

Programming in Python

```
print(0)
```

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Project : A simple calculator

- Gets two inputs from the users
- Users choose one of these four options :
add, subtract, multiply or divide
- Operation is done according to the choice made by user
- Result of the operation is displayed in the screen

Reference materials

- Think Python by Allan Downey
<http://greenteapress.com/thinkpython2/thinkpython2.pdf>
- Python official documentation:
<https://docs.python.org/3/tutorial/index.html>
- Google's Python class:
<https://developers.google.com/edu/python/>
- Tutorials point:
<https://www.tutorialspoint.com/python/index.htm>
- Datacamp: Python for data science:
<https://campus.datacamp.com/courses/intro-to-python-for-data-science/chapter-1-python-basics?ex=1>

Why Python

- Python is cool
- Python is concise
- Python is easy
- Python is beginner friendly
- Python is for everyone

Getting started

(Windows)

- Install Python :
<https://www.python.org/downloads/>
- Download python 3.6.3
- Use the downloaded .exe file and install python on your machine
- After installation, make sure that Python IDLE is in your machine.

Getting started (Ubuntu)

- The latest versions of Ubuntu, by default, comes up with python 2
- Upgrade the python version to 3
- Follow the instructions at this link:

<https://askubuntu.com/questions/865554/how-do-i-install-python-3-6-using-apt-get>

Getting started

(Mac)

- Install python for mac:
<https://www.python.org/downloads/mac-osx/>
- Type “python” on the command line to test
- You are all set

Online Interpreters

- <https://repl.it/languages/python3>
- <https://www.python.org/shell/>

Problem 0: Your first python program : printing “Hello World!” on the screen.

```
print(“Hello World!”)
```

- Create a folder called “pythonpractice” somewhere in your computer.
- Open IDLE.
- Go to file >> New file>>. Create a new file called “helloworld.py”
- Save it in the pythonpractice folder.
- Write the program and save the file.
- In the IDLE, go to Run>>Run Module
- Enjoy the output
- Modify the program and print “my calculator” on the screen
- You can use “#” to make comments in your program. Eg. #My first python program

Variables

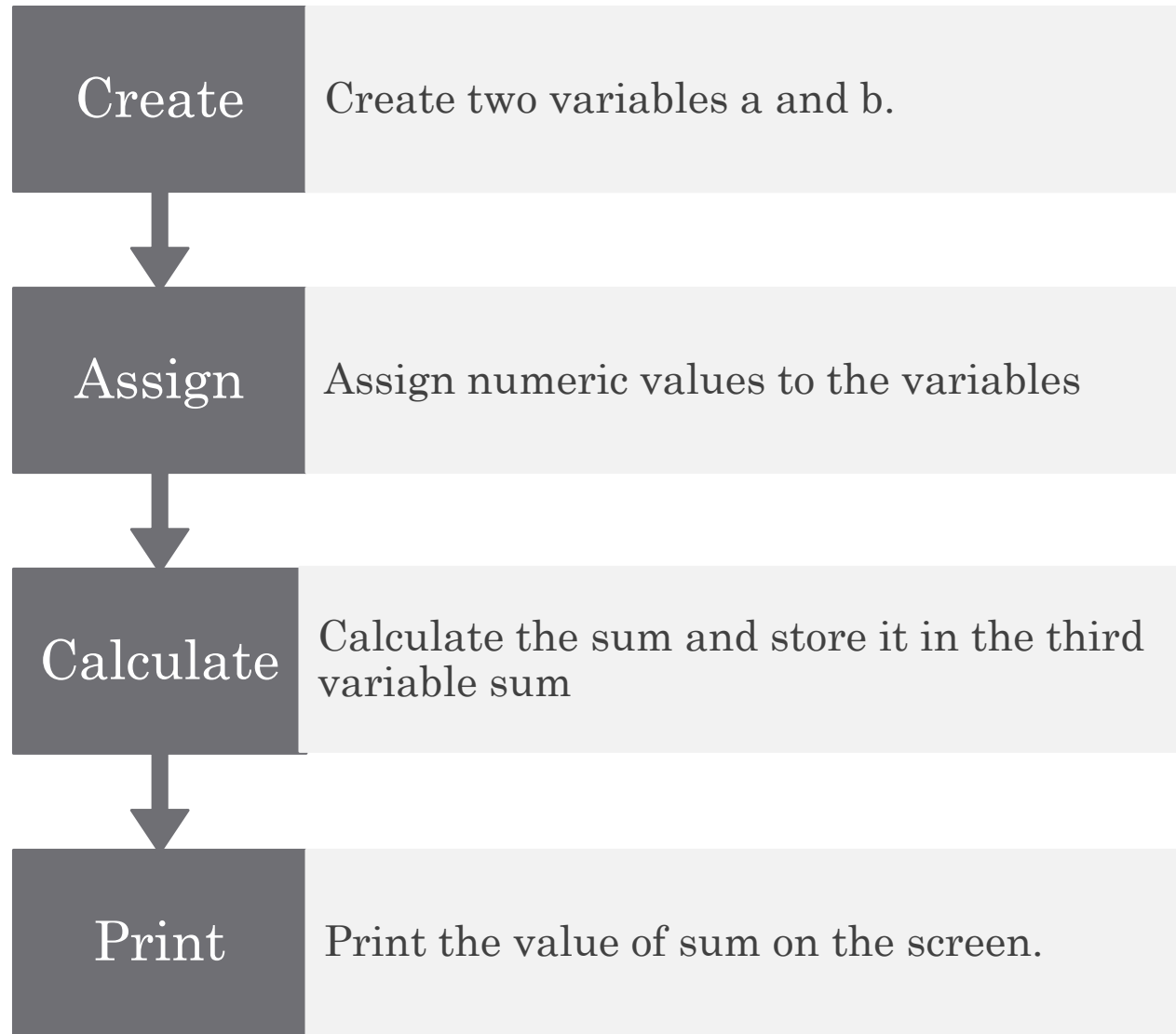
```
a=10  
print(a)
```

```
b=10.5  
print(a)
```

```
x="hello world"  
print(x)
```

- We don't need to explicitly declare a variable in python. For eg. int a.
- A variable's type is decided by the type of value assigned to it.
- The equal sign (=) or in python, the assignment operator is used to assign values to variables
- Basic variable types: integer, float, string.
- Advanced variable types: lists, tuples, dictionaries.

Problem 1: The Addition problem



Problem 2: Incorporating all operations

- Modify Problem 2 to get inputs from the users and generate the sum.

Example, num1=input('Enter the first number')

- Add three additional features to the program: subtraction, multiplication and division.

Functions

- A function takes some inputs as the arguments, performs computation and returns the output.
- Example, Function can be defined as :

def myFunction(input1, input2):

sum=input1+input2

return sum

- Example, A function can be called as:

myFunction(10,20)

Problem 3: Implementa tion of Functions

Modify	Modify the solution of problem two by creating functions for each of the operations.
Call	Now, call the respective functions by passing necessary arguments(inputs) to them.
Store	Store the results returned by functions in variables.
Print	Print all the results.

Conditional Statements (If / Else)

- General syntax :

if (condition 1):

Take action 1

elif(condition 2):

Take action 2.

else:

Take action 3.

- Example

`if (sum>100):`

`print("the sum is greater than 100")`

`else:`

`print("the sum is less than or equal to 100)`

Problem 3: Implementa tion of If / Else statements

Inputs	Get inputs from the user. The user enter 'a' for addition, 's' for subtraction, 'm' for multiplication and 'd' for division.
Store	Store the user input in a variable. Lets say, <i>user_ops</i>
If / Else	Call the functions according to the value stored in variable <i>user_ops</i> . Example, if <i>user_ops</i> is 'a' call addition function
Compute and Print	Do necessary computations and print the result

Loops (For and while)

```
For numbers in range(1, 10):  
    print(numbers)
```

```
myList=[1,2,3,4,5]
```

```
For numbers in myList:  
    print(numbers)
```

```
count=1
```

```
while (count<10):  
    print(count)  
    count=count+1
```

Loops (For and while)

Exercise : Create a program in python to print numbers from 1 to 1000 in the screen. Use either while loops or for loops.

If (loop_used_by_you=='for'):

print('show the program to the friend who is on your left')

else:

print('show the result to the friend who is on your right')

Lists

- Lists are the sequences of values

Example, myList=[1,2,3,4,5]

- List elements can be accessed using indices

Example, myList[0] is 1.

- Lists are mutable
- List elements can be traversed one by one by using for or while loops
- Lists can also be nested.

List operations

- **len(list_name)** : Gives the number of elements in the list.

Example, len(myList) gives 5

- **list_name.append(x)**: Appends x at the end of the list

Example, myList.append(6) appends 6 at the end of myList

- **del list_name[index]** : deletes the element of that particular index

Example, del myList[0] deletes 1 from the list.

Libraries / packages : Numpy

- Stands for “numerical python”
- Is the Python’s answer to Matlab
- Install numpy as :

pip install numpy

- Useful Link :

https://www.tutorialspoint.com/numpy/numpy_environment.htm

Homework

- Practice numpy from Tutorialspoint
- Modify the calculator program. After each of the calculations, the users should be asked whether they want to continue or they want to exit. Design the program to work according to the choice made by the user.

Thank you !