



# Arithmetic Calculator

Level 1 - Python



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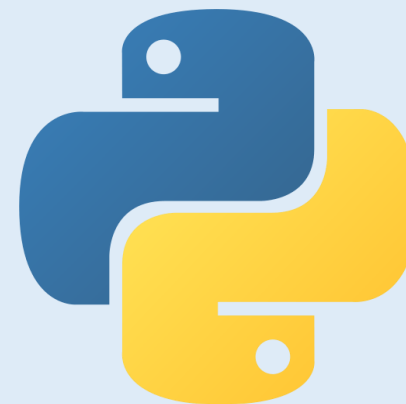
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# Introduction

Mathematics and Programming are dependent on each other in many ways!

The *problem-solving skills* involved in solving complex algebra are not dissimilar to those needed in the creation of games and applications.



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Python is a text-based programming language and is very popular for its simplistic yet effective applications.

Companies such as Google and NASA use Python as Python is very good at handling complex maths (such as that needed to launch rockets into space!)



# Task

A Maths class has run out of calculators!

Using Python, create a console-based calculator that the class can use while they wait for their replacements.





# Process

In this project we will be making a basic calculator in python. The program should:

- Ask the user for 2 numbers
- Add these numbers together
- Print out the result

## Extension

- Allow the user to choose which operation they would like to perform (+ - ÷ x )



# What it will look like..

```
--- Basic Calculator ---  
Enter an operator: (+ - / *)  
*  
  
Please input your first number:  
10  
  
Please input your second number:  
3  
  
The product of 10 multiplied by 3 is 30
```

# Input and Output

```
1  
2 print("Hello World!")  
3
```

Input is the process of receiving information from the user.

We do this using the `input()` statement.

We can store the user's data in variables!

Output is the process of supplying information to the user.

In python, we use the `print()` statement.

```
4 print("What is your name?: ")  
5 name = input()
```

# Step 1

Ask the user for 2 numbers

Because the data we are handling is numerical, we wrap the `input()` statement in an `int()`.

```
1 #Get user input
2
3 print("Please input your first number: ")
4 num1 = int(input())
5
6 print("Please input your second number: ")
7 num2 = int(input())
8
```

```
10 print(num1)
11 print(num2)
```

We can check this has worked by printing the variables to the console!



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```
1 #Get user input
2
3 print("Please input your first number: ")
4 num1 = int(input())
5
6 print("Please input your second number: ")
7 num2 = int(input())
8
```

```
Please input your first number:
10
Please input your second number:
7
10
7
>>> |
```

# Mathematical Operators

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Addition, subtraction, multiplication and division are all very easy to do in Python! However, the operators used to perform each function are slightly different than the ones we use in mathematics.

```
1
2 num1 = 15
3 num2 = 3
4
5 print(num1 + num2)
6 print(num1 - num2)
7 print(num1 * num2)
8 print(num1 / num2)
```

Instead of 'X' and '÷' to multiply and divide, we use \* and /.

```
18
12
45
5.0
```

# Step 2

Add these numbers together

```
1 #Get user input
2
3 print("Please input your first number: ")
4 num1 = int(input())
5
6 print("Please input your second number: ")
7 num2 = int(input())
8
9 result = num1 + num2
```

The next step is to calculate the sum of these two numbers.

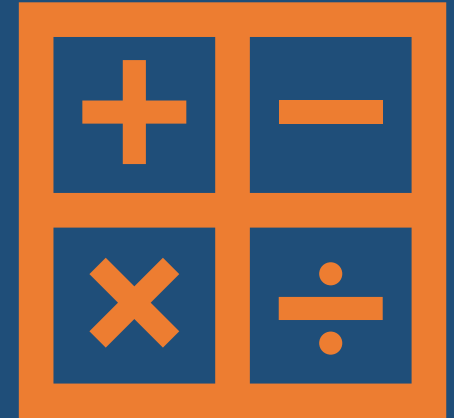
To do this, we create a variable called 'result' and store the sum of num1 + num2. To add numbers together in Python we use the '+' operator.



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# Step 3

Output the result

The process of joining data together is called **concatenation**

```
1 #Get user input
2
3 print("Please input your first number: ")
4 num1 = int(input())
5
6 print("Please input your second number: ")
7 num2 = int(input())
8
9 result = num1 + num2
10 print("The sum of", num1, "and", num2, "is", result)
```

```
Please input your first number:
5
Please input your second number:
5
The sum of 5 and 5 is 10
```

Finally, we print out the result. We concatenate the text and variables together using commas and then print it to the console.



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# Extension

To improve our program, we want the user to choose which operation they would like to perform

```
#Get the operation
print("Enter an operator: (+ - / *)")
operator = input()

#Get user input
print("Please input your first number: ")
num1 = int(input())

print("Please input your second number: ")
num2 = int(input())
```

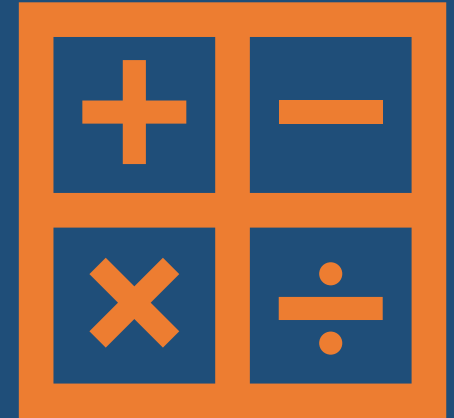
Above our original user input statements, ask the user to enter an operator



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# IF Statements

```
1 print("Enter a number: ")
2 num = int(input())
3
4 if num == 10:
5     print("Number is equal to 10")
6
7 elif num > 10:
8     print("Number is greater than 10")
9
10 else:
11     print("Number is less than 10")
12
```

The IF statement is a decision-making statement that guides a program to make decisions based on specified criteria.

The IF statement executes one set of code if a specified condition is met (TRUE) or another set of code evaluates to FALSE.

# Extension

```
12
13 if operator == "+":
14     result = num1 + num2
15     print("The sum of", num1, "add", num2, "is", result)
16
```

Using IF statements, we can decide whether to add, subtract, divide or multiply our variables.

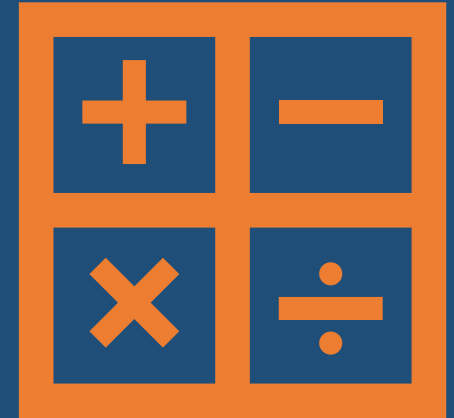
In the example above, IF our user selected the '+' operator, the sum of num1 and num2 will be displayed.



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# Extension

```
12 if operator == "+":
13     result = num1 + num2
14     print("The sum of", num1, "add", num2, "is", result)
15
16 elif operator == "-":
17     result = num1 - num2
18     print("The result of", num1, "subtract", num2, "is", result)
19
20 elif operator == "*":
21     result = num1 * num2
22     print("The product of", num1, "multiplied by", num2, "is", result)
23
24 elif operator == "/":
25     result = num1 / num2
26     print("The result of", num1, "divided by", num2, "is", result)
27
28 else:
29     print("Incorrect input.")
30
```

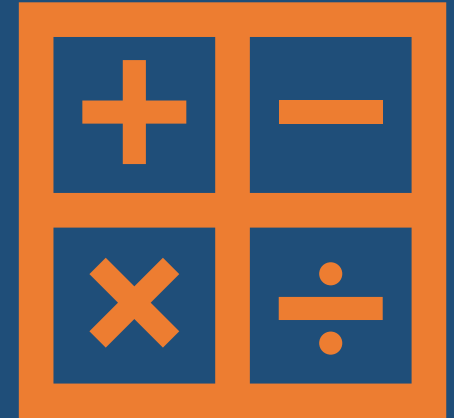
We can expand this to each operator, so depending on what the user chooses, they get the appropriate response!



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# Final product...

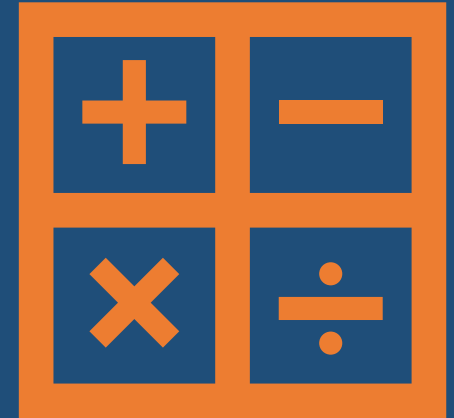
```
1 print("--- Basic Calculator ---")
2
3 #Get the operation
4 print("Enter an operator: (+ - / *)")
5 operator = input()
6
7 #Get user input
8 print("\nPlease input your first number: ")
9 num1 = int(input())
10
11 print("\nPlease input your second number: ")
12 num2 = int(input())
13
14 if operator == "+":
15     result = num1 + num2
16     print("\nThe sum of", num1, "add", num2, "is", result)
17
18 elif operator == "-":
19     result = num1 - num2
20     print("\nThe result of", num1, "subtract", num2, "is", result)
21
22 elif operator == "*":
23     result = num1 * num2
24     print("\nThe product of", num1, "multiplied by", num2, "is", result)
25
26 elif operator == "/":
27     result = num1 / num2
28     print("\nThe result of", num1, "divided by", num2, "is", result)
29
30 else:
31     print("\nIncorrect input.")
32
```



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# Conclusion...

## Learning Outcomes:

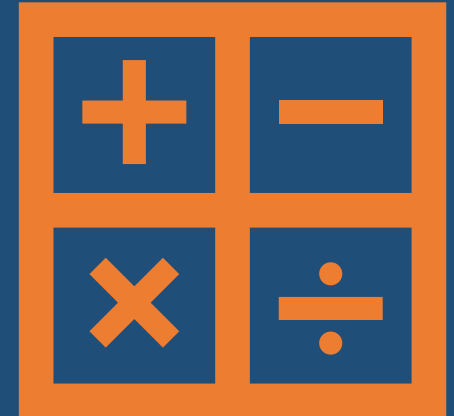
- ✓ Learn how to output information to the user
- ✓ Learn how to take input from the user
- ✓ Use IF statements
- ✓ Use mathematical operators



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# Links to Everyday Life...

## At Work

Calculators are everywhere! Not only in Maths class, but on your phone and your computer

Whether it's a finance company or software on a cashier's till, using maths is a crucial part of programming applications



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# Congratulations!

You have created your own arithmetic calculator using Python!



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