OOPS--

Wednesday, January 29, 2025 9:03 AM

Keywords : -- static , this ,
OOPS intro
Pillars of oops
Advt and Disadvt of OOPs
Method , properties , Namespace
Folder creation

Strategies --- > OOPS ---> Principles

Structured Programming
Procedural Programming or Modular Programming -- When we create different set of functions(Operations to perform) i.e a Modular Programming
OOPS Programming - When we create different set of functions(Operations to perform but here we call as object .. Each object has its relevant functions

In oops the Software --- is a collection of objects containing functions and data related to those functions but in Modular programming the system was a collection of functions

Problems in Modular Programming

1. Reusability -- We must write the same code or logic at multiple places, increasing code duplication.
2. Extensibility -- wouldn't be able to extend easily with additional features.
3. Simplicity -- we usually end up with many functions and code in scattered manner.
4. Maintainability : It was difficult to manage and maintain the application code.

OOPS came into the picture to overcome the problems we had in Modular Programming:

1. Reusability :: Class & Objects
2. Extensibility :: Inheritance --- Aggregation / Composition
3. Simplicity :: Abstraction , Encapsulation and Polymorphism
4. Maintainability :: If we combine all

Abstraction :: Hiding or removing unnecessary things , providing the essential features without including the background details … For eg : Google search bar , ATM Machine (Logical thinking)

Encapsulation : Binding the data and functions together into a single unit .(Physical Implementation)
For eg:
Private String Salary -- public getSalary(); --- ReadOnly
Private String employee name --- public String SetName(String name){ Read / Write } ,, public getName()

Inheritance : The class from which the members are transferred is called Parent / Base / Super
The class that inherits the Parent/ Base / Superclass members is called Derived / Child / Subclass

Polymorphism : We can say that the same function will have or show the different behaviour by taking different types of values or with a different number of values … The ability to take more than one form.

a. **Static Polymorhism/ Compile-time Polymorphism / Early binding. (Overloading)**

```
Person p = new Person(int a ,float b);
p.display(20,30.5);
Class ABC
{

Void display();
Void display(int a);
Void display(int a , float b);



}
```

b. **Dynamic Polymorphism/ Run time Polymorphism/ Late Binding (Overriding)**

```
Person p = null;
P = new Father();
p.jd();
Person p = new Employee();
p.jd();
Person p1 = new Employee();
p.jd();
Person p = new SocialWorker();

Person p = new Person();

Father f = new Person();

Class Person
{
```

Private int I;

Private Void jd()
{}
}
class Father extends Person
{

Void jd()
{}

}

Class Employee extends Person
{

Void jd()
{}
}

15 mins break

CLASS & OBJECTS :

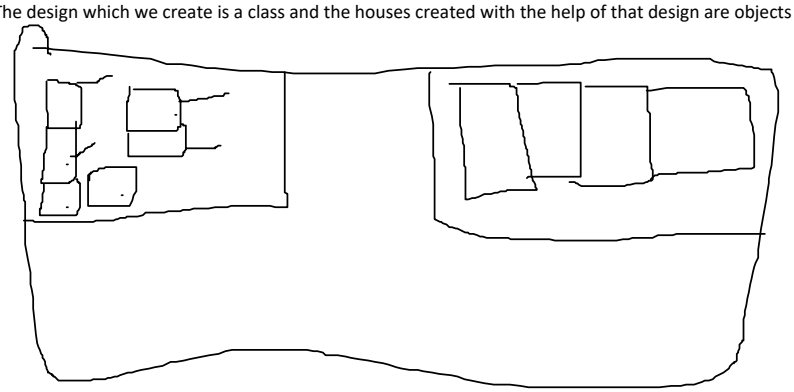
Class is a blueprint --- an architecture -- structure --- Objects which are belonging to that class has it's own properties and behaviour

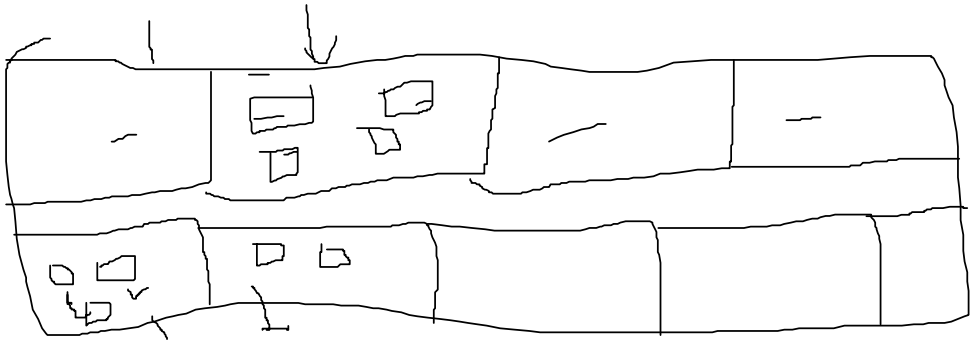
In a govt sector

The residential building they are offering to their employees , the structure or a blue print of all the flats are same

2 bed room sets -- MIG
3 bed room sets --HIG

The design which we create is a class and the houses created with the help of that design are objects





A class is a user defined data type that represents both state and behaviour

State -- Properties
Behaviour -- action

A cLass is composed of three things --- name , attributes and operations

Public class <Classname>
{

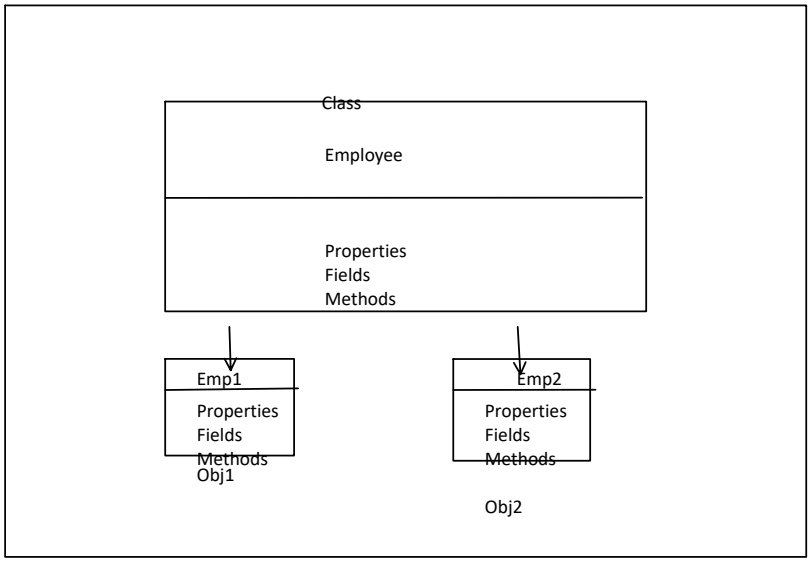
```
Int a=20 , int b;   // states
  public int input(int a , int b )  // behaviour
{
Return a+b;
}
```

A=0 , b=0

```
}


}
```

```
<classname> <objectname> = new <classname()>;
<objectname>.input(20,30).
```



Types of Classes

Abstract
Partial
Concrete
Sealed
Static

// Substitute of Copy Constructor

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace OopsPrograms
{
   internal class Person
   {
      public string Name;
      public int Age;

      // default constructor
      public Person(string name , int age) {

         Name = name;
         Age = age;


      }

      public Person(Person p)
      {
         Name = p.Name;
         Age = p.Age;

      }

      public void Display()
      {
         Console.WriteLine($"Name : {Name} and Age : {Age}");
      }
```

```
  }

  class MainProgram
  {
    static void Main(string[] args)
    {
      Person person1 = new Person("Niti", 35);
      person1.Display();

      Person person2 = new Person(person1);
      person2.Display();

      person2.Name = "Aditi";
      person2.Age = 20;
      person2.Display();
    }

  }
}
```

Keywords : private , public , protected , abstract , static i. e.. Modifiers

Access Specifier : - special kind of modifiers which is used to define the scope of a type(class, Interface, Delegates) and its Members(Variables, properties,
Constructor and methods.

Different types of AS in C#
- Private
- Public
- Protected
- Internal
- Protected Internal
- Private protected(7.2 onwards)

Public class Employee <Type> we can define that class as Public or internal and by default it's internal
{

Private int id; // Variable
Public string Name {get; set;} //Properties

Public Employee(){} //Constructor

Protected void Display(){} // Method
}

Type Member : You may any type of AC from the given 6
By default it is private

Assemblies : are the building block of .Net Framework applications and also a fundamental unit of deployment . It is a precompiled .Net Code that can by run by CLR

Two types of Assemblies

Assembly EXE -- Console Application (having Main() and it's a executable file
Assembly DLL -- Class Library (where there is no Main() or not a executable file

Access Specifier	Within the class	Derived class in same Assembly	Non-Derived class in same assembly	Derived class in other Assemblies	Non-Derived class in other Assemblies				
private	Yes	No	No	No	No				
public	Yes	Yes	Yes	Yes	Yes				
protected	Yes	Yes	No	Yes	No				
internal	Yes	Yes	Yes	No	No				
Protected internal	Yes	Yes	Yes	Yes	No				
Private protecte	Yes	Yes	No	No	No				

d									

WAP related to banking system where few attributes are given as :
Account holder as public
Account number as protected
Balance as private
Bankname as internal

Create a BankAccount class with all the attributes , implement a constructor to initialize all the attributes
Then implement a public method showAccountDetails() that will prints the account holder name and bank name

Create a derived class SavingAccount that tries to access the accountNumber

In the main() method create an object to try to access each attribute.

Access specifier