Game Show Buzzer System

What You Need:

1 x Crazy Circuits Bit Board
1 x micro:bit v2
1 x Crazy Circuits Pushbutton (optional)
4 x Cardboard Buttons
LEGO Baseplate
Misc LEGO Pieces
1/8" Maker Tape
1/4" Maker Tape

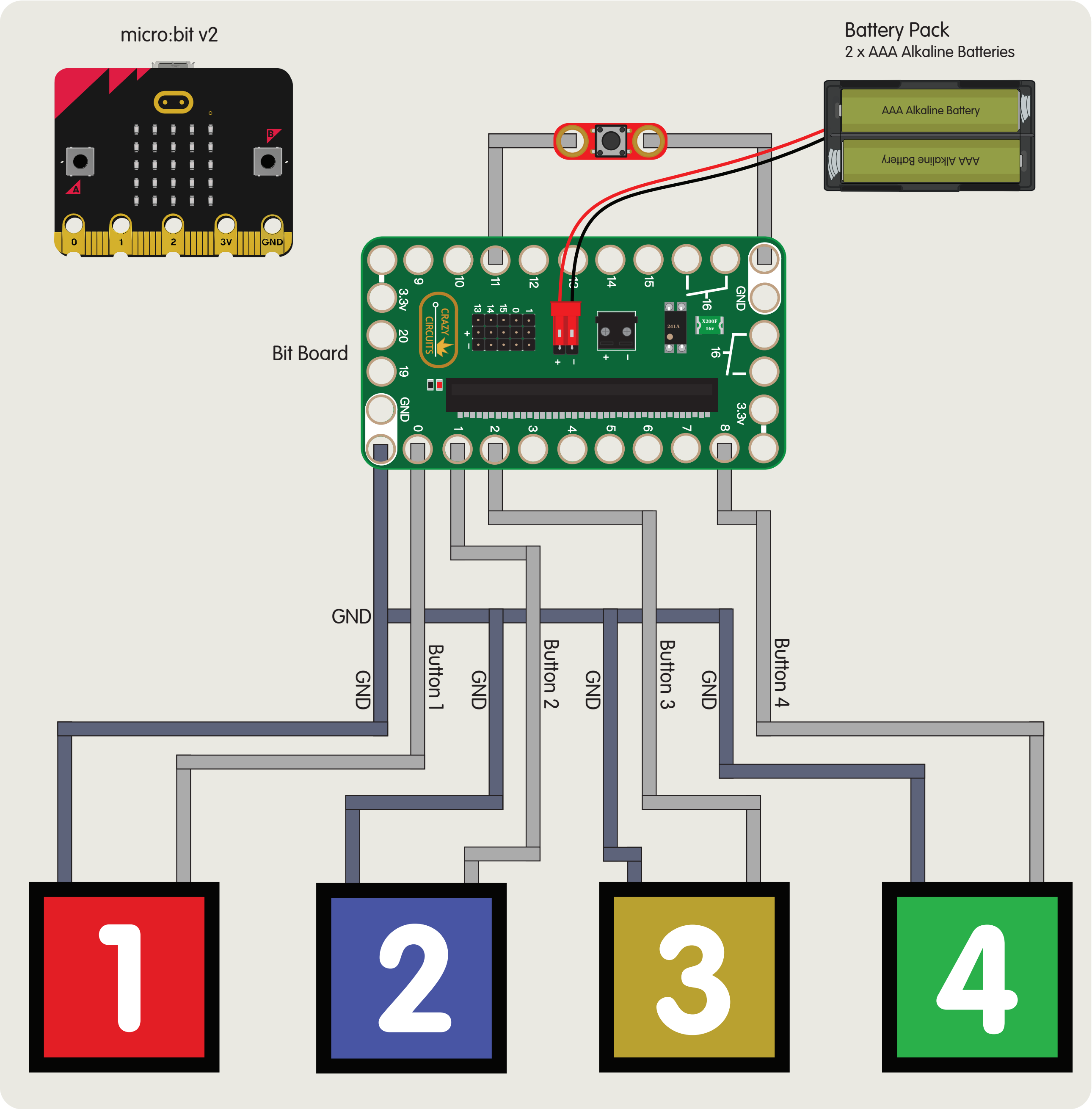
How it Works:

Our Game Show Buzzer System allows up to four players to play a classic trivia-style game where the host asks a question and then the players can smash their button to "buzz in" first and get a chance to answer the question.

But wait! Once you hit your buzzer you've got just 20 seconds to answer the question. If you answer correctly (or incorrectly) before the time is up the game host can reset the system for the next round. If you fail to answer in the alloted time the system will reset itself and (depending on the style of game you've chosen) another team can have the opportunity to steal so they get a chance to answer.

When a team hits their buzzer the built-in LED matrix on the micro:bit will display the number of the team so there's no dispute about who buzzed in first. (No "raising hands" and then arguing about the game host not seeing your hand in the air.)

The micro:bit will start beeping when a button is pressed and continue to beep until time runs out or the host resets the system. (The beeping rate increases as time is running out!)



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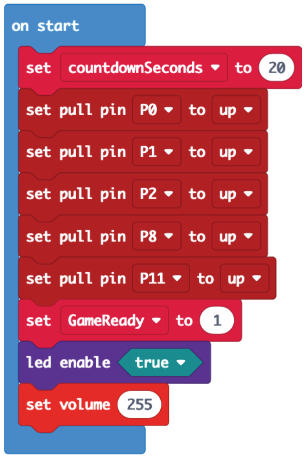
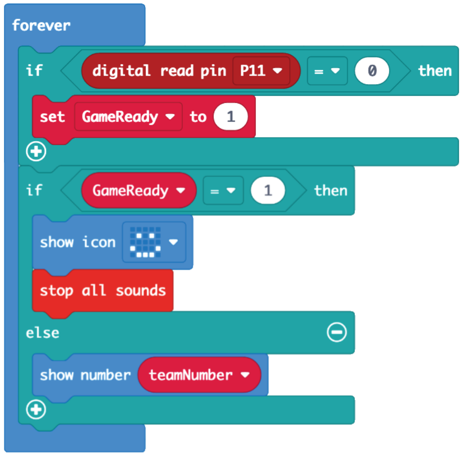
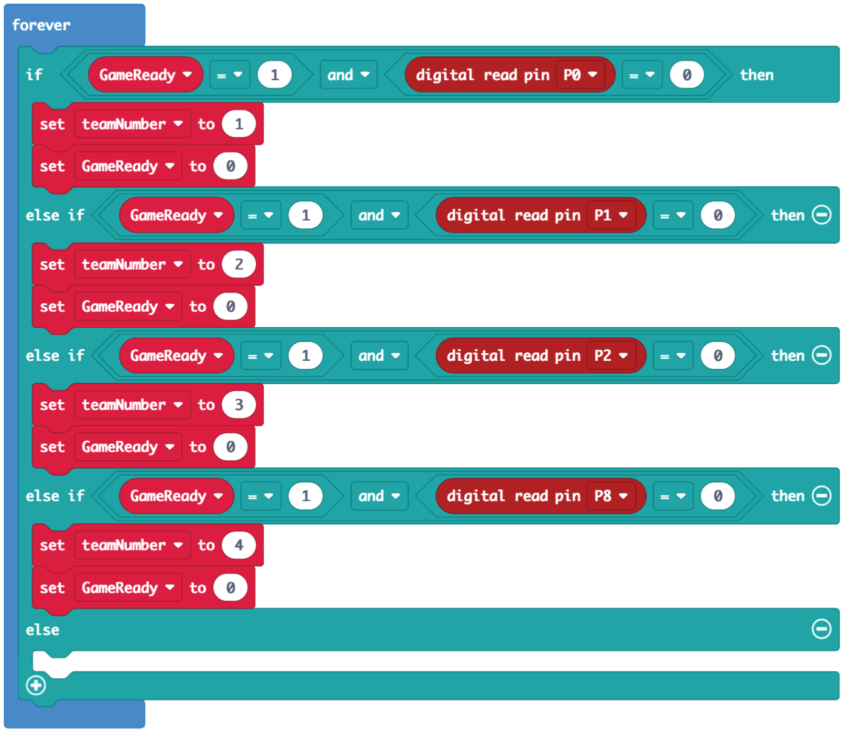
The code for the Game Show Buzzer System may look complex, but we'll break down each part to explain what is happening, and how to make changes.



```
on start
    set countdownSeconds to 20
    set pull pin P0 to up
    set pull pin P1 to up
    set pull pin P2 to up
    set pull pin P8 to up
    set pull pin P11 to up
    set GameReady to 1
    led enable true
    set volume 255
```

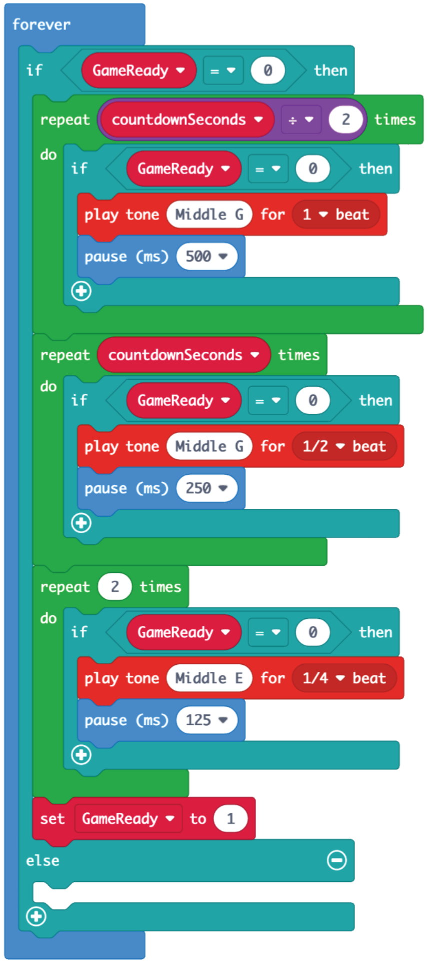


```
forever
    if digital read pin P11 = 0 then
        set GameReady to 1
    if GameReady = 1 then
        show icon
        stop all sounds
    else
        show number teamNumber
```



```
forever
    if GameReady = 1 and digital read pin P0 = 0 then
        set teamNumber to 1
        set GameReady to 0
    else if GameReady = 1 and digital read pin P1 = 0 then
        set teamNumber to 2
        set GameReady to 0
    else if GameReady = 1 and digital read pin P2 = 0 then
        set teamNumber to 3
        set GameReady to 0
    else if GameReady = 1 and digital read pin P8 = 0 then
        set teamNumber to 4
        set GameReady to 0
    else
```

https://makecode.microbit.org/_Ywd68x9b6Vqb



```
forever
    if GameReady = 0 then
        repeat countdownSeconds ÷ 2 times
        do
            if GameReady = 0 then
                play tone Middle G for 1 beat
                pause (ms) 500
        repeat countdownSeconds times
        do
            if GameReady = 0 then
                play tone Middle G for 1/2 beat
                pause (ms) 250
        repeat 2 times
        do
            if GameReady = 0 then
                play tone Middle E for 1/4 beat
                pause (ms) 125
        set GameReady to 1
    else
```

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Game Show Buzzer System

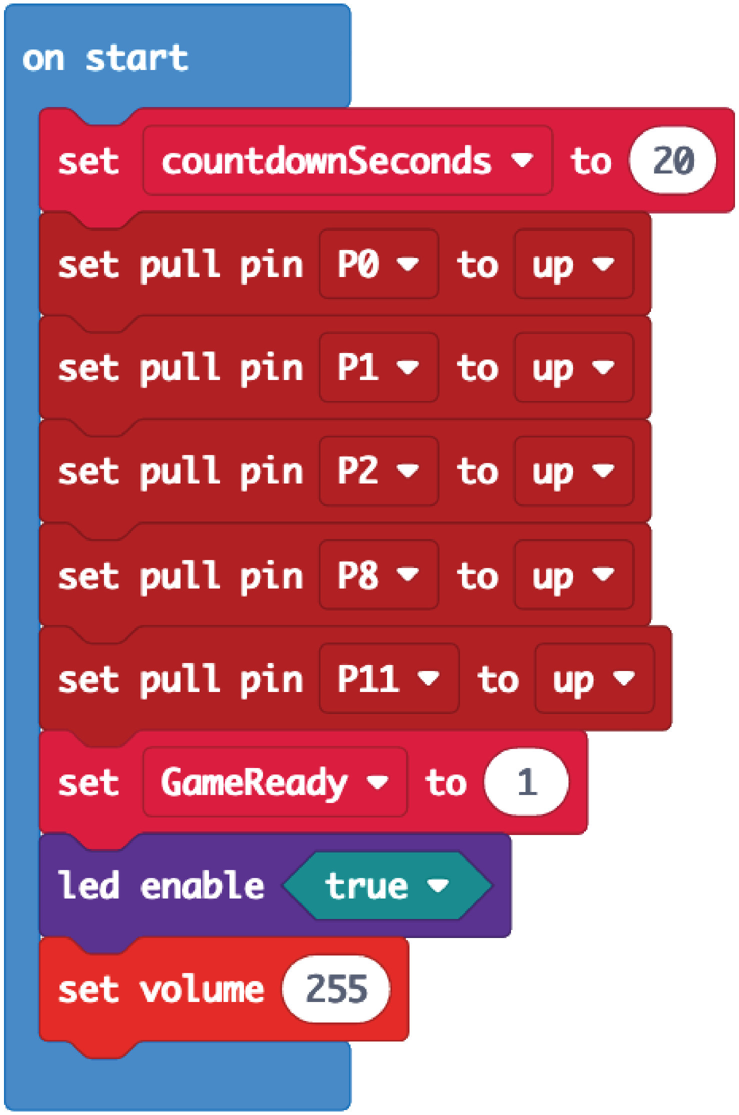
Our **on start** section is where we get things ready for our program. W're going to set our **countdownSeconds** to 20 which means the micro:bit will beep for half of that time (10 seconds) at a slow rate, and then beep at a faster rate for the last half of the time. You can change the number if you prefer more or less time.

Next we set the pins we are going to use so they can have buttons attached to them. On the front of the Bit Board we'll be using **P0**, **P1**, **P2**, and **P8**. These four pins were chosen as they do not conflict with the built-in LED matrix on the front of the micro:bit

Our "reset" button on **P11** is a little different than the others. You can connect a button as shown in the diagram (either a Crazy Circuits button or one you make youself) or you can use **Button B** on the front of the micro:bit. **Button B** is actually connected to **P11** already so either way will work. (We like to connect buttons separately so we don't have to grab hold of the micro:bit to press the built-in buttons but you can do it either way.)

We set **GameReady** to let our code know that the game is ready to be played. In some parts of our code **GameReady** will be set to **0** (zero) to let the code know that something else is happening and the game is not ready to be played. 1 and 0 are often used in programming to designate on and off, or true and false. The are **binary numbers**.

Finally we set the **led enable** to true because we are using the built-in LED matrix on the micro:bit, and we **set volume** to maximum so everyone in the room can hear the micro:bit beeping countdown.



```
on start
    set countdownSeconds ▾ to 20
    set pull pin P0 ▾ to up ▾
    set pull pin P1 ▾ to up ▾
    set pull pin P2 ▾ to up ▾
    set pull pin P8 ▾ to up ▾
    set pull pin P11 ▾ to up ▾
    set GameReady ▾ to 1
    led enable true ▾
    set volume 255
```

Game Show Buzzer System

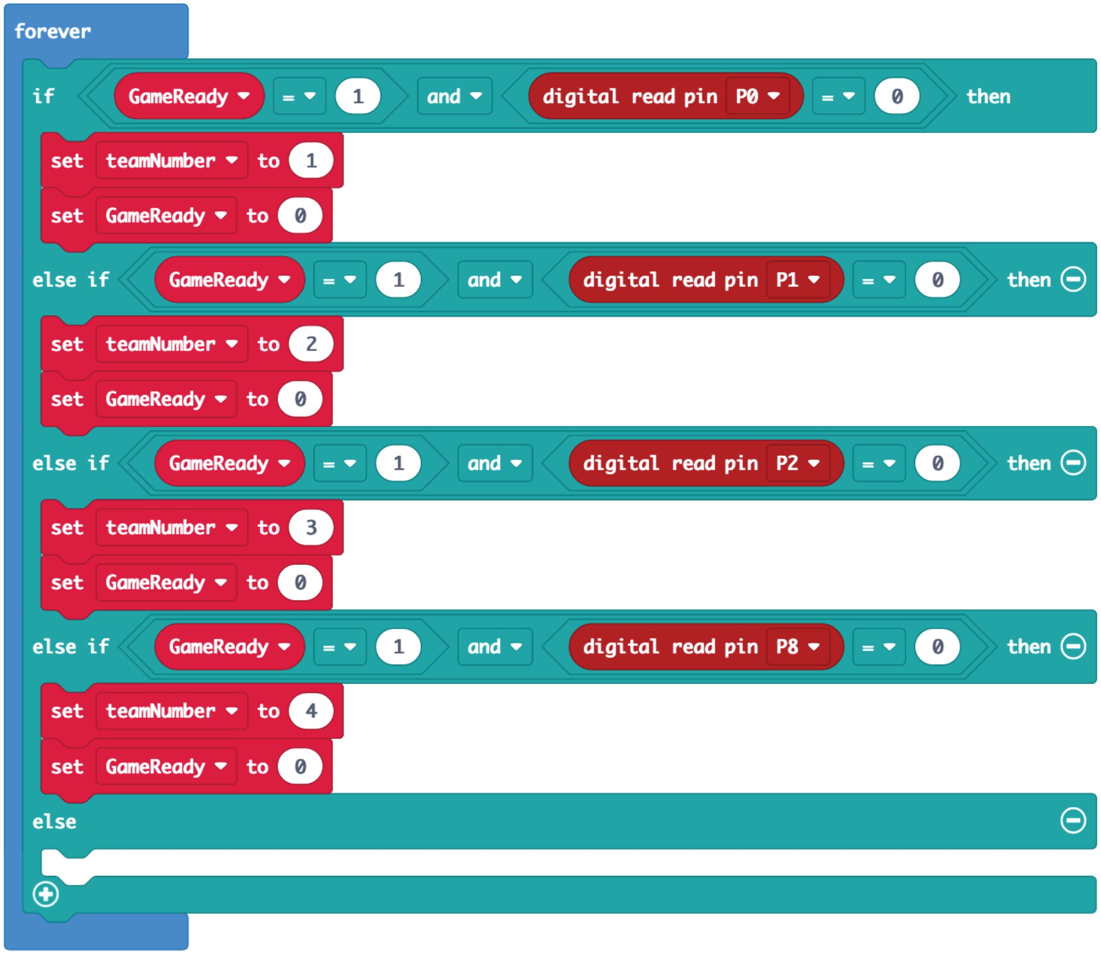
Here's a fun fact, micro:bit code can have multiple **forever** sections that will all run simultaneously. While we could easily put all of our forever code sections into a single group breaking it up can make it easier to write your code and to separate chunks of code from each other.

Here's our first **forever** section.

For this one we've got an **if/else** section that checks if any of the four buttons are pressed. Note that **GameReady** must be **1** (true) or pressing the buttons won't do anything.

When a button is pressed (as long as **GameReady** is set to a value of **1**) the variable **teamNumber** will be set to match the number of the button that was pressed. We also set **GameReady** to 0 so our code knows that we're not ready for another button press yet.

But what happens to the **teamNumber** variable that we set? We'll use that in the next section.



```
forever
    if GameReady = 1 and digital read pin P0 = 0 then
        set teamNumber to 1
        set GameReady to 0
    else if GameReady = 1 and digital read pin P1 = 0 then
        set teamNumber to 2
        set GameReady to 0
    else if GameReady = 1 and digital read pin P2 = 0 then
        set teamNumber to 3
        set GameReady to 0
    else if GameReady = 1 and digital read pin P8 = 0 then
        set teamNumber to 4
        set GameReady to 0
    else
```

Game Show Buzzer System

Here’s our next **forever** section.

This section will play the countdown beeps after a button is pressed.

There is an **if** section so the code will only be executed if **GameReady** is set to **0** (zero). If you remember what happened in the second **forever** section when a button was pressed, we set **GameReady** to **0**, so this sections runs after a button is pressed.

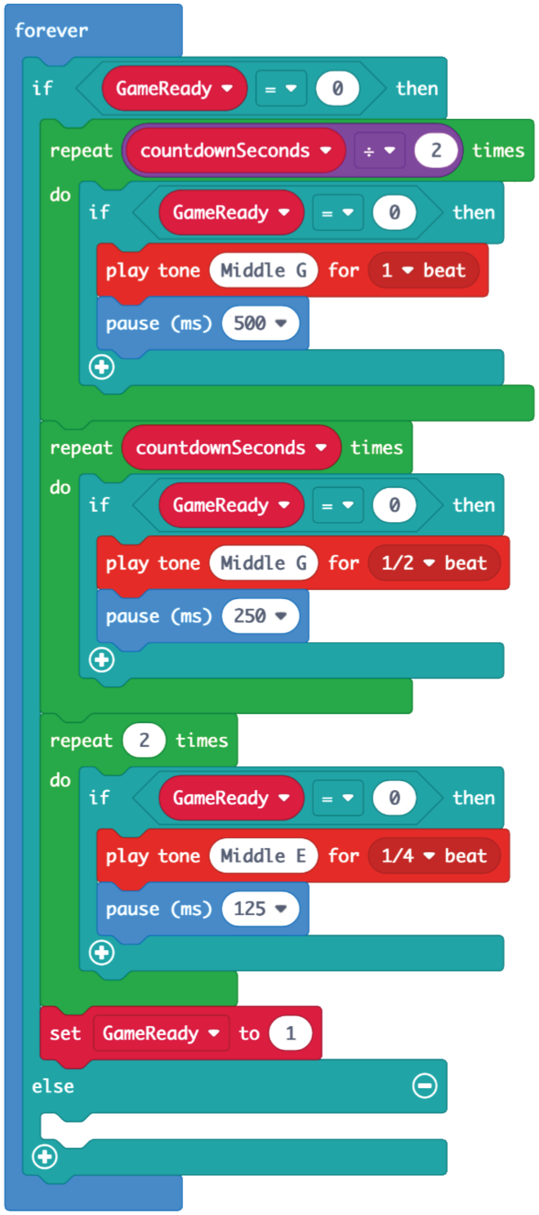
There are three sections to the part of the code, and a bit of maths. Each section plays a beep (tone) to indicate the countdown is happening and the player is running out of time.

In each section we use a **repeat X times** function where we play the **tone**, wait a specific amount of time, then **pause**, then repeat.

For the first **repeat** section we divide the **countdownSeconds** by two so it will run in half the time since the **tone** and the **pause** combined equal one second.

For the second **repeat** section we repeat by **countdownSeconds** because **tone** and the **pause** combined equal a half second so we can do twice as many.

Finally the last **repeat** section just plays two final tones quickly to signal that the time is up. After that we reset **GameReady** to **1** so we are ready for buttons to be pressed again.



```
forever
  if GameReady = 0 then
    repeat countdownSeconds ÷ 2 times
    do
      if GameReady = 0 then
        play tone Middle G for 1 beat
        pause (ms) 500
    repeat countdownSeconds times
    do
      if GameReady = 0 then
        play tone Middle G for 1/2 beat
        pause (ms) 250
    repeat 2 times
    do
      if GameReady = 0 then
        play tone Middle E for 1/4 beat
        pause (ms) 125
    set GameReady to 1
  else
```

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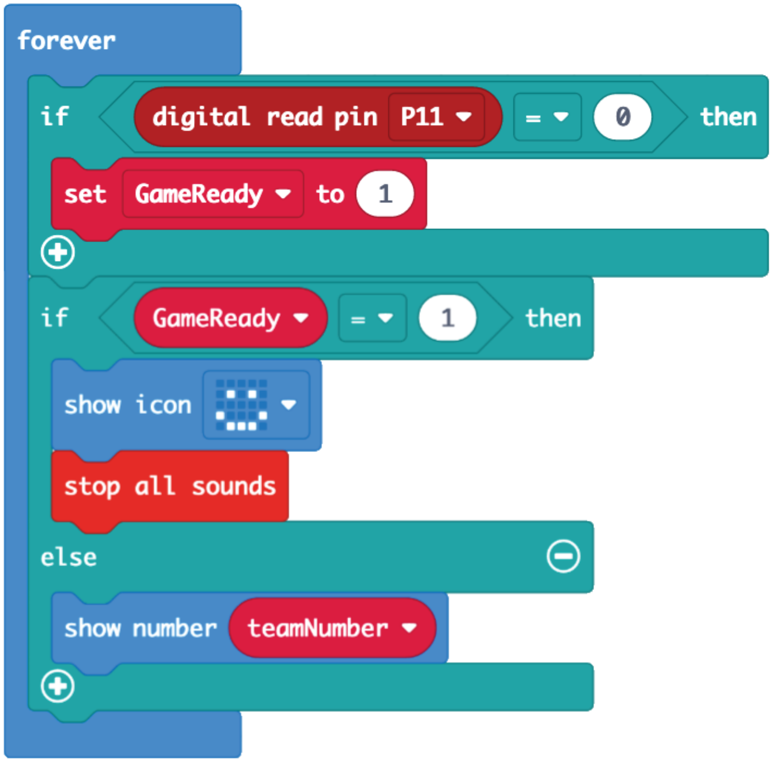
There's just one more **forever** section in our code that we have to look at. This section does two important things.

First, it checks if the reset button (the one connected to **P11** or the built-in **Button B** on the micro:bit)
has been pressed, and if so sets **GameReady** to **1** so that our game playing buttons can be pressed.

The second **if** section checks if **GameReady** is equal to **1** and if it is shows a smiley face on the built-in LED matrix on the micro:bit

The **else** part means that **GameReady** is equal to **0**, indicating that a player has pressed their button, so we display the number that corresponds to the team/button on the built-in LED matrix.

All of these parts combined allow our program to run and make sure our system does what we want it to do.



```
forever
    if digital read pin P11 = 0 then
        set GameReady to 1
    if GameReady = 1 then
        show icon
        stop all sounds
    else
        show number teamNumber
```

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