Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2023

Computer Science

Section C

Ordinary Level

Wednesday 24 May   Morning 11:30 – 12:30

80 marks

Do not hand this up.

This document will not be returned to the State Examinations Commission.

Instructions

There is one section in this paper.

Section C   Programming   One question   80 marks

                                                 Answer all question parts

Answer all parts of the question on your digital device.

Calculators may be used during this section of the examination.

The *Formulae and Tables* booklet cannot be used for this section of the examination.

The superintendent will give you a copy of the *Python Reference Guide*.

Ensure that you save your work regularly.

Save your files using the naming structure described at the beginning of each question part.

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.

Rough work pages are provided at the end of this booklet. Please note that this booklet is not to be handed up and will **not** be reviewed by an examiner.

At the end of the examination it is your responsibility to ensure that you have saved your files onto your external media.

You will be provided with a brown envelope for your external media. Write your examination number on this envelope and place your external media into it before sealing. Place this envelope in the pouch at the front of the red envelope that contains your examination booklet from Section A and B.

There is no examination material on this page

Answer all question parts.

Question 16

(a) Open the program called **Question16_A.py** from your device. The source code is shown and described briefly below.

Before making any changes, you should save your working copy of the file using the format **CandidateNumberQuestion16_A.py**. For example, you would save the file as **123456Question16_A.py** if your candidate number was 123456.

Enter your Examination Number in the space provided on **line 2** in your Python file**.**

The program below produces a times table for a specific number. A times table is a multiplication table in a list that shows the multiples of a specific number. The code below works by using a `for` loop to multiply the number seven by zero, then by one, then by two until the loop repeats ten times in total.

```
1  # Question 16(a)
2  # Examination Number:
3
4  print("Multiplication program")
5
6  number = 7
7
8  print("Multiplications of ", number)
9
10 for i in range(10):
11     print(number*i)
```

Make the following changes to the program:

(i) Currently the first line that is printed by the program is "Multiplication program".
Change the program so that the first line printed is "Times Table program".
When the program is run the output may now look as follows:

```
Times Table program
Multiplications of 7
0
7
14
21
28
35
42
49
56
63
```

This question continues on the next page.

(ii) Update the program so that a row of asterisks appears above and below the line which outputs "Times Table program".
When the program is run the output may now look as follows:

```
********************
Times Table program
********************
Multiplications of 7
0
7
14
21
28
35
42
49
56
63
```

(iii) Amend the program to ask for and accept the user's choice of number to be used as the multiplier. Store the entered number in the variable called `number`.
When the program is run and the user enters 8 as the number, the output may now look as follows:

```
********************
Times Table program
********************
Enter number: 8
Multiplications of 8
0
8
16
24
32
40
48
56
64
72
```

(iv) Currently the user can enter a negative number. Negative numbers should not be allowed in this program. Amend the program so that the times table is not printed out and an appropriate error message is displayed if the user enters a negative number.
When the program is run and the user enters -2 as the number, the output may now look as follows:

```
Times Table program
Enter number: -2
This program does not support negative numbers.
```

(v) Times tables normally shows the result of multiplying a specific number by zero to twelve inclusive. Amend the program so it displays the results of multiplying the entered number by zero to twelve inclusive.
When the program is run and the user enters the number 8, the output may now look as follows:

```
********************
Times Table program
********************
Enter number: 8
Multiplications of 8
0
8
16
24
32
40
48
56
64
72
80
88
96
```

(vi) Update the program so that it displays the results in the format "3 x 8 = 24", as shown below.
When the program is run and the user enters the number 8, the output may now look as follows:

```
********************
Times Table program
********************
Enter number: 8
Multiplications of 8
0 x 8 = 0
1 x 8 = 8
2 x 8 = 16
3 x 8 = 24
4 x 8 = 32
5 x 8 = 40
6 x 8 = 48
7 x 8 = 56
8 x 8 = 64
9 x 8 = 72
10 x 8 = 80
11 x 8 = 88
12 x 8 = 96
```

Save your file using the format **CandidateNumberQuestion16_A.py**. For example, you would save the file as **123456Question16_A.py** if your candidate number was 123456.

This question continues on the next page.

(b) Open the program called **Question16_B.py** from your device. This file only contains two comments on lines 1 and 2.

Before making any changes, you should use the format **CandidateNumberQuestion16_B.py** to save your file. For example, you would save the file as **123456Question16_B.py** if your candidate number was 123456.

Enter your Examination Number in the space provided on **Line 2.**

Implement a program for a temperature alert system for a baby's room.

You should use comments throughout your program to explain your code. You may wish to reuse some of the code you used in part **(a)** as part of your solution.

Your program should do the following:

- Display a message which outputs "Welcome to Temperature Alert System".
- Ask the user to enter a temperature value in degrees Celsius. An example of how this might look is shown below.

```
Enter temperature value in degrees Celsius: 22
```

- Use a conditional statement to output different pieces of information based on the temperature value that has been input by the user. See the table below for conditions and the outputs that should be displayed.

Condition	Output
Temperature is less than 20	Too cold. Turn up heating.
Temperature between 20 – 24	Temperature is just right.
Temperature is more than 24	Too warm. Turn down heating.

An example output is shown below.

```
Welcome to Temperature Alert System
Enter temperature value in degrees Celsius: 22
Temperature is just right.
```

Save your file using the format **CandidateNumberQuestion16_B.py**. For example, you would save the file as **123456Question16_B.py** if your candidate number was 123456.

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