AlgoHack micro:bit [1]

Authors

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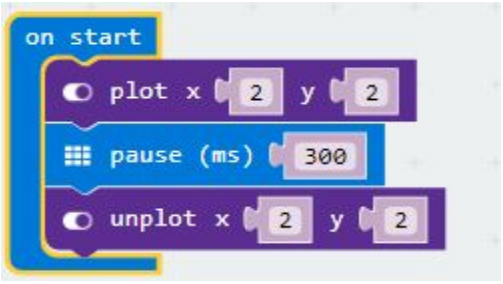
AlgoHack aims to teach Computer Science and Programing to young people, initiated by Shilpa Sayura Foundation, supported by GOOGLE RISE and Computer Society of Sri Lanka.

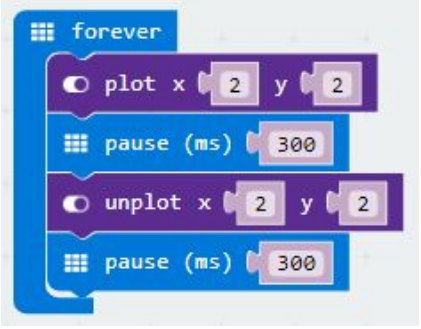
This program **light** LED at 2,2
Wait for 1000 milliseconds
And **un-light** the LED



pause is a Basic component
The code is following.
You can skip code and work with blocks only.

```
led.plot(2, 2)
basic.pause(300)
led.unplot(2, 2)
```

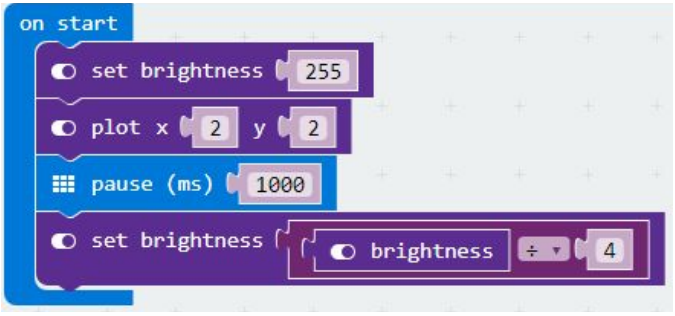
What will happen?
if we put this code inside forever block?



The code looks like this

```
basic.forever(() => {
    led.plot(2, 2)
    basic.pause(300)
    led.unplot(2, 2)
    basic.pause(300)
})
```

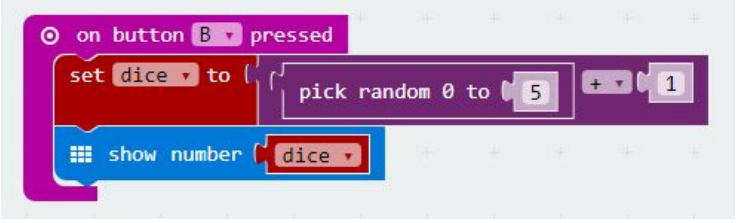
Controlling LED Brightness



You can set brightness from 0 - 255.
0 is zero brightness, 255 is maximum brightness

Random Number Dice

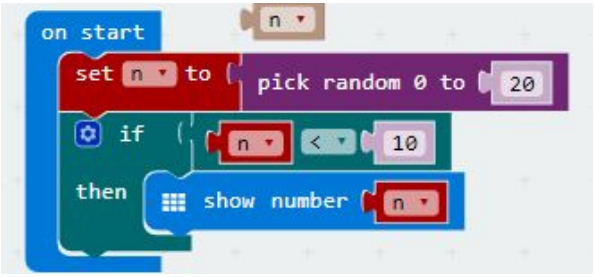
Let's play with random numbers
Every Time you press B, microbit gives you a number



Random number block in Math gives a number between 0 and given number. Here we add 1 to make it more human. Humans start counting from 1. Computers do it from 0.

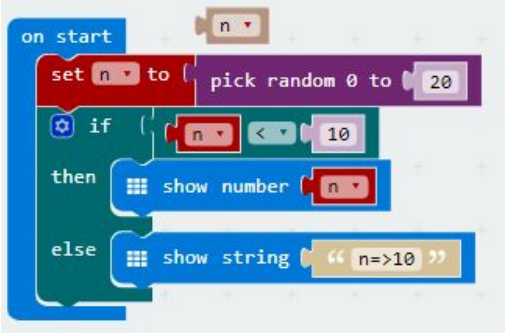
Conditions

We can compare two values with a condition.
Below we pick a random number from 0 to 20
if it is smaller than 10 we can do something.



IF ...THEN ... ELSE

We can use conditions to branch programs.
If number is smaller than 10 we print it.
Else we print “n > 10” text

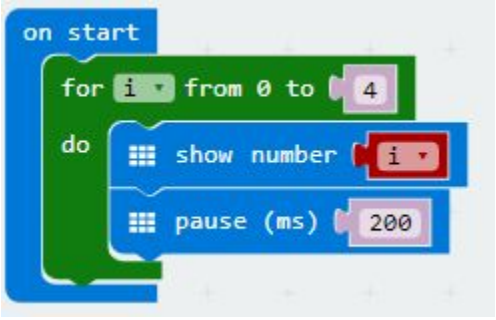


```
let n = 0
n = Math.random(21)
if (n < 10) {
    basic.showNumber(n)
} else {
    basic.showString("n=>10")
}
```

Modify above program to test n <=10 condition.

Doing Loops

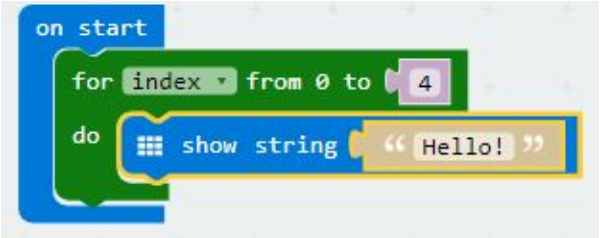
There are two types of loops in programming.
The FOR loop runs a code block for number of times.
Following code prints a number 4 times.
The value of i increases at every loop




```
for (let i = 0; i <= 4; i++) {
    basic.showNumber(i)
    basic.pause(200)
}
```

Write a program to print numbers 1 to 10
Include 100ms delay between every output.

What does this code do?

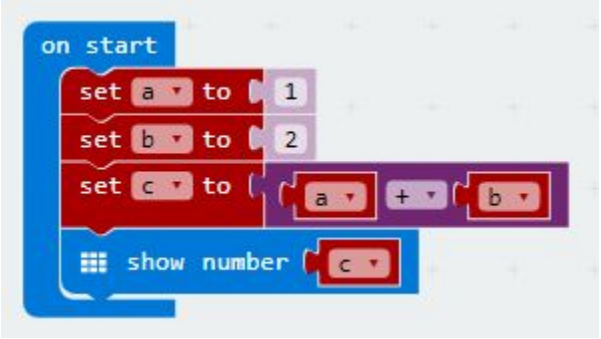


Let's do some math with microbit

What is the answer for 1+2 ?

We know the answer is 3

But how do we get microbit to do math?



1. We use **on start**
2. Then we create **variable a** and place 1 in it.
3. Next we create **variable b** and place 2 in it.
4. Now a and b keeps the values 1 and 2.
5. Now we need a **formula** for the addition

c=a+b is this ok?

5. Now we create **variable c**

6. We drag the **addition block** from **Math**

7 We place a and b **variables on addition block**

8. Finally we **show result** , that is **c**

Can you make a program to add 3 numbers?
The formula is d=a+b+c

Can you solve math problems using microbit?

5+2 2+4+3 6-2+2 6+1+3
9-3 4-2 6-2-1 8-5+4
2 x 3 4 x 2 3 x 3 5 x 2 x 3
6 / 2 8 / 4 12 / 3 3 / 1

Tip : Write your formula with variables first

Can you solve a bit advanced math problem?
Master crow brought 2 toffees at Rs. 2 and 3 chocolates at Rs. 10. How much he spend?

Modify your program

If Master crow give Rs. 100 to the shop,
how much balance does he gets back?

Little More Math

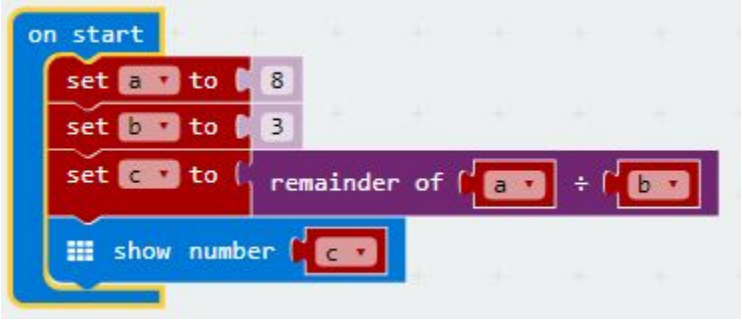
You have 8 mangos.

How many will be left if you share them among 3 friends ?

It's easy to do such calculations with computer.

We used remainder of block in Math (more…) menu

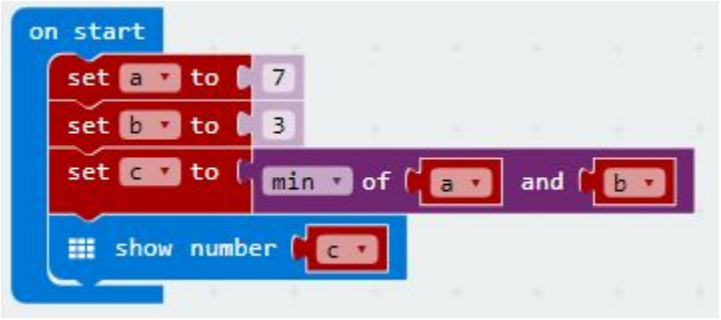
We simply modified our adding program.



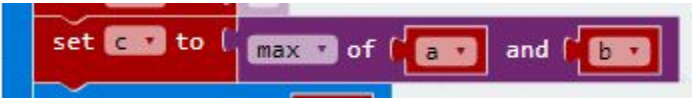
You have been given **two numbers**, say they are 7 and 3.

What block we can used to find smaller number. (min)

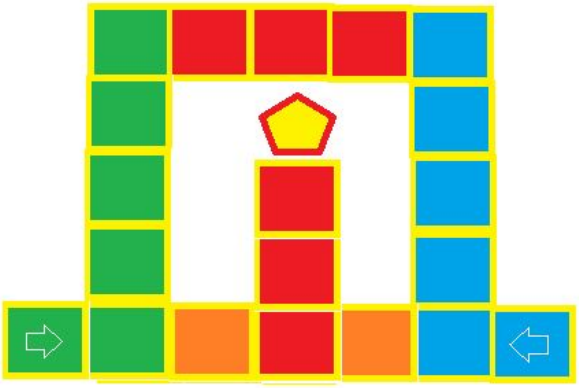
We can use **min of ... and** block in Math (more..) menu



How do you get bigger value? We change **min to max**



Can you design a game like ludo with microbit **?**
We throw a dice to generate a number in turn.
Then we step the number through the board.
The one gets to the throne first becomes the winner?



Now We need a dice?

This time we will make a dice with **4 sides**
It will give us numbers 0-4**.**

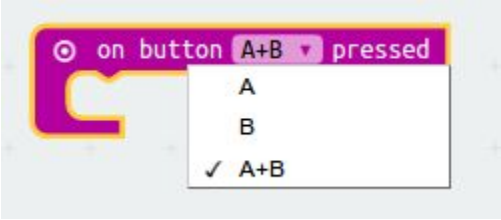
If you get 0 no moving allowed.
Make your own rules for the game.

This dice works with **on shake**.
Get **on shake** block from **Input menu.**

Do you like to learn how to make a timer?

When you press **A+B** the program starts
Pressing A starts the timer.
Pressing B pauses the timer.
We can code the A and B buttons do something

Add a new button from Inputs
Set it to listen to A+B button

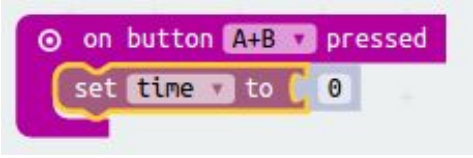


Now we make variables
Variables are used to remember a value.
We can use that value later.
Click the **Variables** then **Make a variable**
We shall call it **time**
Every variable needs a unique **name**.

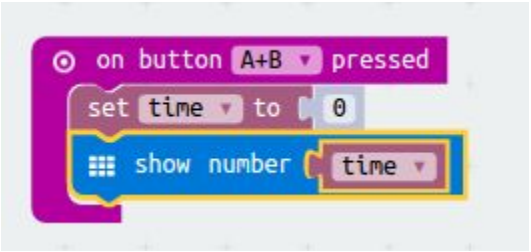
Set

Set the time to 0

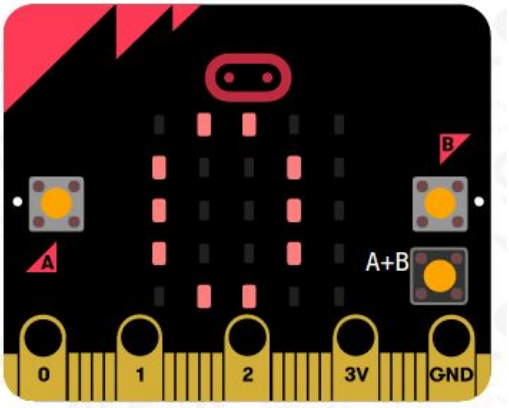
When buttons A and B are pressed together
Drag a **set … to** block into button **A+B pressed block**



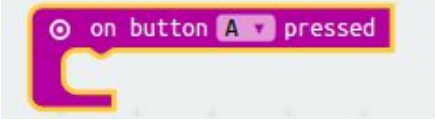
Next, we are going to display time.
To do this, drag a **show number** block from **Basic**
And connect time variable into it.



Press the **A+B** buttons to set your timer to 0.

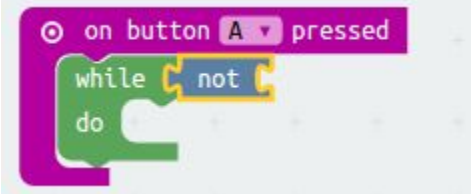


Let's use button A to start your timer,
The timer should start when button A is pressed
Add a new on button A pressed block

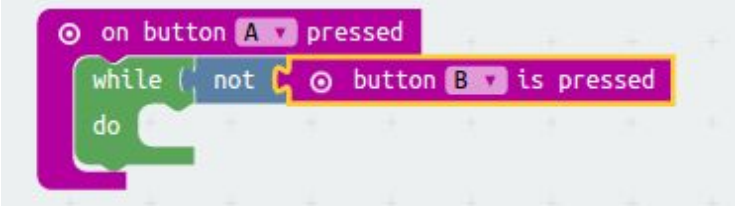


The timer need to count until we press button B.
To do this, drag **while** block into button A event

Drag **not** block, from **Logic** to the while block:

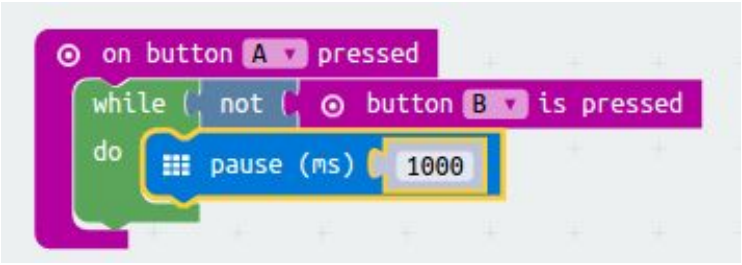


Drag a button **B pressed** block after the **not** block.



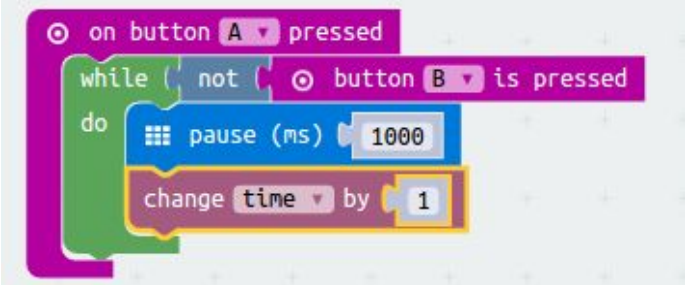
The code inside **while** loop will be run repeatedly
It will happen as long as button B is **not pressed**.

Now we want to add 1 second delay to our timer
Add pause block from Basic timer to wait 1 second

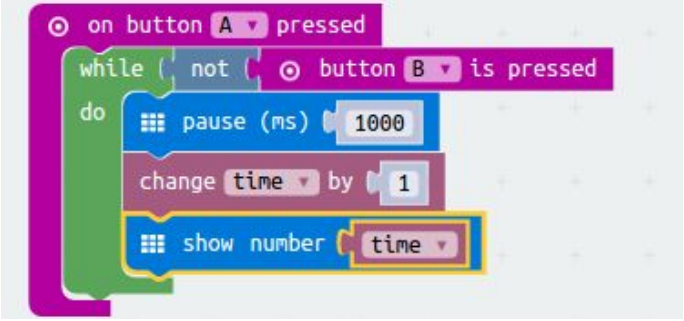


We also need to increase time variable now.

Drag change by 1 from block from Variable.
This increment value in timer variable by 1.

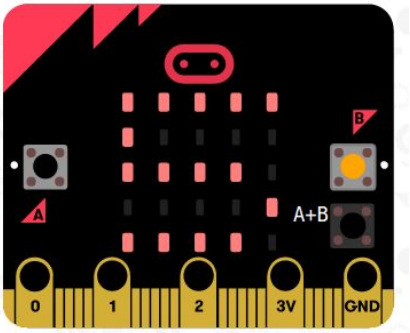


Finally we display the updated time variable.



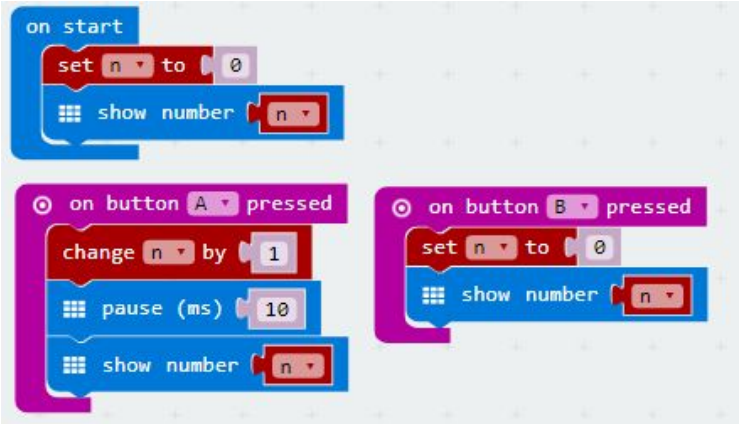
Test your code now.

Press buttons A+B set your timer to 0
Press button A to start your timer
Press and hold button B to pause your timer



Use this timer to challenge your friends.
Ask them to say alphabet backwards or name 10 fruits

Following is a Click Counter done same way
Can you explain it ?



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Shilpa64.lk

ශිල්පසයුර Google for Education CSSL COMPUTER SOCIETY OF SRI LANKA

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