P 5 2

Pre-Leaving Certificate Examination, 2021

Computer Science

Section C

Higher Level

Time: 1 hour

80 marks

Instructions

There is one section of the examination paper in this booklet.

Section C	Programming	80 marks	1 question

Answer all parts of the question on your digital device.

Instructions are provided for each question.

Ensure that you save your work regularly and when you complete each question.

Do not change the file names or save your work under different file names.

If you are unable to get some code to work correctly you can comment out the code so that you can proceed. The code that has been commented out will be reviewed by the examiner.

Section C Programming 80 marks

Answer all question parts.

Question 16

A school is looking at ways of speeding up and streamlining the exam correcting process for teachers within the school. Currently, teachers within the school use a number of different methods to grade their students and keep track of student progress. The majority of teachers use a percentage style marking system based between (0 - 100%), but parents and students would prefer a letter based grade, either an A, B or C, as they find this form more meaningful. The current grading system must be changed to reflect this.

(a) Open the program called **Question16_A.py** from your device.
Enter your name in the space provided on **Line 2**.

This program is designed to ask the user for the student's name and the mark the student scored on an exam. When the program is run, it outputs the student's name and their result in the traditional percentage style format.

```
1  # Question 16(a)
2  # Student name:
3
4  student_name = input("Please enter the students name: ")
5  student_score = int(input("Please enter the students mark: "))
6  score_as_a_percentage=(student_score/150)*100
7
8
9  print(student_name,"scored",score_as_a_percentage,"%")
```

A sample run of the program is shown below; the student's name is Martin and they scored 75 out of a possible 150 marks.

```
Please enter the students name: Martin
Please enter the students mark out of 150: 75
Martin scored 50.0 %
```

Modify the program to do the following:

(i) Currently the '**student_score**' variable is converted to an integer value. However, the teacher has realised in some cases the students' results may include decimals; for example, a student may score 130.5 out of a 150. Modify the program so it can deal with **float** values.

(ii) Currently the program grades the exam out of a hard coded value of 150. However, not all exams are marked out of 150. Modify the program so that it prompts the user to enter a value called '**exam_total**'. The '**exam_total**' variable should then be used by the program in the calculation of the overall percentage value. The '**exam_total**' input must be an integer value.

Two different sample runs of the program are given below where values of 100 and 200 are used for the '**exam_total**' variable.

```
Please enter the students name: Martin
Please enter the students mark: 50
Please enter the total amount of marks going for the exam: 100
Martin scored 50.0 %
```

```
Please enter the students name: Martin
Please enter the students mark: 50
Please enter the total amount of marks going for the exam: 200
Martin scored 25.0 %
```

(iii) By using the function **round**, or otherwise, modify the program so that the value of the variable 'percentage' is rounded to one decimal place when it is displayed.

When the program is run the output may look as follows:

```
Please enter the students name: Martin
Please enter the students mark: 67
Please enter the total amount of marks going for the exam: 150
Martin scored 44.7 %
```

(iv) Create a general function called '**username**' that asks the user to enter their name. This function should then return the user's chosen name into a welcome message within the program.

Modify the program to **call the function**.
Modify the program to **display a welcome message containing the user's name**.
When the program is run it may look as follows.

```
Please enter your username: Martin
Welcome Martin, to the student result calculator.
```

```
Please enter the students name: Julie
Please enter the students mark: 100
Please enter the total amount of marks going for the exam: 100
```

(v) The teacher uses a percentage style grade when writing their own reports. However, the exam reports that the parents of the students receive show the result as either an A, B or C as students and parents find these types of grades more meaningful.

Extend the program so it displays the student's result as both a percentage and as a letter using the ranges given below.

Grade Range (%)	Grade Category
80 – 100	A
60 – 79	B
0 – 59	C

When the program is run the output may look as follows:

```
Welcome to the student result calculator.
Please enter the students name: Martin
Please enter the students mark: 100
Please enter the total amount of marks going for the exam: 150
Martin scored 66.7 %. They got a B.
```

Save and close your file before moving on to the next part.

(b) Open the program called **Question16_B.py** from your device.
Enter your name in the space provided on **Line 2.**

A teacher has a number of different classes whose exams they must correct. To make it easier to analyse student result data, the teacher uses separate lists to record the names and results of students. The results of one class are shown below in **Table 1**.

Create a program that allows the teacher to enter their students' names and results so they can be analysed for class reports.

Student Name	Student Result (out of 200)
Martin	140
Lucy	100
Paul	78
Julie	185
Sam	45
Mark	124
Maud	178

Table 1

Your program should use a function to ask the user to input the student names until a value of 'end' or 'End' is entered. The program should use a separate function to ask the user to input numeric student exam results until a value of '-1' is entered. Student names and student exam results should both be stored in separate lists.

After all the names and results have been entered, the program should display the inputted student names and results to the user.

As the teacher has a large number of students and results to enter, the program should be able to tell the user if the number of student names entered does not match the number of student results entered. If this happens, the program should allow the user to enter the missing student name(s) or result(s) at the correct index location according to Table 1.

For their personal reports the teacher needs to analyse the data to find:

- Highest score as a percentage of 200 marks.
- Lowest score as a percentage of 200 marks.
- Average score as a percentage of 200 marks.

Score as percentage can be calculated by:

$$\% = \left(\frac{\text{StudentResult}}{200} \right) \times 100$$

Your program should output this data to the user.

Your program may look as follows:

```
Please enter the students name and enter ‘end’ or ‘End’ when complete: Martin
Please enter the students name and enter ‘end’ or ‘End’ when complete: Lucy
Please enter the students name and enter ‘end’ or ‘End’ when complete: Paul
Please enter the students name and enter ‘end’ or ‘End’ when complete: Julie
Please enter the students name and enter ‘end’ or ‘End’ when complete: Sam
Please enter the students name and enter ‘end’ or ‘End’ when complete: Mark
Please enter the students name and enter ‘end’ or ‘End’ when complete: Maud
Please enter the students name and enter ‘end’ or ‘End’ when complete: end

Please enter the students result and enter ‘-1’ when complete: 140
Please enter the students result and enter ‘-1’ when complete: 100
Please enter the students result and enter ‘-1’ when complete: 78
Please enter the students result and enter ‘-1’ when complete: 185
Please enter the students result and enter ‘-1’ when complete: 45
Please enter the students result and enter ‘-1’ when complete: 124
Please enter the students result and enter ‘-1’ when complete: 178
Please enter the students result and enter ‘-1’ when complete: -1

Student names are: [‘Martin’, ‘Lucy’, ‘Paul’, ‘Julie’, ‘Sam’, ‘Mark’, ‘Maud’]
Student results are : [140.0, 100.0, 78.0, 185.0, 45.0, 124.0, 178.0]

Highest value scored is: 92.5 %
Lowest value scored is : 22.5 %

The student who scored the highest value is: Julie
The student who scored the lowest value is: Sam
The average value in the class is : 60.7 %
```

OR

```
Please enter the students name and enter ‘end’ or ‘End’ when complete: Martin
Please enter the students name and enter ‘end’ or ‘End’ when complete: Lucy
Please enter the students name and enter ‘end’ or ‘End’ when complete: Paul
Please enter the students name and enter ‘end’ or ‘End’ when complete: Julie
Please enter the students name and enter ‘end’ or ‘End’ when complete: Sam
Please enter the students name and enter ‘end’ or ‘End’ when complete: Mark
Please enter the students name and enter ‘end’ or ‘End’ when complete: Maud
Please enter the students name and enter ‘end’ or ‘End’ when complete: end

Please enter the students result and enter ‘-1’ when complete: 140
Please enter the students result and enter ‘-1’ when complete: 100
Please enter the students result and enter ‘-1’ when complete: 78
Please enter the students result and enter ‘-1’ when complete: 185
Please enter the students result and enter ‘-1’ when complete: 45
Please enter the students result and enter ‘-1’ when complete: 124
Please enter the students result and enter ‘-1’ when complete: 178
Please enter the students result and enter ‘-1’ when complete: -1

Student names are: [‘Martin’, ‘Lucy’, ‘Paul’, ‘Julie’, ‘Mark’, ‘Maud’]
Student results are: [140.0, 100.0, 78.0, 185.0, 45.0, 124.0, 178.0]

ERROR: You have entered more student results than student names
Compare the entered names and results and add the missing name to the correct index location

Student results are: [140.0, 100.0, 78.0, 185.0, 45.0, 124.0, 178.0]

Student names are: [‘Martin’, ‘Lucy’, ‘Paul’, ‘Julie’, ‘Mark’, ‘Maud’]

Please enter the students name that was left out: Sam
What is the index position of the name: 4

Highest value scored is: 92.5 %
Lowest value scored is: 22.5 %

The student who scored the highest value is: Julie
The student who scored the lowest value is: Sam
The average value in the class is: 60.7 %
```

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