Answer 6 questions taking at least 1 from each group.

(Read Question no 8 before answering Group A)

Group A

1. Define a class named `PrimeNumbers` with the following description:

Instance variables/data members:

- `int start` – To store the start value
- `int end` – To store the end value

Member methods:

- `PrimeNumbers()` – Default Constructor.
- `void setRange( )` – To input and store the `start` and end.
- `boolean isPrime(int)` – To check whether a number is Prime or not.
- `void printList()` – To display all the prime numbers between `start` and end.

Write a main method to use the object the class `PrimeNumbers` to print prime number between a given ranges.

2. Define a class named `StudentMarksheet` with the following description:

Instance variables/data members:

- `int roll` – To store roll no
- `String name` – To store name
- `int math` – to store marks of maths out of 100
- `int phy` – to store marks of physics out of 100
- `int comp` – to store marks of computers out of 100
- `int total` – to store total marks out of 300
- `double avg` – to storage average marks for the student
- `String grade` – to store the grade of the student. (Formula can be taken from your previous semester marksheet.)

Member methods:

- `StudentMarksheet()` – Default Constructor.
- StudentMarksheet(int r, String n, int m, int p, int c) – Parameterised constructor.
- `void setStudentDetails( )` – To input and store the `roll, name, math, phy` and cmp.
- `boolean isValid(int m, int p, int c)` – To check whether `math`, phy and `comp` marks are valid or not.
- `void generateMarksheet()` – To calculate `total`, average and generate grade of the student.
- Void `printMarksheet()` – Print the details of the student after generating marksheet.

Write a main method to use the object the class `StudentMarksheet` to print marksheet of N number of students. N should be a user input.

Group B

3. Write a program in Java to input a sentence from user. Find the word that has maximum number of vowels in it. Also prepare a table to report the number of vowels in each word.
4. Write a program in Java to input N strings into a String array and sort them in dictionary order.

Group C

5. Create a class named `'Member'` having the following members:
   Data members
   1 – Name
   2 – Age
   3 - Phone number
   4 – Address
   5 – Salary
   It also has a method named `'printSalary'` which prints the salary of the members. Two classes `'Employee'` and `'Manager'` inherits the `'Member'` class. The `'Employee'` and `'Manager'` classes have data members `'specialization'` and `'department'` respectively. Now, assign name, age, phone number, address and salary to an employee and a manager by making an object of both of these classes and print the same.

6. Create a Java program to demonstrate multiple inheritance is possible in java through interfaces.

Group D

7. There are two files called 'Country.txt' and 'Capital.txt'. 'Country.txt' has 10 country names in each line and 'Capital.txt' has corresponding capitals in each lines. Write a JAVA program to create a file named 'CountryCapitals.txt' by concatenating the contents from both files. For each entry in 'County.txt' and 'Capital.txt' add an entry in 'CountryCapitals.txt' saying "The Capital of Country1 is Captial1". Display the content of the 'CountryCapital.txt file'.

8. Extend the class in Question no 2 and Write the details of the students into file named 'StudentMarksheet.txt'. After writing all students'' details display the content of 'StudnetMarksheet.txt'.

Group E

9. Write a Java program to create a custom exception to validate Roll number format of a student according to your admit card. Test your Custom Exception class.

10. Write a Java program to input principal, time and interest rate as command line argument and find the interest. Give user 2nd change to enter the values of principal, time and interest if values are not passed as command line arguments.

Group F

11. Write a Java program to generate 3 simultaneous threads.

12. Write a Java program to create a progress bar using thread that propagates from 0% to 100% in steps of 10%.