Set A

RMIT University

School of Engineering

Advanced Mechatronics System Design – MANU2451

LabVIEW Test 2019

Student Name:

Student Number:

You have 60 minutes to finish this test and return this page at the end of the test period. If this page is not returned, you will not receive any mark for this assessment. After you finished testing your code, put all your files in a zip-folder, and then submit the zipped folder through Canvas → Assignments → Assessment 1 → LabVIEW Code Submission.

If you have any questions, please raise your hand. This is an open book assessment and you can use all available materials including Google. **However, this is an individual assignment and no form of communication with any other person (except your lecturer) is allowed during this test.**

Set A

Task 1: Please save and submit as "SetA_Task1" (**4 Points**)

In a geometric progression, the elements of the sequence are:

$$a, ar, ar^2, ar^3 \cdots$$

Write a program which allows you to:

a. Enter a and r as constants. Set $a = 3$ and $r = 0.75$. (**0.25 points)**

b. Enter a variable n, where n refers to the n-th element of the sequence. (**0.25 points)**

c. Calculate the n-th element of the sequence. (**1.5 points)**

d. We can then sum up all the elements, i.e.

$$a + ar + ar^2 + ar^3 + \cdots$$

Calculate the sum of the first to n-th element **(2 points)**

Task 2: Please save and submit as "SetA_Task2" (**5 Points**)

You will create a program which will count up if you press the "count up" button, and count down if you press the "count down" button. You can also reset the counter to zero, when you press the "reset" button.

Write a program which:

a. Offers three push buttons, in which you will label them as "count up", "count down" and "reset". **(0.5 points)**

b. Every time when the "count up" button changes from LOW to HIGH, a counter will count up by one. **(1 points)**

c. Every time when the "count down" button changes from LOW to HIGH, the same counter in b) will count down by one. **(1.5 points)**

d. When the "reset" button is pressed, the counter will drop to zero. **(1.5 points)**

e. The program has to run continuously when you order it to do so. **(0.5 points)**

Task 3: Please save and submit as "SetA_Task3" (**4 Points**)

In this task, you will calculate the sum of numbers which can be fully divided by 3 in the range of 0 to 100.

a. Bring in a structure which will run 100 iterations. **(0.5 points)**

b. Find a function within the "numeric" palette which can give you a quotient and remainder from division. **(0.5 points)**

c. Think of a way to use the above function to determine if the iteration number "i" can be divided fully by 3. **(2 points)**

d. Cumulatively add all the numbers which can be fully divided by 3 and display the sum in a numeric indicator. **(1 point)**

Task 4: Please save and submit as "SetA_Task4" (**4 Points**)

You are going to write a code to decide how much tips to give the restaurant, depending on the quality of the food and service. To do this, you will use some AND or OR functions, amongst others.

Here are the tasks in detail:

a. First, bring in a "structure" which will repeat the iterations until you press stop. (**0.25 points)**

b. Add a pushbutton and label it "Food". (**0.25 points)**

c. Add another pushbutton and label if "Service". (**0.25 points)**

d. Use AND, OR, plus any other necessary functions to code this tipping table up: (**3 points)**

Food	Quality	Tip Amount
0	0	0
1	0	1
0	1	2
1	1	3

e. Display the tip amount. (**0.25 points).**

Task 5: Please save and submit as "SetA_Task5" (**3 Points**)

Use an x-y-graph to plot a circle with radius r (variable), centred at x = 4 (constant) and y =4 (constant). **(3 points)**