

# Code Rock Paper Scissors on a micro:bit with MakeCode

Microbit

Beginner

10 Mins

## 1 Overview

In this project you will learn how to code your micro:bit to play rock-paper-scissors using gestures and the LED matrix. We will start by understanding the basic game logic and how to present rock, paper, and scissors on the LED matrix. You will discover how to use random selection for the micro:bit's choice and show it on the LED matrix, so players can see what the micro:bit picked and work out whether they have won. Through this project you will develop fundamental coding concepts like variables, conditionals and random numbers while creating something fun and interactive. By the end you will have a fully functional game that you can play with friends or challenge the micro:bit yourself.



### What you'll learn

- How to create a variable
- How to use the on shake function
- How to use if, else if and else statements
- How to use random numbers
- How to show patterns on the LED matrix

## 2 What you'll need



### What you'll need

- The micro:bit MakeCode editor
- micro:bit
- micro USB cable
- battery pack for the micro:bit (optional)

### 3 Key words

#### Key words

##### Variable

A variable is something that can change. Think of it like a labelled box: you pop something inside, and the label tells you what it is. You can swap what's inside whenever you like.

*A variable called score might start at 0, then change to 1, 2 and 3 as you collect points in a game.*

##### Random

Random means you can't guess what's coming next, a bit like rolling a dice. The computer picks for you, so you get a different surprise each time.

*Asking a computer for a random number between 1 and 6 is just like rolling a dice, you never know if you'll get a 1 or a 6.*

##### LED Matrix

The LED matrix is the grid of little red lights on the front of the micro:bit. By switching them on and off in patterns, your code can show numbers, letters and tiny pictures.

*Like a mini scoreboard made of dots, the LED matrix lights up to spell out your step count.*

##### Accelerometer

An accelerometer is a tiny part inside the micro:bit that senses movement, like tilting, shaking or being turned over. It turns that movement into numbers your code can react to.

*A bit like the sensor in a games controller that knows when you tilt it to steer, the accelerometer notices when the micro:bit moves.*

##### If statement

An if statement checks whether something is true, and only runs its instructions when it is. It's how code makes decisions.

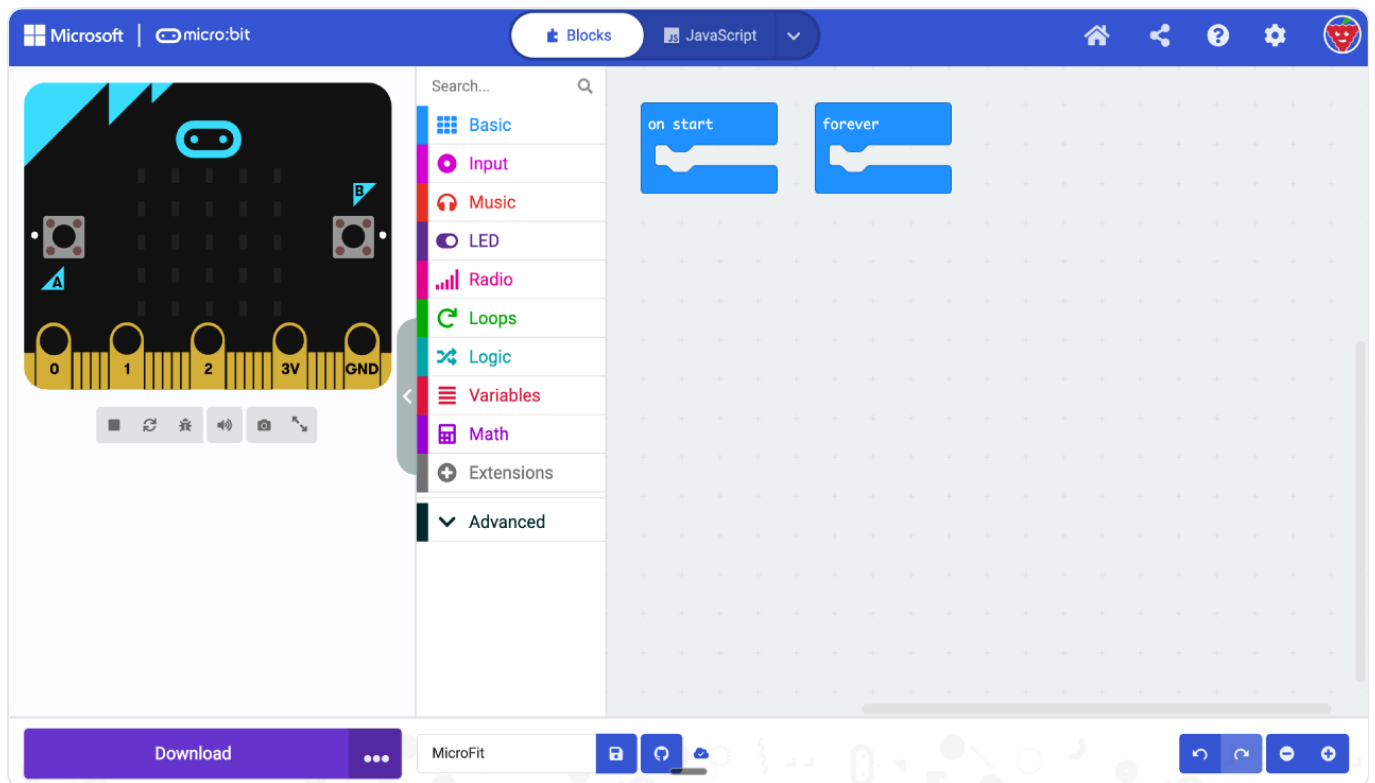
*"If it's cold, put on a coat." If it's warm, you skip the coat, the action only happens when the check is true.*

### 4 Navigating to the MakeCode Editor

#### On a Computer

1. Open your favourite web browser. We recommend either Google Chrome or Microsoft Edge.
2. In the Address bar type [makecode.microbit.org](https://makecode.microbit.org).

3. Select **New Project** and give it the name **RockPaperScissors**.

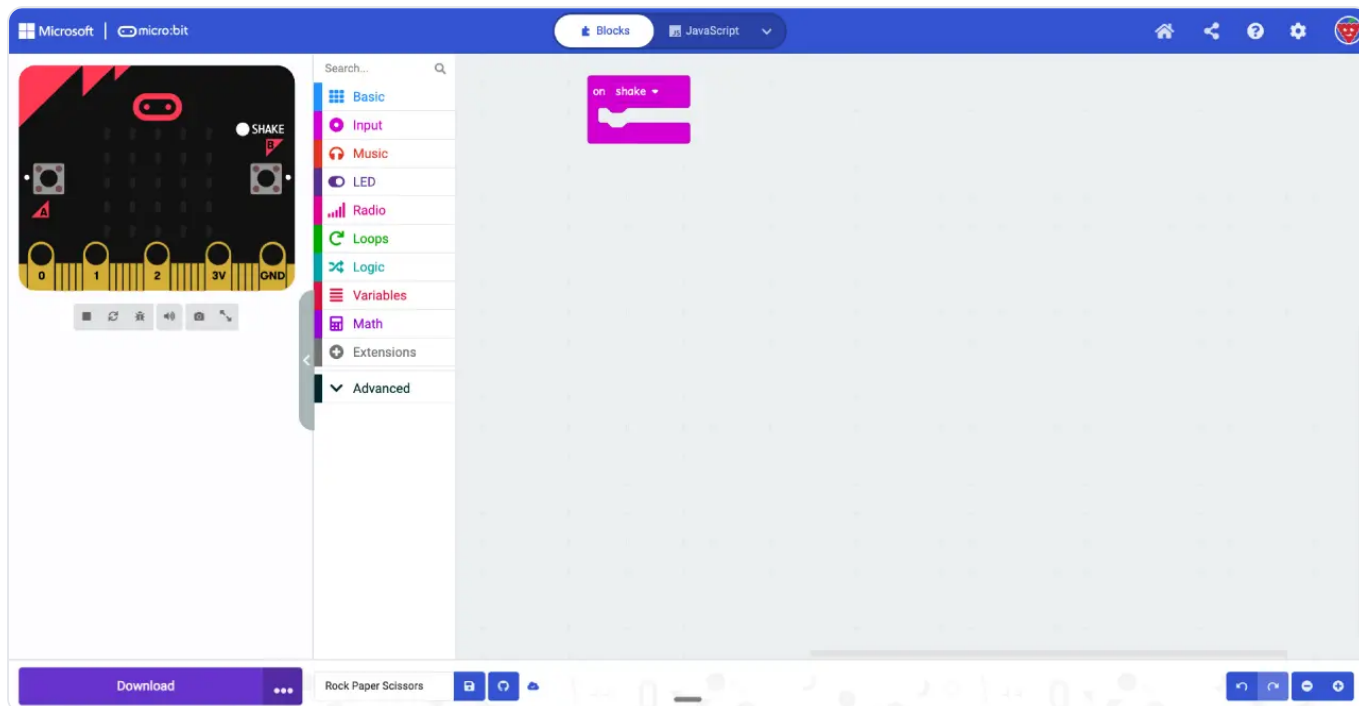


## On a Tablet or Phone

1. Open the **micro:bit app**. If you don't have the app yet you can download it from your devices app store by searching for **micro:bit**.
2. Select **Create Code**.
3. Select **New Project** and name it **RockPaperScissors**.

## 5 Set up the Code Area

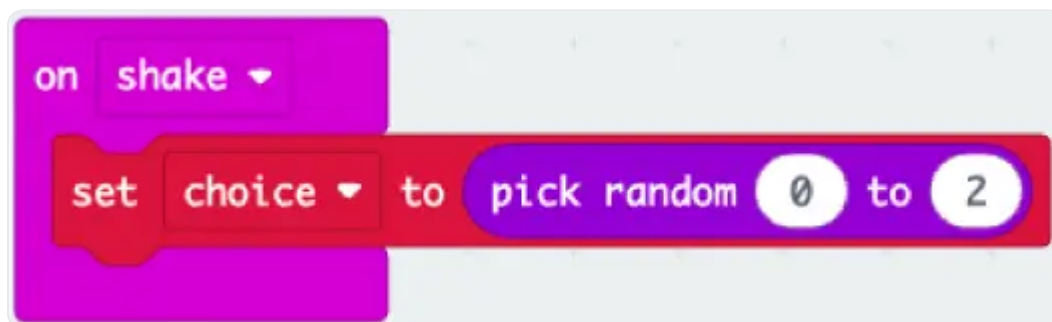
1. Select the `on start` block and drop it on the **bin** icon to delete it.
2. Select the `forever` block and drop it on the **bin** icon to delete it.
3. Select **Input**. Select a `on shake` block and drop it within the code area.



## 6 Create and Set choice Variable

1. Select **Variables**, choose **Make a Variable**, and name it **choice**.
2. Snap a **set choice to** block inside the **on shake** block.
3. Select **Math**. Select a **pick random 0 to 10** block and snap it onto the **set choice to** block where it says **0**. Change **10** to **2**.

Everytime the micro:bit is shaken it will choose a number between 0 and 2.

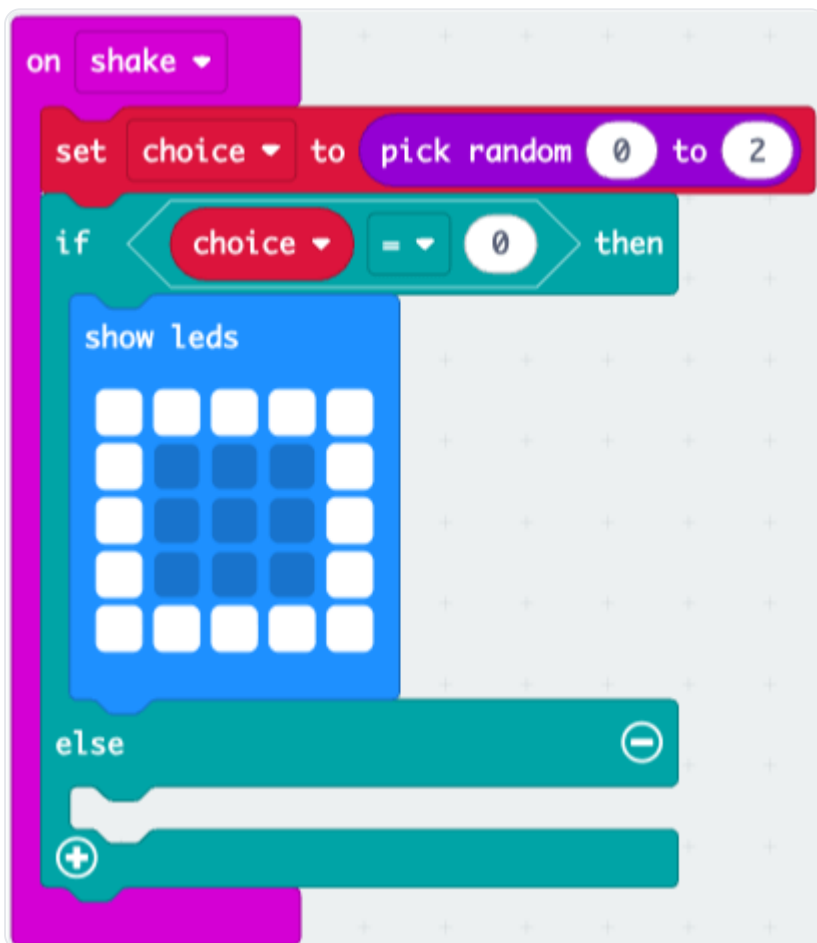


## 7 Creating the if Condition

1. Select **Logic**. Select an **If true then else** block and snap it below the **set choice to** **pick random 0 to 2** block.
2. Select **Logic**. Select a **0 = 0** block and snap it onto the **if** block where it says **true**.
3. Select **Variables**. Select a **choice** block and snap it onto the **if** block before the **=** sign.
4. Select **Basic**. Select a **show leds** block and snap it inside the **if choice = 0** block.
5. Make the following pattern by selecting the squares to represent **paper**.

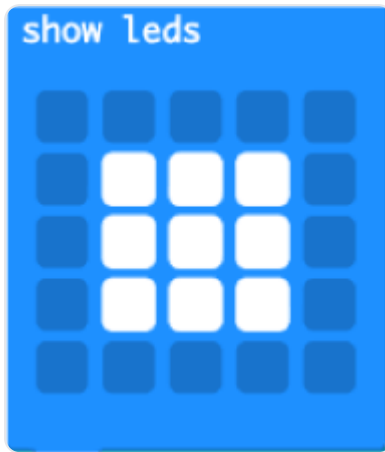


This piece of code will check to see if choice is equal to zero and if it is it will display the paper icon on the LED Matrix.

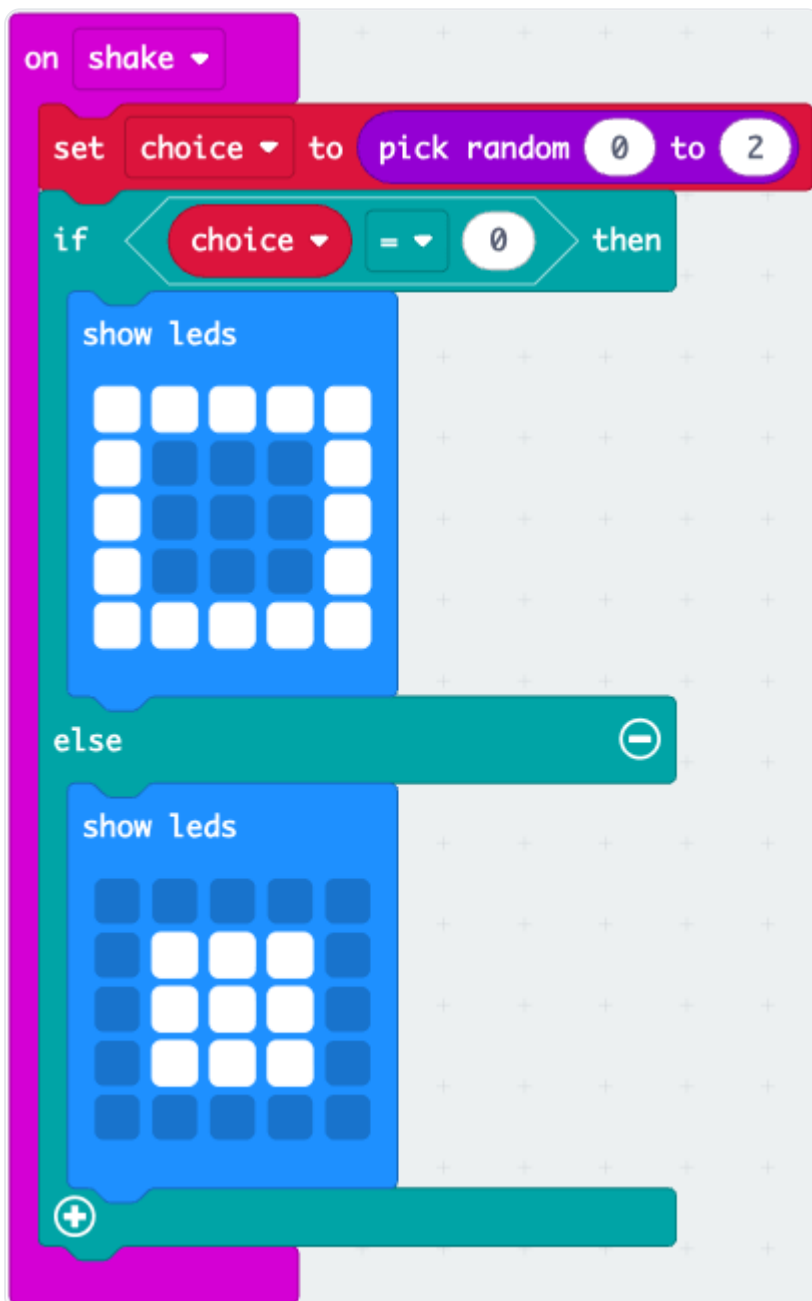


## 8 Create the else Condition

1. Select **Basic**. Select a `show leds` block and snap it inside the `else` block.
2. Create the following pattern by selecting the squares to represent **rock**.

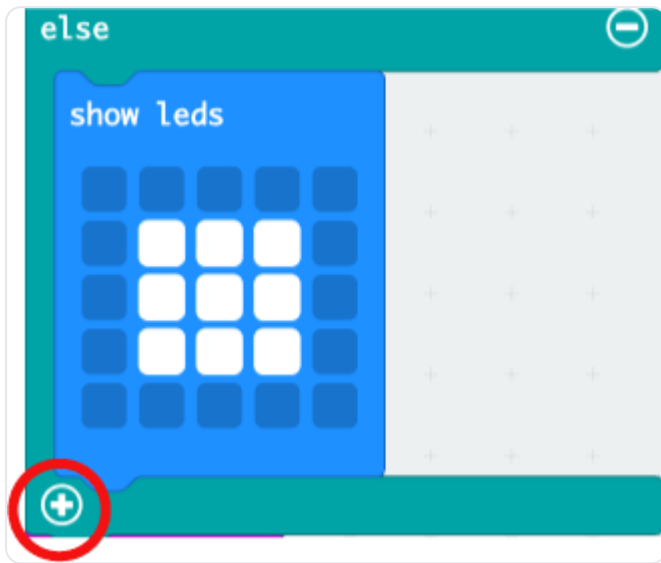


For now the else block is the catch-all: if choice isn't 0, it displays the rock icon on the LED matrix. In the next step we'll add an else if branch for choice = 1, which leaves the else handling the last value, 2.

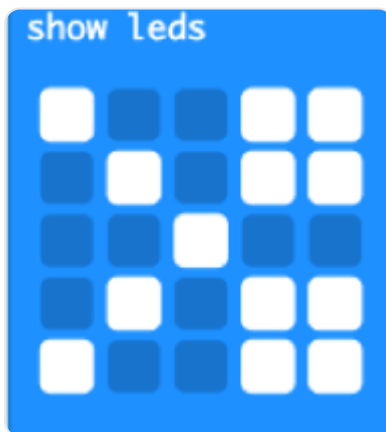


## 9 Create the else if Condition

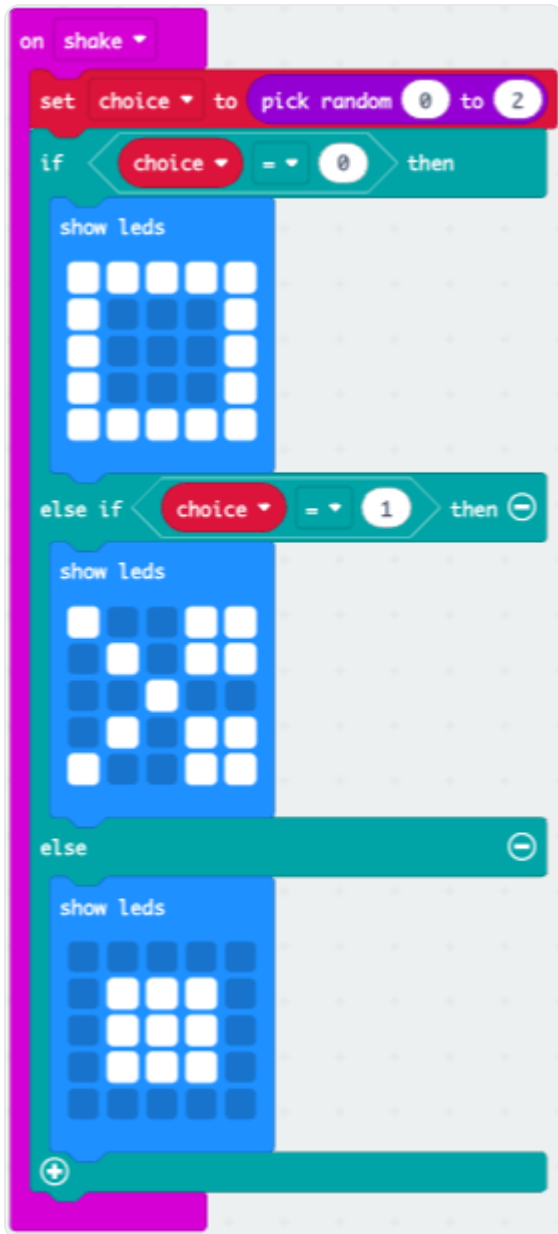
Select the **+** below `else`.



2. Select **Logic**. Select a `0 = 0` block and snap it onto the `else if` block where it says **false**.
3. Select **Variables**. Select a `choice` block and snap it onto the `else if` block before the `=` sign. Change the **0** to **1**.
4. Select **Basic**. Select a `show leds` block and snap it inside the `else if choice = 1` block.
5. Create the following pattern by selecting the squares to represent **scissors**.



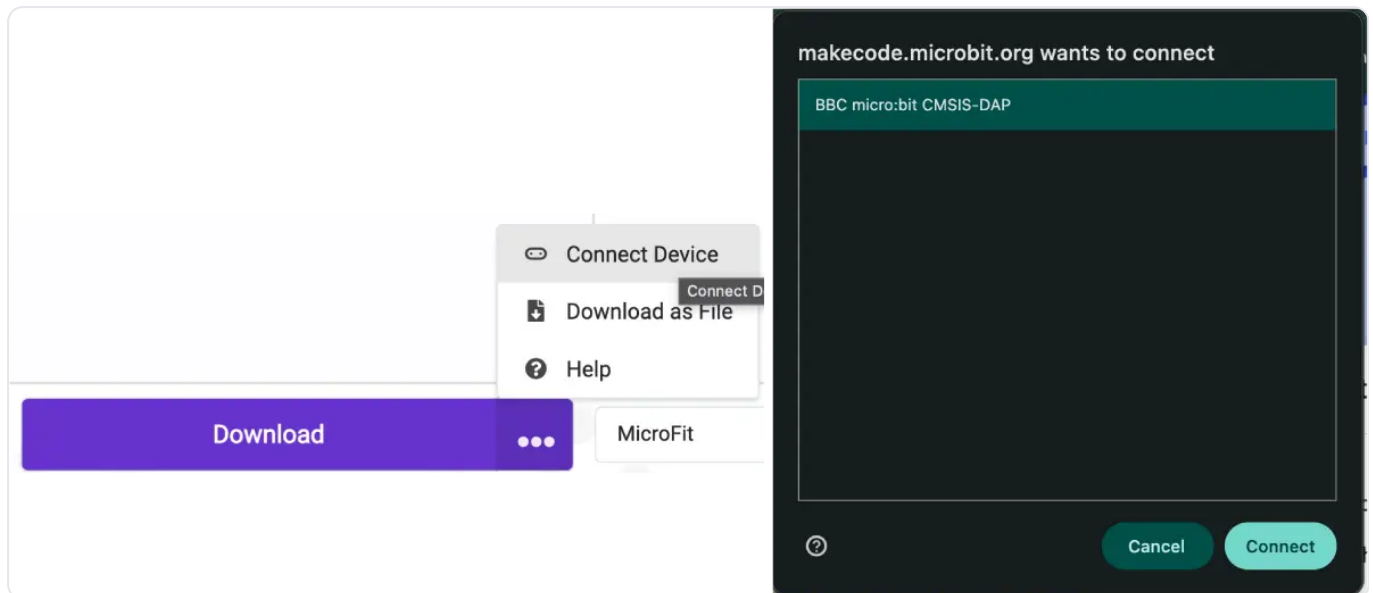
This piece of code checks to see if choice is equal to 1. If it is, it displays the scissors icon to the LED matrix.



## 10 Downloading Your Code

### Using a Computer

1. Select the **three dots** next to **Download**.
2. Select **Connect Device**.
3. A pop-up will show you how to connect the micro:bit to the computer. Keep following the on-screen instructions.
4. Select **BBC micro:bit XXX** and select **Connect**. The XXX is your own micro:bit's name, so don't worry if it looks a little different.
5. Select **Download**.



## Using a tablet or phone

1. Select **Download**.
2. Follow the on-screen instructions to pair the micro:bit with the micro:bit app.

Once you've finished the on-screen steps, your code downloads to your micro:bit.

## 11 Run it and Watch

Shake the micro:bit to see either a rock, paper, or scissors icon display on your micro:bit. Remember the choice is random, so you may have to shake it a few times to see all three icons.

**Don't have a micro:bit?** We can test it on the MakeCode editor by selecting the **white dot** next to **Shake** on the micro:bit Simulator and watch it select the rock, paper, or scissors icon and display it on the virtual LED matrix.

## 12 Try it yourself

### Try it yourself

**Challenge:** Can you add a sound so your micro:bit gives a little beep each time it makes a choice? Try snapping a `play tone` block from **Music** inside your `on shake` block, just after you set the choice. For an extra challenge, play a different note for rock, paper and scissors!

*Good to know: the sound plays through the built-in speaker, which only the micro:bit V2 has. If you have a V1, you can still try this challenge by clipping a buzzer or headphones to the pins. Everything else in this project works happily on both V1 and V2.*

## 13 Stuck? Quick fixes

| Problem                                 | Try this                                                                                                                                            |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Nothing happens when I shake it         | Give it a firm shake, not too gentle. Also check your blocks are snapped inside the <code>on shake</code> block.                                    |
| The same icon keeps showing             | That's normal! The choice is random, so shake a few more times and the others will appear.                                                          |
| My icons look wrong or blank            | Open each <code>show leds</code> block and check you've selected the right squares for rock, paper and scissors.                                    |
| It only ever shows two icons            | Check your <code>else if</code> is set to <code>choice = 1</code> , and that <code>pick random</code> goes from <b>0</b> to <b>2</b> (not 0 to 10). |
| My code won't download to the micro:bit | Use a data USB cable (not a charge-only one), make sure the micro:bit is paired, and try a different USB port.                                      |