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Exam seat no:

Roll no: SE 265

Batch no: B1

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**ASSIGNMENT NO : 06**

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

import array as arr

# Accept the % marks of the students

def accept\_perc():

a = arr.array('f', [])

no\_stud = int(input("Enter the number of Students : "))

for i in range(0, no\_stud):

a.append(float(input("Enter the First Year % of Student[{0}] : ".format(i))))

return a

# Print the % marks of the Students

def print\_perc(a):

for i in range(0, len(a)):

print("\t {0:.2f}".format(a[i]), end=" ")

print()

# Shell Sort

def shell\_sort(a):

# Start with a big gap, then reduce the gap

n = len(a)

gap = n // 2

# Do a gapped insertion sort for this gap size.

# The first gap elements a[0..gap-1] are already in gapped

# order keep adding one more element until the entire array

# is gap sorted

while gap > 0:

for i in range(gap, n):

# add a[i] to the elements that have been gap sorted

# save a[i] in temp and make a hole at position i

temp = a[i]

# shift earlier gap-sorted elements up until the correct

# location for a[i] is found

j = i

while j >= gap and a[j - gap] > temp:

a[j] = a[j - gap]

j -= gap

# put temp (the original a[i]) in its correct location

a[j] = temp

gap //= 2

return a

# Insertion sort

def ins\_sort(a):

# Traverse through 1 to len(a)

for i in range(1, len(a)):

key = a[i]

# Move elements of a[0..i-1], that are

# greater than key, to one position ahead

# of their current position

j = i - 1

while j >= 0 and key < a[j]:

a[j + 1] = a[j]

j -= 1

a[j + 1] = key

return a

# Top 5 Score

def top\_five(a):

print("Top five score are : ")

cnt = len(a)

if cnt < 5:

start, stop = cnt - 1, -1 # stop set to -1 as we want to print the 0th element

else:

start, stop = cnt - 1, cnt - 6

for i in range(start, stop, -1):

print("\t {0:.2f}".format(a[i]), end=" ")

# Driver program

if \_\_name\_\_ == "\_\_main\_\_":

unsort\_A = arr.array('f', [])

ins\_sort\_A = arr.array('f', [])

shell\_sort\_A = arr.array('f', [])

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:

unsort\_A = accept\_perc()

elif choice == 2:

print\_perc(unsort\_A)

elif choice == 3:

print("Elements after sorting using Insertion Sort :")

ins\_sort\_A = ins\_sort(unsort\_A)

print\_perc(ins\_sort\_A)

top\_five(ins\_sort\_A)

elif choice == 4:

print("Elements after sorting using Shell Sort :")

shell\_sort\_A = shell\_sort(unsort\_A)

print\_perc(shell\_sort\_A)

top\_five(shell\_sort\_A)

else:

print("Wrong choice")

flag = 0

**Output:**

1. Accept array elements

2. Display the Elements

3. Insertion Sort

4. Shell Sort

5. exit

Enter your choice : 1

Enter the number of Students : 4

Enter the First Year % of Student[0] : 98

Enter the First Year % of Student[1] : 87

Enter the First Year % of Student[2] : 75

Enter the First Year % of Student[3] : 83

1. Accept array elements

2. Display the Elements

3. Insertion Sort

4. Shell Sort

5. exit

Enter your choice : 2

98.00 87.00 75.00 83.00

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 :

75.00 83.00 87.00 98.00

Top five score are :

98.00 87.00 83.00 75.00

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 :

75.00 83.00 87.00 98.00

Top five score are :

98.00 87.00 83.00 75.00

1. Accept array elements

2. Display the Elements

3. Insertion Sort

4. Shell Sort

5. exit

Enter your choice : 5

Wrong choice