**Assignment 3 Task**

Q1) What are Data Structures? List some of data structures and their use in real world application.

Ans: Data Structure is a way of organizing and storing data in a computer so that it can be accessed and updated efficiently.

* Arrays are a collection of elements of the same type stored in contiguous memory locations. They are widely used for simple and efficient storage of data, such as lists, matrices, or tables.
* Linked lists consist of nodes that contain data and a reference to the next node in the list. They are useful for dynamic data structures that require frequent insertions and deletions, like implementing stacks, queues, or hash tables.
* Stacks follow the Last-In-First-Out (LIFO) principle, where the last item added is the first one to be removed. They are used in applications that involve recursive function calls, expression evaluation, and undo/redo operations.
* Trees are hierarchical data structures composed of nodes connected by edges. They find applications in file systems, XML/HTML parsing, decision-making algorithms (e.g., decision trees), and organizing hierarchical data like organization charts.
* Graphs consist of a set of vertices connected by edges. They are employed in various domains, such as social networks, transportation networks, web page crawling, and optimization problems like the shortest path algorithms.

Q2) Doing Reading Chapter 3 done

Q3) Create a list data type and store names of your friends in it (at least 5), check out what are methods available in list data type, try to figure out their working using help function in python.

Ans:

Names **=** ['Sayan', 'Shreyansh', 'Neil', 'Sagnik']

print(dir(Names))

help(Names**.**extend(['Subhajit','Sudip']))

['\_\_add\_\_', '\_\_class\_\_', '\_\_class\_getitem\_\_', '\_\_contains\_\_', '\_\_delattr\_\_', '\_\_delitem\_\_', '\_\_dir\_\_', '\_\_doc\_\_', '\_\_eq\_\_', '\_\_format\_\_', '\_\_ge\_\_', '\_\_getattribute\_\_', '\_\_getitem\_\_', '\_\_getstate\_\_', '\_\_gt\_\_', '\_\_hash\_\_', '\_\_iadd\_\_', '\_\_imul\_\_', '\_\_init\_\_', '\_\_init\_subclass\_\_', '\_\_iter\_\_', '\_\_le\_\_', '\_\_len\_\_', '\_\_lt\_\_', '\_\_mul\_\_', '\_\_ne\_\_', '\_\_new\_\_', '\_\_reduce\_\_', '\_\_reduce\_ex\_\_', '\_\_repr\_\_', '\_\_reversed\_\_', '\_\_rmul\_\_', '\_\_setattr\_\_', '\_\_setitem\_\_', '\_\_sizeof\_\_', '\_\_str\_\_', '\_\_subclasshook\_\_', 'append', 'clear', 'copy', 'count', 'extend', 'index', 'insert', 'pop', 'remove', 'reverse', 'sort']

Help on NoneType object:

class NoneType(object)

| Methods defined here:

|

| \_\_bool\_\_(self, /)

| True if self else False

|

| \_\_repr\_\_(self, /)

| Return repr(self).

|

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| Static methods defined here:

|

| \_\_new\_\_(\*args, \*\*kwargs) from builtins.type

| Create and return a new object. See help(type) for accurate signature

#### Q4) What is the difference between ordered data type and unordered data type?

Ans: Ordered data types are sequential data types on which we can use indexing and slicing. Ex - list, tuple. Unordered data types are non sequential and we can’t use indexing or slicing on them. Ex - set, dictionary.

Q5) Write down types of each value given? (in python)

Ans:

a. 100 - integer

b. 105.5 - float

c. 192.56j - complex

d. 10+6j - complex

e. ‘10’ - string

f. ‘hello world’ - string

g. [10, 20, 50, 100] - list

h. { ‘name’: ‘sachin’, ‘age’: 24, ‘language’: ‘python’ } - dictionary