

سوالاٲ:

- 1-What is the difference between a compiled and an interpreted programming language? Give examples.
- 2-What is an algorithm and what is its purpose? Give an example of a simple algorithm.
- 3-What is a data structure? Name a few common data structures.
- 4-What is the difference between a variable and a constant?
- 5-What is the difference between a class and an object?
- 6-What is OOP and what are its advantages?
- 7-What is encapsulation?
- 8-What is inheritance?
- 9-What is polymorphism?
- 10-What is an exception and how is it handled?
- 11-What is a database and what is its purpose?
- 12-Name different sorting algorithms and explain the advantages and disadvantages of each.
- 13-What are tree data structures and what are their applications?
- 14-Name different search algorithms and explain the advantages and disadvantages of each.
- 15-What is algorithm design and what are its steps?
- 16-What are the concepts of a relational database and how do they differ from NoSQL databases?

پاسخنامه:

1-Compiled languages (like C++) are translated entirely into machine code before execution, while interpreted languages (like Python) are interpreted line by line during runtime. This difference affects execution speed, portability, and debugging.

2-An algorithm is a set of well-defined instructions to solve a problem. Algorithms are used in all aspects of programming. For example, the binary search algorithm is used to find an element in a sorted array.

3-A data structure is a way of organizing and storing data in a computer. Common examples include arrays, linked lists, trees, graphs, and hash tables.

4-A variable is a value that can change during program execution, while a constant is a value that remains fixed throughout the program.

5-A class is a blueprint for creating objects, while an object is an instance of a class.

6- OOP stands for Object-Oriented Programming and is a programming paradigm based on objects and classes. OOP promotes code reusability, maintainability, and flexibility.

7-ncapsulation is the process of hiding the implementation details of a class and exposing only its interface.

8- Inheritance is the process of creating a new class (child class) based on an existing class (parent class). The child class inherits all the properties and methods of the parent class.

9-Polymorphism is the ability of a variable or function to take on many forms.

10-An exception is an event that disrupts the normal flow of a program. Exceptions are handled using try-catch blocks.

11-A database is an organized collection of data used to store, retrieve, and manage information.

12-Sorting algorithms like Bubble Sort, Insertion Sort, Merge Sort, Quick Sort, etc., have different time and space complexities and are suitable for different types of data.

13-trees are hierarchical data structures used to represent hierarchical relationships, searching, and sorting.

14-Search algorithms like Linear Search, Binary Search, etc., have different time complexities and are suitable for different data structures.

15-Algorithm design is the process of creating an algorithm to solve a specific problem. The steps include understanding the problem, designing the algorithm, implementing the algorithm, and analyzing the algorithm.

16-A relational database is organized based on the relational model and uses tables, rows, and columns to store data. NoSQL databases are more flexible and suitable for unstructured data