The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical and Computer Engineering

Study Programme	: Bachelor of Software Engineering Honours
Name of the Examination	: Final Examination
Course Code and Title	**: EEX3465 – Programming Fundamentals**
Academic Year	: 2020/21
Date	: **9th January 2022**
Time	: 0930-1230hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper contains **five (05)** questions. **(SECTION A - 1 Question and SECTION B - 4 Questions)**
3. The Question 01 in SECTION A is **COMPULSORY** and select **any THREE (03)** questions from SECTION B.
4. This is a Closed Book Test **(CBT).**
5. Answers should be in clear handwriting.
6. Do not use red colour pen.

SECTION A

Question 01 ***(Compulsory)***

a) Answer the question using the following description.

The Registrar's office wishes to recruit some IT technical staff to support IT services of the university. In order to select a suitable candidate a two paper test was carried out. The test has two papers. Paper 1 covers IT knowledge and Paper 2 covers the knowledge in English Lanauge. Only 7 people sat the selection test. The registrar's office requires a computer program to be developed to process the marks of the test.

The following shows sample scores of the marks obtained by the applicants.

Student No	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Paper 1	46	82	14	62	34	25	40
Paper 2	32	80	20	46	63	78	50

In order to develop the program, a a multi-dimesnional array has to be used to store the data.

i. Declare a two-dimensional array called ***selectiontestmarks*** to store the marks of applicants.

[3 marks]

ii. Initialise all the values of the array to 0.

[3 marks]

iii. Write a function called ***findhighestmark*** that takes the paper number (i.e. 1 or 2) as a parameter and returns the highest mark for the paper

[7 marks]

iv. Write a function called ***highestscorer*** that takes the paper number (i.e. 1 or 2) as a parameter and returns the position of the applicant who scored the the highest mark for that paper .

[8 marks]

v. Write a function called ***averagemark*** that takes the paper number (i.e. 1 or 2) as a parameter and returns the average mark for that paper.

[8 marks]

vi. Write a main program that uses the three functions ***findhighestmark***, ***highestscorer*** and ***averagemark*** to produce the following report with actual data from a selection test:

Average mark for Paper 1:
Average mark for Paper 2:
Highest mark for Paper 1
The position of the candidate with the highest mark for paper 1
Highest mark for Paper 2
The position of the candidate with the highest mark for paper 2

[11 Marks]

SECTION B

*Answer any **THREE (03)** questions*

Question 02

a) The COVID monitoring team of the national airport uses a list provided by the World Health Organisation (WHO) that lists countries with identified patients of Omicron Variant of the COVID-19 (Corona) Virus. The team leader has requested you to develop a program to find if a person coming into the country has travelled to a country affected by the virus. Write a C program that declares an array capable of recording the names of counries included in the list provided by WHO, initialise the array with the names "China", "Russia", "UAE", "Australia", "South Africa" and "Singapore". The program should check the country of the origin of travel of a passenger is in the list of affected countries and display a suitable message.

[12 marks]

b) Write a C Program to print the first 10 odd numbers.

[8 marks]

Question 03

a) By using a suitable examples, draw flowcharts to show the following programming constructs:

(i) Do .. while loop

(ii) for loop

[10 Marks]

b) A number is divisible by 9, if the sum of its digits is divisible by 9. Write a function called ***divisibleby9*** that takes a single integer value as the parameter and returns true if the value in the parameter is divisible by 9 and false if it is not. The value used should be a single value, for e.g. 123 and should not reat individual digits separately. Use the function ***divisibleby9*** in a main program to display whether the values {56, 49, 35, 54} are divisible by 9. Use suitable messages.

[10 marks]

Question 04

a) A teacher needs to store the following data about the students in his class:

student first name (20 characters), surname (50 characters), registration no (number), exam mark (number), assignment mark (number)

Declare a structure in C language named ***student*** to represent the data and create a variable of the structure type called ***student1***. Use self descriptive variable names and suitable data types in your declaration.

[6 Marks]

b) Write statements in C to record following values in ***item1*** variable

student Name	Surname	Registration Number	Exam Mark	Assignment Mark
Kamal,	Deshapriya	71625387	68	42

[4 Marks]

c) The final mark of a student is caluclated as follows:

Final Mark = Exam Mark * 0.7 + Assignment Mark * 0.3 +bonus mark

The bonus mark is an additional 5 % of the Exam mark if the student's assignment mark is higher than 60. Write a function called ***givebonus*** that takes the Exam mark and the assignment mark as arguments and returns the bonus mark if applicable or 0 if no bonus can be given..

Write a main program to print the mark sheet for a student The sheett should show the exam mark, assignment mark, bonus marks and final mark.

[10 Marks]

Question 05

a) Draw a flow chart for a program to print the factorial of a number?

[12 Marks]

(b) Write the output of following programs, explaining how you reached theanswer:

(i)

```
#include <stdio.h>

int main(){
        int i;
        for(i=1; i++<=1; i++)
        i++;
        printf("%d",i);
        return 0;
}
```

(ii)

```
# include <stdio.h>
void changevalue(int *somevalue)
{
   *somevalue = 30;
}

int main()
{
 int y = 20;
 changevalue(&y);
 printf("%d", y);

 return 0;
}
```

[08 Marks]

--- End ---