

University of Ruhuna- Faculty of Technology
Bachelor of Engineering Technology Honours Degree
Level 2 (Semester I) Examination, June/July 2023
Academic year 2021/2022

Course Unit: ENT2142 Object Oriented Programming (Theory)

Duration: 2 hours

-
- This is a closed book examination.
 - This examination consists of four (04) questions that are given equal marks.
 - Answer all four (04) questions.
 - Use C++ programming language for answering questions.

- 1)
- a) List two (02) advantages of using a high-level language as a programming language over a low-level language. (4 marks)
- b) List down the main four (04) features of Object-oriented Programming. Briefly explain each of them. (4 marks)
- c) Briefly explain the terms of 'class' and 'object' used in object-oriented Programming. (4 marks)
- d) Explain the difference between 'private' and 'protected' keywords relevant to OOP. (2 marks)
- e) Write down two classes using C++ for an online bank management system considering the given specifications.
- i) The "Account" class represents a bank account and contains attributes such as the account number, balance, and account holder name. It also includes methods for depositing and withdrawing funds from the account.
- ii) The "Transaction" class represents a specific transaction made on an account. It includes attributes such as the transaction ID, account number, transaction amount, and transaction type.

(11 marks)

2)

a) Explain the function of **friend function**.

(2 marks)

b) Constructors and destructors are special member functions in object-oriented programming languages like C++. Explain the functionality of '**constructors**' and '**destructors**'.

(4 marks)

c) Explain **three (03)** main types of constructors with example code.

(6 marks)

d) Circle class represents a circle shape and the code for the circle class given in Q2.Code 01. It has a private member radius and a constructor to initialize it.

i) Define the calculateArea() function outside the class to calculate the area of the circle and a 'Circle' object can be taken as a parameter.

ii) Declare a friend function inside the circle class.

```
class Circle {  
    private:  
        double radius;  
    public:  
        Circle(double r) {  
            radius = r;  
        }  
};
```

Q2.Code 01

(4 marks)

e) A color-displaying system is part of a simple computer program. Color represents three components: red, green, and blue.

i) Define a class as 'color' and include three components under a private member of the class.

ii) Write down constructors to perform the below-given operations.

(1) Initially color code should be 0:0:0.

(2) At the creation of object, color code should be able to pass as an argument. Take values for the color codes 255, 0, and 0 for the red, green, and blue components respectively.

iii) Create a general function to display color code as RGB-Red:Green:Blue

(9 marks)

3)

- a) Briefly explain the term **Polymorphism** in object-oriented programming. (3 marks)
- b) List down types of **Polymorphism** and describe the functionality. (4 marks)
- c) Write down **two (02)** advantages of using **Inheritance** for programming. (4 marks)
- d) List down **two (02)** types of **inheritance** using block diagrams. (4 marks)
- e) Answer the questions below based on the program in Q3.Code 02 in figure 01.
- Write down the type of Inheritance depicted by the given Q3.code 02 and give clearly base and derived classes.
 - Write the names of all the members (data members and member functions) accessible from member functions of the class: printHouse.
 - Assume that the class printHouse was derived privately from both book and newspaper. Name the functions that could be accessed through objects of class printHouse.

```
class book {
    string name, author;
    int year;

protected:
    float price;

public:
    book();
    void citation();
    void Display_Details(); };

class newspaper {
    string name, publisher;
    int year;

protected:
    int noOfArticles;

public:
    newspaper ();
    void authorsDetails(); };

class printHouse :public book, public newspaper {
    char printHouse_Code[10], printHouse_Name[20];

public:
    printHouse();
    void printHouseOpenHrs();
    void DisplayPrintHouseDetails(); };
```

Figure 01: Q3.Code 02

(10 marks)

4)

- a) Explain **two (02)** key importance of having **Database Management System (DBMS)**.
(4 marks)
- b) List down **three (03)** types of database models and give the most widely used model with reason.
(5 marks)
- c) Write down the **three (03)** types of attributes in the context of databases.
(3 marks)
- d) Explain the functionality of the **foreign key** used in database.
(3 marks)
- e) Assume that a database table named "cars" consists of the following columns(field): CAR_ID, CAR_NAME, BRAND, COLOR, PRICE, and MANUFACTURER_ID.
- i) Select the **primary key** of this table and explain the reason for the selection.
 - ii) Write down a SQL query to create the "cars" table with the primary key field.
 - iii) Write down a SQL query to fetch "CAR_NAME" from the "cars" table.
 - iv) Write down a SQL query to update the price of a car named "Toyota Corolla" to 8,000,000 LKR in the "cars" table.

(10 marks)

.....**End of the paper**.....