SAVEETHA SCHOOL OF ENGINEERING

SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES

INSTITUTE OF PLACEMENT AND TRAINING

CSA09 –JAVA PROGRAMMING

1. Write a program to count all the prime and composite numbers entered by the user.

   Sample Input:

   Enter the numbers

   4
   54
   29
   71
   7
   59
   98
   23

   Sample Output:

   Composite number:3
   Prime number:5

   Test cases:

   1. 33, 41, 52, 61, 73, 90
   2. TEN, FIFTY, SIXTY-ONE, SEVENTY-SEVEN, NINE
   3. 45, 87, 09, 5.0 , 2.3, 0.4
   4. -54, -76, -97, -23, -33, -98
   5. 45, 73, 00, 50, 67, 44

2. Find the M^{th} maximum number and N^{th} minimum number in an array and then find the sum of it and difference of it.

   Sample Input:

   Array of elements = {14, 16, 87, 36, 25, 89, 34}
   M = 1
   N = 3

   Sample Output:

   1^{st}Maximum Number = 89
   3^{rd}Minimum Number = 25
   Sum = 114
   Difference = 64

   Test cases:

   1. {16, 16, 16 16, 16}, M = 0, N = 1
   2. {0, 0, 0, 0}, M = 1, N = 2
   3. {-12, -78, -35, -42, -85}, M = 3 , N = 3
   4. {15, 19, 34, 56, 12}, M = 6 , N = 3
   5. {85, 45, 65, 75, 95}, M = 5 , N = 7

3. Write a program to print the total amount available in the ATM machine with the conditions applied. Total denominations are 2000, 500, 200, 100, get the denomination priority from the user and the total number of notes from the user to display the total available balance to the user

   Sample Input:

   Enter the 1^{st} Denomination: 500
   Enter the 1^{st} Denomination number of notes: 4
   Enter the 2^{nd} Denomination: 100

Enter the 2nd Denomination number of notes: 20
Enter the 3rd Denomination: 200
Enter the 3rd Denomination number of notes: 32
Enter the 4th Denomination: 2000
Enter the 4th Denomination number of notes: 1
Sample Output:
Total Available Balance in ATM: 12400

Test Cases:
3 Hidden Test cases (Think Accordingly based on Denominations)

4. Write a program using choice to check
   Case 1: Given string is palindrome or not
   Case 2: Given number is palindrome or not
   Sample Input:
   Case = 1
   String = MADAM
   Sample Output:
   Palindrome
   Test cases:
   1. MONEY
   2. 5678765
   3. MALAY12321ALAM
   4. MALAYALAM
   5. 1234. 4321

5. Write a program to convert Decimal number equivalent to Binary number and octal numbers?
   Sample Input:
   Decimal Number: 15
   Sample Output:
   Binary Number = 1111
   Octal = 17
   Test cases:
   1. 111
   2. 15. 2
   3. 0
   4. B12
   5. 1A. 2

6. In an organization they decide to give bonus to all the employees on New Year. A 5% bonus on salary is given to the grade A workers and 10% bonus on salary to the grade B workers. Write a program to enter the salary and grade of the employee. If the salary of the employee is less than $10, 000 then the employee gets an extra 2% bonus on salary Calculate the bonus that has to be given to the employee and print the salary that the employee will get.
   Sample Input & Output:

Enter the grade of the employee: B
Enter the employee salary: 50000
Salary=50000
Bonus=5000.0
Total to be paid:55000.0

Test cases:

1. Enter the grade of the employee: A
   Enter the employee salary: 8000
2. Enter the grade of the employee: C
   Enter the employee salary: 60000
3. Enter the grade of the employee: B
   Enter the employee salary: 0
4. Enter the grade of the employee: 38000
   Enter the employee salary: A
5. Enter the grade of the employee: B
   Enter the employee salary: -8000

7. Write a program to print the first n perfect numbers. (Hint Perfect number means **a positive integer that is equal to the sum of its proper divisors)**

   Sample Input:
   N = 3
   Sample Output:
   First 3 perfect numbers are: 6 , 28 , 496
   Test Cases:
   1. N = 0
   2. N = 5
   3. N = -2
   4. N = -5
   5. N = 0.2

8. Write a program to enter the marks of a student in four subjects. Then calculate the total and aggregate, display the grade obtained by the student. If the student scores an aggregate greater than 75%, then the grade is Distinction. If aggregate is 60>= and <75, then the grade is First Division. If aggregate is 50 >= and <60, then the grade is Second Division. If aggregate is 40>= and <50, then the grade is Third Division. Else the grade is Fail.

   Sample Input & Output:
   Enter the marks in python: 90
   Enter the marks in c programming: 91
   Enter the marks in Mathematics: 92
   Enter the marks in Physics: 93
   Total= 366
   Aggregate = 91.5
   DISTINCTION

   Test cases:

   a) 18, 76, 93, 65

b) 73, 78, 79, 75
c) 98, 106, 120, 95
d) 96, 73, -85, 95
e) 78, 59. 8, 76, 79

9. Write a program to read the numbers until -1 is encountered. Find the average of positive numbers and negative numbers entered by user.

Sample Input:

Enter -1 to exit...
Enter the number: 7
Enter the number: -2
Enter the number: 9
Enter the number: -8
Enter the number: -6
Enter the number: -4
Enter the number: 10
Enter the number: -1

Sample Output:

The average of negative numbers is: -5. 0
The average of positive numbers is : 8. 66666667

Test cases:

1. -1, 43, -87, -29, 1, -9
2. 73, 7-6, 2, 10, 28, -1
3. -5, -9, -46, 2, 5, 0
4. 9, 11, -5, 6, 0, -1
5. -1, -1, -1, -1, -1

10. Write a program to read a character until a * is encountered. Also count the number of uppercase, lowercase, and numbers entered by the users.

Sample Input:
Enter * to exit...
Enter any character: W
Enter any character: d
Enter any character: A
Enter any character: G
Enter any character: g
Enter any character: H
Enter any character: *
Sample Output:
Total count of lower case:2
Total count of upper case:4
Total count of numbers =0
Test cases:

1. 1, 7, 6, 9, 5
2. S, Q, I, K, 7, j, M

3. M, j, L, &, @, G
4. D, K, I, 6, L, *
5. *, K, A, e, 1, 8, %, *

11. Write a program to calculate the factorial of number using recursive function.

Sample Input & Output:

Enter the value of n: 6

Sample Input & Output:

The factorial of 6 is: 720

Test cases:

1. N = 0
2. N = -5
3. N = 1
4. N = M
5. N = %

12. Write a Program to Find the Nth Largest Number in a array.

Sample Input:

List : {14, 67, 48, 23, 5, 62}

N = 4

Sample Output:

4th Largest number: 23

Test cases:

1. N = 0
2. N = -5
3. N = 1
4. N = M
5. N = %

13. Write a program to convert the Binary to Decimal, Octal

Sample Input:

Given Number: 1101

Sample Output:

Decimal Number: 13

Octal:15

Test cases:

1. 211
2. 11011
3. 22122
4. 111011. 011
5. 1010. 0101

14. Write a program to find the number of special characters in the given statement

Sample Input:

Given statement: Modi Birthday @ September 17, #&$% is the wishes code for him.

Sample Output:
Number of special Characters: 5

15. Write a Program to Remove the Duplicate Items from a array.
    Sample Input:
        Enter the number of elements in array:7
        Enter element1:10
        Enter element2:20
        Enter element3:20
        Enter element4:30
        Enter element5:40
        Enter element6:40
        Enter element7:50
    Sample Output:
        Non-duplicate items:
        [10, 20, 30, 40, 50]

16. Bank is a class that provides method to get the rate of interest. But, rate of interest may differ according to banks. For example, SBI, ICICI and AXIS banks are providing 8.4%, 7.3% and 9.7% rate of interest. Write a Java program for above scenario.
    Sample Input SBI, 8.4
    Sample Output
    Test case
    1. SBI, 8.3
    2. ICICI, 7.3
    3. AXIS, 9.7
    4. SBI, 8.6
    5. AXIX, 7.6

17. Bring out the situation in which member names of a subclass hide members by the same name in the super class. How it can be resolved? Write Suitable code in Java and
    Implement above scenario with the Parametrized Constructor (accept int type parameter) of the Super Class can be called from Sub Class Using super () and display the input values provided.

    Sample Input : 100, 200
    Sample Output : 100, 200
        Test Cases
        1. 10, 20
        2. -20, -30
        3. 0, 0
        4. EIGHT FIVE
        5. 10.57, 12.58

18. Display Multiplication table for 5 and 10 using various stages of life cycle of the thread by generating a suitable code in Java.
    Sample Input 5, 10

5 X 1 = 5
5 X 2 =10
....
10 X 1 =10
10 X 2 = 20
....
Test Cases:
1. 10, 20
2. -10, -30
3. 0, 0
4. SIX, SIX
5. 9.8, 9.6

19. Using the concepts of thread with implementing Runnable interface in Java to generate Fibonacci series.
    Sample Input : 5
    Sample Output : 0 1 1 2 3 .... .
    Test Cases
    1. 7
    2. -10
    3. 0
    4. EIGHT FIVE
    5. 12.65
20. Generate a Java code to find the sum of N numbers using array and throw ArrayIndexOutOfBoundsException when the loop variable beyond the size N.
    Sample Input : 5
    1 2 3 4 5
    Sample Output : 15
    Test Cases
    1. 4, 10
    2. -10
    3. 0
    4. EIGHT SEVEN
    5. 12.68

21. Using the concepts of thread with implementing Runnable interface in Java to find whether a given number is prime or not.
    Sample Input : 5
    Sample Output : 5 is Prime

    Sample Output : 15
    Test Cases
    1. 4
    2. -10
    3. 0
    4. EIGHT SEVEN

5. 11. 48

22. Generate a Java code to handle Exceptions such as Arithmetic Exception, ArrayIndexOutOfBoundsException, NullPointerException using Multi-Catch Statements.

23. Generate a Java Code to Write and Read the string "Computer Science and Engineering" using FileWriter and FileReader Class.

24. Create a java program to construct the volume of Box using default constructor method.

25. Accept the string "Welcome to Saveetha university" from the user and perform the following operations by writing a suitable Java code.
    i) Replace any word in the given String
    ii) Find the length
    iii) Uppercase Conversion

26. Create a HashTable to maintain a bank detail which includes Account number and Customer name. Let Account number be the key in the HashTable. Write a Java program to implement the following operations in the HashTable
    i) Add 3 records
    ii) Display the size of HashTable
    iii) Clear the HashTable

27. Create a employee record using map interface and do the following operations.
    i. Add object iii. Remove specified object
    ii. isEmpty or not iv. Clear

28. Create a simple generics class with type parameters for sorting values of different types.

29. Develop a Java code to insert the following elements, using ListIterator to append + symbol in each element and print them in reverse order. {C, A, E, B, D, F}.

30. Generate a Java code to perform simple arithmetic operations and to throw Arithmetic Exception for Division-by-Zero.

31. Write a Java program to create three threads in parallel and display the natural numbers in orders using sleep() method.

32. If n = 8, then array 'a' will have 7 elements in the range from 1 to 8. For example {1, 4, 5, 3, 7, 8, 6}. One number will be missing in 'a' (2 in this case). Write a source code to find out that missing number

33. Create a class with a method that prints "This is parent class" and its subclass with another method that prints "This is child class". Now, create an object for each of the class and call
    1 - method of parent class by object of parent class
    2 - method of child class by object of child class
    3 - method of parent class by object of child class

34. Write a Java program to create a class Student and create constructor which assigns the values for the student details such as student name, register number, and five subject marks. Calculate the total and average of five subject marks and display the marks and average.

35. Generate a code to Count the Number of Words, Character and Lines from the File using Stream I/O in Java.

36. Generate a code to non-negative integer's num1 and num2 represented as strings; return the product of num1 and num2, also represented as a string.

37. Implement pow(x, n), which calculates x raised to the power n
    Input: x = 2.00000, n = 10
    Output: 1024.00000

38. Given an integer array nums, find the subarray with the largest sum, and return its sum. Input: nums = [-2, 1, -3, 4, -1, 2, 1, -5, 4]
    Output: 6
    Explanation: The subarray [4, -1, 2, 1] has the largest sum 6.

39. There is an exam room with n seats in a single row labeled from 0 to n - 1. When a student enters the room, they must sit in the seat that maximizes the distance to the closest person. If there are multiple such seats, they sit in the seat with the lowest number. If no one is in the room, then the student sits at seat number 0. Design a class that simulates the mentioned exam room. Implement the ExamRoom class: ExamRoom (int n) Initializes the object of the exam room with the number of the seats n. int seat () Returns the label of the seat at which the next student will set. Void leave (int p) indicates that the student sitting at seat p will leave the room. It is guaranteed that there will be a student sitting at seat p.
    Input["ExamRoom", "seat", "seat", "seat", "seat", "leave", "seat"]
    [[10], [], [], [], [], [4], []]
    Output
    [null, 0, 9, 4, 2, null, 5]

40. You have n tiles, where each tile has one letter tiles[i] printed on it. Return the number of possible non-empty sequences of letters you can make using the letters printed on those tiles.

Input: tiles = "AAB"

Output: 8

Explanation: The possible sequences are "A", "B", "AA", "AB", "BA", "AAB", "ABA", "BAA".