Department : Computer Engineering

Class : SE

Subject : Data Structure Lab

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Batch: H4

Assignment No : 5

- **Problem Statement:**

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

- **Code :**

```
class sort():
    per = []
    n = int(input("Enter the number of Students : "))

def__init__(self):
        per = self.per
        n = self.n
return

# Accept the % marks of the students
defaccept_perc(self):
print("Accepting percentages from user")
self.per = []

for iin range(0, self.n):
self.per.append(float(input("Enter the First Year % of Student[{0}] : ".format(i))))
return self.per

defprint_perc(self):

for iin range(0, self.n):
print("\t {0:.2f}".format(self.per[i]), end=" ")
```

```
print()

# This is a sample Python script.
definsertion_sort(self):
print("\n")
print("----INSERTION SORT----")
for iin range(1, self.n):
            current = self.per[i]
            j = i - 1
while ((self.per[j] > current) and j >= 0):
                temp = self.per[j + 1]
self.per[j + 1] = self.per[j]
self.per[j] = temp
                j = j - 1
self.per[j + 1] = current
print("Iteration", i, ": ", self.per)
return self.per

defshellSort(self):
print("\n")
print("----SHELL SORT----")
        interval = self.n // 2
# Rearrange elements at each n/2, n/4, n/8, ... intervals
while interval >0:
for iin range(interval, self.n):
                temp = self.per[i]
                j = i
while j >= interval and self.per[j - interval] > temp:
self.per[j] = self.per[j - interval]
                    j -= interval
self.per[j] = temp
            interval //= 2
print('Sorted Array in Ascending Order:')
print(self.per)
return self.per

deftop_five(self):
print("Top five score are : ")
cnt = self.n

if cnt<5:
            start, stop = cnt - 1, -1
else:
            start, stop = cnt - 1, cnt - 6
for iin range(start, stop, -1):
print("\t {0:.2f}".format(self.per[i]), end=" ")


# Driver program
```

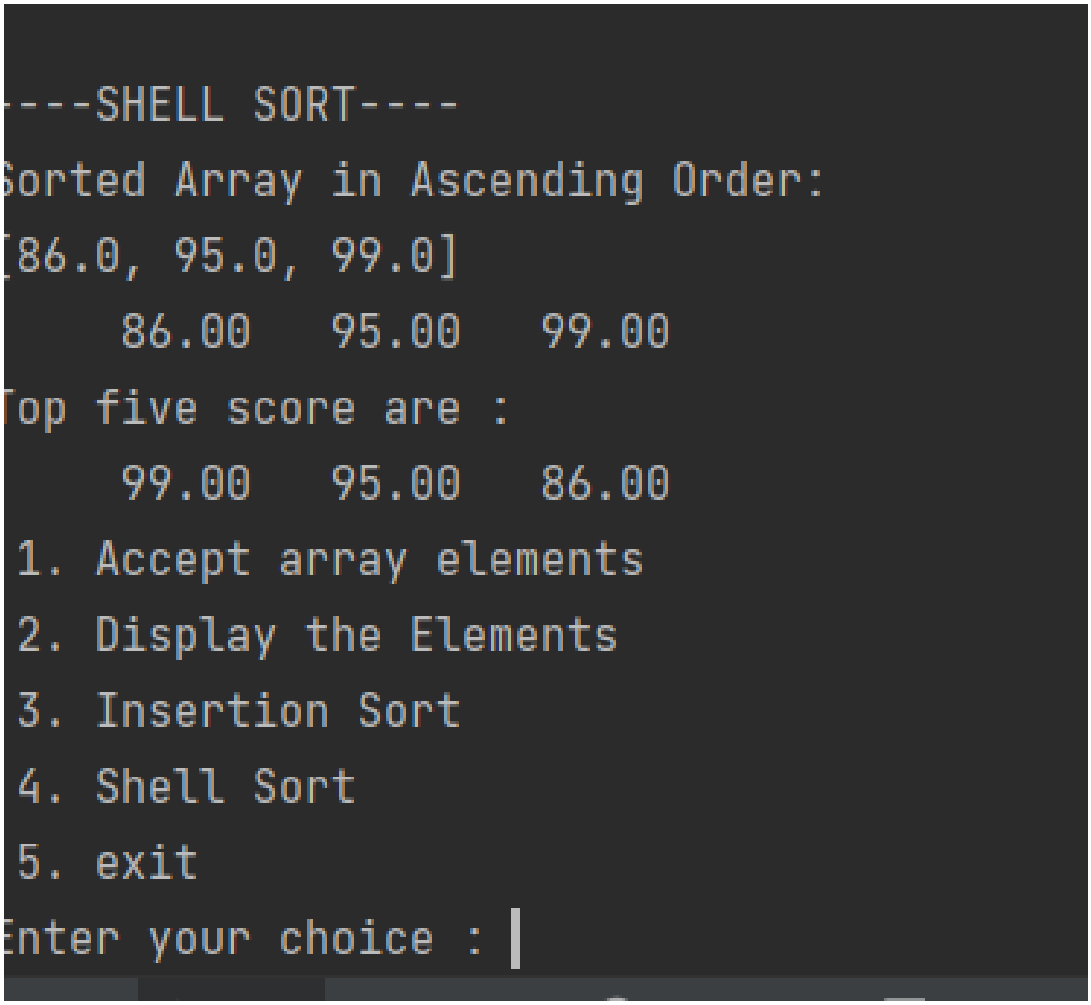
```
S1 = sort()
if __name__ == "__main__":
    flag = 1
while flag == 1:
print("\n 1. Accept array elements \n 2. Display the Elements \n 3. Insertion Sort \n 4. Shell Sort \n 5. exit")

        choice = int(input("Enter your choice : "))
if choice == 1:
            S1.accept_perc()

elifchoice == 2:
            S1.print_perc()

elifchoice == 3:
print("Elements after sorting using Insertion Sort :")
            S1.insertion_sort()
            S1.print_perc()
            S1.top_five()

elifchoice == 4:
print("Elements after sorting using Shell Sort :")
            S1.shellSort()
            S1.print_perc()
            S1.top_five()

else:
print("Wrong choice")
            flag = 0
```

- **Output:**

```
"C:\Users\admin\PycharmProjects\prac 5\venv\Scripts\python.exe" "C:/Users/ad
Enter the number of Students : 3

 1. Accept array elements
 2. Display the Elements
 3. Insertion Sort
 4. Shell Sort
 5. exit
Enter your choice : 1
Accepting percentages from user
Enter the First Year % of Student[0] : 95
Enter the First Year % of Student[1] : 86
Enter the First Year % of Student[2] : 99

 1. Accept array elements
 2. Display the Elements
 3. Insertion Sort
 4. Shell Sort
 5. exit
```

```
 5. exit
Enter your choice : 2
     95.00   86.00   99.00

 1. Accept array elements
 2. Display the Elements
 3. Insertion Sort
 4. Shell Sort
 5. exit
Enter your choice : 3
Elements after sorting using Insertion Sort :


----INSERTION SORT----
Iteration 1 :  [86.0, 95.0, 99.0]
Iteration 2 :  [86.0, 95.0, 99.0]
     86.00   95.00   99.00
Top five score are :
     99.00   95.00   86.00
 1. Accept array elements
```

```
----INSERTION SORT----
Iteration 1 :  [86.0, 95.0, 99.0]
Iteration 2 :  [86.0, 95.0, 99.0]
     86.00   95.00   99.00
Top five score are :
     99.00   95.00   86.00
 1. Accept array elements
 2. Display the Elements
 3. Insertion Sort
 4. Shell Sort
 5. exit
Enter your choice : 4
Elements after sorting using Shell Sort :
```


----SHELL SORT----
Sorted Array in Ascending Order:
[86.0, 95.0, 99.0]
86.00 95.00 99.00
Top five score are :
99.00 95.00 86.00
1. Accept array elements
2. Display the Elements
3. Insertion Sort
4. Shell Sort
5. exit
Enter your choice :