

Reaction timer

The micro:bit can be used to measure time

You have to tell it when to start and when to stop

The difference between the two will tell you how much time has elapsed

You could use this like a stopwatch

Reaction timer

Here's how you'd do this:

```
1  #running time
2  from microbit import *
3
4  while True:
5      if button_a.is_pressed():
6          elapsed = running_time()
7          display.scroll(elapsed)
8
```

This uses a **variable** called `elapsed` to record the time elapsed

- press A to get the time elapsed
- press it again and the time has continued to run

Reaction timer

Here's how you'd do this:

```
1 #work out the time
2 from microbit import *
3 import music
4
5 start = running_time()
6
7 music.play(music.ENTERTAINER)
8
9 end = running_time()
10 duration = end - start
11 display.scroll(duration)
12
```

This times how long it takes for a piece of music to play

This uses two **variables** called `start` and `end` and another one called `duration`

The variable `duration` works out the difference between the `start` and `end` to get the time taken for the music to play

Reaction timer

Create a **reaction timer**

Press **button A** to start the game. This will give you a countdown and then display a diamond

As soon as you see the diamond press **button B**. The faster you press it the quicker your **reaction time**

There are **two parts** to the program

Reaction timer

There are two parts to the program

In part A:

- do a countdown
- create a variable called `start` to record the start time
- display a diamond

In part B:

- create a variable called `end` to record the end time
- create a variable called `reaction` and use it to work out how long the reaction time was
- display the variable `reaction`

```
1  #reaction time
2  from microbit import *
3
4  start = 0 #to avoid confusing microbit
5
6  while True:
7      if button_a.is_pressed():
8          #do a count down
9          #part A code goes here
10
11
12         if button_b.is_pressed():
13             end = running_time()
14             #part B code goes here
15
```

Reaction timer

How to do a countdown

```
5  while True:
6      if button_a.is_pressed():
7          display.show(3)
8          sleep(1000)
9          display.show(2)
10         sleep(1000)
11         display.show(1)
12         sleep(1000)
```

Don't forget to show the diamond at the end of the countdown

Reaction timer

Convert to seconds

The micro:bit only deals in milliseconds

You can convert the reaction time to seconds by dividing it by 1000

```
16  
17  
18 seconds = reaction / 1000  
19 display.scroll(seconds)
```

Reaction timer

Dealing with cheaters:

If you hold button b down as you start the program you're cheating. You'd be trying to get a reaction time of 0

So we can deal with cheaters like this:

```
16
17     if button_b.is_pressed():
18         if start == 0:
19             display.scroll("cheat")
20         else:
21             end = running_time()
22             #code for part B
```

Line 18 uses two = signs to check if start is 0