

ITA6017 - PYTHON PROGRAMMING
ASSIGNMENT 2

REG NO: 22MCA0223

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Question 1

A team of authorities designed by Govt. of India to conduct a survey on Colleges. Let us assume 'n' number of colleges. They were asked to rank the colleges based on 3 different parameters. The parameters are facilities, academics and infrastructure. Maximum score in each parameter is as follows.

Facilities=25

Academics=50

Infrastructure=25

At the end of the survey the scores of the individual parameters are added up to get the total score and the colleges are ranked based on the score. The college that scores the highest score is ranked first. Next highest score is given the rank second and so on. Write a program to read the scores of the three parameters for each college, store the scores in a list. Make a list of individual score list for ten colleges. Find the total score for all ten colleges, and sort them. Print the Total score in the sorted (Descending) order. You have to use any sorting method for sorting.

Input format:

Read the scores for facilities for College 1

Read the scores for academics for College 1

Read the scores for infrastructure for College 1

Read the scores for facilities for College 2

Read the scores for academics for College 2

Read the scores for infrastructure for College 2

--

Read the scores for facilities for College 10

Read the scores for academics for College 10

Read the scores for infrastructure for College 10

Output format:

Total score in the sorted order (Descending)

Code

```
print("Enter number of colleges: ")
numberOfColleges = int(input())

facilitiesScores = []

academicsScores = []

infrastructureScores = []

for i in range(numberOfColleges):
    print("\nEnter scores for College " + str(i + 1) + " :")

    while (True):
        print("Enter facility score: ")
        facilityScore = int(input())

        if (facilityScore <= 25):
            facilitiesScores.append(facilityScore)
            break
```

```
        print("Facility score should be <= 25")

while (True):
    print("Enter academics score: ")
    academicScore = int(input())

    if (academicScore <= 50):
        academicsScores.append(academicScore)
        break
    print("Academic score should be <= 50")

while (True):
    print("Enter infrastructure score: ")
    infraScore = int(input())

    if (infraScore <= 50):
        infrastructureScores.append(infraScore)
        break
    print("Infrastructure score should be <= 50")

totalScores = []

for i in range(numberOfColleges):
    totalScores.append((facilitiesScores[i] + academicsScores[i] +
infrastructureScores[i], i))

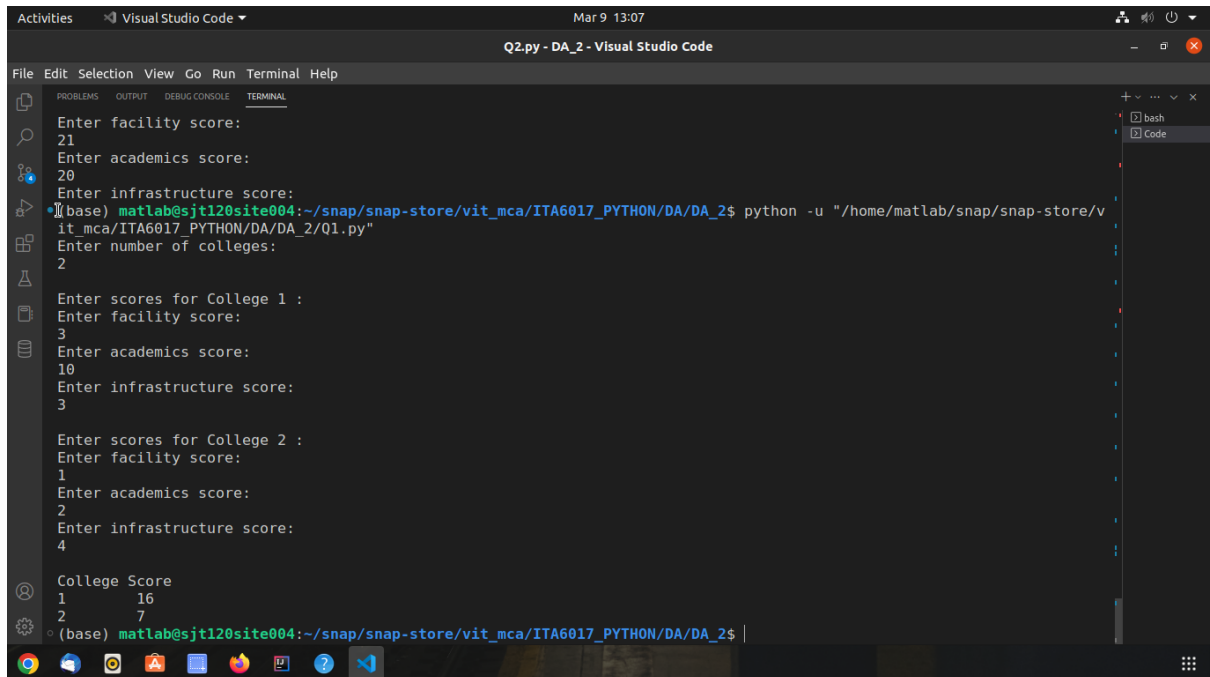
totalScores.sort(reverse=True)
```

```
print("\nCollege\tScore")

for score in totalScores:

    print(score[1] + 1, "\t", score[0])
```

Output



```

Activities Visual Studio Code Mar 9 13:07
Q2.py - DA_2 - Visual Studio Code

File Edit Selection View Go Run Terminal Help
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Enter facility score:
21
Enter academics score:
20
Enter infrastructure score:
10
(base) matlab@sjt120site004:~/snap/snap-store/vit_mca/ITA6017_PYTHON/DA/DA_2$ python -u "/home/matlab/snap/snap-store/vit_mca/ITA6017_PYTHON/DA/DA_2/Q1.py"
Enter number of colleges:
2

Enter scores for College 1 :
Enter facility score:
3
Enter academics score:
10
Enter infrastructure score:
3

Enter scores for College 2 :
Enter facility score:
1
Enter academics score:
2
Enter infrastructure score:
4

College Score
1 16
2 7
(base) matlab@sjt120site004:~/snap/snap-store/vit_mca/ITA6017_PYTHON/DA/DA_2$

```

```

deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q1.py
Enter number of colleges:
10

Enter scores for College 1 :
Enter facility score:
32
Facility score should be <= 25
Enter facility score:
20
Enter academics score:
30
Enter infrastructure score:
40

Enter scores for College 2 :
Enter facility score:
10
Enter academics score:
12
Enter infrastructure score:
15

```

```
Enter scores for College 3 :
Enter facility score:
14
Enter academics score:
25
Enter infrastructure score:
39

Enter scores for College 4 :
Enter facility score:
44
Facility score should be <= 25
Enter facility score:
20
Enter academics score:
31
Enter infrastructure score:
22

Enter scores for College 5 :
Enter facility score:
33
Facility score should be <= 25
Enter facility score:
```

```
Facility score should be <= 25
Enter facility score:
11
Enter academics score:
22
Enter infrastructure score:
33

Enter scores for College 6 :
Enter facility score:
11
Enter academics score:
22
Enter infrastructure score:
33

Enter scores for College 7 :
Enter facility score:
44
Facility score should be <= 25
Enter facility score:
21
Enter academics score:
30
Enter infrastructure score:
```

```
Enter infrastructure score:
50

Enter scores for College 8 :
Enter facility score:
21
Enter academics score:
34
Enter infrastructure score:
54
Infrastructure score should be <= 50
Enter infrastructure score:
45

Enter scores for College 9 :
Enter facility score:
32
Facility score should be <= 25
Enter facility score:
20
Enter academics score:
26
Enter infrastructure score:
36
```

```
Enter infrastructure score:
36

Enter scores for College 10 :
Enter facility score:
12
Enter academics score:
13
Enter infrastructure score:
16
```

College Score

7	101
8	100
1	90
9	82
3	78
4	73
6	66
5	66
10	41
2	37

Question 2

Students in a class are appreciated based on the following factors

Number of 'S' grade ≥ 3

Attendance ≥ 90

Participation in sports activity in a semester ≥ 2

Appreciation is given as follows:

(i) 'Excellent' if all three conditions are met

(ii) 'Very Good' if conditions (i) and (ii) are met

(iii) 'Good' if conditions (i) and (iii) are met

Given the Number of 'S' grades, Attendance and Participation in sports activity in a semester, write the python code to output the appreciation for the student. Check boundary conditions and print 'Invalid input' for wrong input.

Boundary Condition:

All values of input ≥ 0

Code

```
print("Enter number of S grades: ")
while True:
    numberOfSGrades = int(input())

    if numberOfSGrades >= 0:
        break

    print("Invalid input")
```



```
print("Enter attendance percentage: ")
while True:
    attendance = int(input())

    if attendance >= 0:
        break

    print("Invalid input")

print("Enter participation in sports activity: ")
while True:
    participation = int(input())

    if participation >= 0:
        break

    print("Invalid input")

if numberOfSGrades >= 3 and attendance >= 90 and participation >= 2:
    print("Excellent")
elif numberOfSGrades >= 3 and attendance >= 90:
    print("Very Good")
elif numberOfSGrades >= 3 and participation >= 2:
    print("Good")
```

Output

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q2.py
Enter number of S grades:
4
Enter attendance percentage:
95
Enter participation in sports activity:
3
Excellent
```

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q2.py
Enter number of S grades:
4
Enter attendance percentage:
80
Enter participation in sports activity:
4
Good
```

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q2.py
Enter number of S grades:
4
Enter attendance percentage:
93
Enter participation in sports activity:
1
Very Good
```

Question 3

A man engaged 'n' labourers to make 't' toys in 'd' days. Assume that all men work with same speed and efficiency. After 'd1' days, he found that only 't1' toys were made. Design an algorithm and write a Python code to determine the number of additional men to be employed to complete the task in time. For example, if n is 10, t is 320, d is 5, d1 is 3, and t1 is 120 then the number of additional men to be employed is 12. Assume that the speed of making toys is uniform for all men.

Input Format:

Read the number of labourers engaged in work

Read the total number of toys to be made (t)

Read the total number of days allotted for completion (d)

Read the number of days work had been done (d1)

Read the number of toys made in d1 days (t1)

Output Format:

Number of more men required for completing the job in allotted period

Code

```
print("Enter number of labourers engaged: ")
numberOfLabourers = int(input())

print("Enter total number of toys to make: ")
totalNumberOfToys = int(input())
```

```
print("Enter total number of days allotted for completion: ")
totalDays = int(input())

print("Enter number of days work done: ")
daysDone = int(input())

print("Enter number of toys made: ")
toysMade = int(input())

labourEfficiency = toysMade / (daysDone * numberOfLabourers)

perDayEfficiencyRequired = (totalNumberOfToys - toysMade) /
(totalDays - daysDone)

remainingPerDayEfficiency = perDayEfficiencyRequired - (
    numberOfLabourers * labourEfficiency
)

labourersRequired = int((remainingPerDayEfficiency) /
labourEfficiency)

print(
    "Number of more men required for completing the job in allotted
period is "
    + str(labourersRequired)
)
```

Output

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q3.py
Enter number of labourers engaged:
10
Enter total number of toys to make:
320
Enter total number of days allotted for completion:
5
Enter number of days work done:
3
Enter number of toys made:
120
Number of more men required for completing the job in allotted period is 15
```

Question 4

Write a python program that prints Pascal's triangle

```
      1
     1 1
    1 2 1
   1 3 3 1
  1 4 6 4 1
 1 5 10 10 5 1
1 6 15 20 15 6 1
```

Code

```
from math import factorial

n = 5

for i in range(n):
    for j in range(n - i + 1):
        print(end=" ")

    for j in range(i + 1):
        print(factorial(i) // (factorial(j) * factorial(i - j)),
end=" ")

    print()
```

Output

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q4.py
      1
     1 1
    1 2 1
   1 3 3 1
  1 4 6 4 1
```

Question 5

VIT follows relative grading based on the class average to grade the performance of students in various examinations. Write a program that accepts the marks secured by a student for a given subject along with the average marks of the respective class. Then display the grade he has secured, based on the following instructions.

- a) Grading is done based on the deviation from class average.
- b) If the deviation from class average of the student's mark is greater than or equal to 20, the student has scored S grade
- c) If the deviation from class average of the student's mark is greater than or equal to 10, the student has scored A grade
- d) If the deviation from class average of the student's mark is within the range of -5 to + 5, the student has scored B grade
- e) If the deviation from class average of the student's mark is less than or equal to 10, the student has scored C grade
- f) If the deviation from class average of the student's mark is less than or equal to 15, the student has scored D grade
- g) If the deviation from class average of the student's mark is less than 20, the student has scored F grade

Code

```
print("Enter marks secured by student: ")
marks = int(input())

print("Enter average marks of the class: ")
average = int(input())
```

```
diff = marks - average

grade = ""

if diff >= 20:
    grade = "S"
elif diff >= 10:
    grade = "A"
elif -5 <= diff <= 5:
    grade = "B"
elif -10 <= diff <= -6:
    grade = "C"
elif -15 <= diff <= -11:
    grade = "D"
else:
    grade = "F"

print("Grade secured by the student: " + grade)
```


Output

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q5.py
Enter marks secured by student:
50
Enter average marks of the class:
25
Grade secured by the student: S
```

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q5.py
Enter marks secured by student:
40
Enter average marks of the class:
30
Grade secured by the student: A
```

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q5.py
Enter marks secured by student:
27
Enter average marks of the class:
30
Grade secured by the student: B
```

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q5.py
Enter marks secured by student:
21
Enter average marks of the class:
30
Grade secured by the student: C
```

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q5.py
Enter marks secured by student:
14
Enter average marks of the class:
30
Grade secured by the student: F
```

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q5.py
Enter marks secured by student:
16
Enter average marks of the class:
30
Grade secured by the student: D
```

Question 6

A company wants its employees to work for 'X' hours on average per day in a week (Monday to Friday). Given the number of hours worked by an employee on each day of a week, design a flowchart and write a Python code to compute the average number of hours worked by the employee. Number of hours worked can be floating point values. For example, 7 hours 30 minutes is entered as 7.5 hours

Input Format:

Number of hours worked on first day

Number of hours worked on second day

Number of hours worked on third day

Number of hours worked on fourth day

Number of hours worked on fifth day

Output Format:

Average hours worked in a week

Code

```
hoursWorkedPerDay = []

for i in range(5):
    print("Enter number of hours worked on day " + str(i + 1) + " :")
    hoursWorkedPerDay.append(float(input()))

sum = 0
for hours in hoursWorkedPerDay:
    sum += hours
```

```
average = sum / 5
```

```
print("Average hours worked in a week : " + str(average))
```

Output

```
deadmercury@DESKTOP-QUKDS0U MINGW64 /e/LEARNING/vit_mca/ITA6017_PYTHON (main)
$ C:/Python311/python.exe e:/LEARNING/vit_mca/ITA6017_PYTHON/DA/DA_2/Q6.py
Enter number of hours worked on day 1 :
4
Enter number of hours worked on day 2 :
3
Enter number of hours worked on day 3 :
5
Enter number of hours worked on day 4 :
7
Enter number of hours worked on day 5 :
1
Average hours worked in a week : 4.0
```