 # SECTION B

Question 1 [15]

Define a class with the following specifications:

Class name: Restaurant

Member variables:

- double **billAmount** – stores the basic bill amount

- double **discoun**t – stores the discount percentage

- double **gst** – stores GST (18% fixed)

- double **serviceCharge** – stores service charge (5% fixed)

- double **finalAmount** – stores the final amount after all calculations

Member methods:

void accept() – input value for billAmount using Scanner class methods only.

void calculateBill() – calculate the final amount based on the following conditions:

Bill Range	Discount
Below 1000	5%
1000 - 3000	12%
Above 3000	18%

Note:

1. First apply discount

2. Then add service charge on discounted amount

3. Finally add GST on the above amount

void display() – display the details in the given format:

Basic Amount Discount Service Charge GST Final Amount

xxxx.xx xxx.xx xxx.xx xxx.xx xxxx.xx

Write the **main()** method to create an object and call the above methods.

Question 2 [15]

Define a class to implement Binary Search in a sorted array of decimal numbers. The program should:

1. Accept an array of decimal numbers

2. Sort them in ascending order using any sorting technique

3. Accept a search value

4. Implement binary search to find the value

5. Display "Found at position x" or "Not Found" .

Array values: 4.5, 8.9, 12.5, 15.7, 18.2, 22.4, 26.7, 28.9, 32.1, 37.8

Question 3 [15]

Define a class to check if a number is a TWISTED PRIME number. A number is TWISTED PRIME if:

1. The number itself is prime

2. When the number is rotated 180 degrees (6 becomes 9, 9 becomes 6, 0 becomes 0, 1 becomes 1, 8 becomes 8), the new number is also prime

3. Only digits 0, 1, 6, 8, 9 should be used in the number

Example1:

Input: 619

Output: TWISTED PRIME number [619 is prime, when rotated becomes 916 which is also prime]

Example2:

Input: 916

Output: TWISTED PRIME number [916 is prime, when rotated becomes 619 which is also prime]

Example3:

Input: 681

Output: Not a TWISTED PRIME number [681 is not prime]

[Understanding/Application]

Question 4 [15]

Define a class to accept values into 4x4 array and perform the following:

1. Calculate and display the sum of the border elements

2. Calculate and display the sum of inner matrix (2x2)

3. Find the difference between these sums

4. Check if the difference is a perfect square

Example:

A[][] = {{1,2,3,4},

{5,6,7,8},

{9,10,11,12},

{13,14,15,16}}

Output:

Border sum = 1+2+3+4+8+12+16+15+14+13+9+5 = 102

Inner sum = 6+7+10+11 = 34

Difference = 68 (Not a perfect square)

Question 5 [15]

Define a class to overload the method process() as follows:

void process(String str) - Convert the string to a number where each letter is replaced by its position in alphabet (A=1, B=2, etc) and check if the number is prime

void process(String str1, String str2) - Check if strings are anagrams after removing all spaces and special characters

void process(String str, char ch) - Replace all vowels with the given character and display frequency of each consonant in the modified string

Question 6 [15]

Define a class to accept a number and check if it's a COLORFUL number. A number is COLORFUL if all the products of consecutive digits in all possible combinations are different.

Example1:

Input: 236

Output: COLORFUL number

Explanation:

Single digits: 2, 3, 6

Double digits products: 2x3=6, 3x6=18

Complete number product: 2x3x6=36

All products (2,3,6,6,18,36) are different

Example2:

Input: 224

Output: Not a COLORFUL number

Explanation: Products have repetition (2,2,4,4,8,16)

[Understanding/Application]