

Memory - Blocks – Microsoft Arcade

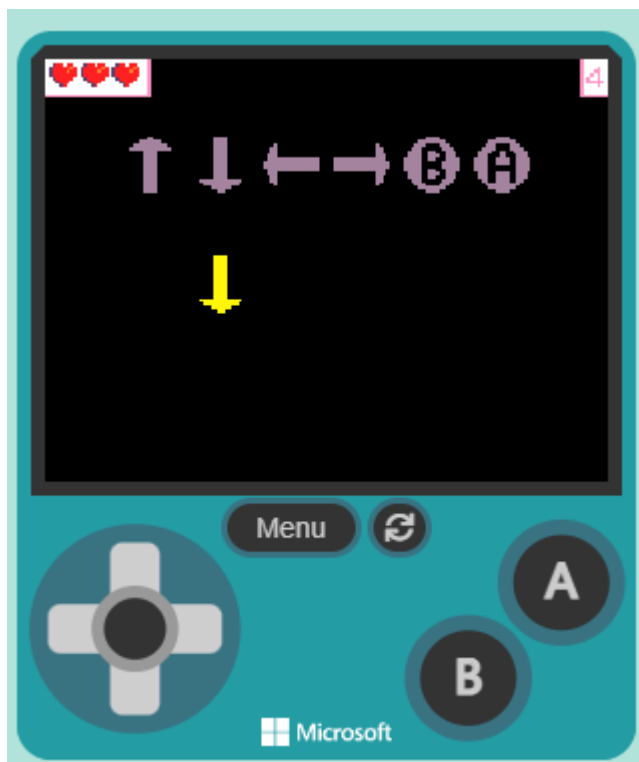
The following instructions will take you through the steps of creating a game where the computer plays a sequence of keypresses that the player memorises and then plays back.

The first sequence is 4 keypresses long.

Each time the sequence is played back correctly; the length of sequence increases by 1.

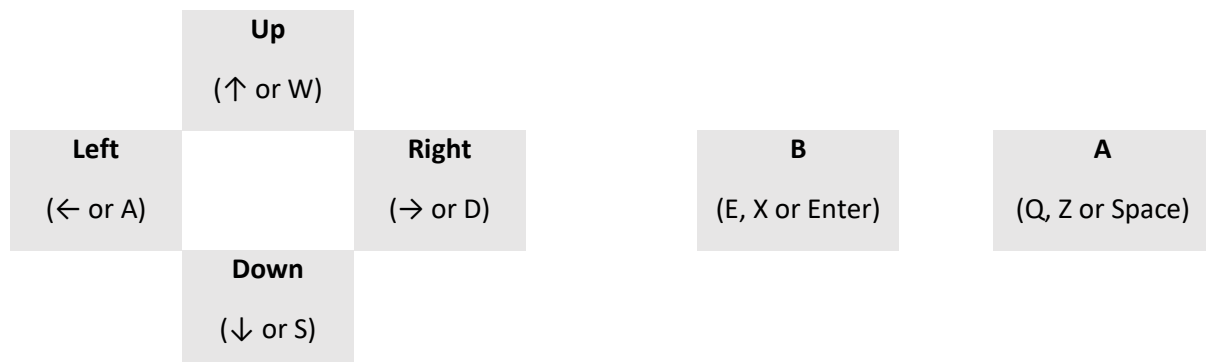
There are 3 attempts at each sequence.

The game ends when the player fails to get the sequence correct 3 times.



Controls

To control the tank, use the left and right direction keys on the console. Alternatively, it may be easier to use the keyboard mappings for the keys as follows. Use the A button to serve the ball.



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Step 1 – Draw the icons

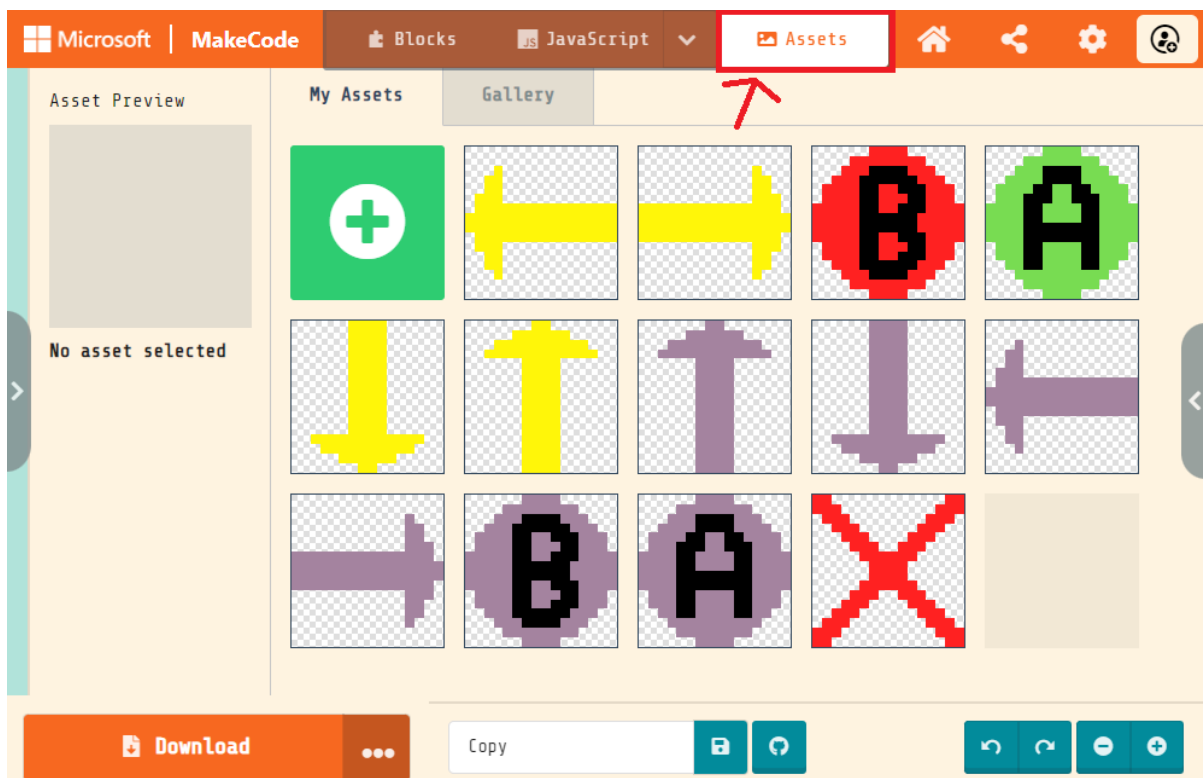
Because the game generates sequences of keypresses to memorise, the game requires 13 images to be created in the Assets section of MakeCode Arcade. The Assets section is accessed from the buttons on the top bar. Each image should be 16 x 16 pixels.

There will need to be 6 images representing the enabled keys and named “left”, “right”, “up”, “down”, “b”, and “a”.

There will need to be 6 images representing disabled keys and named “left-inactive”, “right-inactive”, “up-inactive”, “down-inactive”, “b-inactive”, and “a-inactive”.

There will need to be 1 image representing a cross and named “cross”.

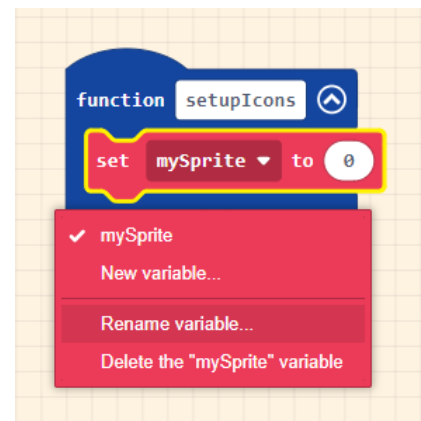
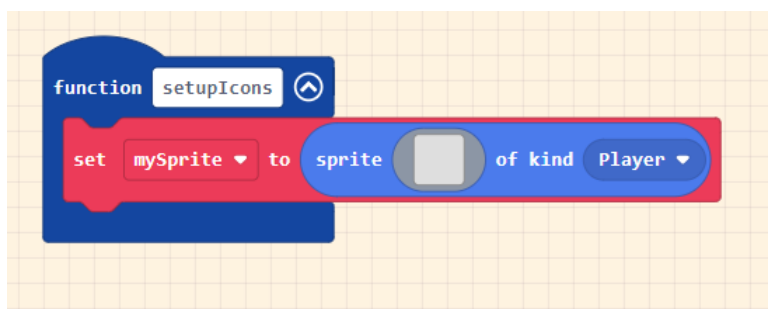
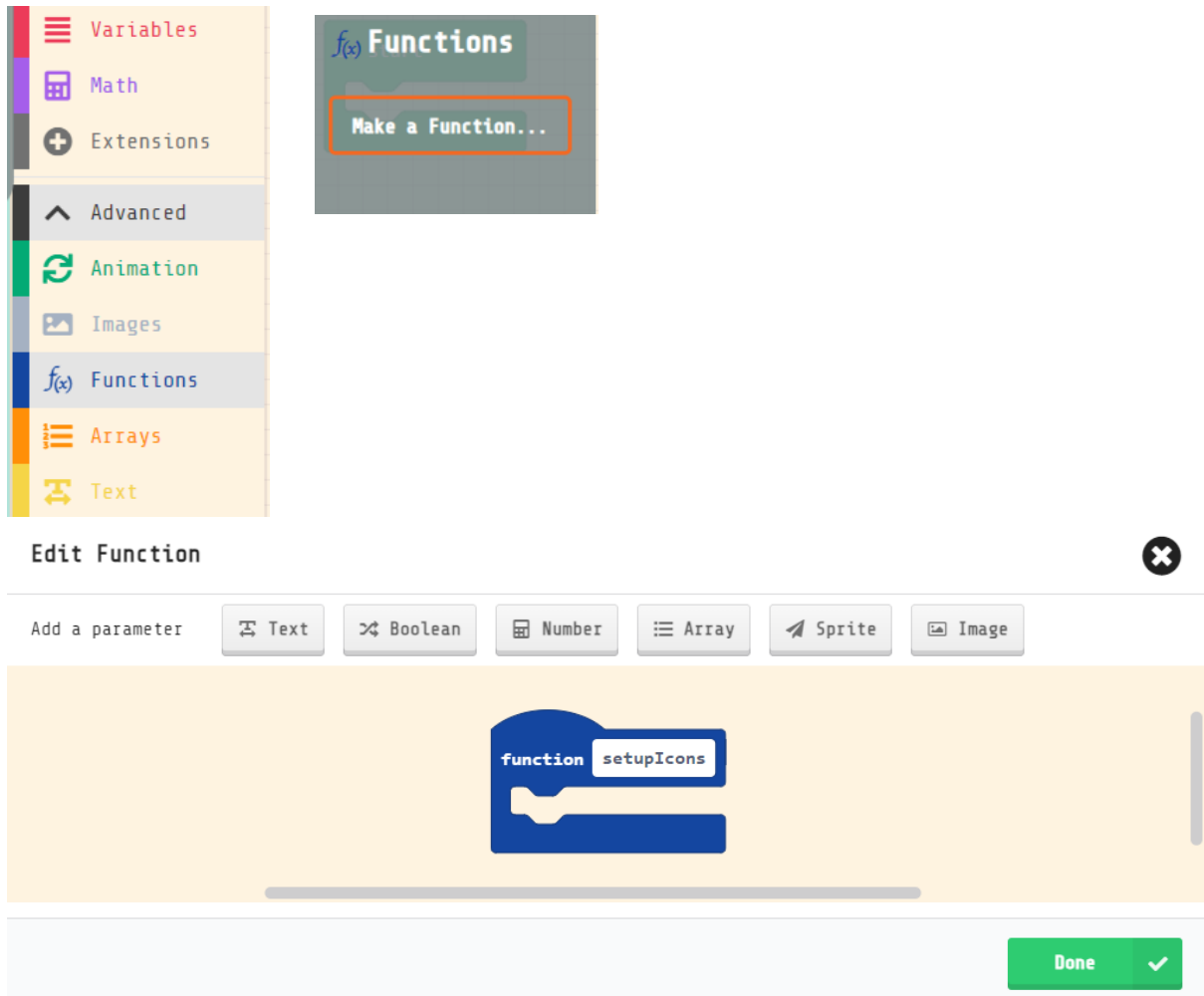
Examples of all 13 images are shown in the screen shot below.



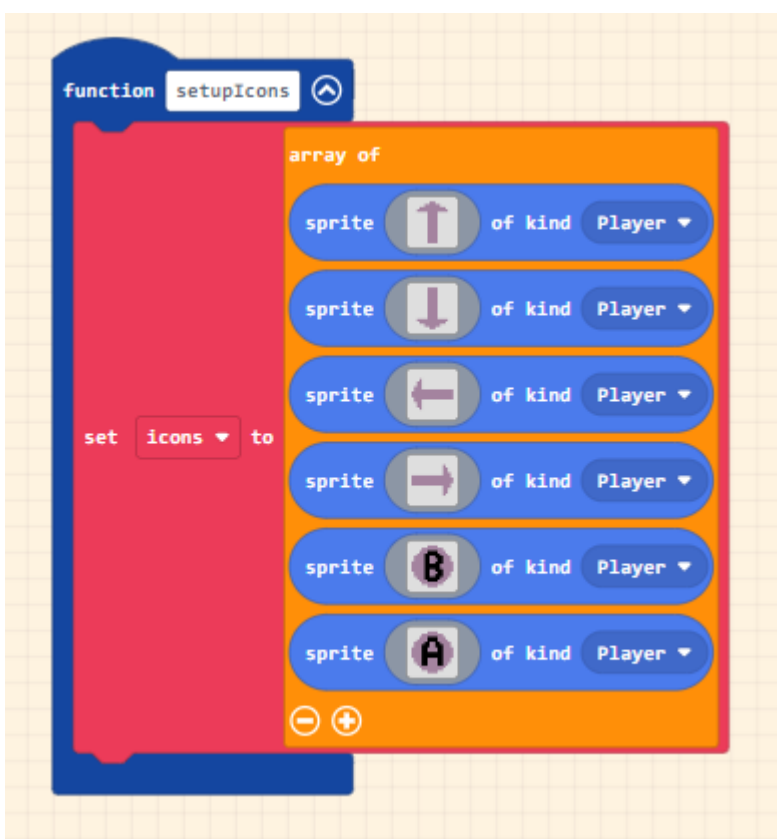
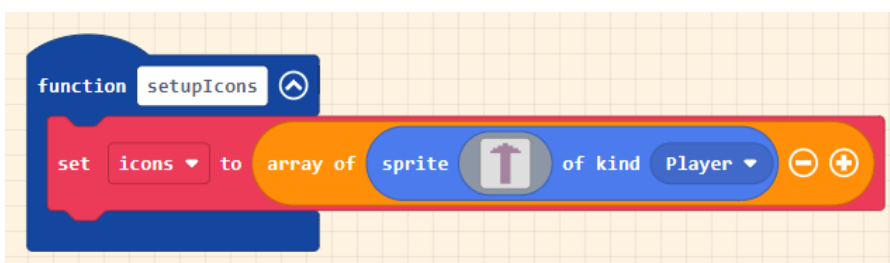
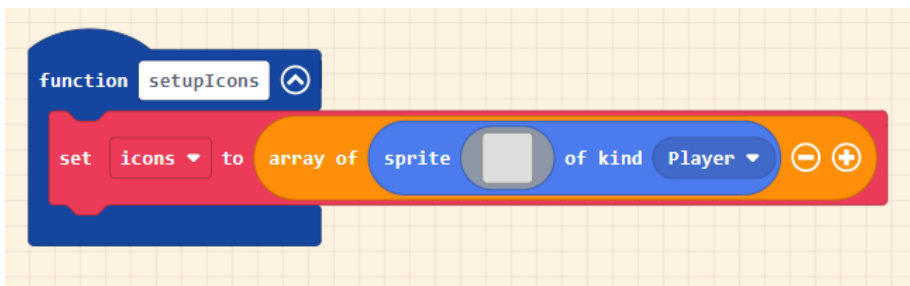
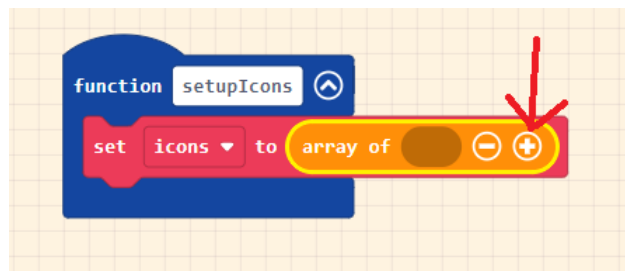
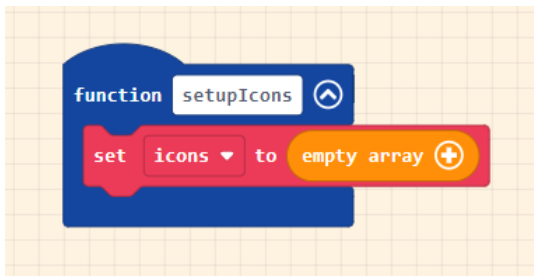
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Step 2 – Setup the top row of icons

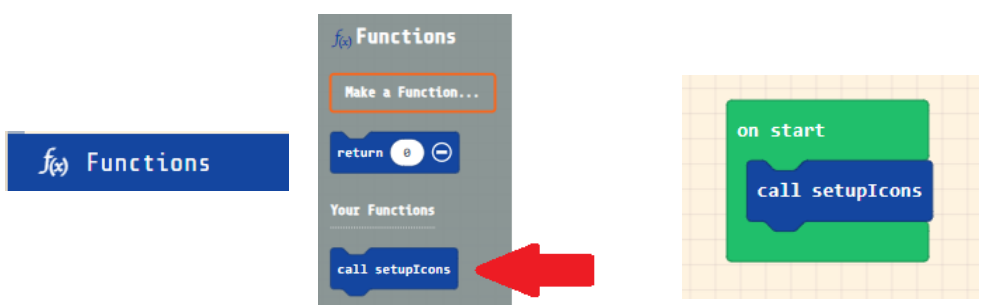
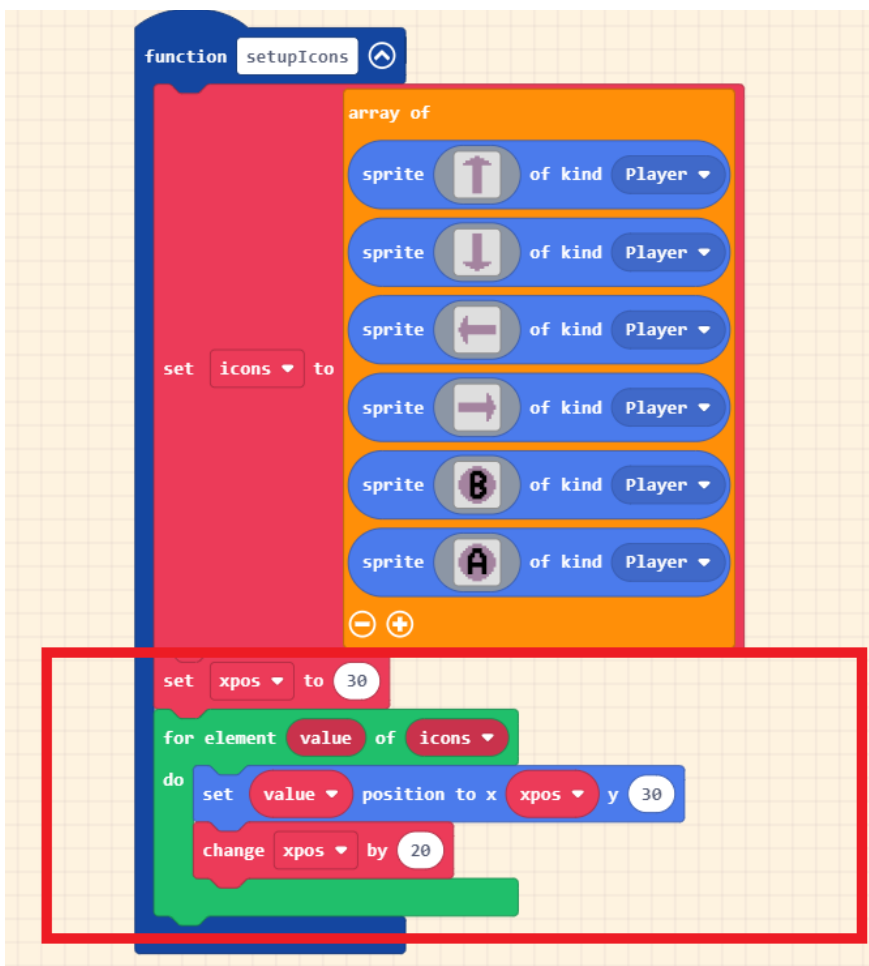
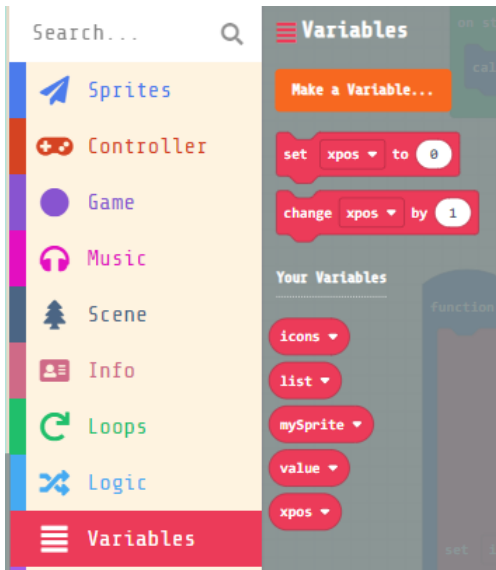
The top row of icons will be used as the focus of the game. We will use a function to setup the array of icons and position them correctly. Create a new function called `setupIcons` by selecting Advanced -> Functions -> Make a Function... as shown below.



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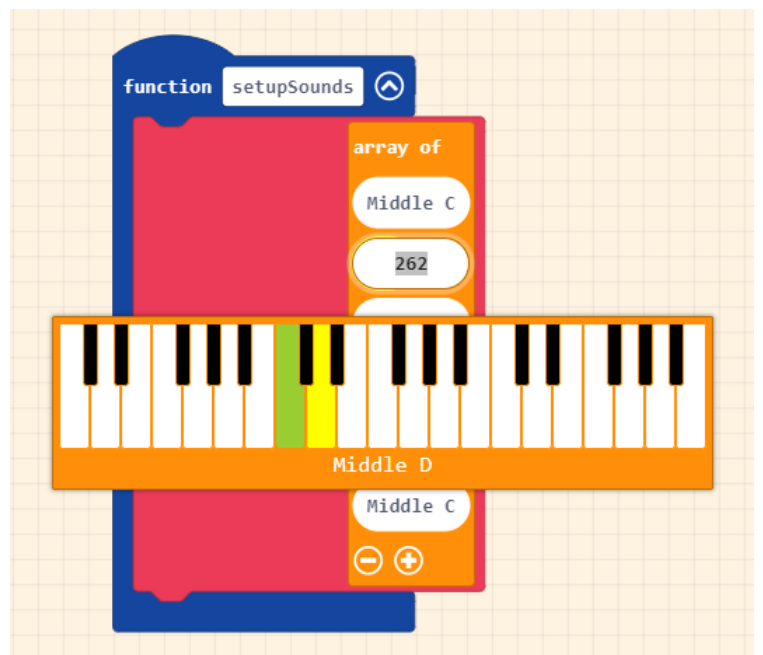
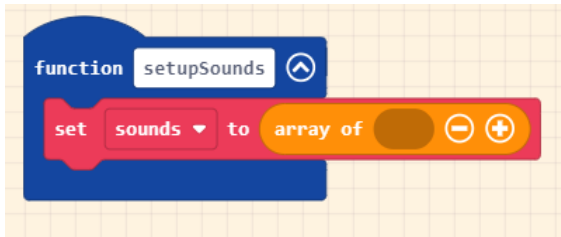
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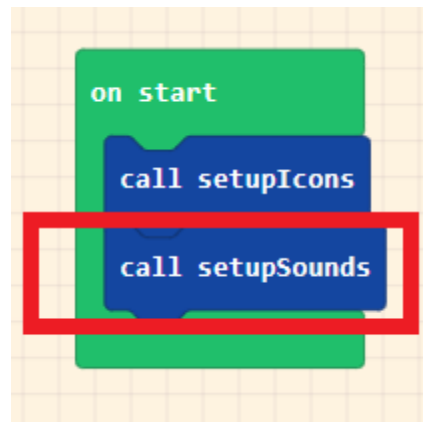
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Step 3 – Setup the sounds to play

This is like the previous step but instead of icons, we are setting up sounds to play. Start by creating a new function called “setupSounds”.

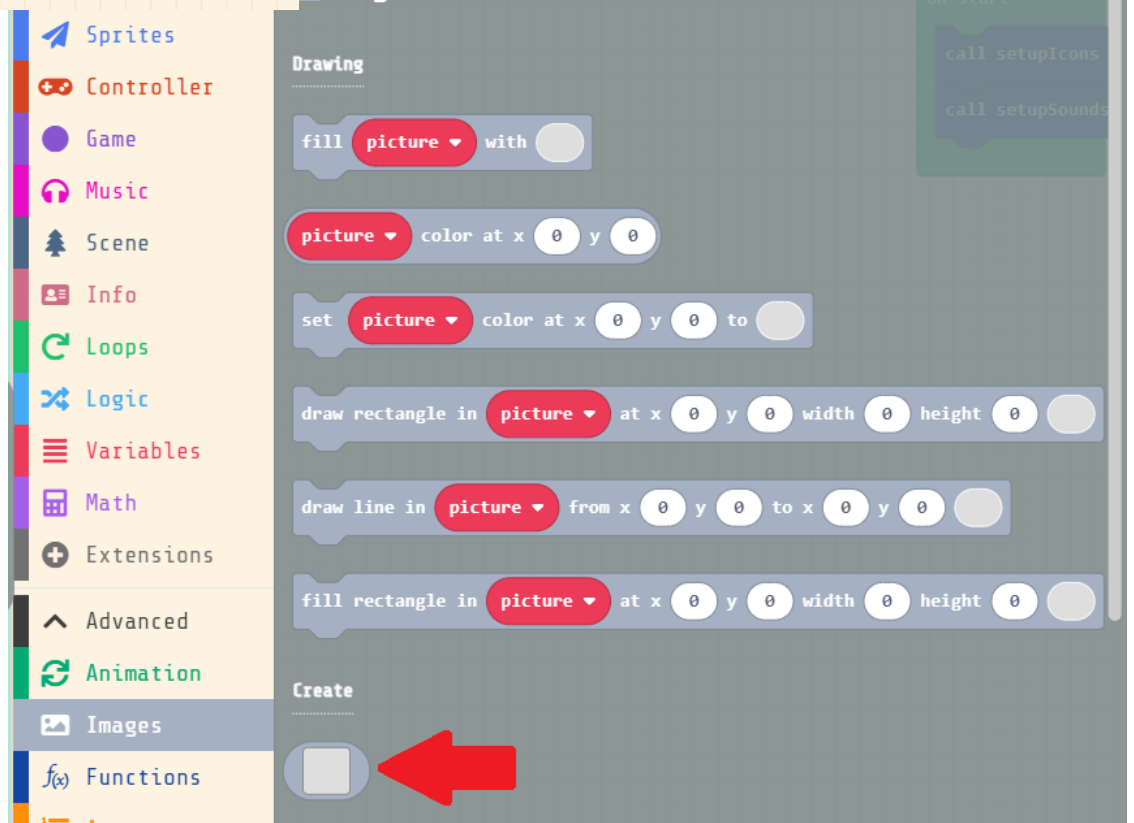


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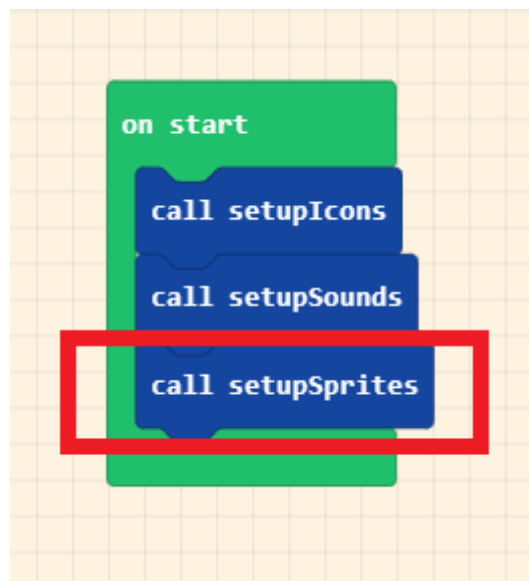
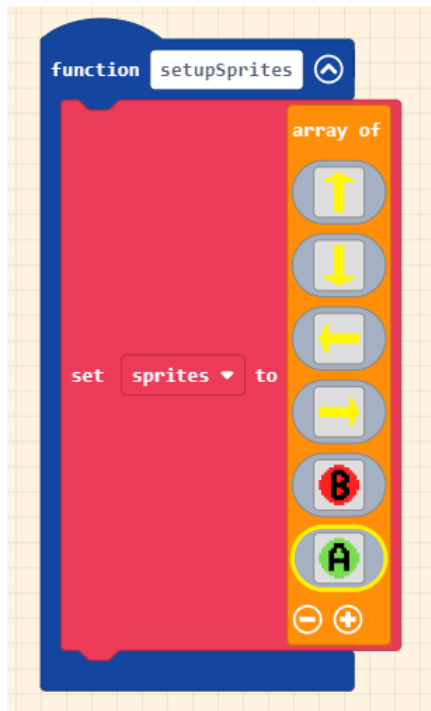


Step 4 – Setting up the sprites to show

As in the previous 2 steps, a new function is to be created to setup the sprites that will be needed.



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Step 5 – Setup the error indicator

When the player makes a mistake, we will want to let them know by showing a cross. Add the following code to your “on start” block. Start by making a new variable

Search... Variables

Make a Variable...

set mySprite to 0

change mySprite by 1

set cross to sprite of kind

Your Variables

cross

icons

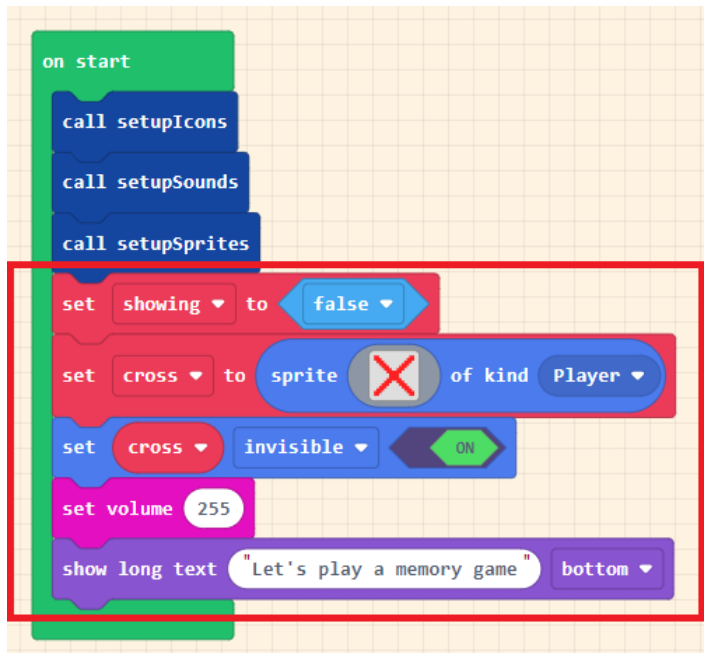
mySprite

New variable name:

showing

Ok

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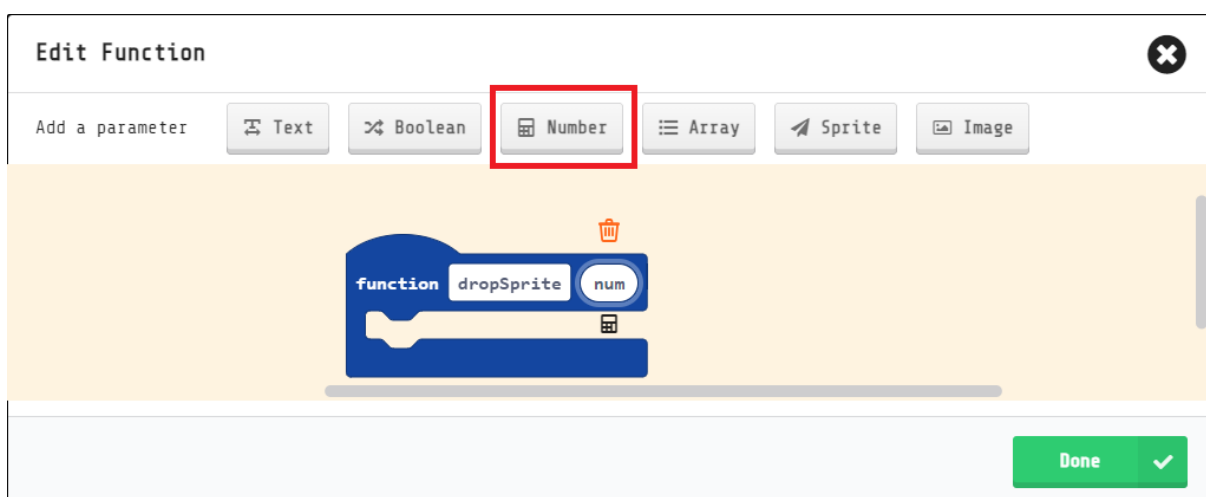
Step 6 – Dropping the sprites

Here a new function is to be created that will be used to make the sprites drop from the icons.

Create a new function by selection Extensions -> Functions – Make function...



This function needs a number parameter called num.

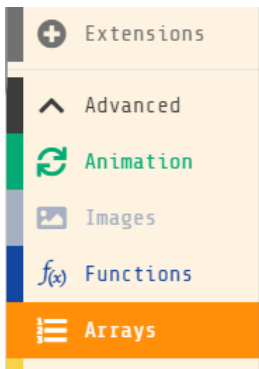


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```
function dropSprite num ^
  set mySprite to sprite of kind Player
  set mySprite position to x 0 y 0
  set mySprite velocity to vx 50 vy 50
  set mySprite x to 0
```

```
function dropSprite num ^
  set mySprite to sprite of kind Player
  set mySprite position to x 0 y 0
  set mySprite velocity to vx 0 vy 50
  set mySprite lifespan to 750
```

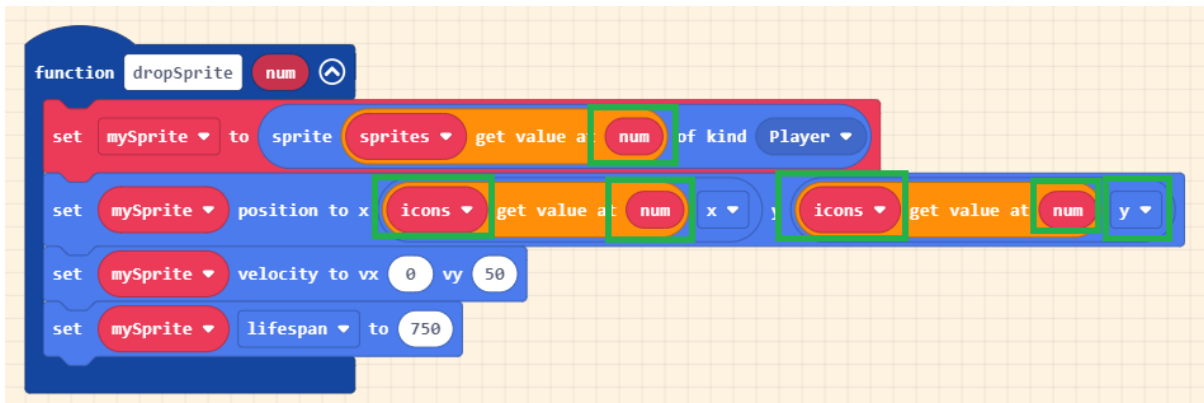
Use the Extensions -> Arrays section for the next section.



```
function dropSprite num ^
  set mySprite to sprite list get value at 0 of kind Player
  set mySprite position to x mySprite x y mySprite x
  set mySprite velocity to vx 0 vy 50
  set mySprite lifespan to 750
```

```
function dropSprite num ^
  set mySprite to sprite sprites get value at 0 of kind Player
  set mySprite position to list get value at 0 x y list get value at 0 x
  set mySprite velocity to vx 0 vy 50
  set mySprite lifespan to 750
```

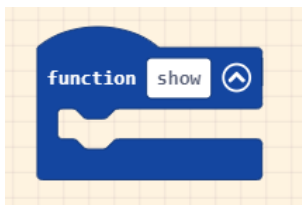
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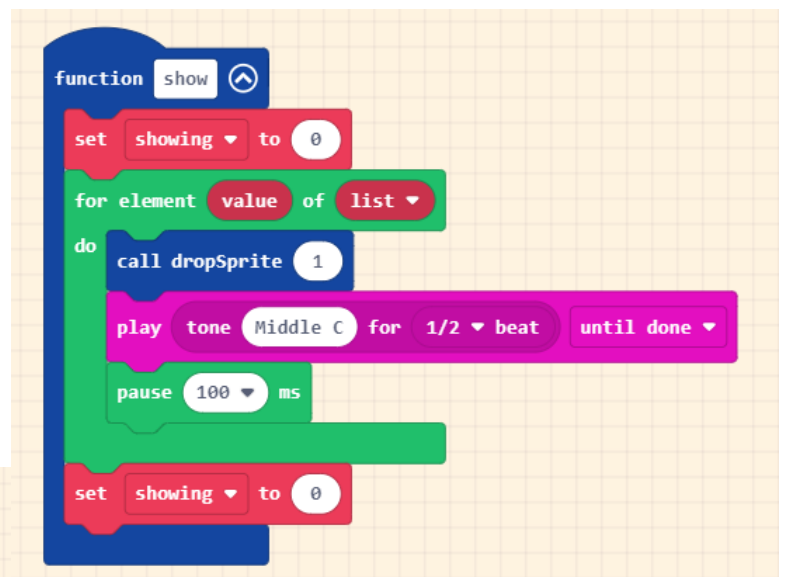
```
function dropSprite num
  set mySprite to sprite sprites get value at num of kind Player
  set mySprite position to x icons get value at num x y icons get value at num y
  set mySprite velocity to vx 0 vy 50
  set mySprite lifespan to 750
```

Step 7 – Showing the sprites

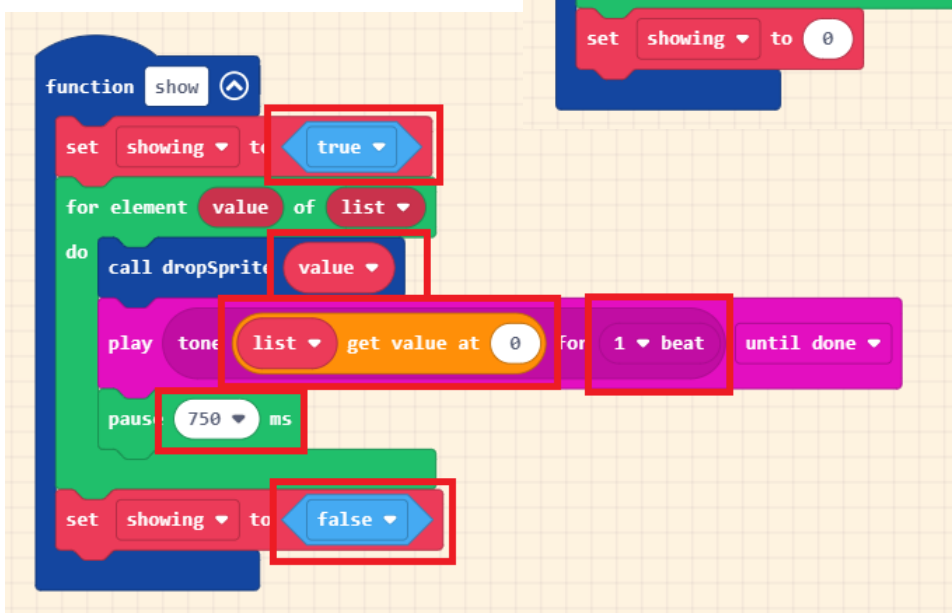
As in the previous step, create a new function but this time call it show.



```
function show
```

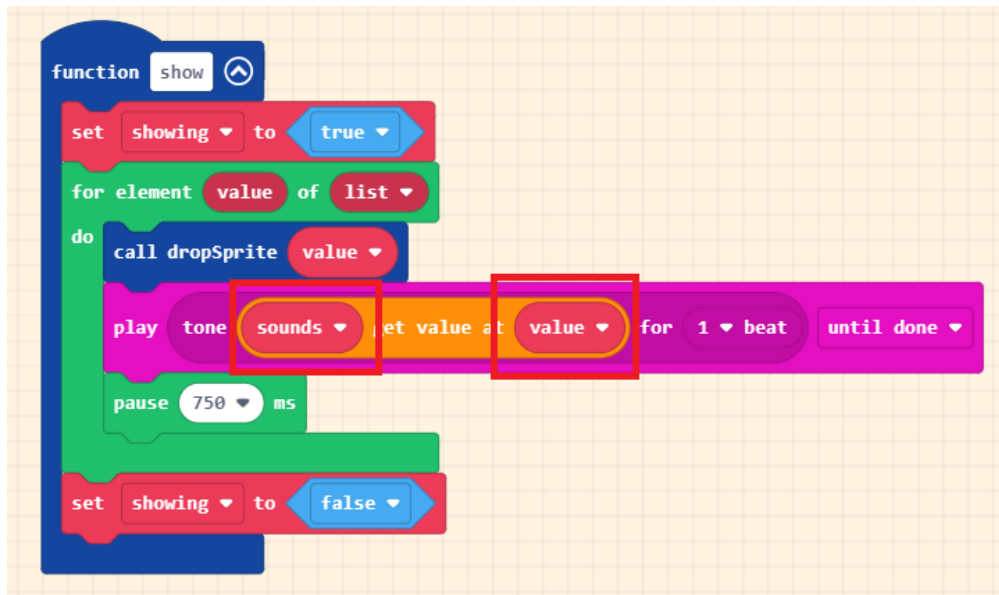


```
function show
  set showing to 0
  for element value of list
  do
    call dropSprite 1
    play tone Middle C for 1/2 beat until done
    pause 100 ms
  set showing to 0
```



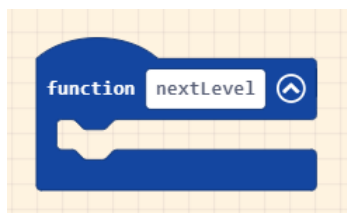
```
function show
  set showing to true
  for element value of list
  do
    call dropSprite value
    play tone list get value at 0 for 1 beat until done
    pause 750 ms
  set showing to false
```

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Step 8 – Creating a level

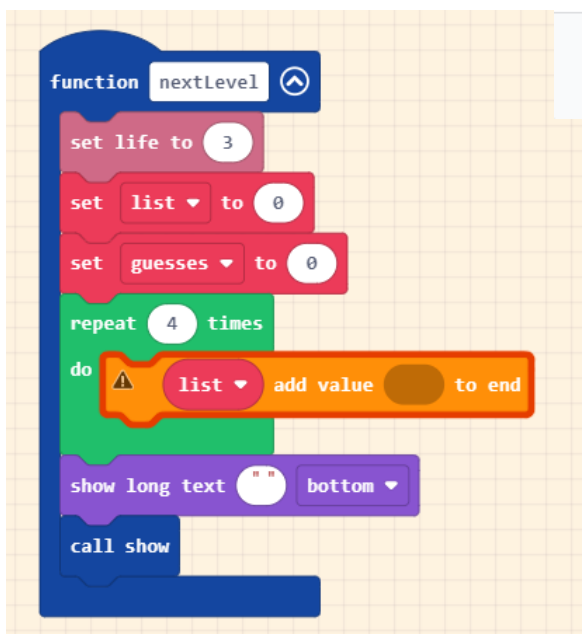
Create a new function called NextLevel



New variable name:



guesses



Ok



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```
function nextLevel  
  set life to 3  
  set list to empty array  
  set guesses to empty array  
  repeat score times  
  do  
    list add value pick random 0 to 10 to end  
  show long text join "Hello " "World " bottom  
  call show
```

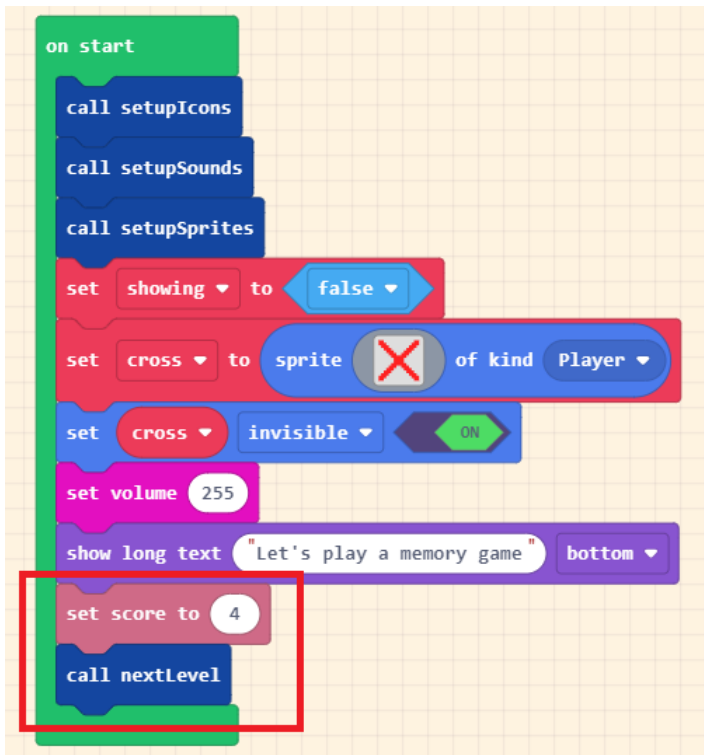
```
function nextLevel  
  set life to 3  
  set list to empty array  
  set guesses to empty array  
  repeat score times  
  do  
    list add value pick random 0 to 5 to end  
  show long text join "Round " 0 - 0 top  
  call show
```

```
function nextLevel  
  set life to 3  
  set list to empty array  
  set guesses to empty array  
  repeat score times  
  do  
    list add value pick random 0 to 5 to end  
  show long text join "Round " score - 3 top  
  call show
```

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Step 9 – Hooking up the start

Add the following to the “on start” code; then try it out.



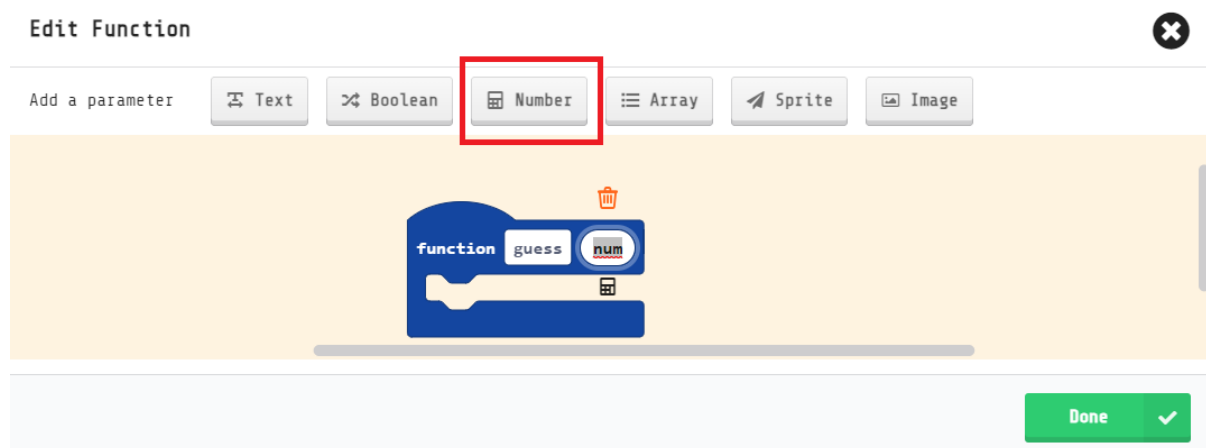
Step 10 – Guesses

Here a new function is to be created that will be used to make the sprites drop from the icons.

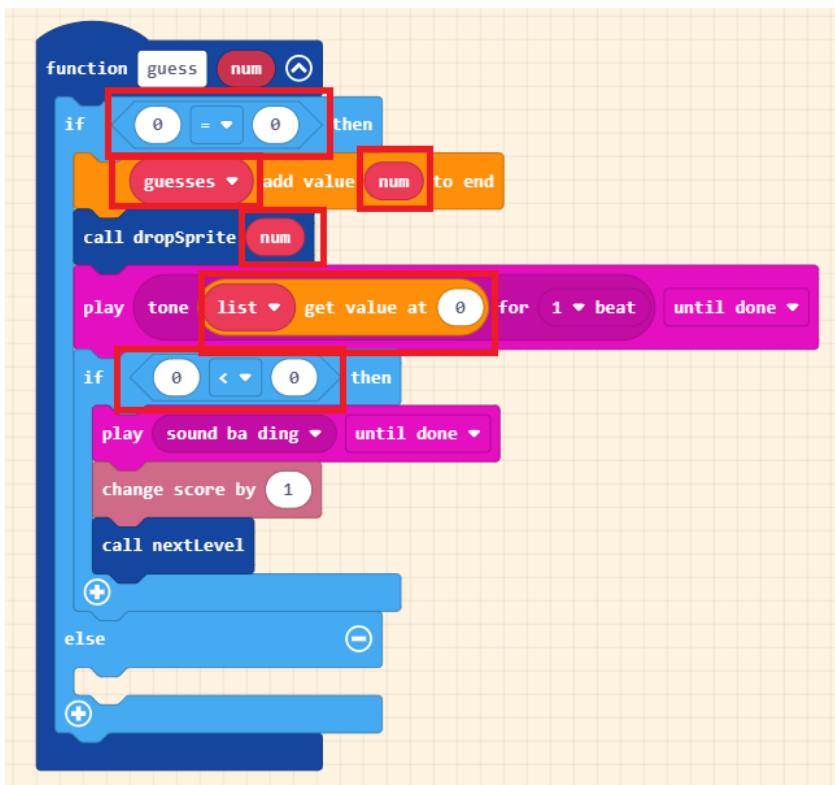
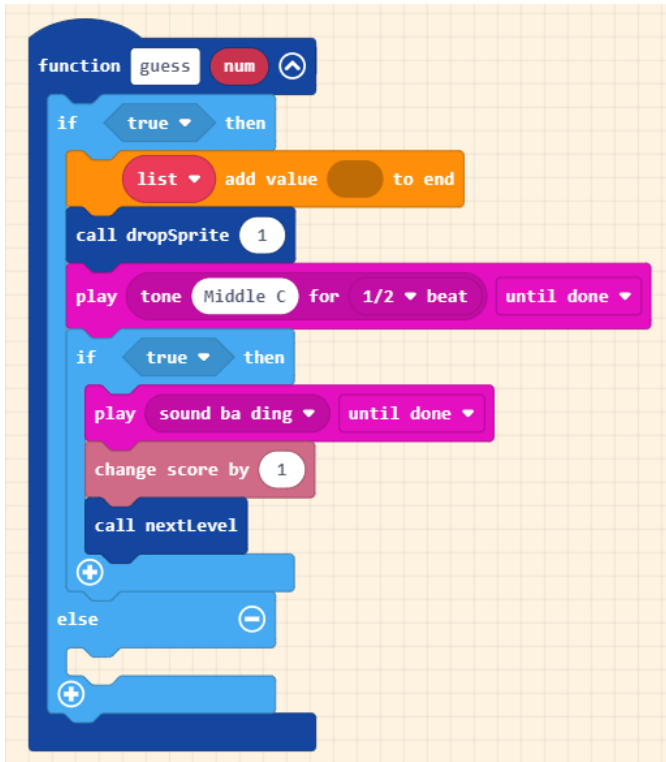
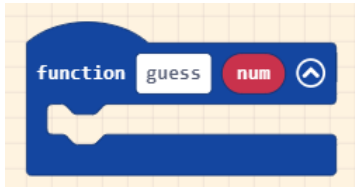
Create a new function by selection Extensions -> Functions – Make function...



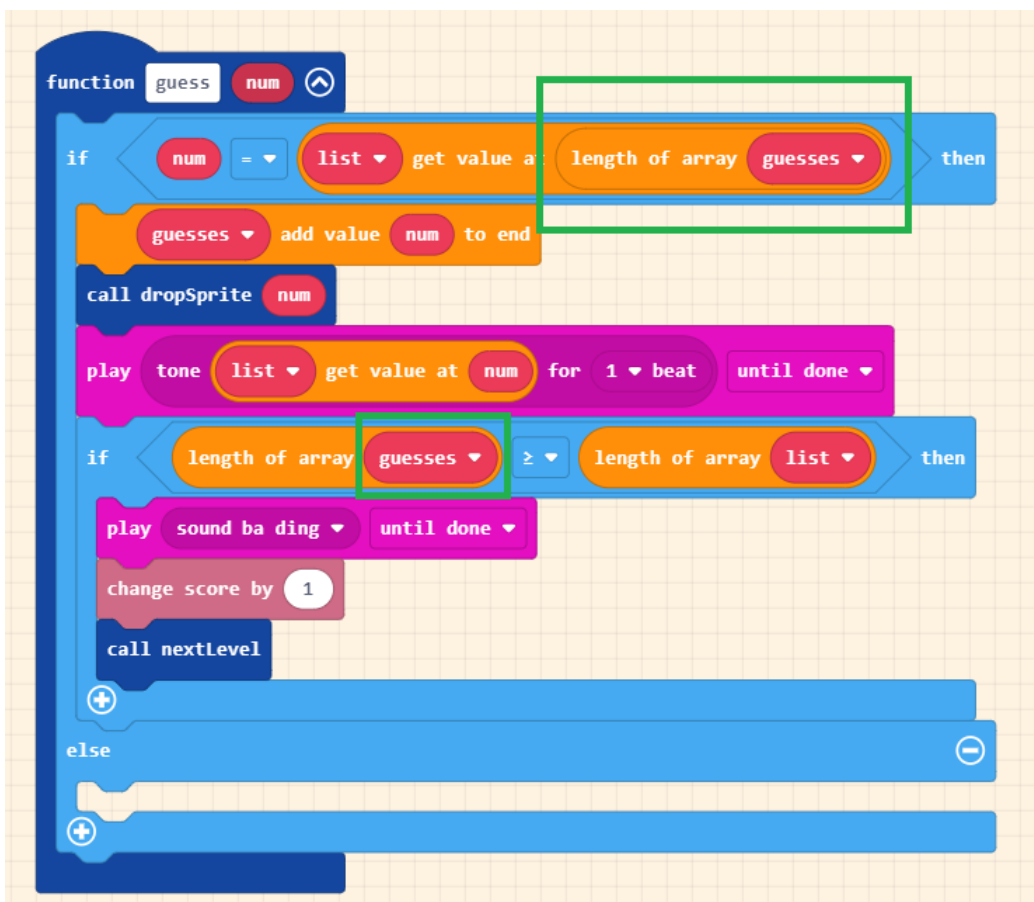
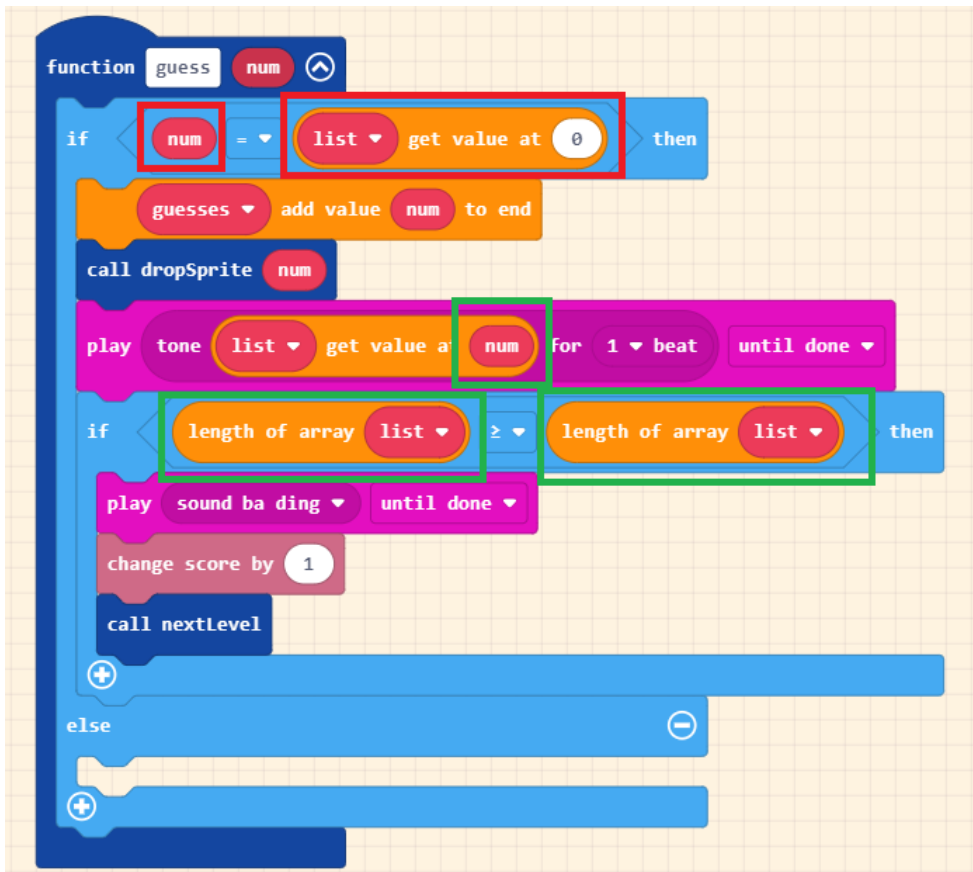
This function needs a number parameter called num.



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```
function guess num
  if num = list get value at length of array guesses then
    guesses add value num to end
    call dropSprite num
    play tone list get value at num for 1 beat until done
    if length of array guesses >= length of array list then
      play sound power up until done
      change score by 1
      call nextlevel
  else
    set showing to 0
    change life by -1
    set cross auto destroy OFF
    if true then
      play sound ba ding until done
      set guesses to 0
      pause 100 ms
      set cross auto destroy OFF
    call show
```

```
function guess num
  if num = list get value at length of array guesses then
    guesses add value num to end
    call dropSprite num
    play tone list get value at num for 1 beat until done
    if length of array guesses >= length of array list then
      play sound power up until done
      change score by 1
      call nextlevel
  else
    set showing to true
    change life by -1
    set cross invisible OFF
    if 0 < 0 then
      play sound ba ding until done
      set guesses to empty array
      pause 1000 ms
      set cross invisible ON
    call show
```

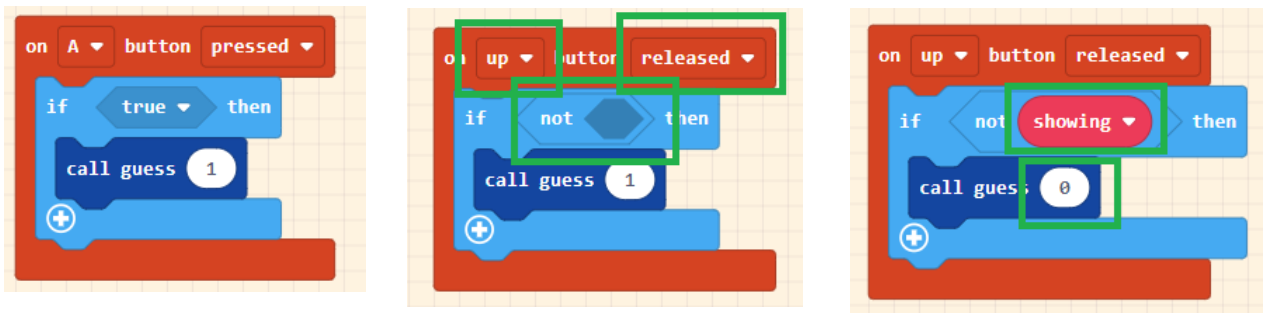
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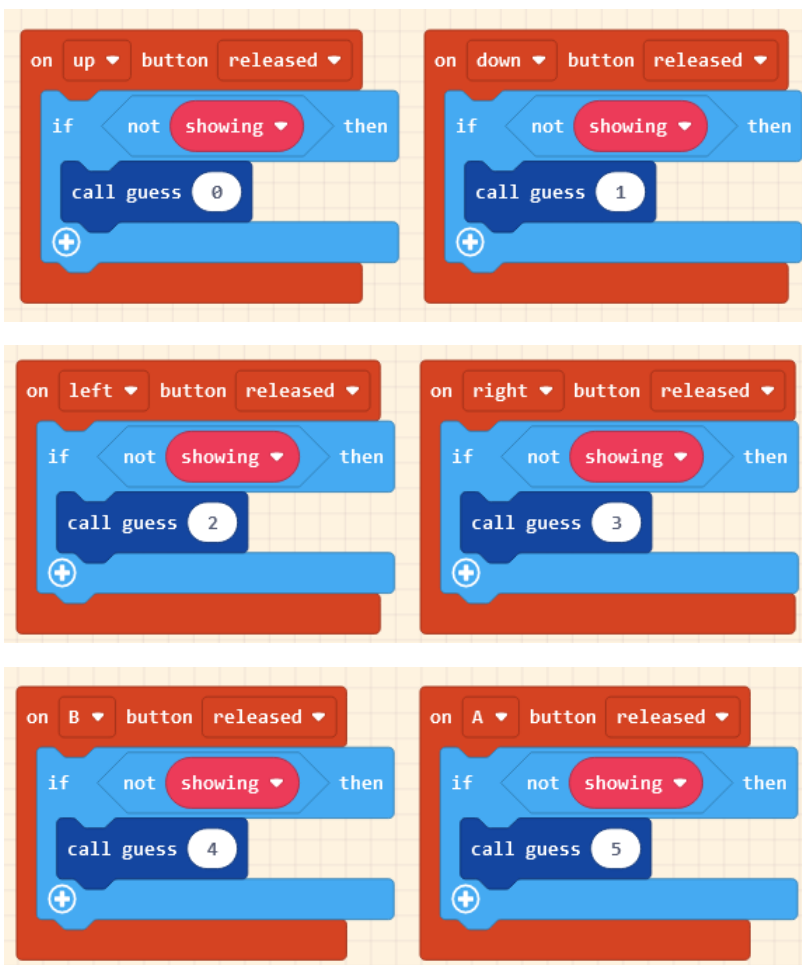
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Step 11 – Keypresses

Now we need to hook up the key presses so the player can play back the tune. We will start with the up button.



Now add the down, left, right, A and B buttons so you have 6 in total like the below:



Extending the game

There are many ways that this game can be extended. Just a few ideas are given below.

- Animate the sprites as they fall.
- Rather than randomly generating a sequence for each level, add to the existing sequence to make it longer.
- Rather than randomly generating a sequence, use the notes to play a tune.