Course Agenda

- Introduction to Python Programming
- Programming Basics - variables, operators, decision making, iteration, sequences
- Data Structures in Python - list, tuple, set, dictionary
- Functions - Functiona Arguments, lambda functions, function objects, map - filter - reduce
- Arrays and NumPy functions
- Data Frames and data cleaning using pandas
- Data Visualisation using matplotlib and seaborn

Introduction to Python Programming

- Data Types in Python
- Variables in Python
- Data Type conversion
- Accept inputs from user
- Operators in Python

Python is –

- Open source
- Interpreter based
- Platform independent
- Current version – 3.12.x
- Download it from here - https://www.python.org/download/releases/3.0/

Python Data Types

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In [ ]:
```
10 # int
```

In [ ]:
```
15.5 # float
```

In [ ]:
```
"abcd" # str
```

In [ ]:
```
True # bool
```

In [ ]:
```
complex(2,3) # complex
```

Note - Everything in Python is an Object

Python Containers

Containers are any object that holds an arbitrary number of other objects. Generally, containers provide a way to access the contained objects and to iterate over them. Examples of built-in containers include tuples, lists, sets, dictionary.

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In [ ]:
```
[1, 2, 3, 4, 'abc'] # list
```

In [ ]:
```
(1, 2, 3, 4) # tuple
```

In [ ]:
```
{2, 's', 3, 5, 5} # set
```

In [ ]:
```
{1 : "Jane", 2:"George", 3:"Sam"} # dictionary
```

Variables in Python

- A Python variable points to a reserved memory location
- Data or objects are stored in these memory locations
- Variables can be declared by any name or even alphabets

Ex. Define variable name and assign value to the variable

In [ ]:
```
name = "Jane"
print("Welcome", name)
```

In [ ]:
```
print("Welcome", name, sep = "_")
```

formatted string

In [ ]:
```
a = 10
b = 20
c = a + b
print(f"Addition of {a} and {b} = {c}")
print(f"Addition of",a, "and" ,b, "=", c)
```

raw string

In [ ]:
```
path = r"C:\Users\Admin\Newfolder\newfile"
print(path)
```

Python feature - dynamically typed

In [ ]:
```
name
```

In [ ]:
```
name = 10
```

type() - returns class type of the argument(object) passed as parameter

In [ ]:
```
a = True
print(type(a))
```

In [ ]:
```
a = 10
print(type(a))
```

In [ ]:
```
a = 10.5
print(type(a))
```

In [ ]:
```
a = "abcd"
print(type(a))
```

In [ ]:
```
lst = [1, 2, 3, 4]
print(type(lst))
```

Ex. WAP to take name of user as input and print a welcome message

In [ ]:
```
name = input("Enter your name - ")
print("Welcome", name)
```

Ex. WAP to take two numbers as input from user and print their sum.

In [ ]:
```
num1 = input("Enter a number - ")
num2 = input("Enter a number - ")

print(num1 + num2)
```

In [ ]:
```
type(num1)
```

Note - input() always stores the value in str format

Data Type Conversion

`Implicit Conversion:` Conversion done by Python interpreter without programmer's intervention

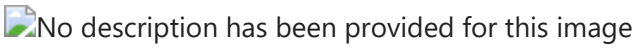
In [ ]:
```
a = 10  # int
b = 2.5 # float
a + b
```

`Explicit Conversion:` Conversion that is user-defined that forces an expression to be of specific data type

In [ ]:
```
a = "10"  # str
b = 5     # int

int(a) + b
```

In [ ]:
```
num1 = int(input("Enter a number - "))
num2 = int(input("Enter a number - "))
print(num1 + num2)
```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`int()` conversion

In [ ]:
```
x = 10.8 # float
int(x)
```

In [ ]:
```
x = "10" # int value in str format
int(x)
```

In [ ]:
```
x = True # bool
int(x)
```

In [ ]:
```
x = False # bool
int(x)
```

In [ ]:
```
x = "abcd" # str
int(x)
```

In [ ]:
```
x = "10.8" # float value in str format
int(x)
```

`float()` conversion

In [ ]:
```
x = True # bool
float(x)
```

In [ ]:
```
x = False # bool
float(x)
```

In [ ]:
```
x = 10 # int
float(x)
```

In [ ]:
```
x = "10.8" # float value in str format
float(x)
```

In [ ]:
```
x = "abcd" # str
float(x)
```

`str()` conversion

In [ ]:
```
x = 10
str(x)
```

In [ ]:
```
lst = [1,2,3,4,5]
str(lst)
```

`bool()` conversion

In [ ]:
```
x = 0
bool(x)
```

In [ ]:
```
x = 1
bool(x)
```

In [ ]:
```
x = 0.0
bool(x)
```

In [ ]:
```
x = 1.0
bool(x)
```

In [ ]:
```
x = 10
bool(x)
```

In [ ]:
```
x = "abc"
bool(x)
```

In [ ]:
```
x = "True"
bool(x)
```

In [ ]:
```
x = "False"
bool(x)
```

In [ ]:
```
x = None
bool(x)
```

Note - bool() returns True for any value except 0 or 0.0 or None

---

Operators in Python

Operators are special symbols in Python that carry out computations. The value that the operator operates on is called as operand.

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Arithmetic Operators

- are used to perform mathematical operations like addition, subtraction, multiplication and division.

In [ ]:
```
a = 10
```

```
b = 6
```

In [ ]:
```
print("Addition - ", a+b)
```

In [ ]:
```
print("Substraction - ", a-b)
```

In [ ]:
```
print("Multiplication - ", a*b)
```

In [ ]:
```
print("Division - ", a/b) # returns result in float format
```

In [ ]:
```
print("Floor Division - ", a//b) # returns integer part of the division
```

In [ ]:
```
print("Exponential - ", a**b) # returns the result of a to the power b
```

In [ ]:
```
print("Modulous - ", a%b) # returns remainder of the division
```

Ex. WAP to accept hours and rate per hour from user and compute gross pay.

In [ ]:
```
hrs = int(input("Enter no of hrs worked - "))
rate = int(input("Enter rate per hour - "))

gross_pay = hrs * rate
print(gross_pay)
```

Ex. WAP to calculate BMI of a person.

In [ ]:
```
weight = float(input("Enter your weight in kgs - "))
height = float(input("Enter your height in mtrs - "))
bmi = round(weight / (height ** 2), 2)
print(bmi)
```

Relational Operators

- It either returns True or False according to the condition.

In [ ]:
```
a = 10
b = 7
```

In [ ]:
```
print(a < b)
```

In [ ]:
```
print(a <= b)
```

In [ ]:
```
print(a > b)
```

In [ ]:
```
print(a >= b)
```

In [ ]:
```
print(a==b)
```

In [ ]:
```
print(a!=b)
```

Ex. WAP to take a number as input and write condition to check if the number is greater than 10.. (Output must be a bool value)

In [ ]:
```
num = int(input("Enter a number - "))
num > 10
```

Ex. WAP to take a number as input and write condition to check if the number is divisible by 5. (Output must be a bool value)

In [ ]:
```
num = int(input("Enter a number - "))
num % 5 == 0
```

Logical Operators

- perform Logical AND, Logical OR, and Logical NOT operations. It is used to combine conditional statements.

`and` - returns True if both the conditions are True else returns False

Ex. WAP to check if the number is divisible by 5 and greater than 10

In [ ]:
```
num = int(input("Enter a number - "))
num % 5 == 0 and num > 10
```

`or` - returns True if either of the conditions is True else. Returns false if both conditions are False

Ex. WAP to check if the number is either divisible by 5 or greater than 10 or both

In [ ]:
```
num = int(input("Enter a number - "))
num % 5 == 0 or num > 10
```

`not` - reverse the bool value

In [ ]:
```
not True
```

In [ ]:
```
not False
```

In [ ]:
```
not (10 - 5 * 2)
```

Assignment Operators

`=` - assigns the result of expression on RHS to variable on LHS

In [ ]:
```
var = 10 + 2 * 5
var
```

Assignment can also be clubbed with arithmetic operators.

+=, -=, *=, /=, //=, **=, %=

In [ ]:
```
a = 10
a = a + (5 * 2 - 3)

a += (5 * 2 - 3)
```

In [ ]:
```
a += 1
```

Objects

- elements in the Python environments
- generic objects
- Sequence objects - collection of elements - str, range()
    - Container sequences/Objects - list, tuple, dict, set

Properties of Sequences

- `Operations on Sequences`
    - Membership - `in` | `not in`
    - Iteration - `for-loop`
- `Functions on Sequences`
    - len() - gives the number of elements in the sequence
    - max() - gives the largest element in the sequence
    - min() - gives the smallest element in the sequence
    - sum() - applicable to numeric sequences, returns the sum of all elements in the sequence
    - math.prod() - applicable to numeric sequences, returns the product of all elements in the sequence
    - sorted() - sorts the elements in the sequence in ASC order and returns a list object

Membership Operators

Membership operators checks whether a value is a member of a sequence.

Sequence Object -

A `sequence` is defined as a collection of arbitrary number of elements. The sequence may be a list, a string, a tuple, or a dictionary

- in - The `in` operator is used to check if a value exists in any sequence object or not.

- not in - A `not in` works in an opposite way to an 'in' operator. A 'not in' evaluates to True if a value is not found in the specified sequence object. Else it returns a False.

In [ ]:
```
"a" in "india"
```

Ex. WAP to check if entered name is present in the mentioned list or not

In [ ]:
```
names = ["Jane", "George", "Sam"]
"Jane" in names
```

In [ ]:
```
names = ["Jane", "George", "Sam"]
"Jack" in names
```

In [ ]:
```
names = ["Jane", "George", "Sam"]
"J" in names
```

Ex. WAP to check if entered character is a vowel or not

In [ ]:
```
ch = input("Enter a single character - ")
ch in "aeiou"
```

Ex. WAP to calculate the hypoteneous of a right angled triangle when sides are given

In [ ]:
```
import math
base = 4
height = 3

hypt = math.sqrt((base ** 2) + (height ** 2))
hypt
```

List of all built-in functions

In [ ]:
```
print(dir(__builtins__))
```

List of all built-in modules

In [ ]:
```
import sys
print(sys.builtin_module_names)
```

List all function in a module

In [ ]:
```
print(dir(math))
```

Display documentation of a function

In [ ]:
```
help(math.sqrt)
```

In [ ]:
```
import math
math.sqrt()
```

In [ ]:
```
import math as m
m.sqrt()
```

In [ ]:
```
from math import sqrt
sqrt()
```

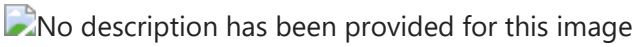
In [105…
```
from math import *
```

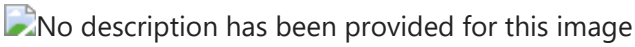
In [103…
```
sqrt = 10
```

In [106…
```
sqrt(16)
```

Out[106…
```
4.0
```

Decision Making





Ex1 - WAP to take a single character as input and check if it is a vowel or a consonant?

In [4]:
```
ch = input("Enter a character - ")
if ch.lower() in "aeiou" :
    print("Vowel")
else:
    print("Consonant")
```

```
Vowel
```

In [12]:
```
ch = input("Enter a character - ")
if len(ch) == 1 and ch.isalpha():
    if ch.lower() in "aeiou" :
        print("Vowel")
    else:
        print("Consonant")
else:
    print("Invalid")
```

```
Invalid
```

Ex. Print customised message for invalid inputs

In [16]:
```
ch = input("Enter a character - ")
if len(ch) != 1 :
    print("Length exceeds the limit")
elif not ch.isalpha():
    print("Input is invalid. Must be alphabet")
else:
    if ch.lower() in "aeiou" :
        print("Vowel")
    else:
        print("Consonant")
```

```
Consonant
```

Examples -

Ex. WAP to accept a single character from user and check if it is a vowel or not.

In [ ]:
```

```

Ex. WAP to take weight in kgs and height in mtrs from user. Calculate BMI and print if the the health status based on following chart

BMI Categories

- Underweight - BMI < 18.5
- Normal weight - BMI between 18.5-24.9
- Overweight - BMI between 25-29.9
- Obesity - BMI > 30

In [ ]:

Ex. WAP to accept hours and rate per hour from user and compute gross pay.

- for 40 hrs pay the standard rate
- if overtime then pay 1.5 times of rate for the additional hrs.

In [18]:
```
hrs = int(input("Enter no of hrs worked - "))
rate = int(input("Enter rate per hour - "))

if hrs <= 40 :
    gross_pay = hrs * rate
else:
    gross_pay = (40 * rate) + ((hrs - 40) * 1.5 * rate)
print(gross_pay)
```

```
4750.0
```

Ex. Toss a coin and guess the outcome

WAP to simulate coin toss and compare the outcome with guess made by user. The program must return "Invalid input" if user enters a wrong or invalid value as a guess.

1. Take a guess as input from user.
2. Validate the input as "Heads" or "Tails", case-sensitive
3. If valid
    - generate random outcomes as heads ot tails
    - Compare the guess with outcome and print Win or lost

In [31]:
```
import random as r
guess = input("Enter your guess as heads or tails - ").lower()
choice_lst = ["heads", "tails"]
if guess in choice_lst :
    outcome = r.choice(choice_lst)
    print("Outcome - ", outcome)
    if guess == outcome :
        print("Win")
    else:
        print("Lost")
else:
    print("Invalid")
```

```
Outcome -  tails
Win
```

random module in Python

- Generates a random value
- Importing random module
  import random as r
- Frequently used functions
  - **r.random()** – Generates a random float number between 0.0 to 1.0
  - **r.randint()** – Returns a random integer between the specified integers
  - **r.randrange()** – Returns a randomly selected element from the range created by the start, stop and step arguments
  - **r.choice()** – Returns a randomly selected element from a non-empty sequence
  - **r.shuffle()** – This functions randomly reorders the elements in a list

```
In [22]: import random as r # as is an operator - used to assign a variable to a moudule whi
```

```
In [23]: r.random() # generates a random value between 0 and 1
```

```
Out[23]: 0.541609545617024
```

```
In [46]: r.randint(-4,5) # generates a random integer between the mentioned start and end va
```

```
Out[46]: 3
```

```
In [25]: r.choice([1,2,3,4]) # generates a random value from the mentioned iterable or seque
```

```
Out[25]: 4
```

```
In [26]: r.choice(["abc", "pqr", "xyz"])
```

```
Out[26]: 'xyz'
```

```
In [27]: r.choice("abcde")
```

```
Out[27]: 'c'
```

```
In [28]: help(r.choice)
```

```
Help on method choice in module random:

choice(seq) method of random.Random instance
    Choose a random element from a non-empty sequence.
```

Ex. 7up and 7down

WAP to simulate the below mentioned scenario -

1. Player enters the game with initial amount as Rs. 1,000/-

2. Generate a random value between 1 to 14 and store it in variable "outcome"
3. if outcome = 7, player hits a jackpot and wins Rs. 1,00,00,000.
4. if outcome < 7, player looses amount by (outcome*100)
5. if outcome > 7, player earns amount by (outcome*100)
6. Print the final amount with the player.

In [47]:
```
import random as r
amount = 1000
outcome = r.randint(1, 14)
print("Your Score - ", outcome)

if outcome < 7 :
    amount -= (outcome * 100)
elif outcome > 7 :
    amount += (outcome * 100)
else:
    print("You have won the jackpot!!!!")
    amount += 1000000
print("Final Balance - ", amount)
```

```
Your Score -  3
Final Balance -  700
```

Loops

Loops are used to execute of a specific block of code in repetitively

while Loop -

```
- Event based or condition based loop
- requires a condition to terminate the loop
- number of iterations is not fixed
```

for loop -

```
- counter based and operates only on sequences
- will execute till the last element of the sequence
- number of iterations = number of elements in the sequence
```

while loop

- The 'while loop' in Python is used to iterate over a block of code as long as the test expression holds true
- Event based loop
- Event occurring inside the loop determines the number of iterations
- This loop is used when the number of times to iterate is not known to us beforehand

Ex. Modify the 7up 7down program based on following rules -

- Ask user his choice to play again as `yes/no`.
- First round starts with amount balance as Rs. 1000. However, further rounds will be played on the balance amount generated from previous round. Example - in round 1 user earned Rs. 800. So for his next round amount will be Rs. 1,800 which is balance generated in previous round.
- The game will terminate if user -
  - choice to play again is `no`
  - hits the `jackpot`
  - has insufficient funds to play the next round.

In [51]:
```
import random as r
amount = 1000
choice = "yes"

while choice == "yes" :
    outcome = r.randint(1, 14)
    print("Your Score - ", outcome)

    if outcome < 7 :
        amount -= (outcome * 100)
    elif outcome > 7 :
        amount += (outcome * 100)
    else:
        print("You have won the jackpot!!!!")
        amount += 1000000
        break

    # check for insufficient funds
    if amount <= 600 :
        print("Insufficient funds, Balance - ", amount)
        choice = input("Top-up with 1000 to continue or quit. yes/no? ")
        if choice == "yes" :
            amount += 1000
            continue
        break

    print(f"Your current balance is {amount}")
    choice = input("Do you wish to play again? yes/no? ").lower()

print("Final Balance - ", amount)
```

```
Your Score -  4
Insufficient funds, Balance -  600
Your Score -  13
Your current balance is 2900
Final Balance -  2900
```

break statement

- The 'break' statement ends the loop and resumes execution at the next statement
- The break statement can be used in both 'while' loop and 'for' loop
- It is always used with conditional statements

continue statement

- The 'continue' statement in Python ignores all the remaining statements in the iteration of the current loop and moves the control back to the beginning of the loop
- The continue statement can be used in both 'while' loop and 'for' loop
- It is always used with conditional statements

Ex. Write a code to validate user input for an integer input

In [ ]:

```
```

for loop

- The 'for loop' in Python is used to iterate over the items of a sequence object like list, tuple, string and other iterable objects
- The iteration continues until we reach the last item in the sequence object
- Counter driven loop
- This loop is used when the number of times to iterate is predefined

Ex. WAP to print square of numbers in the given list

In [53]:

```
numbers = [1, 2, 3, 4, 5]
for i in numbers :
    print(i, " - ", i **2)
```

```
1  -  1
2  -  4
3  -  9
4  -  16
5  -  25
```

Ex. WAP to print square of all even numbers in the given list

In [55]:

```
numbers = [1, 2, 3, 4, 5]
for i in numbers :
    if i % 2 == 0 :
        print(i, " - ", i **2)
```

```
2  -  4
4  -  16
```

Ex. WAP to accept a word from user and print vowels in the word, no duplicates

In [59]:
```
word = input("Enter a word - ")
for ch in "aeiou" :
    if ch in word :
        print(ch)
```

```
i
```

In [62]:
```
word = input("Enter a word - ")
for ch in set(word) :
    if ch in "aeiou" :
        print(ch)
```

```
i
```

Ex. Write a python code to print the product of all elements in the numbers = [6, 5, 3, 8, 4, 2, 5, 4, 11, 43]?

In [63]:
```
numbers = [6, 5, 3, 8, 4, 2, 5, 4, 11, 43]
product = 1
for i in numbers :
    product *= i
product
```

Out[63]: 54489600

In [68]:
```
import math as m
m.prod(numbers)
```

Out[68]: 54489600

In [66]:
```
sum(numbers)
```

Out[66]: 91

Ex. WAP to perform product of first 10 natural numbers

In [69]:
```
m.prod(range(1, 11))
```

Out[69]: 3628800

In [70]:
```
sum(range(1, 11))
```

Out[70]: 55

range(`[start], stop, [step]`)

- `start` - Optional. An integer number specifying at which position to start. Default is 0
- `stop` - Required. An integer number specifying at which position to end.
- `step` - Optional. An integer number specifying the incrementation. Default is 1

In [71]:
```
range(1, 11)  # 1 - 10
```

Out[71]:
```
range(1, 11)
```

In [72]:
```
list(range(1, 11))
```

Out[72]:
```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

In [73]:
```
for i in range(1,11):
    print(i, end = ",")
```

```
1,2,3,4,5,6,7,8,9,10,
```

In [74]:
```
for i in range(11):
    print(i, end = ",")
```

```
0,1,2,3,4,5,6,7,8,9,10,
```

In [75]:
```
for i in range(1, 50, 3):
    print(i, end = ", ")
```

```
1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49,
```

In [76]:
```
for i in range(1, 50, 5):
    print(i, end = ", ")
```

```
1, 6, 11, 16, 21, 26, 31, 36, 41, 46,
```

In [77]:
```
for i in range(50, 0, -1):
    print(i, end = ", ")
```

```
50, 49, 48, 47, 46, 45, 44, 43, 42, 41, 40, 39, 38, 37, 36, 35, 34, 33, 32, 31, 30,
29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9,
8, 7, 6, 5, 4, 3, 2, 1,
```

Examples

Ex. WAP to accept an integer from user and print a table for given number.

3 x 1 = 3

.

.

3 x 10 = 30

In [78]:
```
num = int(input("Enter a number - "))
for i in range(1, 11) :
    print(f"{num} x {i} = {num*i}")
```

```
3 x 1 = 3
3 x 2 = 6
3 x 3 = 9
3 x 4 = 12
3 x 5 = 15
3 x 6 = 18
3 x 7 = 21
3 x 8 = 24
3 x 9 = 27
3 x 10 = 30
```

Ex. WAP to print prime number between 1 - 100

In [80]:
```
num = int(input("Enter a number - "))
flag = True
for i in range(2, num):
    if num % i == 0 :
        flag = False
        break
if flag :
    print("Prime Number")
else:
    print("Not a prime number")
```

```
Not a prime number
```

for .. else

- if a for loop is `terminated` abruptly using a `break` statement then else block is `NOT` executed
- if for loop is executed successfully till its last iteration, then else block is `executed`

In [82]:
```
for i in range(1, 10) :
    print(i)
    if i == 7 :
        print("Terminate")
        break
else:
    print("Else executed")
```

```
1
2
3
4
5
6
7
Terminate
```

In [86]:
```
for i in range(1, 6) :
    print(i)
    if i == 7 :
        print("Terminate")
        break
```

```
else:
    print("Else executed")
```

```
1
2
3
4
5
Else executed
```

In [94]:
```
# resultset = conn.execute("Select * from inventory")
resultset = [
    ("product1", "Coffee", 5, "30 days"),
    ("product2", "Tea", 30, "35 days")
]
```

Ex. Check for products less than 10 units

In [95]:
```
for tup in resultset :
    if tup[2] < 10 :
        break
else:
    print("No products less than 10 units")
```

Ex. Print prime numbers between 1-100 using for-else

In [97]:
```
num = int(input("Enter a number - "))
for i in range(2, num):
    if num % i == 0 :
        print("Not Prime")
        break
else :
    print("Prime")
```

```
Not Prime
```

In [98]:
```
for num in range(1, 101):
    for i in range(2, num):
        if num % i == 0 :
            break
    else :
        print(num, end = " ")
```

```
1 2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97
```

In [ ]:

In [ ]:

Strings in Python

Strings are -

- an ordered sequence of characters
- enclosed in a pair of single quotes or pair of double quotes
- immutable

Empty string

In [ ]:
```
string = ''

string = ""
```

Note - bool() of empty str is always

Defining a string

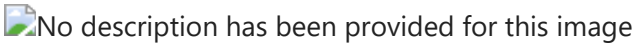
In [ ]:
```
string = "aero-plane"
```

Extract first element from the string

In [ ]:

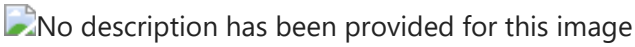
Extract 5th element from the string

In [ ]:



Ex. Extract last element from the string

In [ ]:



Ex. Extract first 3 characters from string

In [ ]:

Ex. Extract all characters from index position 3

In [ ]:

Ex. Extract last 4 characters from the string

In [ ]:

Reverse of string

In [ ]:

Ex. WAP to check if entered string is a palindrome or not.

`Palindrome` - the string reads same characters left to right or right to left

Ex - madam

In [ ]:

Ex. WAP to generate a new string by swapping first and last characers

ex - abcde - ebcda

In [ ]:

Operations on Strings

- Concatenation
- Repetition
- Membership
- Iteration

In [ ]:

`Concatenation` - merging two strings into a single object using the + operator.

In [ ]:

`Repetition` - The repetition operator * will make multiple copies of that particular object and combines them together.

In [ ]:

Strings are immutable and cannot be modified

In [ ]:

Built-in Functions

- **len()** - returns length of the string
- **min(), max()** - returns minimum and maximum element from the string
- **sorted()** - sorts the characters of the string and returns a list

In [ ]:
```
string = "Mississippi"

len(string)
```

In [ ]:
```
min(string)
```

In [ ]:
```
max(string)
```

In [ ]:
```
sorted(string) # returns a list object
```

Strings Methods

- **str.index(`obj`)** - returns index of the first occurence of the character
- **str.count(`obj`)** - returns count of number of occurences of the charcter
- **str.upper()** - returns string of uppercase characters
- **str.lower()** - returns string of lowercase characters
- **str.title()** - returns string of sentence case charaters
- **str.isupper()** - checks if all characters are uppercase
- **str.islower()** - checks if all characters are lowercase
- **str.isdigit()** - checks if all characters are digits
- **str.isalpha()** - checks if all characters are alphabets
- **str.isalnum()** - checks if all characters are either alphabets or digits
- **str.split(`delimiter`)** - splits the string on the mentioned delimiter and returns a list of obtained parts of the string
- **str.replace(`str` , `str`)** - replaces all the mentioned characters with the specified string and returns a new string
- **str.strip(`delimiter`)** - removes whitespace characters from start and end of the string (delimiter can also be specified)
- `delimiter` **.join(** `sequence`) - it is called on a string object which acts as a delimiter to join all string elements in the sequence passed as an argument to join()

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

Examples

Ex. WAP to convert the given string -

string = "I am in Python class"

o/p - 'ssalc nohtyP ni ma I'

o/p - 'I Am In Python Class'

In [ ]:
```
string = "I am in Python class"
```

Ex. WAP to print foloowing pattern

In [ ]:
```
*
**
***
****
*****
```

Ex. WAP to replace all vowels in a word with and asterisk.

In [ ]:
```

```

Ex. WAP to accept numbers from user in comma seperated format. Extract the integers and perform their summation

In [ ]:
```

```

Ex. Write a Python program to get a string from a given string where all occurrences of its first char have been changed to '#', except the first char itself.

Sample String : 'restart'

Expected Result : 'resta#t'

In [ ]:
```

```