20BCE1707

VIT
Vellore Institute of Technology

Final Assessment Test (FAT) – May 2022

Programme	**B.Tech**	Semester	**Winter Semester 2021-22**
Course Title	**JAVA PROGRAMMING**	Course Code	**CSE1007**
Faculty Name	**Prof. K Pradeep**	Slot	**D2+TD2**
		Class Nbr	**CH2021225000744**
Time	**3 Hours**	Max. Marks	**100**

Part A (7 X 10 Marks)
Answer All questions

1. Generate a square matrix for the given order of matrix. Write a Java program to rotate the matrix elements by one place in Anti-clockwise direction. Provide the option to specify the number of steps needed to rotate. Centre element should stay in the same position. Your program should include separate methods to change the position, rotate and print the matrix elements. **[10]**

2. A nationalized bank maintains its customers' account details using a class *Customer* which includes attributes like Customer name (type char[]), account number (type long), balance (type double), and net banking facility (type bool). The bank allows its customers to create their own e-credit card that can be issued to another customer. This e-card is valid for 24-hours and can be used for any online shopping. The e-card includes the customer name to whom the credit card is issued, account number, the credit limit and valid upto. These data are included in a new class E-Card which inherits the class Customer. When an e-card is issued the balance of the source account (from customer) and destination account (to customer) should be updated accordingly. You may include other necessary constructors, input and output functions in both classes. **[10]**

   Write a main method to test harness the above code.

3. Define an exception handler class that handles the negative balance exception in a bank application. Consider the classes you have created for Question 2. Modify the '*E-Card*' class so that while issuing the e-card, if the balance becomes negative then an exception should be thrown. **[10]**

   Your program should include the main method and display appropriate error message for the invalid transactions.

4. Let's consider a shopping mall which has a huge parking area to accommodate cars and motorcycles. The mall management wants to automate entry and exit of vehicles using a software simulation implementing a parking area. In this application the following things are going to be detected: **[10]**

   a. When a car or motorcycle enters or leaves the parking area, use different counters for car and motorcycles to increment and decrement while going in and out respectively.

   b. An object to store the statistics of the vehicle being parked. Store total number of cars and total number of motorcycles parked.

   c. A mechanism to control cash flow. Each time a car/motorcycle leaves parking area an amount (Rs. 40/20) is added to the total cash.

   Use appropriate classes and methods to implement the above scenario. Create separate threads for each of the above task and ensure that the entry, exit and cash collection methods are *mutually exclusive*.

5. Consider the course registration system where a student can register maximum of 3 courses for week-end semester classes. Create a hashmap 'H1', with 'n' key-value pairs where keys are the names of students and values are the courses registered by them. Create another hashmap 'H2' with 'm' key-value pairs where keys are the names of courses offered for B.Tech and values are the names of faculty handling the courses. [10]

Write appropriate code (i) to add or remove a student from H1, Iterate over the maps and display the key-value pairs stored in them (ii) Given a student name, fetch the names of all faculties who teach him/her. Eg: if the elements of H1 are

Stud Name	Courses Registered
A	Python, Maths, C
B	C, C++
C	C++, Physics, Chemistry

And if the elements of H2 are

Course Name	Faculty
Python	111
Maths	222
C	333
C++	444
Physics	555
Chemistry	666
Digital Electronics	777

For the student — B, faculty should be displayed as 333 and 444.

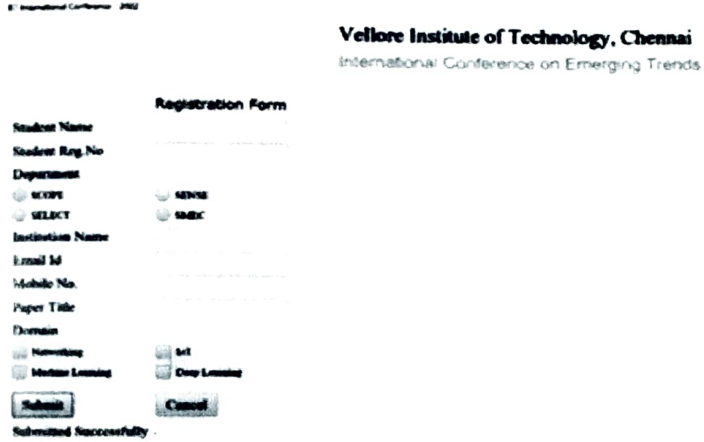
6. Assume that you have an input file, named 'unsortedinput.txt' that contains input in the form: [10]

8-byte non-negative integer, Name (15 Character long), Age (0 - 100). The number of records is unspecified, but assume that it is not more than 1,00,000. Develope a Java program that reads the records from the input file and create an appropriate in-memory linear data structure to hold them (use built-in data structure provided by Java language). Next, the program sorts the records into ascending order, using the 8-byte integer field as the key. Finally, the program write the sorted records into an output file named 'sortedoutput.txt'.

7. Write a JSP that will allow an user to enter two values and then select a type of mathematical operation to apply against them. Upon clicking Submit button, the result of the chosen operation should be displayed. A valid code must have: [10]
   - only one jsp - Math.jsp - that submits to itself with
   - four types of operations - add, subtract, multiply, divide
   - display some kind of error if the user attempts to divide by 0

Part B (2 X 15 Marks)
Answer <u>All</u> questions

8. VIT institution has planned to organize an international conference for the benefit of students. As a part of the student committee, you are asked to design a GUI interface using JavaFX as shown below: [15]



9. Design a Credit Card application using servlet to process the HTTP Request and Response with the following constraints. The web application includes Login and Logout options. Once the user enters into login page, it has option to read login id, password, submit button and clear button. Upon entering the data, validate the data. If it success then display the balance fetched from another table. **[15]**