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

Study Programme	: Bachelor of Technology Honours in Engineering/ Bachelor of Science Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	: EEX3417 Software Development for Engineers
Academic Year	: 2022/2023
Date	: Monday, 19th February 2024
Time	: 13.30 to 16.30 hrs
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of four (4) questions on four (4) 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 .
8. Do not use red colour pens.

Question 01	**40 marks**

i) Draw a flow chart for the following pseudo code. Clearly indicate terminations, control structures, processes, inputs and outputs. **[10 marks]**

```
Set end as char
Set marks as number
end="n"
WHILE end<>"y"
INPUT marks
IF marks>=0 and marks<=100
                marks=marks*.5
        ELSE
                Print enter valid mark
        END IF
        Input end y/n
END WHILE
```

ii) Write a C program for the above pseudo code. **[10 marks]**

iii) The following provided C program is designed to calculate the power of a given number using a custom function. The function name is **power1.** All the variables are **int** type. Write correct answers in blank spaces from (1) to (14) in the answer book.

[10 marks]

```
#_____(1)_____ <stdio.h>

int ____(2)_____(int p,int a)
{
   __(3)__ y=1;
   for(int __(4)_____=1;i<=p;i++)
   {
      y=y*a;
   }
   return ___(5)_____;
}
int main()
{
   __(6)__ x=0;
   __(7)__ e=0;
   __(8)__ pw=0;
   printf("Enter x value ");
   scanf("%d",__(9)___);
   printf("Enter power ");
   scanf("__(10)___",&e);
   pw=____(11)_____(e,x);
   printf("__(12)__ Power of __(13)___ is __(14)___",e,x,pw);
   return 0;
}
```

(iv) This question is based on pointers in a C program. Write program codes for the following description **[5 marks]**

Declare an integer type pointer p1 (use * sign)
Declare an integer type variable "result"
Assign 20 to the variable "result"
Assign the address of the variable to the pointer p1. (use & sign)

(v) Write a C program to initialize an integer array named **myarray** with the length of **10** and enter the number 5 into the 2nd element of the array. **[5 marks]**

Question 02	20 marks

(i) Read the following scenario and draw the object class diagram and their relationships for the scenario, and write suitable attributes for each class. **[10 marks]**

There are five classes named **Bus**, **Car**, **Vehicle**, **Driver**, and **Engine**.
Both **Bus** and **Car** classes inherit from the **Vehicle** class. The attribute of the **vehicle** class is **reg_no** and Methods are **start_engine**() and **stop_engine**(). The attribute of the **bus** class is **no_of_seats**, and the Methods are **load_passengers**() and **unload_passengers**(). The attribute of the **Car** class is the **model**. Methods are **lock_doors**() and **unlock_doors**(). The **Driver** class is not directly related to the **Vehicle** hierarchy, but it interacts with **vehicles** by **drive**() and **stop**() methods. Attributes are **driver_licsence_no** and **name**. A **vehicle** class should have an **engine** class with two methods called **start_engine**() and **stop_engine**(). Attributes are **fuel_type** and **horse_power**.

(ii) Draw a use case diagram for the following description, including name, boundary, use cases, actors and relationships. **[10 marks]**

There are three base use cases in a **food ordering system**: **Order food**, **Payment**, and **Receive order**. A **Customer** can place an **Order food** after selecting from the menu (**select menu**). When ordering food, ordering drinks (**Order drinks**) is optional. After ordering food, the **customer** pays the total **payment** to the **cashier**. **Customer** confirms after receiving food (**receive order**). Customers can track **order status**, but it is optional.

Question 03	20 marks

(i) Answer (a) and (b) using figure 1. **[10 marks]**

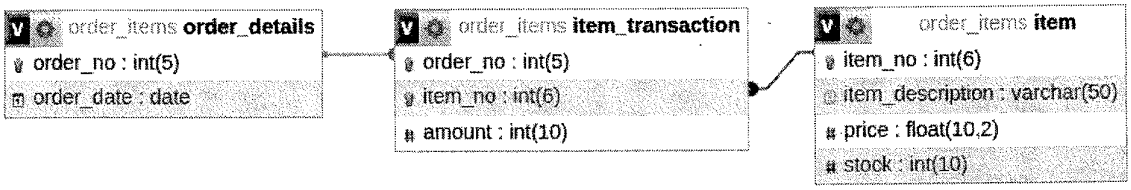


Figure 1: Tables

(a) Draw an ERD for the tables given in Figure 1 with correct relations, entities, attributes and relationships.

(b) Write database name, table names, field names (with data type, length), primary keys and foreign keys for each table.

(ii) Read the following sentences in the description and write whether each sentence belongs to functional or non functional requirements. **[10 marks]**

No	Description
1	Users can browse products and add them to a shopping cart.
2	The interface should be easy to learn and use, even for first-time users.
3	The system should respond to user actions within 2 seconds.
4	Users can create accounts and log in.

Question 04	**20 marks**

(i) Categorize the following software as either *system* software or *application* software **[5 marks]**

No	Software
1	Windows 11
2	Google docs
3	printer driver
4	Adobe Photoshop
5	Norton AntiVirus
6	BIOS

(ii) Write the feasible path and infeasible path in the following C program **[5 marks]**

```
#include <stdio.h>
int main(){
   int a=0;
   scanf("%d",&a);
   if(a>100)
      printf("H");
   else if(a>200)
      printf("H1");
}
```

(iii) Briefly explain what is meant by vulnerability **[5 marks]**

(iv) What are the key benefits of iterative deployments in an agile environment? **[5 marks]**