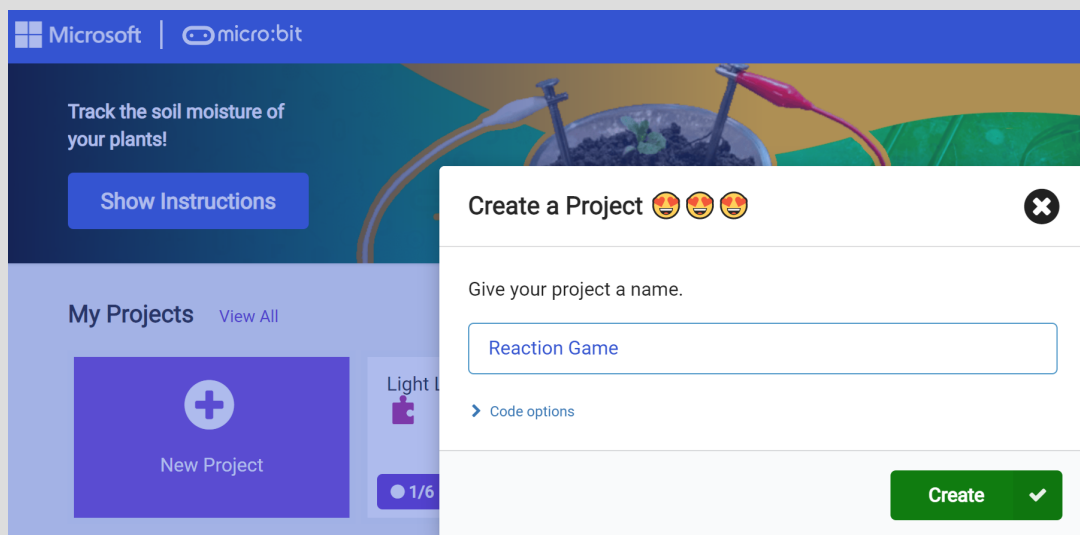- Micro:bit
- A device to make the code.
- MakeCode website.
- 4 crocodile clips & leads
- 2 pieces of cardboard
- 4x pieces of aluminium foil
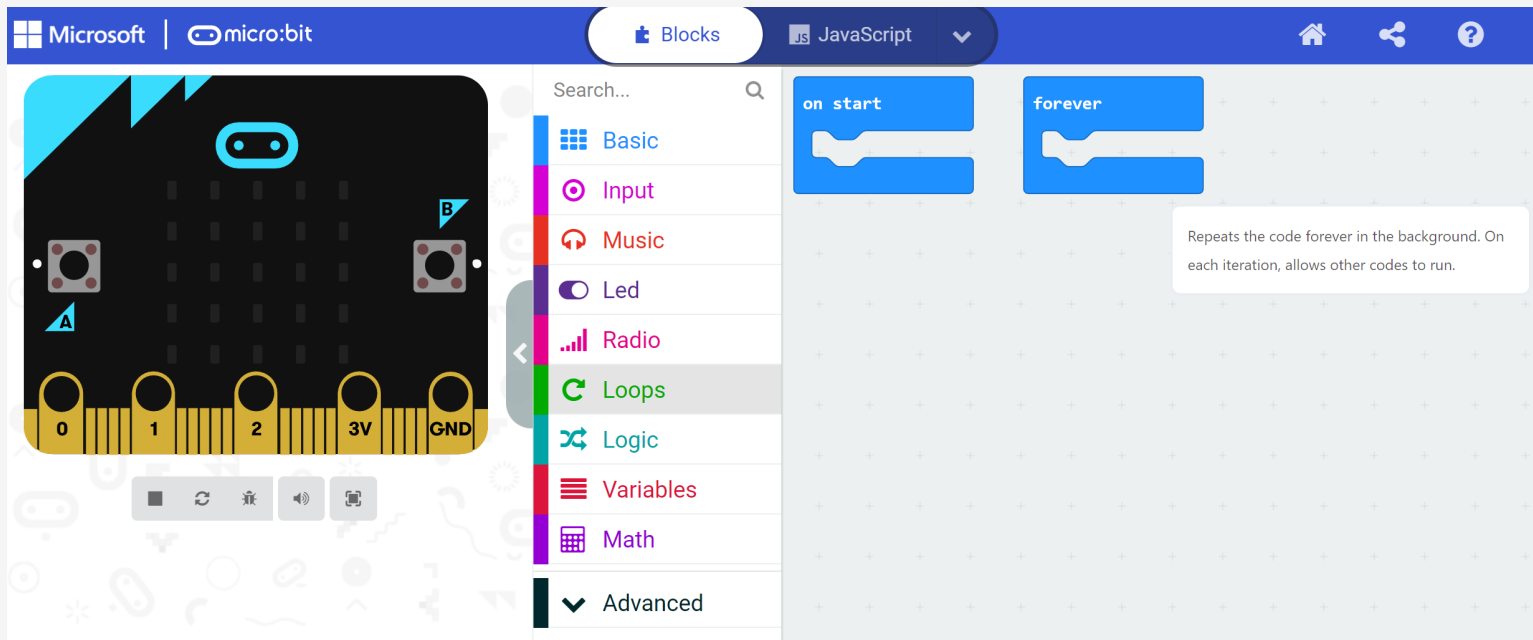- Sellotape
- Scissors
- Marker pen

METHOD

1
- Open the tutorial in one browser tab and the MakeCode website in a second tab.
- On the MakeCode website, click on New Project.
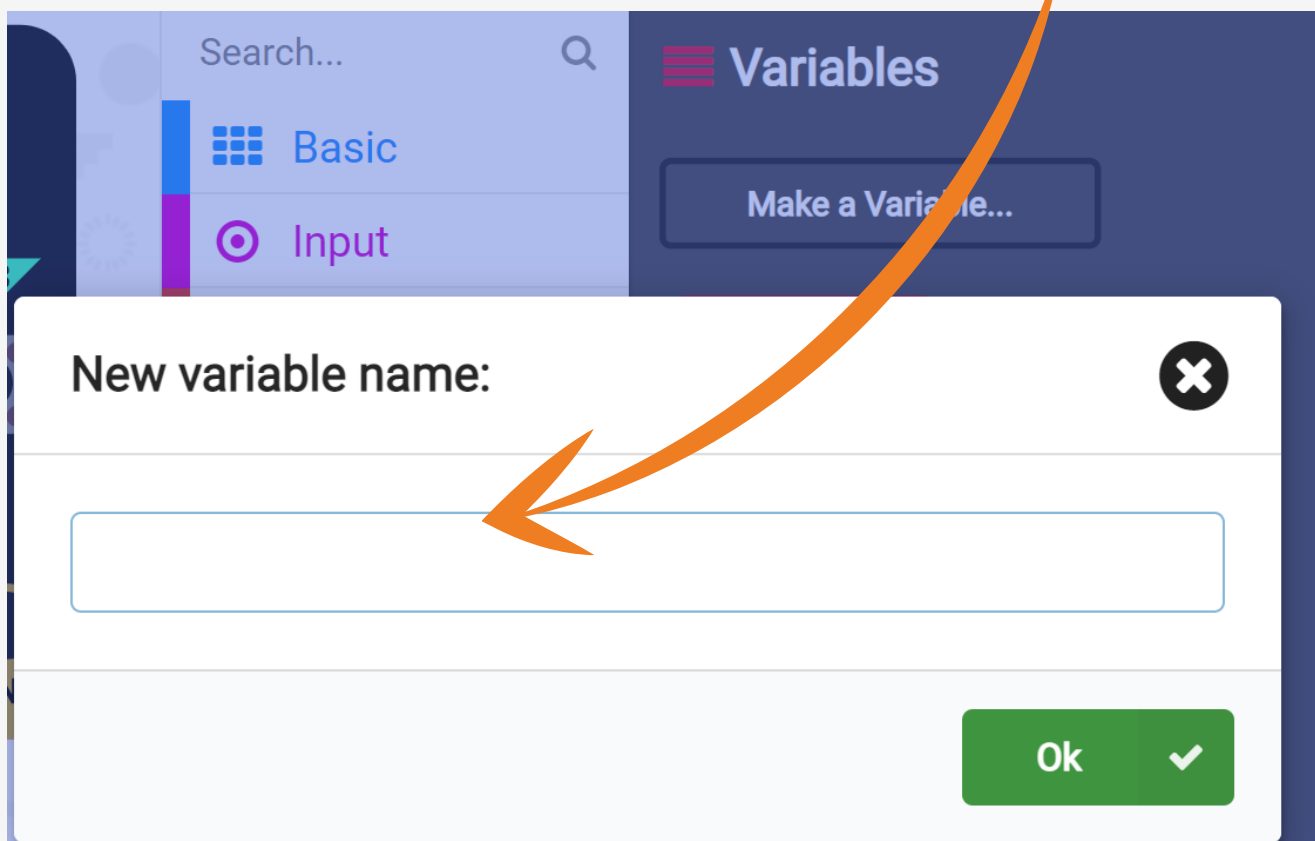- Name the project "Reaction Game". Click "Create".

Use the tutorial to create the code on the MakeCode project window. Alternatively, use the step-by-step instructions below.

1. Click on "loops" and then "forever".

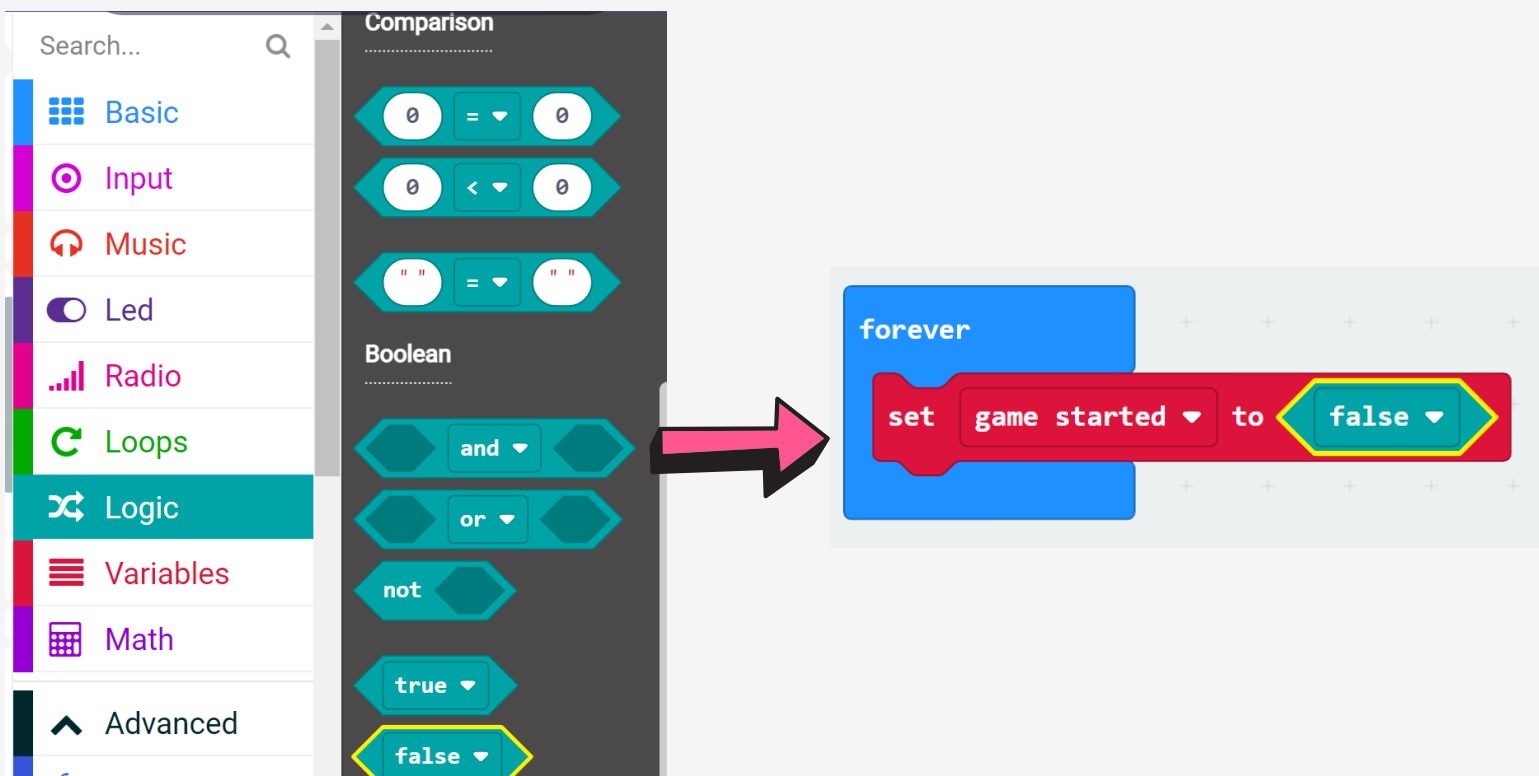2. Click on "Variables" and "Make a variable". Name this "Game started".

3. Click on Variables –> Select the option highlighted in yellow in the image below.

Variables

Make a Variable...

game started ▼

set game started ▼ to 0

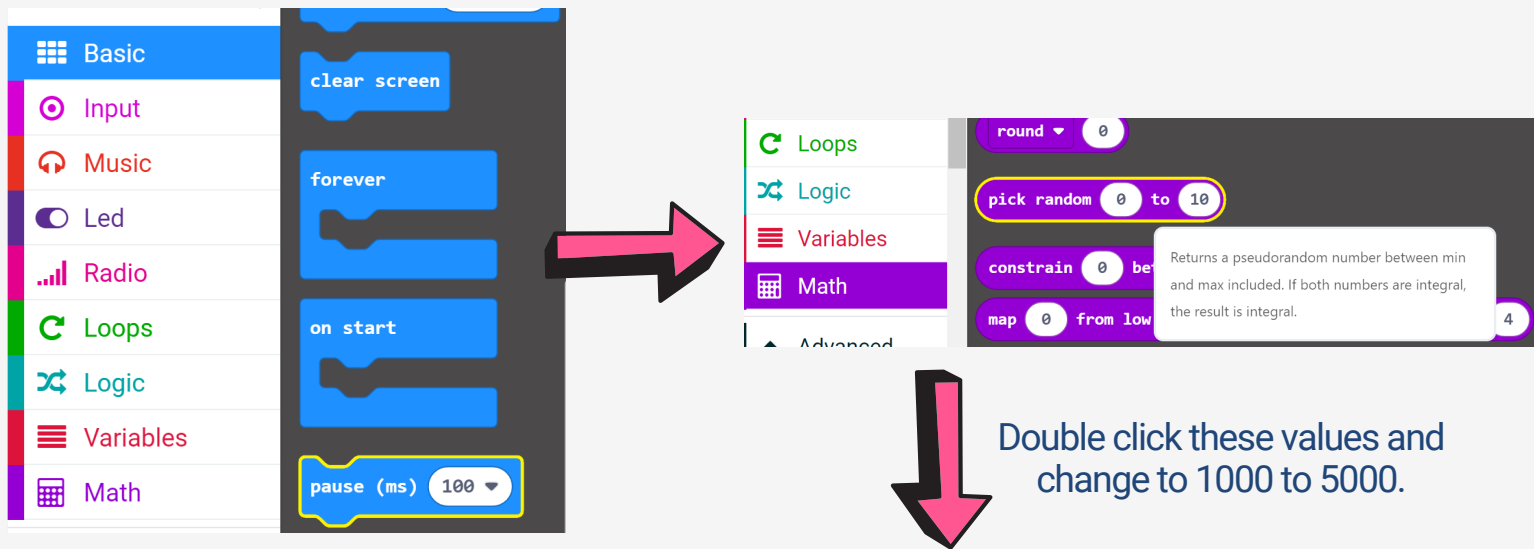Sets this variable to be equal to the input.

change game

4. Drag the red code inside the "forever loop". Then, click on "Logic" and scroll down until you see "False". Click on "False". and drag it to replace "0" in the red code.
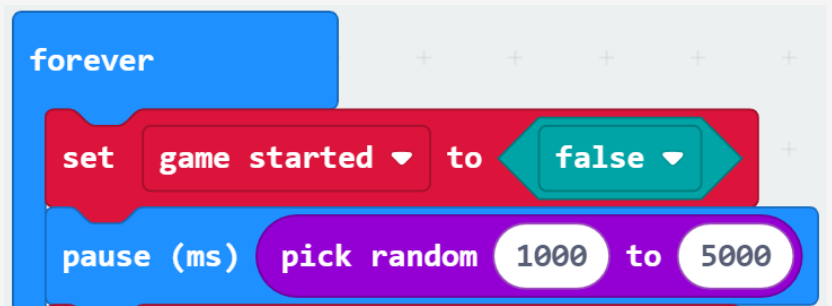*You will notice that the code is all colour-coded.*

Search... 🔍

▦ Basic
◉ Input
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◯ Led
📶 Radio
C Loops
⤬ Logic
☰ Variables
▦ Math
⌃ Advanced

Comparison

0 = ▼ 0
0 < ▼ 0
" " = ▼ " "

Boolean

and ▼
or ▼
not
true ▼
false ▼

forever

set game started ▼ to false ▼

5. Click "Basic" –> "Pause". Insert this into the forever loop.
Click "Math" and "pick random 0 to 10". Drag this into the position as shown in the image below.
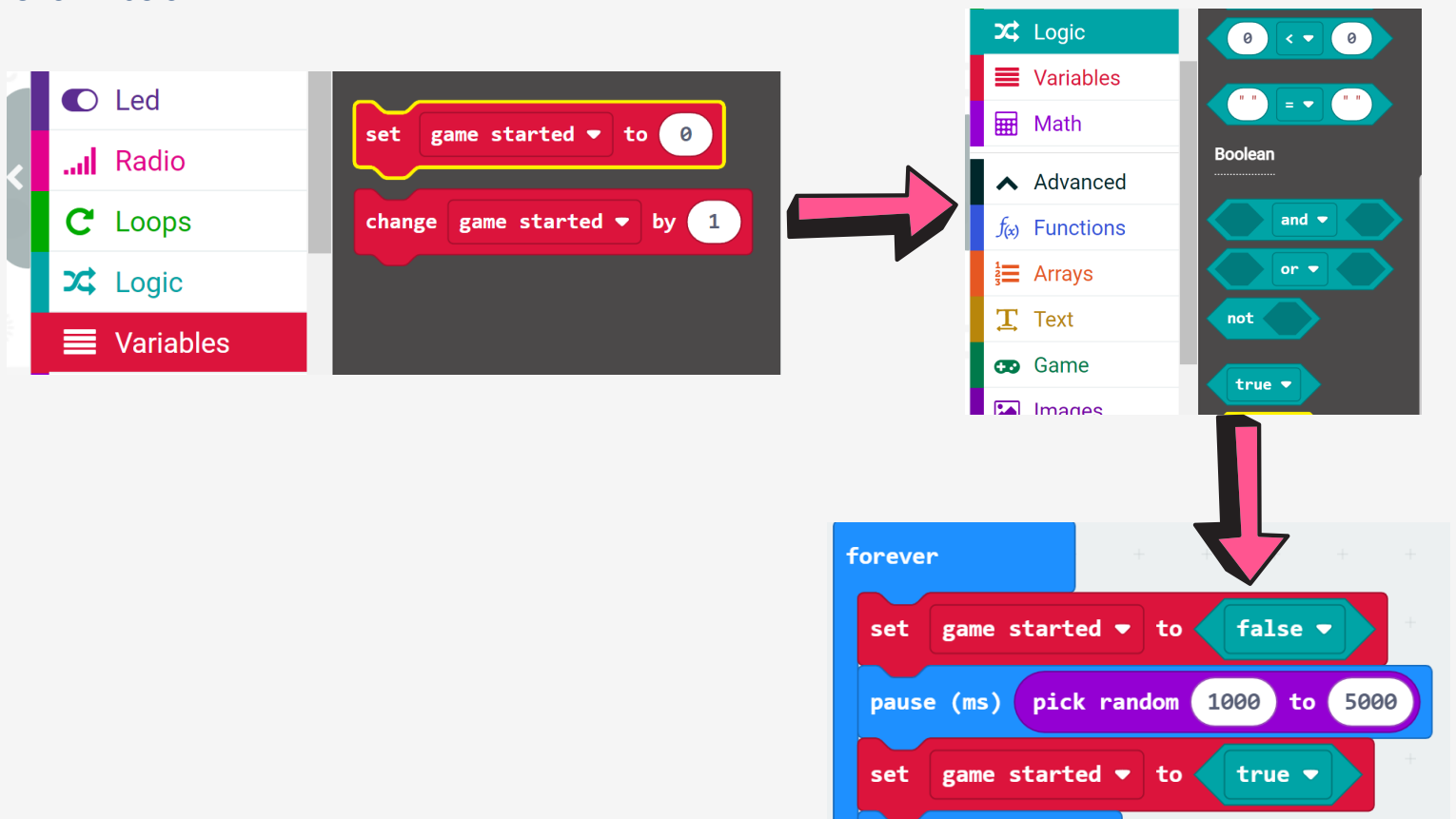

Double click these values and change to 1000 to 5000.

6. Select "Variables" –> "set game started to 0". Select "Logic" –> "true". Drag "True" into the position shown below.

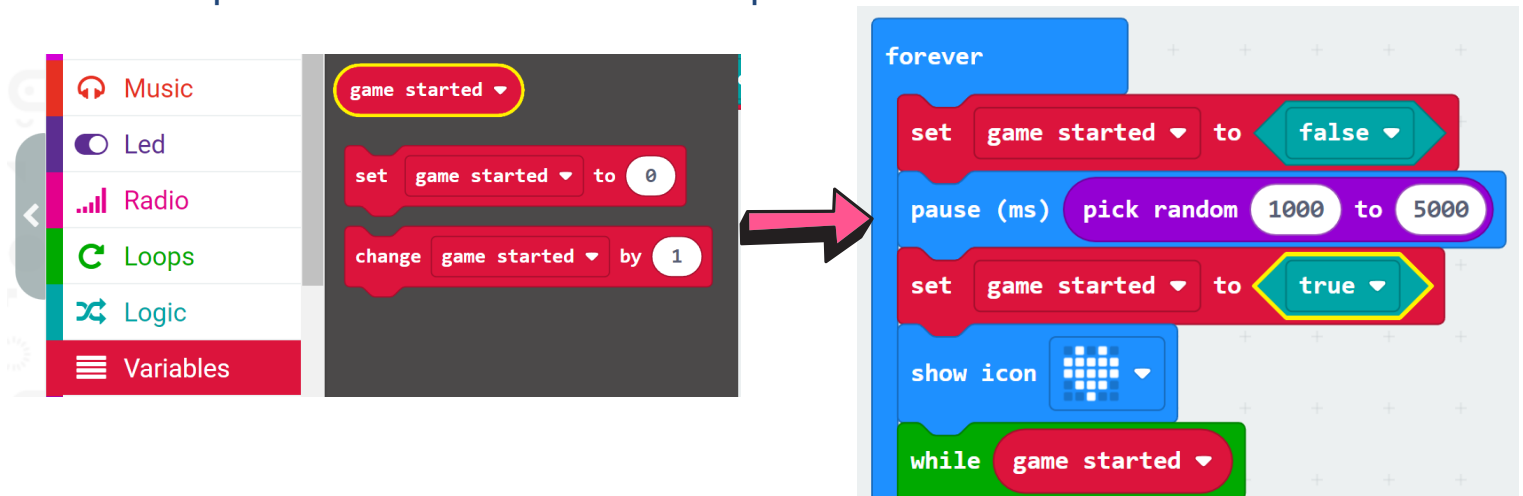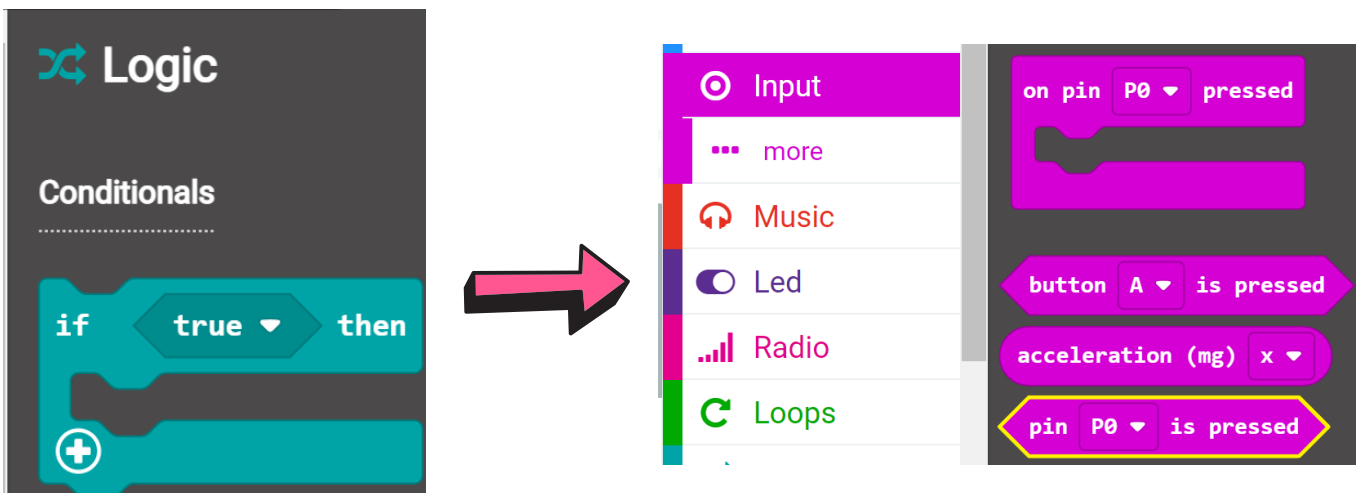7. Click "Basic" –> "show icon". Then click "loops" –> "while..." as shown below.
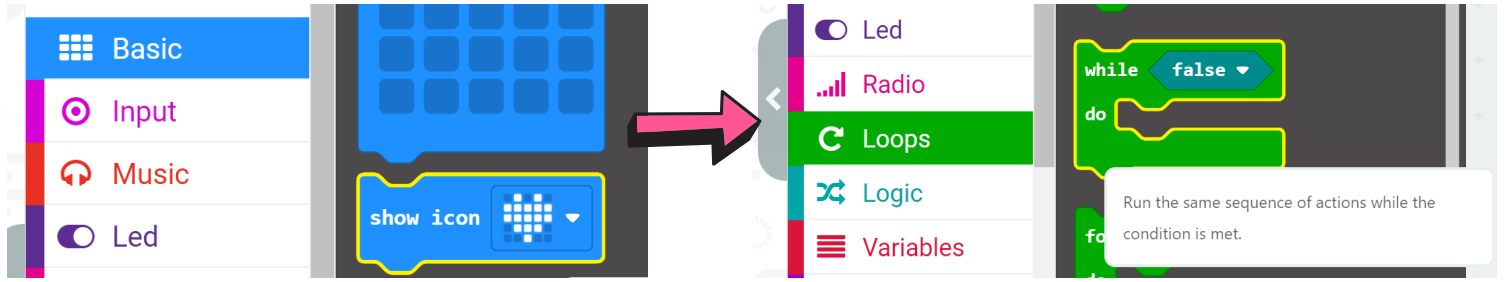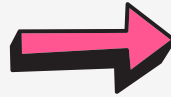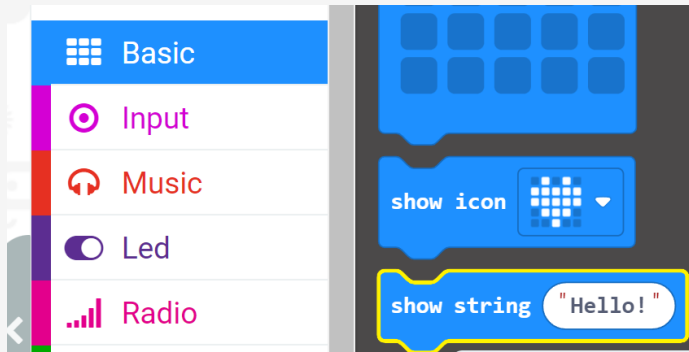

8. Click "Variables" –> "Game started" (highlighted in yellow below). Click and drag "game started" to replace "false" within the "while" loop.

9. Click "Logic" –> "If...." as shown in the diagram opposite. Drag the "If" code within the "while code". Select "input" and choose the option highlighted in yellow below. Change P0 to P1.

10. Select "Basic" –> "show string…." as shown below. Drag the code into position and double click "hello" to change it to "A". Select "Variables" –> "set game started to 0…" –> select "Logic" –> select "false" and drag into position as shown opposite.

What is your code saying so far?

The code instructs the microbit to wait between 1000-5000ms before showing the **heart icon**. As soon as the icon appears, players A and B should try to hit their button. If P1 (player A) hits first, "A" will appear on the microbit. This ends the game. But what if player B hits their button first? We need to write that code.

11. Repeat Step 9 above. Changing P0 to P2 this time. Select "Basic" –> "show string…." as shown below. Drag the code into position and double click "hello" to change it to "B". Select "Variables" –> "set game started to 0…" –> select "Logic" –> select "false" and drag into position as shown opposite.
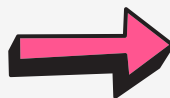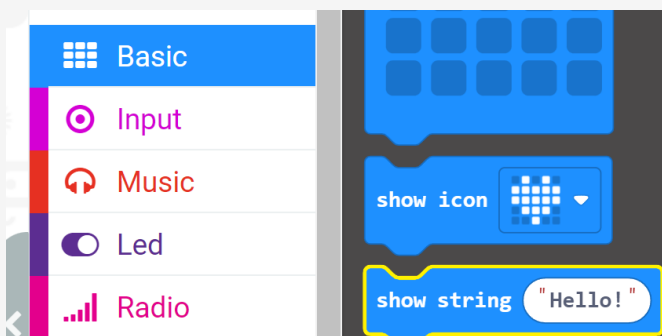
What is your code saying so far?

The completed "while" loop says: while the game is playing, if player A presses their button first, show "A" on the screen and end the game; if player B presses their button first, show "B" on the screen and end the game. But what next?
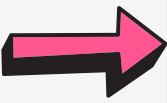
12. We now need to reset the game. Go to "Basic" –> "pause (ms)" and shown below. Click and drag the block into position. Change "100" to "3000" using the keyboard.

13. The final block code we need will clear the screen. Click "Basic" –> "Clear Screen". Drag the block into position at the end of the code.


14. Now you need to download your code and add it to your Micro:bit. At the bottom left of the screen, click the three dots beside "Download" and "Download as file". The hex file for this completed code can also be downloaded **here**.

15. Connect the Microbit device to your computer. Open the window for the Micro:bit and the Download folder. Drag the "microbit-reaction-game.hex" file from the Download folder into the Microbit folder. It will copy across and then seemingly disappear. This is normal - your microbit is ready to use as a reaction timer. Disconnect the microbit from your computer.
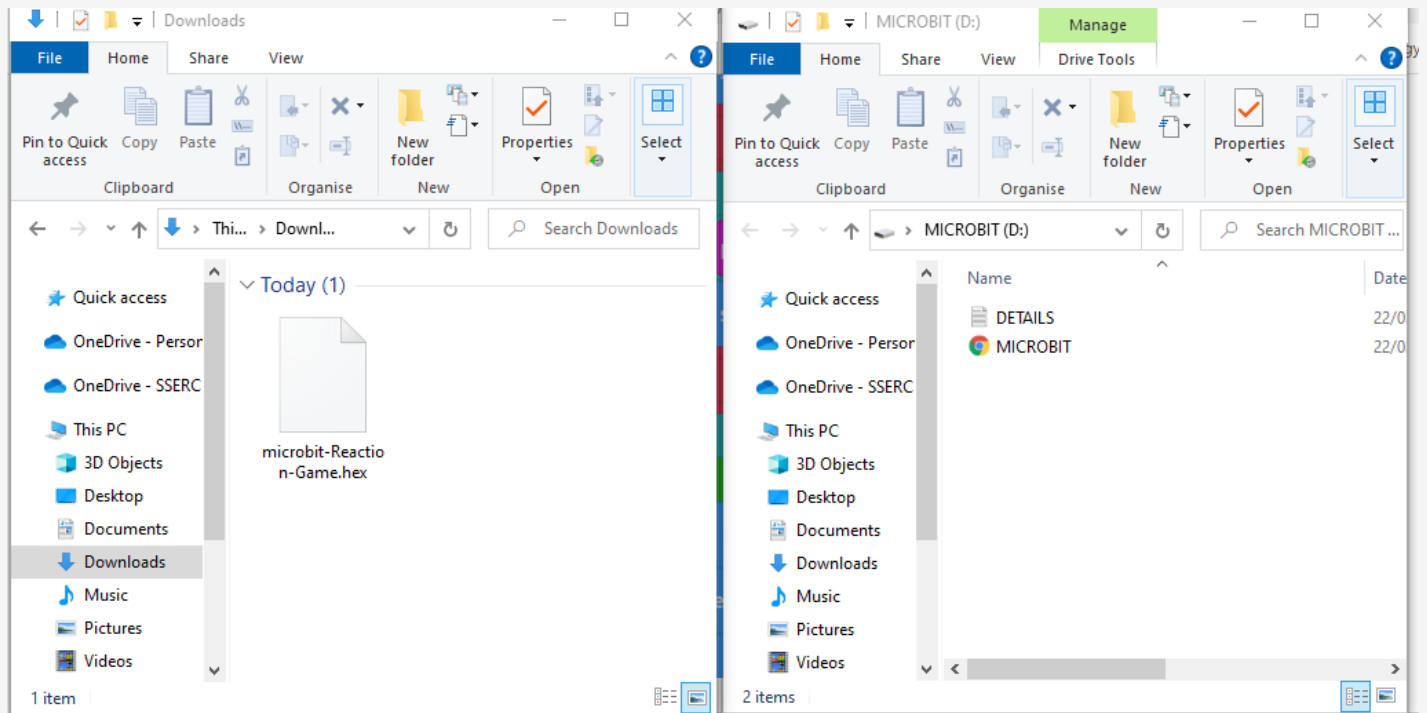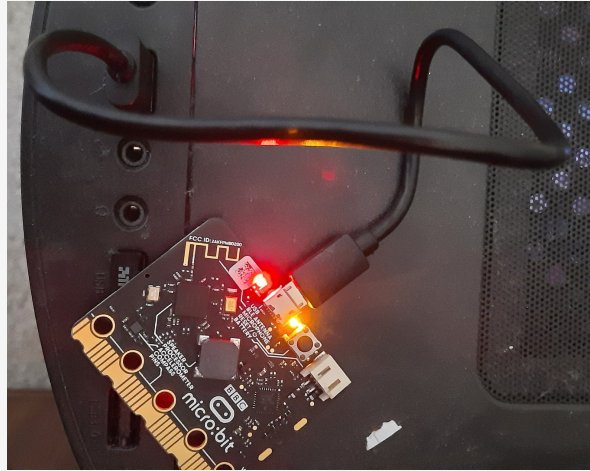
What next?

You've written your code and uploaded it to your Micro:bit. But where is your game board? You have to make it! You are now going to need two pieces of cardboard, 4 pieces of aluminium foil, 4 leads and crocodile clips, some sellotape and a marker pen.

BUILD YOUR GAME BOARD

Follow the instructions below and watch the accompanying videos to build your 2-player reaction game board.

1 Cut 2 pieces of cardboard. The pieces in the image below measured 24cm x 14cm.

2 Cut 4 rectangles of foil and fold them around the edge of the cardboard as shown in the image above (view from the top) and below (view from the back of the game board). Secure the foil with sellotape.
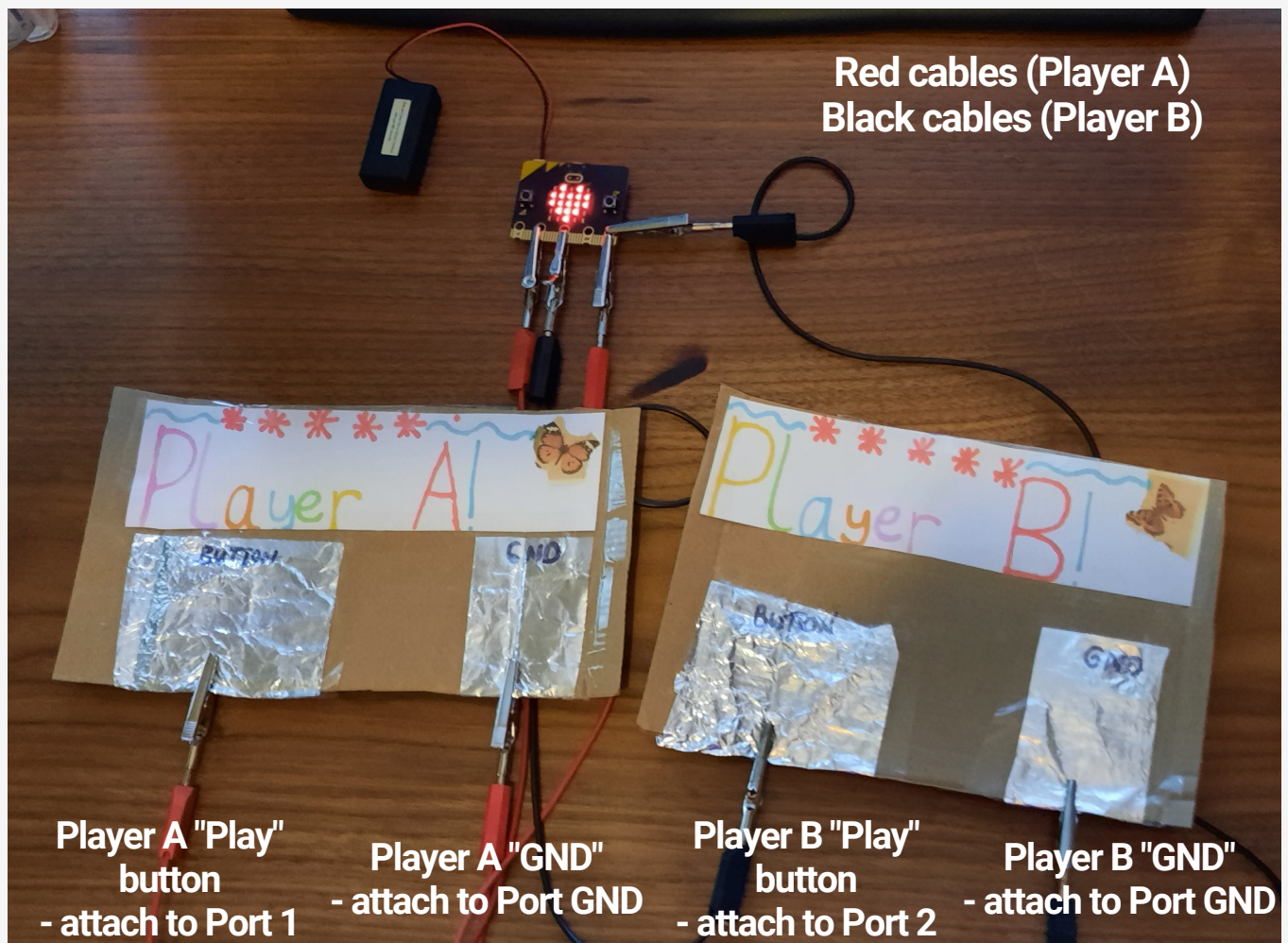
3 Now connect your leads. Add a crocodile clip to each end of each lead.
- Lead 1 - Connect from Player A (left panel) to Port 1 (Micro:bit).
- Lead 2 - Connect from Player A (right panel) to GND (Micro:bit).
- Lead 3 - Connect from Player B (left panel) to Port 2 (Micro:bit).
- Lead 4 - Connect from Player B (right panel) to GND (Micro:bit).

For each of the leads above, the crocodile clip needs to be clipped over the edge of the cardboard, making contact with the foil on both sides.

▶ This video tutorial show how to connect each of the leads, as outlined in the steps above.

Red cables (Player A)
Black cables (Player B)

Player A "Play" button - attach to Port 1

Player A "GND" - attach to Port GND

Player B "Play" button - attach to Port 2

Player B "GND" - attach to Port GND

GAME

PLAY YOUR GAME

▶ You have now coded your own 2-player reaction game. At all times, both players must keep their right hand on the "GND" button. When the heart icon appears on the Micro:bit, the first person to hit their "Play" button wins the point. Watch the video to see it in action.