CHRIST (Deemed to be University)

Department of Computer Science

Master of Artificial Intelligence and Machine Learning

ETE-Component 4 -Practical Test

Course: MAI271 – JAVA Programming
Date: 06 – 12 – 2024
Duration: 1:30 Hour
Marks: 30

1) Design a system using a Java interface to analyze transaction data for a retail store. The task is to count the number of pairs of item prices from an array arr[] that sum up to a given target value. You are provided with an array of integers representing item prices in a transaction and a target sum. The system must determine how many unique pairs of prices match the target. **(15 Marks)**

Example 1:

- Input: arr[] = {1, 5, 7, -1, 5}, target = 6
- Output: 3 (Pairs: (1, 5), (7, -1), (1, 5))

Example 2:

- Input: arr[] = {2, 4, 3, 5, 6}, target = 8
- Output: 2 (Pairs: (2, 6), (3, 5))

2) Design a multithreaded program simulating a restaurant order management system with two threads: a chef and a waiter. Use a shared queue (maximum size 10) to manage orders. The chef thread picks orders from the queue, simulates preparation (1-3 seconds), and waits if the queue is empty. The waiter thread delivers prepared orders (1-2 seconds) and waits if the queue is empty. Use wait() and notify() for synchronization to ensure smooth operation. The program should process exactly 15 orders and terminate automatically after all are handled. Implement the solution using Runnable interface. **(15 Marks)**

General Instruction:

1. Include descriptive comments within the code, explaining its functionality and logic.

2. Attach a PDF document named "your_register_number_exercise_No.pdf" to the submission.The PDF document should include screenshots of the code and the output screen.