COMPUTING — EduBlocks

https://edublocks.org

Year Term 6

Coding

A human instructing the computer what to do. – *computers require clear instructions to work correctly.*

Logical Thinking - Comparative Operators

==	Equal to
!=	Not equal to
<	*Left value is less than the right value.*
>	*Left value is greater than the right value.*
>=	*Left value is greater than or equal to right value.*
<=	*Left value is less than or equal to right value.*

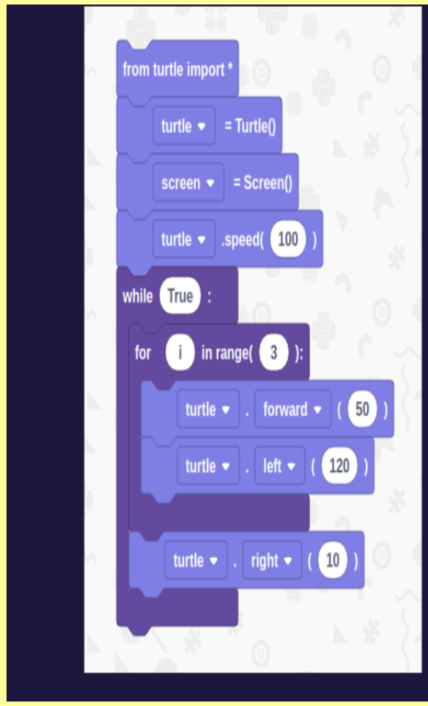
Arithmetic Operators

+	Addition
—	Subtraction
*	Multiplication
/	Division
/ /	Integer division
%	Remainder
* *	Exponent

KEY TERMS

EduBlocks	A visual block based programming tool that helps to introduce text based programming languages
Python	A text based programming language
Programming Code	The process of writing computer programs . The instructions that you write to program a computer
Algorithm	A set of rules/instructions
Sequence	Parts of the code that run in order and the instructions for our code
Selection	Using logical tests to change the flow of the sequence
Iteration	Using loops to repeat sequences of code Code is repeated (looped) while something is true or for a number of times
Variable	A value that can be changed e.g. speed, lives, score.
Data Type: String	A sequence of characters that can include letters, numbers, symbols
Data Type: Integer	Whole numbers with no decimal point.
Data Type: Float	Decimal Numbers
While Loop	A "**While**" **Loop** is used to repeat a specific block of code an unknown number of times, until a condition is met
For Loop	For **loop** is a programming language conditional iterative statement, which is used to check for certain conditions and then repeatedly execute a block of code as long as those conditions are met
IF, Else, Elif	The **if/else statement** executes a block of code **if** a specified **condition** is true. **If** the **condition** is false, another block of code can be executed
Functions	A function is a command which contains the steps needed to perform a task
Subroutines	a set of instructions designed to perform a frequently used operation within a program
Pattern	Repeating sequences of code.
RGB	Colours: red, green and blue
Function	Inbuilt code is a command which contains the steps needed that performs a specific task.

Lesson 2 Drawing Patterns



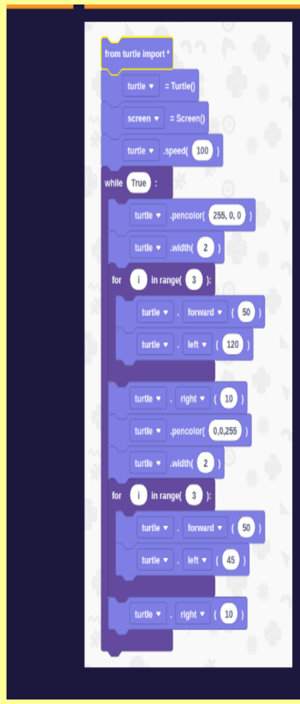
```
from turtle import *
turtle = Turtle()
screen = Screen()
turtle.speed( 100 )
while True :
  for i in range( 3 ):
    turtle . forward ( 50 )
    turtle . left ( 120 )
  turtle . right ( 10 )
```

Patterns are repeating sequences of code.

Here we modify the triangle code to draw a repeating, rotating pattern.
The while True loop will run forever, and the for loop will draw the triangle.

Each time the loop iterates we move the Turtle 10 pixels.

Lesson 2 An example Pattern



```
from turtle import *
turtle = Turtle()
screen = Screen()
turtle.speed( 100 )
while True :
  turtle.pencolor( 255, 0, 0 )
  turtle.width( 2 )
  for i in range( 3 ):
    turtle . forward ( 50 )
    turtle . left ( 120 )
  turtle . right ( 10 )
  turtle.pencolor( 0,0,255 )
  turtle.width( 2 )
  for i in range( 3 ):
    turtle . forward ( 50 )
    turtle . left ( 45 )
  turtle . right ( 10 )
```

Here two for loops are used. The first draws a red triangle at double thickness.

The second loop draws a blue octagon, an eight sided shape.

Did you spot the block to increase the speed of the Turtle?

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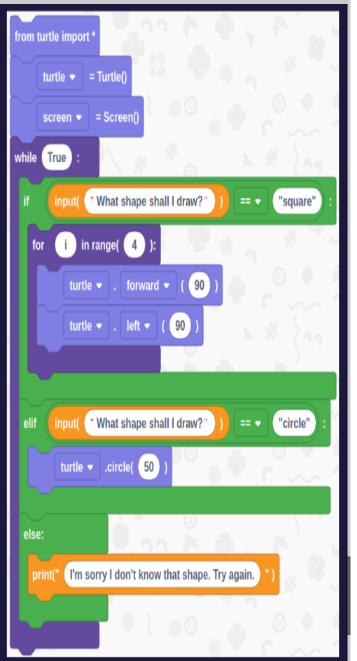
Lesson 3 User Inputs Data Types

In this sequence of code we use logic to draw one of two shapes on the screen.

If the user input is square, then a for loop is used to draw the shape on the screen.

Else If the user input is circle, then a circle is drawn.

If we type in something else, then the else condition will activate and apologise to the user.



```
from turtle import *
turtle = Turtle()
screen = Screen()
while True :
    if input(" What shape shall I draw? ") == "square" :
        for i in range( 4 ):
            turtle . forward ( 90 )
            turtle . left ( 90 )
    elif input(" What shape shall I draw? ") == "circle" :
        turtle .circle( 50 )
    else:
        print(" I'm sorry I don't know that shape. Try again. ")
```

Lesson 4 Variables

We have captured the users colour choice. But how we do we use it?

We need to use conditional tests and logic to make this work.

The green blocks are found in Logic!

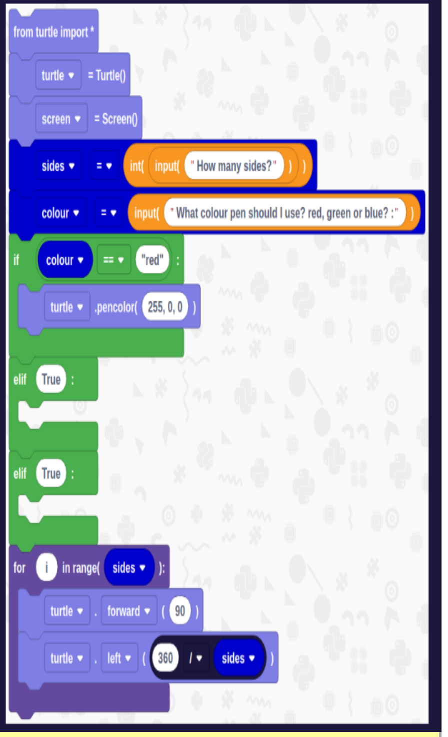
We've created the test for red, can you finish the code?

Red: 255,0,0

Green: 0,255,0

Blue 0,0,255

Run the code, what happens?

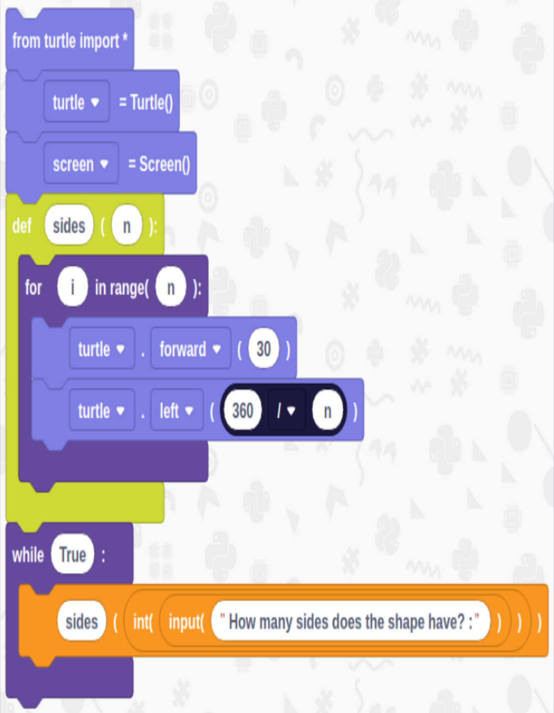


```
from turtle import *
turtle = Turtle()
screen = Screen()
sides = int( input( " How many sides? " ) )
colour = input( " What colour pen should I use? red, green or blue? :" )
if colour == "red" :
    turtle .pencolor( 255, 0, 0 )
elif True :

elif True :

for i in range( sides ):
    turtle . forward ( 90 )
    turtle . left ( 360 / sides )
```

Lesson 5 Functions

- From the Turtle blocks we need to drag:
- from turtle import *
- turtle = Turtle()
- screen = Screen()

Your code should look like this.
Click Run to test!



```
from turtle import *
turtle = Turtle()
screen = Screen()
def sides ( n ):
    for i in range( n ):
        turtle . forward ( 30 )
        turtle . left ( 360 / n )
while True :
    sides ( int( input( " How many sides does the shape have? :" ) ) )
```

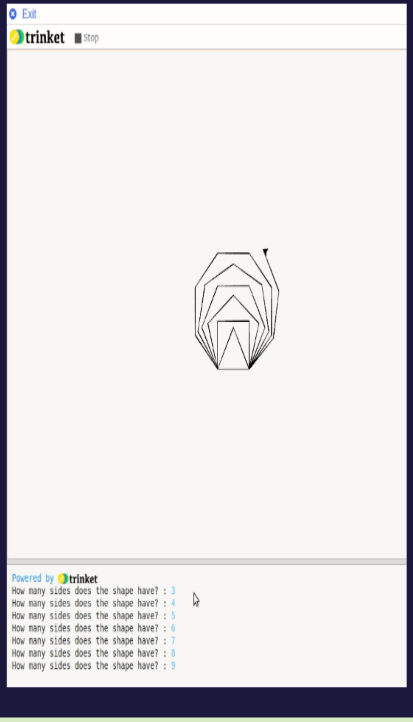
Lesson 5 Why are Functions Useful

Why are functions useful?

Functions are powerful tools. They are subroutines, small sequences of code inside the main code.

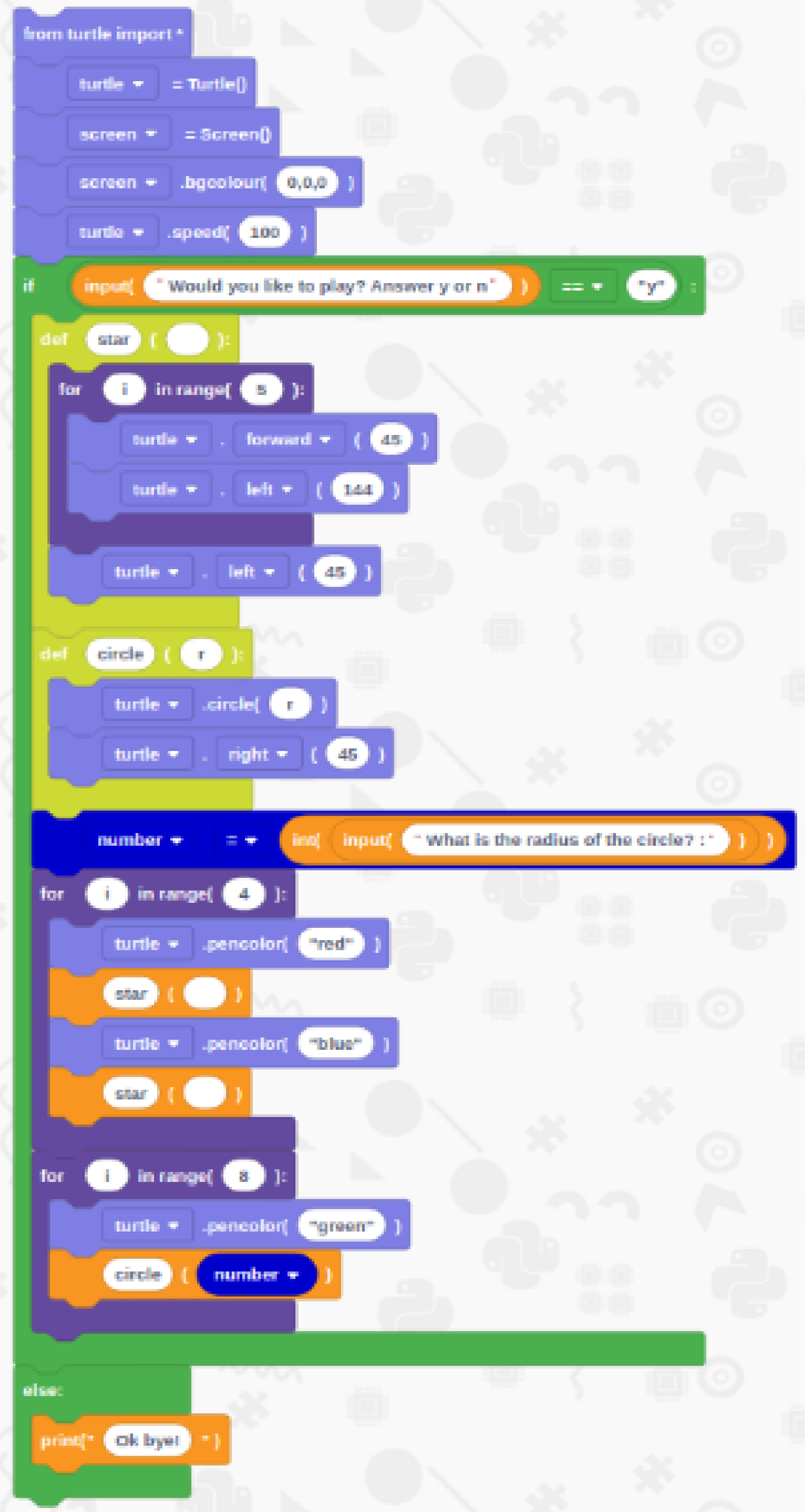
We can call the function, and come out of the main code, do the function, then come back to the code.

They enable us to reuse sections of code.
They keep our code tidy, and with fewer lines to write.
In our code we can draw any shape using one section of code.



```
How many sides does the shape have? : 3
How many sides does the shape have? : 4
How many sides does the shape have? : 5
How many sides does the shape have? : 6
How many sides does the shape have? : 7
How many sides does the shape have? : 8
How many sides does the shape have? : 9
```

Lesson 6 Project



```
from turtle import *
turtle = Turtle()
screen = Screen()
screen .bgcolour( 0,0,0 )
turtle .speed( 100 )
if input( " Would you like to play? Answer y or n" ) == "y" :
    def star ( ):
        for i in range( 5 ):
            turtle . forward ( 45 )
            turtle . left ( 144 )
        turtle . left ( 45 )
    def circle ( r ):
        turtle .circle( r )
        turtle . right ( 45 )
    number = int( input( " What is the radius of the circle? :" ) )
    for i in range( 4 ):
        turtle .pencolor( "red" )
        star ( )
        turtle .pencolor( "blue" )
        star ( )
    for i in range( 8 ):
        turtle .pencolor( "green" )
        circle ( number )
else:
    print(" Ok bye! ")
```

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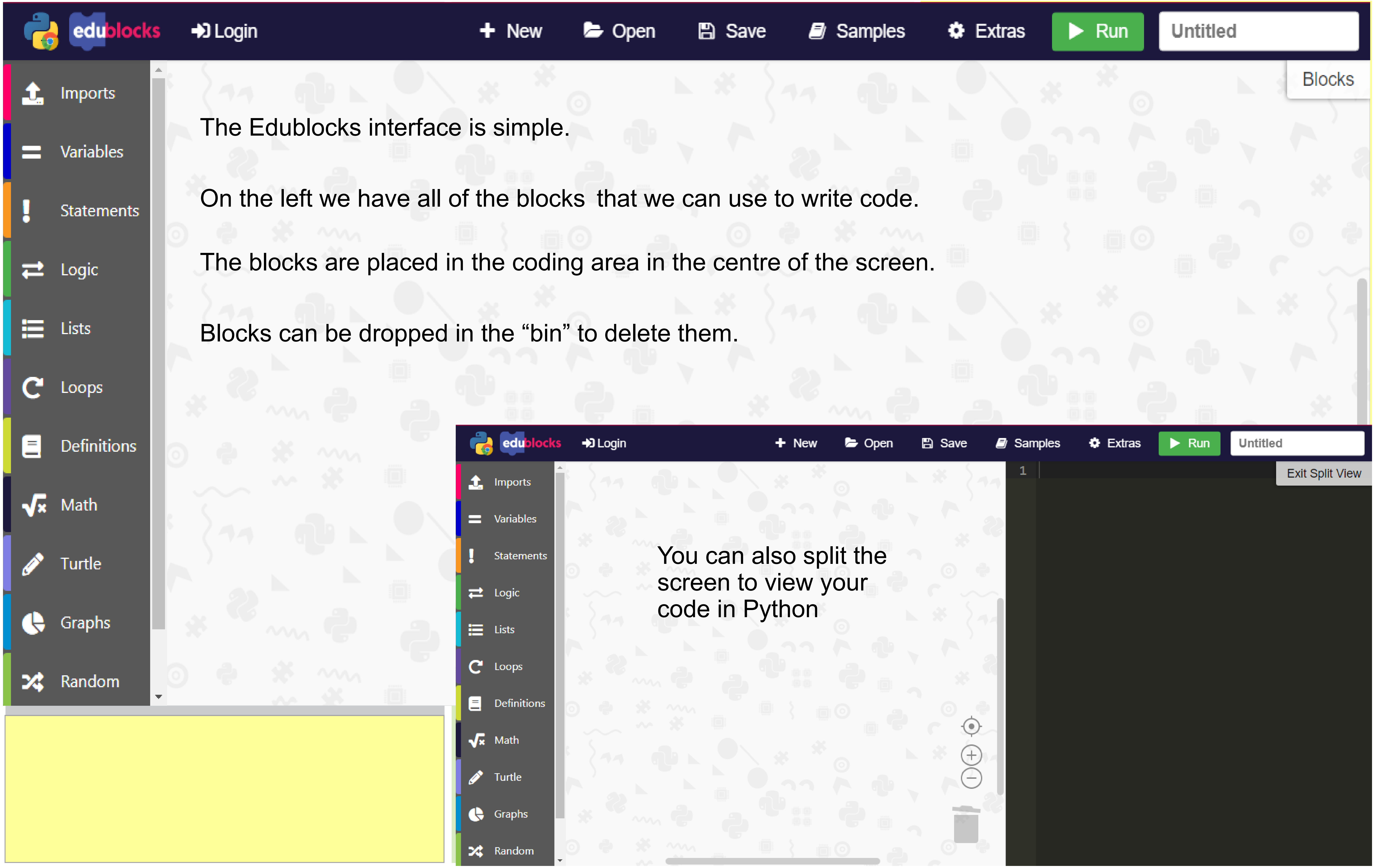

The Edublocks interface is simple.

On the left we have all of the blocks that we can use to write code.

The blocks are placed in the coding area in the centre of the screen.

Blocks can be dropped in the “bin” to delete them.

You can also split the screen to view your code in Python