Activity\_07

Julian Prime SJ. Alvarez

BSCS 2-A

**1. Difference between List, Set and Dictionary and their uses.**

Lists are just like dynamic sized arrays, declared in other languages (vector in C++ and ArrayList in Java). Lists need not be homogeneous always which makes it the most powerful tool in Python. A Set is an unordered collection data type that is iterable, mutable, and has no duplicate elements. Python’s set class represents the mathematical notion of a set. Dictionary in Python is an ordered (since Py 3.7) [unordered (Py 3.6 & prior)] collection of data values, used to store data values like a map, which, unlike other Data Types that hold only a single value as an element, Dictionary holds key: value pair. Key-value is provided in the dictionary to make it more optimized. And all of them are data structures in python that are used to store and organize the data in an efficient manner.

2. What is bubble sort algorithm? How it works?

Bubble Sort is the simplest sorting algorithm that works by repeatedly swapping the adjacent elements if they are in the wrong order. This algorithm is not suitable for large data sets as its average and worst-case time complexity is quite high.

Input: arr[] = {5, 1, 4, 2, 8}

First Pass:

Bubble sort starts with very first two elements, comparing them to check which one is greater.

( 5 1 4 2 8 ) –> ( 1 5 4 2 8 ), Here, algorithm compares the first two elements, and swaps since 5 > 1.

( 1 5 4 2 8 ) –> ( 1 4 5 2 8 ), Swap since 5 > 4

( 1 4 5 2 8 ) –> ( 1 4 2 5 8 ), Swap since 5 > 2

( 1 4 2 5 8 ) –> ( 1 4 2 5 8 ), Now, since these elements are already in order (8 > 5), algorithm does not swap them.

Second Pass:

Now, during second iteration it should look like this:

( 1 4 2 5 8 ) –> ( 1 4 2 5 8 )

( 1 4 2 5 8 ) –> ( 1 2 4 5 8 ), Swap since 4 > 2

( 1 2 4 5 8 ) –> ( 1 2 4 5 8 )

( 1 2 4 5 8 ) –> ( 1 2 4 5 8 )

Third Pass:

Now, the array is already sorted, but our algorithm does not know if it is completed.

The algorithm needs one whole pass without any swap to know it is sorted.

( 1 2 4 5 8 ) –> ( 1 2 4 5 8 )

( 1 2 4 5 8 ) –> ( 1 2 4 5 8 )

( 1 2 4 5 8 ) –> ( 1 2 4 5 8 )

( 1 2 4 5 8 ) –> ( 1 2 4 5 8 )