

THE OPEN UNIVERSITY OF SRI LANKA
 BACHELOR OF TECHNOLOGY – LEVEL 03
 DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
 ECX3217- SOFTWARE DEVELOPMENT FOR ENGINEERS



FINAL EXAMINATION – 2016/2017

Date: 26th November 2017

Time: 09.30 to 12.30 hrs.

<INSTRUCTIONS>

Answer **Question 1** in **Part A**, which is compulsory.

Answer **3 questions** out of 4 given in **Part B**.

This is **closed book exam** and no reference book and materials are allowed.

Part A

1) Use the c program in figure 1 to give answers for a), b), c), d) and e)

```
#include <stdio.h>
void main()
{
    // declare variables
    int i=0;
    int a[10];
    int sum=0;
    int N=9;
    float average=0;
    while(i<=N)
    {
        printf("Enter %d integer number ",i);
        scanf("%d",&a[i]);
        i=i+1;
    }
    i=N;
    while(i>=0)
    {
        printf("%d\n",a[i]);
        sum=sum+a[i];
        i=i-1;
    }
    average=sum/(float)N;
    printf("Average = %.2f\n",average);
}
```

Figure 1

a) If you want to enter only five numbers to get the output what changes should you do to the program? [4 marks]

- b) What will be the output if you enter numbers of multiple of 2, starting from number 2 to the running program? [5 marks]
- c) If you want to enter data with decimal points what changes should you do to the program? [5 marks]
- d) Draw a suitable flow chart for the program given in figure 1. [12 marks]
- e) Rewrite the program to calculate the average if the input value is greater than or equal to 2. [14 marks]

Part B

2) An algorithm to enter marks for five (5) students is shown in figure 2.

For 5 students

If the mark is greater than or equal to forty (40) then print "grade is P"
If the mark is less than forty (40) then print "grade is F"

Figure 2

- a) Draw a flow chart for the above algorithm using begin, end, inputs, iterations and conditional control structures. [7 marks]
- b) Write a C program for the flow chart including header files, main function, inputs, outputs, iterations and conditional control structures. Write the program with the fewest number of lines in the program. [13 marks]

3) "Order" database has following business rules

A **purchase order** must include one or more **order items**.
An **item** includes one or more **order items**.

A **purchase order** has a **purchase order no** which is unique code.
A **purchase order** has **customer name**, **customer address** and **date**.

An **item** has an **item no** which is a unique code.
An **item** has **item description**, **stock** and a **unit price**.

An **order item** has an **item no** and an **order no**.
An **order item** has a **quantity**.

- a) Draw the Entity Relationship Diagram (ERD) for the above description with necessary relationships. [10 marks]
- b) Write entities and their attributes for the above description. [5 marks]
- c) Normalize the table for 3rd normal form [3 marks]
- d) Write primary keys and foreign keys for the above tables [2 marks]

4)

- a) Write different phases of traditional waterfall life cycle model. [10 marks]
- b) Explain the difference between white box testing and black box testing. [5 marks]
- c) Considering the class diagram shown in figure 3, explain name, attributes and methods of the class. [3 marks]

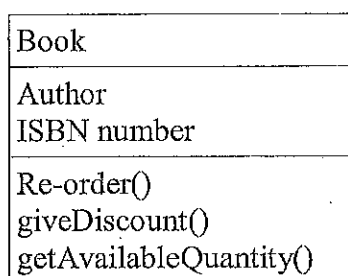


Figure 3

- d) Briefly describe the generalization relationship within classes. [2 marks]

5) Use figure 4 to answer b),c) and d).

Table name	Student		
Field name	Data type	size	Null/not null
st_reg_no	int	4	Not null+primay key
st_name	varchar	40	Null
st_dob	date		Null
st_gender	char		Null
st_address	varchar	60	Null
st_tele	varchar	10,0	Null

Figure 4

- a) Write the SQL statement to create the database called "studentinfo". [5 marks]
- b) Write the SQL command to create the **student** table. [5 marks]
- c) Write the SQL command to insert the following record to the student table. [5 marks]

st_reg_no	st_name	st_dob	st_gender	st_address	st_tele
1113	Amal	02-02-1990	M	Nawala	0110000000

- d) Write the SQL statement to select all the records of the table "student". [5 marks]