**1) Define the difference between procedural programming and object-oriented programming?**

**Procedural Programming** is a programming paradigm that follows a top-down approach and focuses on procedures or functions. In this paradigm, data and functions are separate, which can make it less secure due to the lack of data hiding. The main focus is on the procedures that operate on the data, rather than the data itself. This approach is ideal for medium-sized programs where the complexity is not very high.

On the other hand, **Object-Oriented Programming (OOP)** is a programming paradigm that follows a bottom-up approach and focuses on objects. These objects contain both data and methods, encapsulating them into single entities. This encapsulation provides more security due to data hiding. In OOP, the main focus is on the objects that interact with one another, making it more aligned with how things work in the real world. This approach is ideal for large and complex program.

2) Define Class and Object.

Object - An object is an instance of a class. An object represents a real-world entity and has state and behavior.

Class - . It defines the objects’ relevant properties (attributes) and behavior (methods)5. A class is a user-defined data structure that binds the data members and methods into a single unit.

3) Explain the difference between class and object using a simple example of an education institute.

this scenario, we can have a class called "Student" that represents the blueprint or template for all students in the education institute. The "Student" class would define the common attributes and behaviors that all students share. For example, the class could have attributes such as "name," "age," and "studentID" to represent the student's personal information.

Each object will represent an individual student with their unique data. For instance, we can create two objects named "student1" and "student2" as instances of the "Student" class:

student1 = Student("John Doe", 20, "12345")

student2 = Student("Jane Smith", 22, "67890")

In this case, "student1" and "student2" are objects of the "Student" class. They have their own specific data, such as name, age, and student ID, which are defined by the attributes of the class.

4) List the advantages of using object-oriented concepts in application development.

* Reuse of code through inheritance: This allows developers to create new objects from existing ones, promoting code reuse.
* Data redundancy: This allows the same piece of data to be held in two separate places, which can be beneficial in certain scenarios.
* Code maintenance: It’s easier to maintain and modify existing code, which saves time.
* Security: Data hiding and abstraction mechanisms help maintain security.
* Flexibility through polymorphism: This allows objects to take on many forms, leading to more flexible and dynamic software

5) List the Object Oriented principles and define them using a single sentence (DO NOT copy and paste answer, write in your own words!).

* Encapsulation: This is the practice of keeping the details about how an object works hidden away, exposing only what’s necessary.
* This principle allows one class to inherit the properties and methods of another, promoting code reuse.
* This principle is about simplifying complex systems by breaking them down into manageable, understandable parts.
* Polymorphism: This allows objects of different types to be treated as objects of a parent type.\

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