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

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of four (4) questions in nine (9) pages.
3. Answer **all four** questions.
4. Answers for each question should commence from a new page.
6. This is a **Closed Book Test** (CBT).
7. Answers should be in clear handwriting (you can use a pencil and eraser to write programs) .
8. Do not use red colour pens.
9. Use attached **program 1, program 2** and **figure 2** for answering the questions **(i), (ii)** in **question 1** and **(i)** in **question 2**.
10. Attach program 1, program 2 and figure 2 to your answer sheet.

9. Print contents of members of struct car "Car registration number", "Manufacture company", "Model", "Colour", "Manufacture year".
10. Add a space to the "manu_company" field (Hint-use string concatenation)
11. Add "model" field to the "manu_company" field.
12. Print the "Car type" by manu_company" field.

Question 02

(i) This question is based on a use case for a University library system. Both students and staff can use the library. It has two use cases, registration and borrowing.

There are two types of registrations, student registration and staff registration. In the registration process, there are three sub processes - (1) verify user details, (2) update records and (3) print library cards . There is another facility of sending a message to indicate the completion of the library card If the user wants.

In the borrowing process, there are two sub processes- issuing and returning.

Read the above description. Write correct use cases, associations and actors in correct places in figure 2 in page 9. [8 marks]

(ii) What are the outputs of following phases of the software Life Cycle?
    a. Requirement analysis [2 marks]
    b. Desin [2 marks]
    c. Testing [2 marks]
    d. Deployment [2 marks]

(iii) List four (4) types of threats for software security [2 marks]
(iv) List commonly used two (2) types of data encryption methods [2 marks]

Question 03

Consider the following relational schema for a database called *Books* that holds data about books in a library.

Books(Title, ISBN, Author name, Author nationality, Author address, publisher name, publisher address, total_copies_ordred, Copies_in_hand, publication_date, category, category_description)

Assume the following,

- ISBN number is unique
- A book may have more than one author
- An author may have written more than one book
- Each publisher name is unique and each publisher has a unique address.
- Book Titles are not unique
- Each book has only one publication date and one publisher. A revision of a book is given a new ISBN.
- Categories are unique. Categories could be: biology, poetry, computer vision etc.

  Write clearly, any other assumptions that you need.

(i) Draw an E-R diagram for the given data. Underline the primary key. Clearly show the cardinality. **[08 marks]**

(ii) Normalize the data upto 3ʳᵈ normal form. Indicate the primary keys and foreign keys. **[12 marks]**

Question 04

(i) and (ii) are based on the Flow chart given in Figure 1. Assume you are going to test the code

(i) What will be the test values for Black box testing ? (mention 4 important values)

[3 marks]

(ii) What will be the test cases for Whte Box testing if all branches are to be covered?

[5 marks]

(iii) Read the following description and draw a relevant class diagram

In a University, Details of students include the registration number and program code, details of staff includes staff id, salary code and department id, Details of both staff and students (person) include NIC no, name, age, address and date of birth.

A department has a department code and one or more staff members. [12 marks]

Index No	

Question 1. (ii). Program 1

```c
#include <stdio.h>
#include <time.h>
#include <stdlib.h>
//---------------------
float ____(____N)
{

    _____

    while_____
    {

        _____
    _____/(float) 4;

    }

}
//---------------------
int main()
{
    srand(time(NULL));

    _____
    _____
    _____

    _____("Enter the number 1, 2, 3 or 4-> ");
    scanf_____
    if_____
    {

        _____

    }
    else if_____
    {

        _____
        _____

    }

    {

        _____
        _____

    }
    else if_____
```

```
    {

        _____

        _____

    }
    printf("m1->_____, m2->_____, return number-> _____",_____);
    return 0;
}
```

Question 1 (iii). Program 2

```
#include <stdio.h>
#include <string.h>
struct _____
{
    char reg_no[8];

        _____

        _____

        _____

        _____

        _____

};
int main()
{

        _____

        _____

        _____

        _____

        _____

        _____

    //--------------------
    printf("Car registration number = _____",c1.reg_no);

        _____

        _____

        _____

        _____

        _____

        _____

        _____

    return 0;
}
```
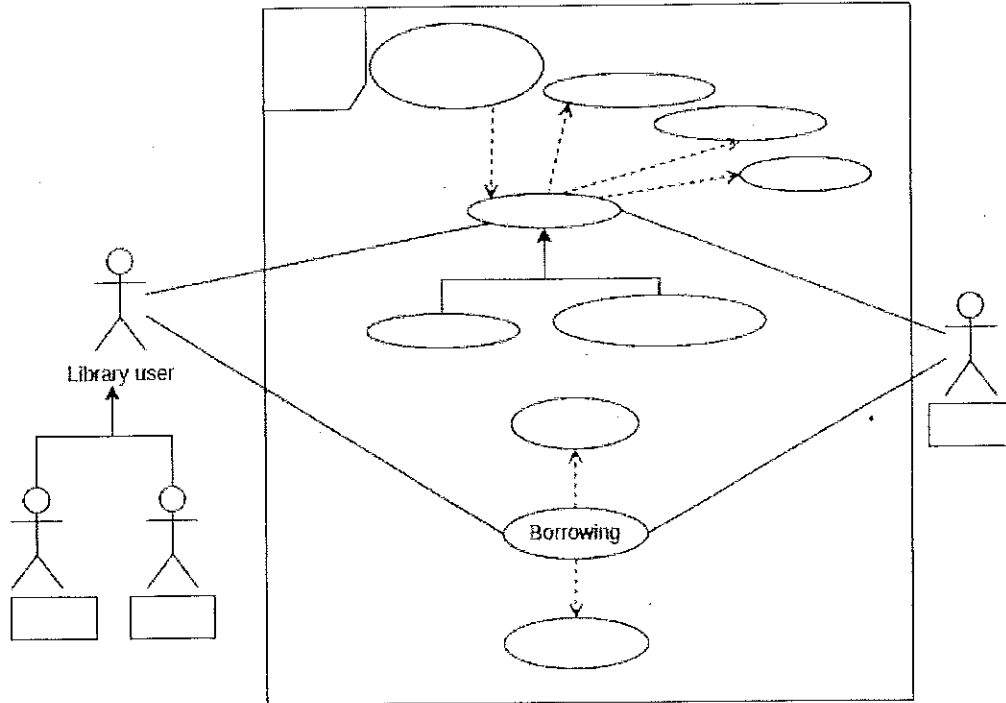
Index No	

Question 2 (i)

figure 2