Algorithm

1. **What are different types of algorithms?**
   - There are several types of algorithms, all designed to accomplish different tasks:

   I.   **Search engine algorithm.** This algorithm takes search strings of keywords and operators as input, searches its associated database for relevant webpages and returns results.

   II. **Encryption algorithm.** This computing algorithm transforms data according to specified actions to protect it. A symmetric key algorithm, such as the Data Encryption Standard, for example, uses the same key to encrypt and decrypt data. If the algorithm is sufficiently sophisticated, no one lacking the key can decrypt the data.

   III. **Greedy algorithm.** This algorithm solves optimization problems by finding the locally optimal solution, hoping it is the optimal solution at the global level. However, it does not guarantee the most optimal solution.

   IV. **Recursive algorithm.** This algorithm calls itself repeatedly until it solves a problem. Recursive algorithms call themselves with a smaller value every time a recursive function is invoked.

   V.   **Backtracking algorithm.** This algorithm finds a solution to a given problem in incremental approaches and solves it one piece at a time.

   VI. **Divide-and-conquer algorithm.** This common algorithm is divided into two parts. One part divides a problem into smaller subproblems. The second part solves these problems and then combines them to produce a solution.

   VII. **Dynamic programming algorithm.** This algorithm solves problems by dividing them into subproblems. The results are then stored to be applied to future corresponding problems.

   VIII. **Brute-force algorithm.** This algorithm iterates all possible solutions to a problem blindly, searching for one or more solutions to a function.

   IX. **Sorting algorithm.** Sorting algorithms are used to rearrange data structures based on a comparison operator, which is used to decide a new order for data.

   X.   **Hashing algorithm.** This algorithm takes data and converts it into a uniform message with a hashing.

   XI. **Randomized algorithm.** This algorithm reduces running times and time-based complexities. It uses random elements as part of its logic.

2. What is RSA Algorithm ?
   - RSA stands for **Rivest Shamir Adleman,** it is used to encrypt and decrypt the messages. It is an Asymmetric key algorithm and Block cipher Algorithm. They have three ways,
       - i) Key Generation.
       - ii) Encryption
       - iii) Decryption
   - ➔ **Key Generations.**
       - Select two large *prime numbers* **p** and **q** for more security.
       - Calculate **n=p*q**
       - Calculate $\phi n=(p-1)(q-1)$
       - Choose the value of 'e' such that **2< e < ϕn** and **gcd(ϕn,e)=1**

3. **What is ACID Properties ?**
   - **A** means Atomicity.
   - **C** means Consistency.
   - **I** means Isolation.
   - **D** means Durability.
   - **Atomicity:**
       - The term atomicity defines that the data remains atomic means if the operation is performed or executed completely or should not be executed at all.
   - Consistency:
       - This means that integrity constraints must be maintained so that the database is consistent before and after the transaction.
   - Isolation:
       - This property ensures that multiple transactions can occur concurrently without leading to the inconsistency of database state.
   - Durability:
       - The database should be durable enough to fold all its latest updates even if the system fails or restarts. If a transaction updates a chunk of data in a database and commits then the database will hold the modified data. If a transaction commits but the system fails before the data could be written on to the disk, then the data will be updated to the disk once the system brings back into action.

4. What is Saga Pattern ?
5. What is Two-phase commit ?
6.