Coding with the BBC micro:bit

Learning Concepts:

- Code Blocks
- Loops
- Random Numbers
- Variables
- Images
- If/Then Statements
- Integers

Preparation:

- Open a web browser and go to https://makecode.microbit.org/
- Explore the Basic, Logic, Variables and Math sections and look at the available Code Blocks

Project:

Code a Rock – Paper – Scissors game by creating the images for each item. Then develop the logic that displays each item at random when you shake the micro:bit.

Using the normal rules of the game, play against another participant in the workshop:

Rock breaks Scissors – Scissors cut Paper – Paper covers Rock

1. Go to the Variables section and drag out a "Set To" block. Change the name of the variable to Rock.
2. Expand the Advanced section and go to the Images section. Drag out a "Create Image" block and join it with the "Set To" block. Create a rock image by clicking on each LED in the block.
3. Drag the combined block inside the "On Start" block.
4. The finished code should look like this:
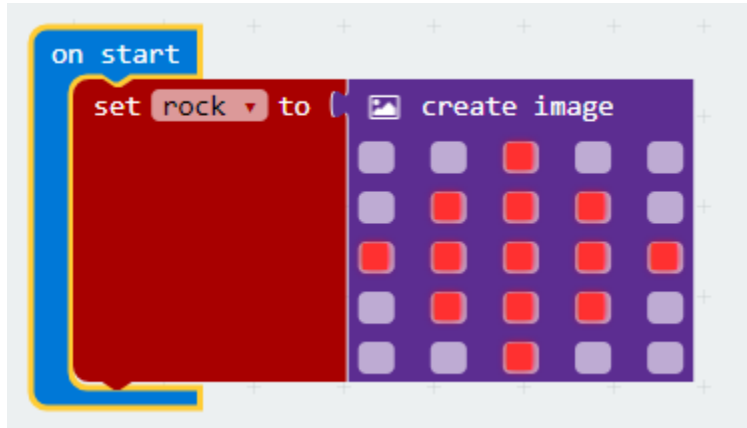
5. Repeat the process to create two more variables for scissors and paper.
6. Go to the Basic section and get a "Show String" block. Type in a message to play when you start the game. Now the "On Start" block should look something like this:
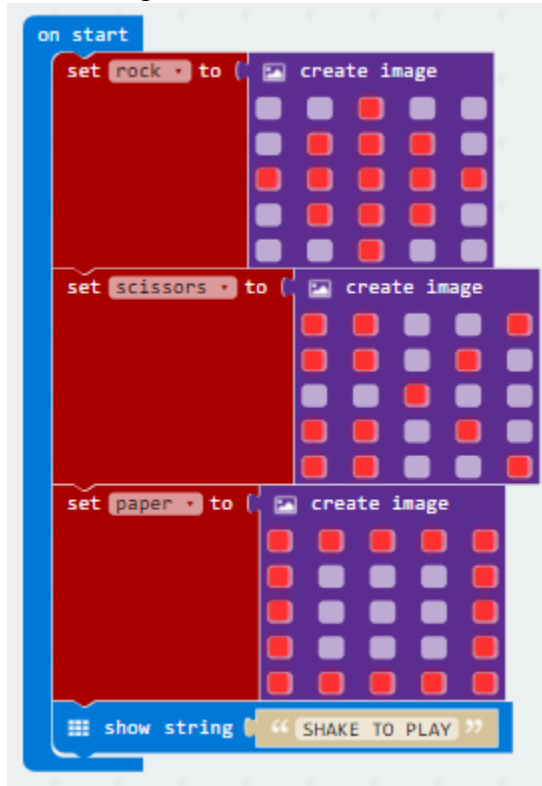
7. Now you are ready for the "On Shake" block from the Input section. This block will run the code you place inside it each time the micro:bit sensors detects it has been shaken.

8. First, you need a variable named "play" and then attach a "Pick Random" block from the Math section. We are going to use three integers from 0 (zero) to 2 (two), one each for the rock, paper and scissors variables. Enter the number 2 inside the "Pick Random" block.

9. Now get an If/Then block from the Logic section. You also need a comparison block from the Logic section. Drag a block for your new play variable and place it in the first position of the comparison block (you can also select it from the drop-down). The end product will look like this:


The logic you are creating is "If variable *play* equals the number *zero*, then do something."

10. The next step is to add the "Then" logic, which will display something using the "Show Image" block. From the Variables section, drop in a rock variable (or select it from the drop-down menu). Your completed If/Then block should look like this:

Drag this block to be inside your "On Shake" block:
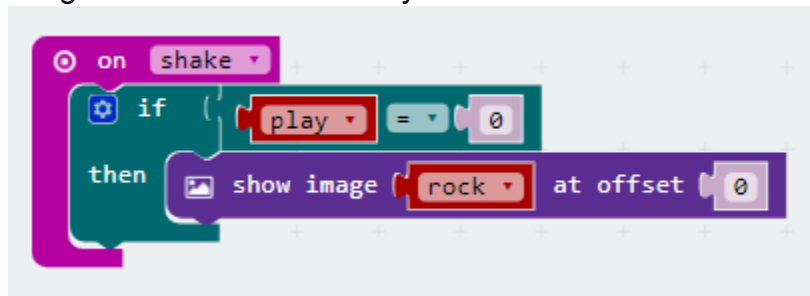
11. Now you can use the "Duplicate" action when you right-click on the If/Then block. Drag the duplicate inside the "On Shake" block and change the Integer to 1 and the image to paper. Repeat for Integer 2 and image scissors. When completed you should have:
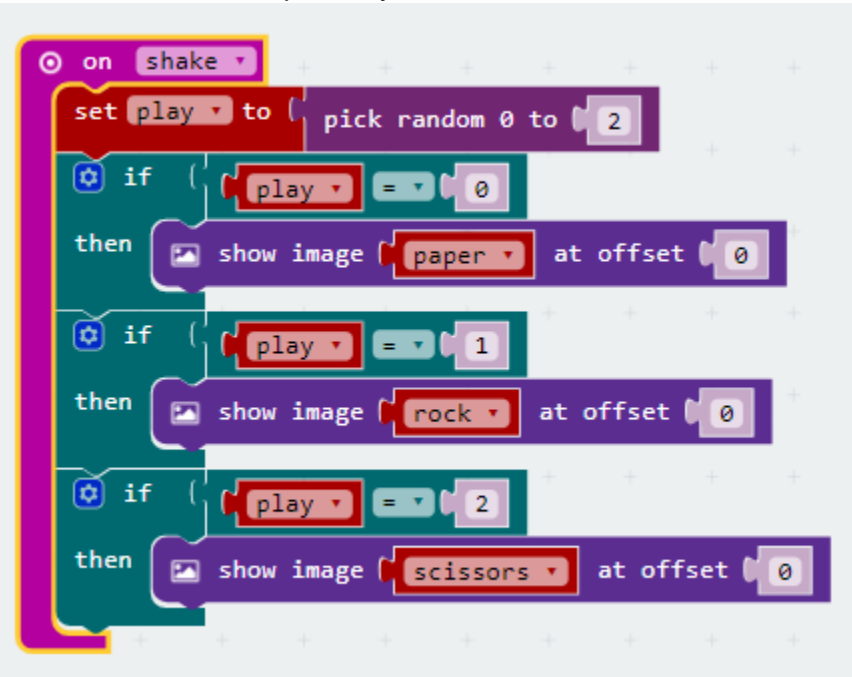
12. **Stretch Goal:** Add the ability to either shake or press the A button to play the game. Use the duplicate action to speed up the process.
13. Try out your game in the simulator! If all works well, then download your finished code to your computer and load onto a micro:bit.

Transfer Your Code:

- Plug in your micro:bit using the supplied USB cable. The micro:bit will appear as a drive (either an icon on the desktop when using a Mac or Linux or as a drive letter in Windows).
- Drag the HEX file downloaded in step 13 to the micro:bit – the code will automatically load and run.
- Detach the micro:bit from the USB cable (follow the proper procedure for disconnecting an external drive from your computer). Use a battery pack to power the micro:bit. Challenge one of the other participants to a game of Rock – Paper – Scissors. Have fun!