BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

BSc HONS DEGREE IN COMPUTER SCIENCE

CS112/SWE201/EEE2203: OBJECT ORIENTED PROGRAMMING I

DURATION: 2 HOURS 30 MINUTES TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES:
The paper consists of Section A (Theory) and Section B (Practical)
Answer **ALL** questions

NOV 2024

SECTION A (40 MARKS)

Question 1

Give a detailed explanation of the following OOP concepts

a. Data encapsulation. [4]
b. Polymorphism. [4]
c. Dynamic binding. [4]
d. Message passing. [4]

Question 2

a. Differentiate parameter passing by reference and by value. [4]
b. Discuss the rules of defining constructors. [6]
c. What is the difference between overloading and overriding in c++? [6]
d. Identify and explain any four(4) features of OOP. [8]

SECTION B (60 MARKS)

Question 3

Write a c++ program to create two classes named Mammal and MarineAnimals.

Create another class named BlueWhale which inherits both the above classes. Create

a function in each of these classes which prints:

"I am mammal", "I am a marine animal" and "I belong to both the categories: Mammals as well as Marine Animals" respectively.

Finally, create an object for each of the above classes and try calling:

a. function of Mammals by the object of Mammal.

b. function of BlueWhale by the object of BlueWhale.

c. function of each of its parent by the object of BlueWhale.

d. function of MarineAnimal by the object of MarineAnimal. **[20]**

Question 4

Write C++ program that models a bank account. The bank account has the following private data members: account number (an integer), account holder name (a string), and account balance (a double). The program should allow the user to deposit money into the account, withdraw money from the account, and display the current balance of the account. To implement the bank account, you will need to create a BankAccount class, and a separate function to handle withdrawals. This function should be declared as a friend of the BankAccount class.

Requirements:

1. Create BankAccount class with private data members: account number, account holder name, and account balance.
2. Implement public member functions to allow the user to deposit and display the account balance.
3. Implement a separate friend function called withdraw() that allows the user to withdraw money from the account. The withdraw() function should be declared as a friend of the BankAccount class so that it can access the private data members of the BankAccount class. The withdraw() function should not allow the account balance to go below zero.

4. The class should have a constructor which takes in as parameters the account number, the account holder name, and the account balance.
5. The program should include a subroutine which prompts the user to deposit, withdraw or display balance until the user chooses to quit. The menu and the collection of the user's selection should be implemented in a subroutine which returns the value of the user's selection. **[20]**

Question 5

Create a superclass SHAPE to store two data members. Derive two concrete classes TRI and RECT from the base class. Add to the base class, a member function **getdata()** to initialize superclass data members and another member function display to calculate and display the area of Tri(Triangle) and Rect(Rectangle) objects. Make **display** a virtual function and redefine this function in the child classes to suit their requirements. Using these three classes design a program that will accept values of a TRI or RECT interactively and display the area. **[20]**

**********END OF PAPER**********