CSE4IP&CSE5CES(BU-1)

INTRODUCTION TO PROGRAMMING

PROGRAMMING FOR ENGINEERS AND SCIENTISTS

Semester 1, 2021

Assignment 1

Assessment: This assignment 1 is worth 25% of the final mark for this subject.

Due Date: 11:59 PM (AEST/AEDT), Friday April 16, 2021

Delays caused by computer downtime cannot be accepted as a valid reason for a late submission without penalty. Students must plan their work to allow for both scheduled and unscheduled downtime.

Penalties are applied to late assignments (accepted up to 5 working days after the due date only). See the university policy for details.

Individual Assignment: This is an individual assignment. You are not permitted to work as a group when writing this assignment.

Copying, Plagiarism: Plagiarism is the submission of somebody else's work in a manner that gives the impression that the work is your own. The Department of Computer Science and Information Technology treats academic misconduct seriously. When it is detected, penalties are strictly imposed. Refer to the unit guide for further information and strategies you can use to avoid a charge of academic misconduct. All submissions will be electronically checked for plagiarism.

Objectives: The general aims of this assignment are:

- To practise using concepts and techniques covered in Topics1 to 5 and related labs
- To apply those concepts and techniques for practical problem solving, i.e. to design and implement programming solutions

- You are required to implement working Python solutions to problems in a similar format to the lab sessions.

How to submit your assignment

1. The answer for Question 1 must be put in text file **A1Q1.py**. In this file, you write at the top of the answer: (i) Your student ID, (ii) Your first name, and (iii) Your last name, in that order. Do this for all other questions.

2. Put all your answers in a zip file, with the .zip extension. The name of the zip file should be **CSE4IP-20001111** or **CSE5CES-20001111** if your student Id is 20001111, for example.

3. Upload the zip file using Assignment 1 Submission set up on the subject's LMS.

Task 1 (10 marks)

For this task, you are to write a Python code that takes as input a string representing a user's name. Your program should output the length of the name and the number of times each vowel occurs in it. See the below example:

What is your name? John Sam

There are 8 characters in your name.

The number of times 'A' occurs in your name is 1

The number of times 'E' occurs in your name is 0

The number of times 'I' occurs in your name is 0

The number of times 'O' occurs in your name is 1

The number of times 'U' occurs in your name is 0

Task 2 (10 marks)

For this task, you are to write a Python code that asks for a string and a search word. The program then determines and displays how many times the search word appears in the string.

Note: For this question, a "word" is simply taken as a sequence of characters, which may occur as a "stand-alone word" or part of another word.

INPUTS		EXPECTED OUTPUT
String	**Word**	**How many times the search word appears in the string.**
How are you? Are you home?	are	**2 times**

Task 3 (10 marks)

For this task, you are to write a Python code that displays the triangle of a given size similar to the one shown for the example below. If the size is 5, for example, the following triangle is displayed:

```
* * * * *
* * * *
* * *
* *
*
```

Task 4 - (20 marks)

For this task, you are to write a Python code that calculates the balance of a long-term savings account after applying compound interest for a number of years.

INPUTS			EXPECTED OUTPUT
Amount	**Interest**	**Years**	**Balance**
1000	1.5	0	**1000**
1000	1.5	5	**1077.284004**
2500.4	2	7	**2872.173643**

Task 5 - (25 marks)

For this task, you are to write a Python code that asks the user to enter 2 or more integers as a string, to be entered on one line, separated by one zero. If there are more than one zero, then these will be a part of the number. The program then finds the even numbers, computes and prints out the average. See the below example:

```
num = input("Enter your number: ")
```

Assume the user entered "2040304405", then the summation of even numbers is 2+4+44=50, and the average is 50/3=16.6

INPUT	EXPECTED OUTPUT
2040304405	**2+4+44=50** **50/3=16.6**
200400604405	**20+40+6+44=110** **110/4=27.5**

Task 6 (25 marks)

Task 6, Part A (10 marks)

For this task, you are to write a function, named *adjust*, that takes a number of cents between 0 and 9, inclusive, rounds it off to the nearest 5 cents by the following rules, and returns the result:

- 1 and 2 cents are rounded off to 0
- 3, 4, 6 and 7 cents are rounded off to 5
- 8 and 9 cents are rounded off to 10 cents.

INPUT	EXPECTED OUTPUT
1	0
4	5
8	10

Task 6, Part B (15 marks)

Part B depends on your solution to Part A, so make sure that you complete the parts in order.

Write a function, named ***roundOff***, that takes an amount of money in dollars, and rounds it off to the nearest 5 cents and returns the result. The amount is entered as a decimal number with 0, 1 or 2 decimal places. The rounding off is based on the rules given above.

INPUT	EXPECTED OUTPUT
1.34	1.35
3.46	3.45
123.41	123.40
123.42	123.40
123.43	123.45
123.44	123.45
123.45	123.45
123.46	123.45
123.47	123.45
123.48	123.50
123.49	123.50
123.50	123.50