C++ OOP (Classes & Objects, Constructors)

# 1. Introduction to Object-Oriented Programming

Object-Oriented Programming (OOP) is a programming paradigm based on the concept of 'objects', which contain both data and functions. C++ is one of the most popular OOP languages.

# 2. Classes and Objects

A class is a user-defined data type that acts as a blueprint for creating objects.

Syntax:

class ClassName {  
 public:  
 // data members  
 // member functions  
};

Example:

class Student {  
 public:  
 string name;  
 int age;  
 void display() {  
 cout << name << " - " << age;  
 }  
};  
int main() {  
 Student s1;  
 s1.name = "Ravi";  
 s1.age = 20;  
 s1.display();  
}

# 3. Constructors

A constructor is a special member function that is automatically called when an object is created. It initializes the object.

Types of constructors: Default, Parameterized, Copy

class Student {  
 public:  
 string name;  
 int age;  
 Student(string n, int a) { // parameterized constructor  
 name = n;  
 age = a;  
 }  
};

# Assignments:-

1. Design a class Employee with attributes (id, name, salary) and a function to display details.

2. Write a class Book with parameterized constructor initializing title and author.

3. Design a class Rectangle with functions to calculate area and perimeter using constructors.

4. Write a class Laptop with constructor initializing brand and price.

5. Write a class Teacher and create multiple objects using constructors.

6. Write a C++ program to create a class named Base. In Base class create a method showBase(), this method display a message ‘This message from base class’. By inheriting Base class now create a class named Derived. In Derived class create a method showDerived(), this method display a message ‘This message from derived class’. Now test Base and Derived class.

7. Write a C++ program to create a class named Shape. In Shape class create a method named setValue(), this method initialize side of shape. By inheriting Shape class create a new class Square. In Square class create a method area(), this method return area of square. Now by inheriting Shape class create a new class Cube. In Cube class create a method volume(), this method return volume of cube. Now Test Square and Cube classes.