saegis campus

Faculty of Computing and Technology

Department of Computing

Bachelor of Information Technology

BIT Batch 04 – Semester 03

End Examination

Year 2024

BIT 2102 – Object Oriented Programming

Duration: 3 Hours

Instructions to the candidates:

1. **Answer any four questions.**
2. Illustrate your answers with clear diagrams wherever applied.
3. The paper is marked out of 100 Marks.
4. Follow the General Guidelines given by the Department of Examination.

Question 01

A. You are tasked with developing a Java application to manage student records for a university. The application needs to store sensitive information like student names, IDs, GPA, and contact details. Explain how you would use encapsulation principles to design and implement secure and maintainable student data management with a sample Java code.

(10 marks)

B. Define the volatile keyword in Java and explain its primary purpose.

(5 marks)

C. Discuss the two main types of constructors: default constructors and parameterized constructors. Provide examples to illustrate the syntax and usage of each type.

(10 marks)

[Total = 25 marks]

Question 02

A. Explain the concept of abstraction in Java and its purpose in software development.

(5 marks)

B. Differentiate between abstract classes and interfaces in Java. Provide a clear example of each.

(10 marks)

C. You are building a simple shopping list application in Java. The application allows users to add, remove, and view items on their list. Each item has a name and quantity. Describe how you would use a Java Collection Framework class to implement the shopping list functionality. Explain your reasoning for choosing that specific collection.

(10 marks)

[Total = 25 marks]

Question 03

A. Explain the basic principles of inheritance in Java and illustrate the relationship between superclass and subclass.

(5 marks)

B. Explain the concept of nested classes in Java and describe the different types. Provide examples of how each type is used in practice.

(10 marks)

C. You are developing a Java application for a restaurant ordering system. The system needs to represent different menu categories (e.g., Rice, Noodles, and Desserts) and order statuses (e.g., Placed, Preparing, and Delivered). Explain how you would use Enums to represent these categories and statuses. Discuss the advantages of using Enums compared to other approaches with some examples.

(10 marks)

[Total = 25 marks]

Question 04

A. Explain the concept of polymorphism in Java and its relationship to inheritance.

(5 marks)

B. Explain the difference between compile-time polymorphism and runtime polymorphism in Java. Provide examples to illustrate each type.

(10 marks)

C. Briefly explain the throws keyword and its usage.

(5 marks)

D. Explain the difference between try-catch and try-catch-finally blocks.

(5 marks)

[Total = 25 marks]

Question 05

A. Consider a scenario where you need to implement a logging system for a Java application. You want to ensure that only one instance of the Logger class is created throughout the lifetime of the application. Implement the Logger class using a suitable design pattern in Java. Also, provide a brief explanation of how that design pattern ensures only one instance of the class is created and how you would access this instance.

(10 marks)

B. Consider a scenario where you have to implement a multi-threaded Java program to simulate a simple bank account transaction system. The bank account has a balance, and multiple transactions (deposits and withdrawals) may occur concurrently. Implement the BankAccount class with appropriate methods to handle concurrent transactions and ensure thread safety.

(10 marks)

C. Mention five different thread states in Java.

(5 marks)

[Total = 25 marks]

********** End Paper **********