

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

Department of Computer Science and Engineering (CSE)**SEMESTER FINAL EXAMINATION****SUMMER SEMESTER, 2023-2024****DURATION: 2 HOURS****FULL MARKS: 120****SWE 4201: Object Oriented Concepts I****Programmable calculators are not allowed. Do not write anything on the question paper.**

Answer all 4 (four) questions. Figures in the right margin indicate full marks of questions with corresponding COs and POs in parentheses.

1. a) Briefly explain the properties of OOP with simple code examples. 8
(CO1)
(PO1)
- b) Define compile-time polymorphism and run-time polymorphism in Java. State at least three key differences between them. Explain how polymorphism is achieved at compile-time and run-time, providing suitable code examples to illustrate your explanation. 9
(CO1)
(PO1)
- c) Answer the following question - 2 +
8 + 5
(CO1)
(PO1)
 - i. What is enum datatype in java?
 - ii. Write a Java program that defines an enum named Day with values MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, SATURDAY, and SUNDAY. Add a constructor and a method getMessage() that returns a custom message depending on the day (e.g., FRIDAY "Weekend is near!", SUNDAY "Rest day!", others "Work hard!").
 - iii. In the main method of Question 1.c)ii, iterate over all values of the enum using a loop and print each day with its corresponding message.
2. a) Mention three differences between checked and unchecked exceptions in Java with suitable examples for both. How does exception handling improve program reliability? 8
(CO1)
(PO1)
- b) Describe the role of the try-catch-finally block in Java exception handling. How does the finally block ensure resource management (e.g., closing files or database connections)? Write a Java program that demonstrates exception handling for division by zero, including proper use of finally. 10
(CO1)
(PO1)
- c) Table 1 contains some data (student ID, name, marks) saved in student.txt file. The file is located in C:\Users\Username\Documents folder. 3 +
5 + 5
(CO1)
(PO1)

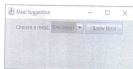
Table 1: A table containing students data for Question 2.c.

ID	Name	Marks
120	Alice	85
132	Bob	78
140	Charlie	92
146	David	64

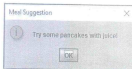
- i. What is the purpose of using the FileReader and FileWriter classes in Java file handling?
- ii. Write a Java program that reads the contents of data.txt, then calculate and print the average score of all students.
- iii. Write a program to add two more students information in student.txt file.

3. a) You are required to develop a Java program that displays meal suggestions based on the time of the day selected by the user. The program should allow the user to choose between three options: Breakfast, Lunch, and Dinner. Depending on the users choice, the program should display one of the following messages: For Breakfast "Try some pancakes with juice!", for Lunch "How about rice with chicken curry?", and for Dinner "Light soup and salad would be perfect!". Figure 1 shows a sample output of the code. Write appropriate program to build the application.

8
(CO3)
(PO3)



(a) First GUI screen



(b) Second GUI screen

Figure 1: Sample output for Question 3.a

- b) What is event handling? Explain in detail how event handling works by discussing the three parts of the event handling mechanism.
- c) Write the approaches of event handling with simple code example.

2 + 9
(CO1)
(PO1)
9
(CO1)
(PO1)

4. Read the description of a HospitalManagement system: the two primary entities are Patient and Doctor. The Doctor class is modeled as an abstract class having the common properties such as name, specialization, and doctorID, representing a general blueprint for all types of doctors in the system. Currently, there are two types of doctor: Surgeon and GeneralPhysician. Surgeon has attributes like surgeryType and successfulSurgeries and include methods performSurgery() for conducting operations. Similarly GeneralPhysician has attributes like clinicHours, patientsPerDay and include methods like prescribeMedicine() or conductCheckup() for routine treatment. Patient has attributes like patientID, medicalHistory and include methods like bookAppointment().

- a) Draw an UML class diagram, with proper details of each class, its properties, methods. Also, mention the relations between different classes.
- b) Write the corresponding java code of the UML diagram of Question 4.a.
- c) Explain the following with an example diagram and corresponding Java code:
- Multilevel inheritance
 - Hierarchical inheritance

10
(CO2)
(PO2)
10
(CO3)
(PO3)
2 x 4.5
(CO1)
(PO1)