



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

**Answer ALL Questions**

**(10 X 10 = 100 Marks)**

1. Create a package by name "NumberPackage". Create a class by name Number with an instance variable – n (int). The class should have a parameterized constructor to initialize the value of 'n'.

Create a class by name SpyNumber within the package. The class should inherit the class Number. The class should have a parameterized constructor that invokes the base class constructor to initialize the value of 'n' and a method isSpyNumber() that checks if the number 'n' is a spy number or not and accordingly return a boolean value. A positive integer is called a spy number if the **sum** and **product** of its digits are equal. Example: 1124 is a spy number as  $1+1+2+4 = 8$  and similarly  $1*1*2*4 = 8$ .

Create a main class that test the above classes. The main class should be defined outside the package.

2. The Office of SpoRIC, VIT wishes to obtain expertise of Faculty members for executing Consultancy Projects. Let's help SpoRIC office to automate the process. Create a class called FacultyExpertise with instance members – Employee ID, Name, Name of the School/Centre, Expertise (Area of specialization), Previous Experience in Industry Projects and Willingness to execute consultancy projects (yes/no). Include a parameterized constructor to initialize the instance members of the class.

Create 'n' objects of this class and write them to a file. Deserialize the same file to read those objects from the file and display only the details of faculties whose expertise include either or both of the following strings "AI / Machine Learning" and Willingness to execute consultancy project is "yes".

3. The time table team of SCORE wishes to obtain the course preferences from faculties for handling a course in Winter Semester. To assist them, let's create a class by name FacultyCoursePreference with the instance members – employee id, name and a string array of size 5 to hold list of courses preferred. The class

should have a parameterized constructor to initialize the instance members and a display method.

Create a main class that reads input values for the employee id, name and list of 5 courses (store it in a string array). If the string array that holds the list of courses have any duplicate values, raise a user-defined exception by name

"CourseRepeatedException". Else create an object of type

FacultyCoursePreference and display back the details.

4. The management of VIT wishes to issue service awards to 1300 employees who have completed more than 10 years of service at VIT. On the day of the service award the management also wishes to serve lunch for them. Assume a 2D string array holds the employee id and their food preference (Veg/Non-Veg). Write a multithreaded program to determine the total count of employees who preferred for Veg and Non-Veg respectively so that the management can take appropriate measures. Create 2 threads and distribute the array to both the threads equally so that each thread determines the count of employees who preferred Veg and Non-Veg respectively. The main() thread has to wait until both the threads complete their task and then arrive at the final count of employees who preferred Veg and the final count of employees who preferred Non-Veg based on the values returned by both the threads.

5. A common place to buy candy is from a machine. The machine sells candies, chips, gum, and cookies. You have been asked to design a user interface for this candy machine using JavaFX with required event handling mechanism.

a) Show the customer the different items sold by the candy machine. Use the controls check box for an item and label for the price of an item.

b) Let the customer make the selection of items and give the required quantity in text field.

c) Show the customer the price of the item selected in non-editable text field.

d) Show the customer the total cost to pay when by click the "Bill" button.

6. Develop a JAVAFX with JDBC application for the scenario of Question. No. 5. Consider the table "CANDY MACHINE" with the field names of "ITEM", "STOCK", and "PRICE" with required records.

Write the code for the below statements only:

Add the "START" button in an interface. Write the event handling mechanism, when click the "START" button, program should read the records from the database. If the stock of the item is greater than 1000, then Item and price of the item controls are visible for the customer to select and see the price of the item. For example, if the stock of the item 'cookies' is 1300, then 'cookies' checkbox is visible to select and 'cookiesprice' label displays the price of the item 2.

Develop the simple email application using JSP. Design the interface to enter the details of email id, first name and last name.

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8. What is Interceptor in struts2? List the usages of default interceptors in Struts2.
9. Explain the persistence class in hibernate. The employee class which contains id, first name, last name and salary as fields. Here, id is the primary key. Write the recommended class, table and mapping file to be persisted the employee class in Hibernate.
10. Write a socket based java server program that responds to client messages as follows: When it receives a message from a client, It simply converts that message into all uppercase letters and sends back the same to the client. Write both the client and server program to demonstrate this.

