**Practical No: 5 (B)**

**Practical Title:** Sorting of an array using insertion and shell sort

**Aim:** Write a Python program to store second year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using

a) Insertion sort

b) Shell Sort and display top five scores

**Pre-requisite:**

Knowledge of sorting techniques

**Objective:**

* To sort array of floating point numbers in ascending order using a)Insertion Sort b)Shell sort and display top five scores.
* Sorted list of elements
* Top five scores.

**Input:**

Size of array Elements of array

**Theory:**

- Write short theory of sorting. - Explain insertion and shell sort with example

**Algorithm:**

def selection Sort(alist):

for fill slot in range(len(alist)-1,0,-1):

position Of Max=0

for location in range(1,fillslot+1):

if alist[location]>alist[position OfMax]:

position Of Max = location

temp = alist[fillslot]

alist[fillslot] = alist[position Of Max]

alist[position Of Max] = temp

alist = [54,26,93,17,77,31,44,55,20]

selectionSort(alist)

print(alist)

def shellSort(alist):

sublistcount = len(alist)//2

while sublistcount > 0:

for start position in range(sublistcount): gap

Insertion Sort(alist,startposition, sublistcount)

print("After increments of size",sublistcount,"The list is",alist)

sublistcount = sublistcount // 2

def gapInsertionSort(alist,start,gap):

for i in range(start+gap,len(alist),gap):

currentvalue = alist[i]

position = i

while position>=gap and alist[position-gap]>currentvalue:

alist[position]=alist[position-gap]

position = position-gap

alist[position]=currentvalue

alist = [54,26,93,17,77,31,44,55,20]

shellSort(alist)

print(alist)

**Flowchart:**

Draw flowchart for above algorithms

**Conclusion:**

By this way, we can sort percentage of students in array using insertion sort and shell sort.

**Question Bank:**

1. Explain the sorting?

2. What are the different types of sorts in data structures?

3. How many passes are required in insertion and shell sort?

4. What is the time complexity of insertion and shell sort?