THE UNIVERSITY OF TRINIDAD AND TOBAGO

FINAL ASSESSMENT/EXAMINATION
SEPTEMBER – DECEMBER 2018

Course Code and Title: ***PROG1004 Computer Programming I***

Programme: ***BASc Computer Engineering.***

Date: 06/12/2018 **Time:** 1:00PM - 4:00PM

Duration: three (3) hours

PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE YOU BEGIN THIS EXAMINATION

Instructions to Candidates

1. **This paper has 6 pages and 6 questions for a total of 55 marks.**
2. **You are required to answer all questions.**
3. **You are required to return the question script.**
4. **You are allowed to use a non-programmable calculator**

Key Examination Protocol

1. Students please note that academic dishonesty (or cheating) includes but is not limited to plagiarism, collusion, falsification, replication, taking unauthorised notes or devices into an examination, obtaining an unauthorised copy of the examination paper, communicating or trying to communicate with another candidate during the examination, and being a party to impersonation in relation to an examination.

2. The above mentioned and any other actions which compromise the integrity of the academic evaluation process will be fully investigated and addressed in accordance with UTT's academic regulations.

3. Please be reminded that speaking without the Invigilator's permission is **NOT** allowed.

QUESTION	MARK
1	/ 5
2	/ 8
3	/ 10
4	/ 10
5	/ 12
6	/ 10
TOTAL	/ 55

QUESTION 1 (5 marks)

Write a C program to determine the number of occurrences of the letter *v* in a sentence. The input consists of a sentence which is made up of alphabetic characters and spaces only and which terminates with a period. Note that the letter *v* may be in either uppercase of lowercase.

QUESTION 2 (8 marks)

What would be the output from the following program:

```
#include <stdio.h>

void main()
{
	int p = -4, q, r = 3;

	while (p <= 2)
	{
		q = 7;
		while (q <= 12)
		{
			r += 7;
			q += 3;
		}
		p += 2;
	}
	printf_s ("r = %d \n", r);
}
```

QUESTION 3 (10 marks)

The Taylor expansion for determining e^{-x} is:

$$e^{-x} = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \frac{x^4}{4!} - \ldots.$$

Your job is to write a C program to determine e^{-x} for a given value of x. The input consists of the value of x. Apply the Taylor expansion to 20 terms in order to determine the required value.

QUESTION 4 (10 MARKS)

This question requires you to develop a C program to determine the area bounded by the graph of a curve defined by

$$f(x) = 2x^2 + 3x - 2$$

and the x-axis.

As discussed in our lectures, this method requires the use of trapezoids to approximate the area.

QUESTION 5 (12 marks)

An online institute would like you to develop a C program to determine the charge payable by its students. A student may enroll in one or more courses. The following are the fees charged to the students based on the types of courses taken:

Course Type	Fees Per Course
Electrical Eng. (E)	850.50
Mechanical Eng. (M)	895.00
Petroleum Eng. (P)	210.00
ICT (I)	132.75

Your job is to write a program to read in a student's id (integer). After entering the id for a student, your program should read in the course type (single character) followed by the number of courses of that course type. The student might be enrolled in more than one course type. Your program should therefore ask if there are any more inputs for this student. If the response is Y (for Yes), then your procedure should ask for the name of the next course type followed by the number of courses taken in that course type. This process should continue until the response is N, indicating that there are no more courses that the student is enrolled in. After processing all the inputs for a given student, your procedure should output the student's id along with the total amount payable.

After processing all the data for one student, your program should ask if there are any more students to be processed. Continue the above process as long as the response to this question is Y.

Your program should validate all responses to questions as well as the course type. Also, the responses to the questions may be in either uppercase or lowercase.

QUESTION 6 (10 marks)

Write a C program to read in the id and number of votes received by each of 20 candidates in an election. For each candidate whose number of votes exceeds the average, your program should output the id and number of votes in a format similar to the following (*ignore the box*):

```
Candidates Exceeding Average

Candidate          Number of Votes

2954                    653

3971                    482
```

END OF EXAMINATION