ADS DAY 1 Questions & Lab work

1) What do you mean by Data Structures?

2) Define The Goals Of Data Structure?

3) What is the Need of DS

4) List out the areas in which data structures are applied extensively(real time examples)?

5) List different types of data structures.

6) What Does Abstract Data Type Mean?

7) What is Recursion?

8) List and Explain types of Recursion

9) Explain the data structures used to perform recursion?

10)List the examples where recursion is used

11)Explain the difference between Recursion and Iteration, justify which to use when,Tail recursion?

12)Difference between Primitive and Non Primitive DS

13)Difference between Linear and Non Linear DS

14)What are different characterstics of an Algorithm?types of Algorithm.

15)State Advantages and Dis advantages of Recursion.

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Lab Questions :

1. Write a program to print a series of numbers with recursive Java methods
2. Write a program to sum a series of numbers with Java recursion
3. Write a program to calculate a factorial in Java with recursion
4. Write a program to print the Fibonacci series with Java and recursion
5.Write a program to implement a recursive Java palindrome checker

Problem 1

Recursive program to find the Sum of the series 1 – 1/2 + 1/3 – 1/4 … 1/N
Given a positive integer N, the task is to find the sum of the series 1 – (1/2) + (1/3) – (1/4) +…. (1/N) using recursion.

Examples:

Input: N = 3
Output: 0.8333333333333333
Explanation:
1 – (1/2) + (1/3) = 0.8333333333333333

Input: N = 4
Output: 0.5833333333333333
Explanation:
1- (1/2) + (1/3) – (1/4) = 0.5833333333333333

Problem 2

Recursive Program to print multiplication table of a number
Given a number N, the task is to print its multiplication table using recursion.
Examples

Input: N = 5
Output:
5 * 1 = 5
5 * 2 = 10
5 * 3 = 15
5 * 4 = 20
5 * 5 = 25
5 * 6 = 30
5 * 7 = 35
5 * 8 = 40
5 * 9 = 45
5 * 10 = 50

Input: N = 8
Output:
8 * 1 = 8
8 * 2 = 16
8 * 3 = 24
8 * 4 = 32
8 * 5 = 40
8 * 6 = 48
8 * 7 = 56
8 * 8 = 64
8 * 9 = 72
8 * 10 = 80