Data Structure:

Q1. What is an Array & Linked list and what is the key difference between them in terms of memory management?
Q2. What are core data types in any language? How can you store 50 digits numbers in memory and Perform addition between two 50 digits numbers without using any third party library?
Q3. What is stack & Queue & difference between them? Implement basic stack in any program.
Q4. What is a pointer, jargaon pointers & How it is useful in memory optimization?

Algorithms:

Q1. Explain what is the complexity of Algorithms? Explain Time & Space complexity with examples.
Q2. Explain Linear search & Binary search algorithm?
Q3. If there is one sorted array & other one is unsorted, Now let us know which search algorithm(Linear, Binary) you use on each array to search an element?
Q4. What is Recursion & Memoization? Explain with any short example(Program).
Q5. 2520 is the smallest number that can be divided by each of the numbers from 1 to 10 without any remainder. What is the smallest positive number that is evenly divisible by all of the numbers from 1 to 20?

Write these programs in any language: (There are lots of way to solve these problems, So consider optimal solution**)**

Q1. Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:
1, 2, 3, 5, 8, 13, 21, 34, 55, 89, …
By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Q2. If we list all the natural numbers below 10 that are multiples of 3 or 5, we get 3, 5, 6 and 9. The sum of these multiples is 23.
Find the sum of all the multiples of 3 or 5 below 1000.

Q3. The sum of the primes below 10 is 2 + 3 + 5 + 7 = 17. Find the sum of all the primes below two million.

Q4. The sum of the squares of the first ten natural numbers is,
1^2 + 2^2 + ... + 10^2 = 385

The square of the sum of the first ten natural numbers is,
1 + 2 + ... + 10)^2 = 55^2 = 3025

Hence the difference between the sum of the squares of the first ten natural numbers and the square of the sum is

3025 - 385 = 2640

Find the difference between the sum of the squares of the first one hundred natural numbers and the square of the sum.