Terminology

built-in functions :: functions that are readily available along with language.
user-defined function :: function defined by user

Object oriented vs procedure (aka functions) oriented

Object oriented programming - Programs written using classes and objects.

Procedure oriented programming - Programs written using functions.

NOTE - `aka` is abbreviation for `also known as`.

Functions

```
*NOTE* - - We are learning functions at very MINIMAL level here.
- We will re-visit this topic for full understanding.
- We are learning function for very high level understanding of procedural
```

Why do we define functions?

In general sense, a function is an element in in programming languages to group set of instructions together so that they can be re-used more than
once.

When should we use functions?

Redundant code - repeating code should be avoided! Whenever any bunch of statements are being repeated multiple times.

Benefits of using functions?

It also lowers the efforts for development and maintenance of the software.
Example -

```python
## Object oriented and procedure (aka functions) oriented
def perform_addition(first_value, second_value):   # starting of definition
    print("this statement is inside function")
    result = first_value + second_value
    return result # end of definition
```

Object oriented programming (OOP)

NOTE - - We are learning classes at very MINIMAL level here.
- We will re-visit this topic for full understanding.
- We are learning class for very high level understanding of object oriente

- Classes and objects are part of programming idea also known as Object oriented
- programming.
- In this concept the data, AND the functions working on the data stay together
- We call those functions as methods in the objects.

Class

What is syntax for class definition?

```python
class Human: # class definition starts here
    height = "5 ft"
    weight = "70 kg" # class definition ends here
```

How to create object of class `Human` ?

```python
mr_modi_ji = Human()
# `mr_modi_ji` is object of class `Human`
```

How to define a method (function) inside a class?

```python
class Human:         # class definition starts here
    height = "5 ft"
    weight = "70 kg"

    def get_details(self):
        return "Mr Modi is our PM" # class definition ends here

mr_modi_ji = Human()
```

What are class attributes in above class `Human` ?

- height
- weight
- get_details

How to invoke a method defined in a class?

```
mr_modi_ji = Human() # first we create `object` of class `human`
mr_modi_ji.get_details() # then we invoke fun using . (DOT) operator on obj
```

Simple data structures (built-in)

- int (immutable)
- float (immutable)
- str (immutable)
- bool (immutable)

Structural data types (built-in)

- list (mutable)

- dict (mutable)

- tuple (immutable)

- set (mutable)

- ==Immutable - you cannot change value of that object==

- ==mutable - you can modify value of that object==

==List==

- There are 2 ways to create an empty list

```
foo = []  # one way
foo = list()  # another way
```

- list is represented with rectangular brackets
- list is mutable data structure
- list elements can be accessed using `indexing`

How do we know `list` is mutable?

Because we do `dir()` on list object and get methods available in list class. Those methods allow us to modify an existing list and hence, list is mutable data structure.

- You can implement following data structures using `list`

```
# STACK ( last in first out - LIFO )
list_1 = [1, 2, 3, 4]
list_1.append()
list_1.pop()


# QUEUE ( first in first out - FIFO )
list_1 = [1, 2, 3, 4]
list_1.append()
list_1.pop(0)  # index should always be o because its FIFO.
```

Tuple

- Tuples are separated by commas
- Tuple is immutable data type
- You can NOT delete / add / modify any value inside the tuple

```
a = (1, 2, 3, 4)
del a[0]

# TRY this code on your machine.
# This code will produce ERROR.
# Because we cannot delete element of tuple.
```

How do we know `tuple` is immutable?

Because we do `dir()` on tuple object and get methods available in tuple class. Those methods do NOT allow us to modify an existing tuple and hence, tuple is immutable data structure.

- Tuple packing and unpacking

```
# tuple packing
a = 'apple', 'samsung', 'nokia'
# You can also unpack values of any tuple into variables, like -
brand_1, brand_2, brand_3 = a
```

```
# brand_1 gets apple
# brand_2 gets samsung
# brand_3 gets nokia


# This is called tuple packing and un-packing
```

Terminology

```
type casting :: is changing type of object from one to another


dynamically typed language :: we don't specify what kind of data we are goi
 put in a variable (duck typing)
concatentation :: joining two strings



### Terminology

variable :: reference to a object // label to a object.
def :: keyword to define a function
arguments :: arguments are input to a function
return :: keyword to return from a function
user-defined function :: function defined by user
built-in functions :: functions of programming language
class attribute :: everything defined under class definition

plain text :: text without formatting
rich text :: text with formatting
```

QUESTIONS TO SOLVE

1. What are the key features of Python?
2. What are the Data Types in Python?
3. How do you write comments in python? And Why Comments are important?
4. Write a program to find the length of the string "machine learning" using `len()` function.
5. Write a program to check if the word 'orange' is present in the "This is orange juice".
6. Write a program to find the number of vowels, consonants, digits, and white space characters in a string

7. Write a Python program to count Uppercase, Lowercase, special character, and numeric values in a given string.

8. Write a program to make a new string with all the consonants deleted from the string "Hello, have a good day".

9. Write a Python program to remove the nth index character from a non-empty string.

10. Write a Python program to change a given string to a new string where the first and last characters have been exchanged.

11. Write a Python program to count the occurrences of each word in a given sentence.

12. How do you count the occurrence of a given character in a string?

13. Write a program to find last 10 characters of a string?

14. Write a program to convert a given string to all uppercase if it contains at least 2 uppercase characters in the first 4 characters.

15. Write a Python program to remove a newline in Python.

16. Write a Python program to swap commas and dots in a string
    ○ Sample string: "32.054,23"
    ○ Expected Output: "32,054.23"

17. Write a Python program to find the first repeated character in a given string

18. Write a Python program to find the second most repeated word in a given string

19. How do you check if a string contains only digits?

20. How do you remove a given character/word from String?

21. Write a Python program to print the characters which have odd index values of a given string

22. Write a Python function to reverse a string if its length is a multiple of 5

23. Python Program to find simple interest and compound interest

24. Write a Python program to format a number with a percentage(0.05 >> 5%)

25. Write a Python program to reverse words in a string

26. Write a Python program to swap cases of a given string

27. Write a Python program to remove spaces from a given string

28. Write a Python Program to find the area of a circle