



Answer ALL Questions (5 * 10 = 50 Marks)

1. VIT PAT Office has shortlisted merit students from B.Tech 2016 batch, possessing programming skill in Java for an internship in a partner university abroad. Create a class 'StudentDetails' with instance members – Register Number, Name, Mobile Number, Aadhar Number and Passport Number. Write a program to read the details of the student and validate the Aadhar Number and Passport Number.

A valid Aadhar Number has 14 characters, where the first 4 characters are digits followed by a space, the next 4 characters are digits followed by a space and the last 4 characters are digits. Example – 1234 5678 9123. If the Aadhar number read is not valid throw an user-defined exception "InvalidAadharNumberException".

A valid Passport Number has 8 characters, where the first character is an uppercase alphabet followed by 7 digits. Example – R9719502. If the Passport Number read does not meet the above criteria throw an user-defined exception "InvalidPassportNumberException".

Write a main class that creates an object of type StudentDetails only when the input details are valid. (10)

2. Your Java faculty evaluates Digital Assignment-I and stores the count of students who have scored 1 mark, 2marks and so on, as follows.

Marks (x_i)	1	2	3	4	5	6	7	8	9	10
Student Count (f_i)	3	4	16	9	11	8	4	6	5	2

She/He wants to calculate the mean of the distribution given by

$$\text{Mean} = \frac{\sum_{i=1}^n f_i x_i}{\sum_{i=1}^n f_i}$$

Assist her/him in completing this task by spawning two threads out of which one works for calculating $\sum_{i=1}^n f_i x_i$ and the other for calculating $\sum_{i=1}^n f_i$. The main thread should calculate mean of the marks. (10)

3. A company desires to shortlist suitable candidates for a particular job vacancy under sports quota. Create a class by name ApplicantDetails with the attributes – Name, Age, Address, Programme, CGPA, University Name, Game Name, a boolean variable 'RepresentedCountry' to hold true or false to indicate whether or not the applicant has represented the country in an international championship, a boolean variable 'RepresentedState' to hold true or false to indicate whether or not the applicant has represented the state in a national championship, an integer variable 'RepresentedStatePosition' to hold the position obtained (1st, 2nd or 3rd) if 'RepresentedState' is true else initialize it to 0 and a string variable to hold the game name if 'RepresentedCountry' or 'RepresentedState' is true else initialize it to null.

Create an array of 'n' objects of this class and write them to a file. Read these objects from the file and display only the details of the applicants matching the following eligibility criteria.

- If the CGPA is greater than 5.0 and the person has represented the country in an international championship, he is eligible for the job.
- Or, if the CGPA is greater than 5.0 and the person has represented the state in a national championship and obtained at least 3rd position, he is eligible for the job. (10)

4. Create two Hashmaps – one for storing the courses registered by B.Tech students in the current semester and the faculty who handles the course as key-value pairs and the other Hashmap for storing the class time and the course to be handled at that time as key-value pairs. Eg., 8AM=> Maths, 9AM=>Java, 10AM=>OOSE and so on. Write the code to
- add or remove a course from the first Hashmap
 - iterate over the maps and display the key-value pairs stored in them
 - Given a particular timing, display the name of the faculty who will be handling the class at that time.
- (10)

5. a) Write a generic function MinMax that takes an array as an argument and displays the maximum and minimum element. Write a main method that invokes the above method for Integer and Float types.
- (5)

- b) Write the output of the following code snippet when executed with "java Test".
- (1)

```
class Test
{
    public static void main(String[] args)
    {
        int a = args.length; int b = 20;
        try
        {
            double c = b/a;
        }
        catch(ArithmeticException e)
        {
            e.printStackTrace();
            c = 0;
        }
        System.out.println(c);
    }
}
```

- c) Will the following program compile successfully? Justify your answer.
- (1)

```
class Test implements Runnable
{
    public void run()
    {
        for(int i=1;i<=5;i++)
        {
            System.out.println("The current value = "+ i);
            Thread.sleep(1000);
        }
    }
}
```

- d) Write a program to read the name of a person in the form First Middle Last. Using the method of PrintWriter print the name in form Last, First M. where 'M' is the person's middle initial. (3)
- Example: Input – William Jefferson Clinton
Output – Clinton, William J.