VIT
Vellore Institute of Technology

Final Assessment Test – June 2023

Course: ITA5004 - Object Oriented Programming using JAVA
Class NBR(s): 0239 / 0268 / 0294 Slot: A2
Time: Three Hours Max. Marks: 100
Faculty Name : Prof. BIMAL KUMAR RAY / Prof. SHYNU P G / Prof. THANGA MARIAPPAN L

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN "OFF" POSITION IS TREATED AS EXAM MALPRACTICE

Answer ALL Questions
(10 X 10 = 100 Marks)

1. Implement a class for a "Book". Book contains a title (a String), a list of authors (array of authors), number of pages (an integer), price (floating point number), publisher (a String) etc. Write suitable constructor and accessor/modifier methods. Implement a class for "Library". A library contains a list of books (array of Book). Write add (to add a book) and remove (to delete a book) methods for library. Write a main () function to create a "Library" and add five "Book" to library. Print the total price of all books.

2. Design and develop inheritance for a given case study, identify objects and relationships and implement inheritance wherever applicable. Employee class has Emp_name, Emp_id, Address, Mail_id, and Mobile_no as members. Inherit the classes: Programmer, Team Lead, Assistant Project Manager and Project Manager from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club fund. Generate pay slips for the employees with their gross and net salary.

3. Explain the following object oriented concepts with proper example.
   a) Abstract classes and Interfaces [5]
   b) Package [5]

4. A student portal provides option for user to register their profile. During the Registration process your program needs to validate that the user should reside in India. If not the system should throw an exception.

Step 1: Create a user defined exception class named "InvalidCountryException".

Step 2: Overload the respective constructors.

Step 3: Create a main class "UserRegistration", add the following method, registerUser– The parameters are String username,String userCountry and add the following logic.

- if userCountry is not equal to "India" throw a InvalidCountryException with the message "User Outside India cannot be registered"
- if userCountry is equal to "India", print the message "User registration done successfully"

Invoke the method registerUser from the main method with the data specified and see how the program behaves,

Name Country Expected Output

Mickey US InvalidCountryException should be thrown.

The message should be "User Outside India cannot be registered"

Mini India The message should be "User registration done successfully"

5. There is one queue of 'n' capacity. This queue is shared between producer and consumer. 'n' is the capacity and for this blog, I will take n = 5.

   Producer adds a block to the queue when queue size is less than its capacity. Consumer will consume from the same queue when queue size is greater than 0. Write a multithreaded Java program with Thread synchronization to implement the above scenario.

6. Create an application that draws a simple stick figure person that looks something like the following figure:

- You should have three buttons: Dress, Hair and Shoes. Associated with the Dress button is a window that has four buttons, one for each of the colors red, green, blue and orange. Pressing one of these buttons will change the color of the dress.
- Similarly, the Hair button is associated with a window that has three buttons, one for each of the colors black, gray and pink.
- And the Shoes button is associated with a window that has three buttons, one for each of the colors red, yellow and blue.

When the application starts, create the windows for the Dress, Hair and Shoes buttons and make these windows invisible. Pressing a button will make the correct window visible. If the window is closed, just make it invisible.

7. Implement a program for maintaining a database of student records using Files. Student has Student_id, name, Roll_no, Class, marks and address. Display the data for few students.

   a) Create Database
   b) Display Database
   c) Delete Records
   d) Update Record
   e) Search Record

8. Write a program to insert 20 random integers from the range between 20 and 200 in order into a LinkedList object, next create a second LinkedList object containing a copy of the first list but in sorted order, then calculate the sum of the elements and the floating-point average of the elements.

9. Write a Java interface that accepts a set of numbers and sorts it. Write a server program to implement it. Now create a client process that sends a set of numbers to the server process through Java RMI technology. Server process in turn sorts the numbers. Client process then prints the set of numbers in sorted order.

10. Develop basic attendance management system using GUI with all possible concepts to help the students manage their attendance and provide the following features:

    a) Tracking total lectures and days missed.
    b) Calculating the attendance in percentage.
    c) Display warning message if attendance doesn't fulfil attendance criteria.
    d) Calculate and display number of classes to be attended to fulfil attendance criteria.

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