Object-Oriented Programming (CS F213)

Module I: Object-Oriented and Java Basics

CS F213 RL1.3: Inheritance Basics

BITS Pilani

Dr. Pankaj Vyas
Department of Computer Science, BITS-Pilani, Pilani Campus

CS F213 RL 1.3 : Topics

- Inheritance

- Inheritance Examples

- Java Support for Inheritance [Just Introduction]

- Types of Inheritance

Inheritance : Reusability
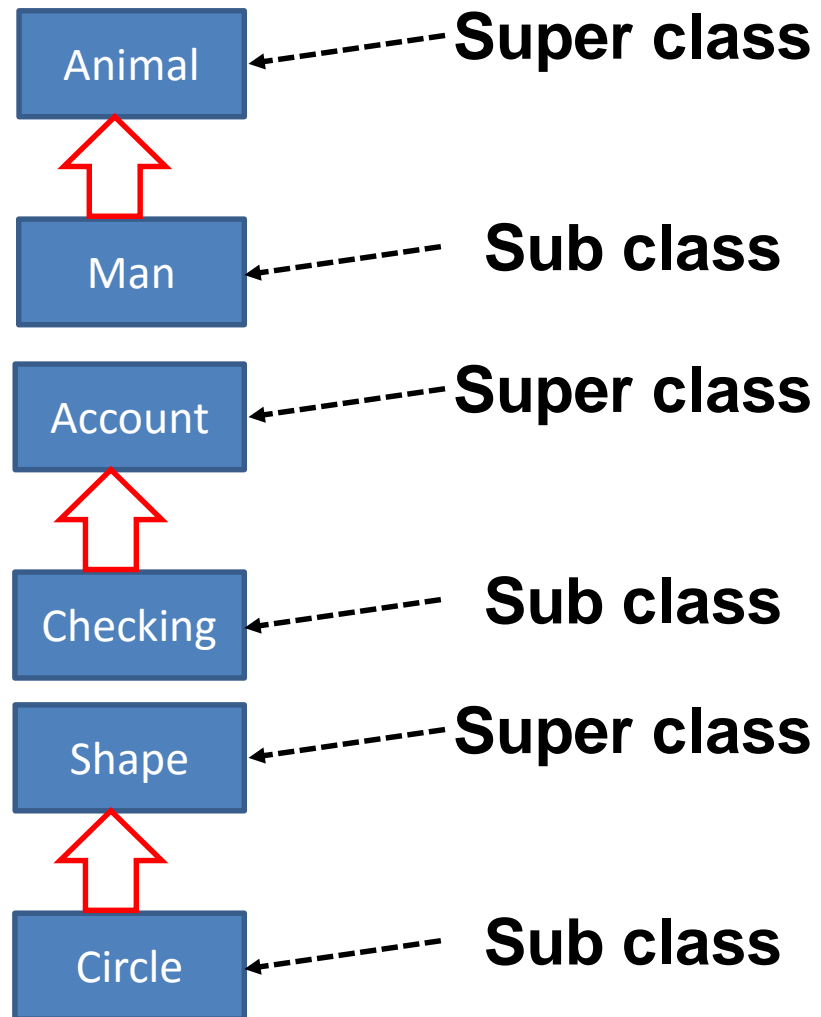
- **Process by which an object of one class acquires properties of an object of other class**

- **Supports Reusability of code and data**

- **Inheritance Supports isA relationship**

- **The class whose properties are extended is known as *super class (in Java) or base class (in C++) or parent class*.**

- **The class which extends the properties of super class is known as *sub class (in Java) or derived class (in C++) or child class***

Inheritance : Some Simple Examples

- Man isA Animal

- Checking isA kind of Account

- Circle isA Type of Shape

Inheritance in Java

```
class Animal
{

        // Define the Baisc Properties of Every Animal

} // End of class Animal

class Man extends Animal
{
        // Define the properties that are specifically for  man

}// End of class Man
```

<<Super Class>>

Animal

Man

<<Sub Class>>
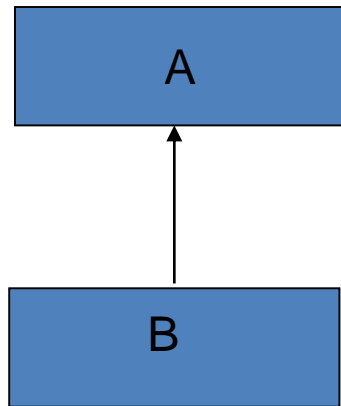
Types of Inheritance

- Single Level Inheritance
- Hierarchical Inheritance
- Multi-Level Inheritance
- Multiple Inheritance

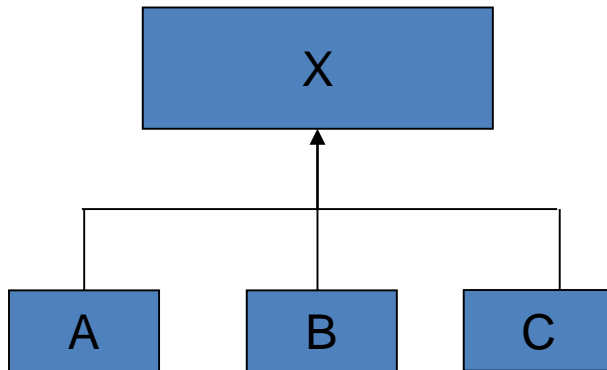# Types of Inheritance : Single Level

Single Level Inheritance


```
class A
{
        ….
}// End of class A


class B extends A
{
        …..
}// End of class B
```

Types of Inheritance : Hierarchical

Hierarchical Level Inheritance


```
class X
{
        ….
}// End of class X

class A extends X
{
        …..
}// End of class A

class B extends X
{
        …..
}// End of class B

class C extends X
{
        …..
}// End of class C
```
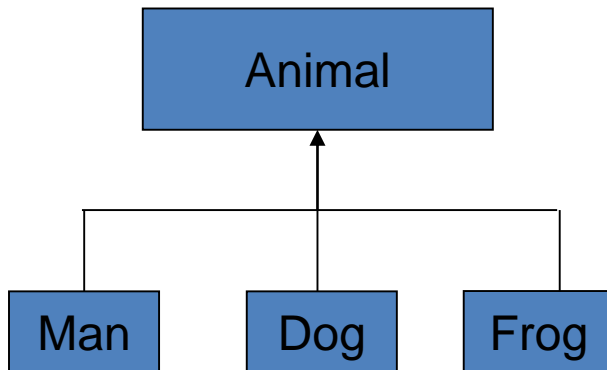
Types of Inheritance : Hierarchical

Hierarchical Level Inheritance

Animal

Man   Dog   Frog

```
class Animal
{
        ….
}// End of class Animal

class Man extends Animal
{
        …..
}// End of class Man

class Dog extends Animal
{
        …..
}// End of class Dog

class Frog extends Animal
{
        …..
}// End of class Frog
```
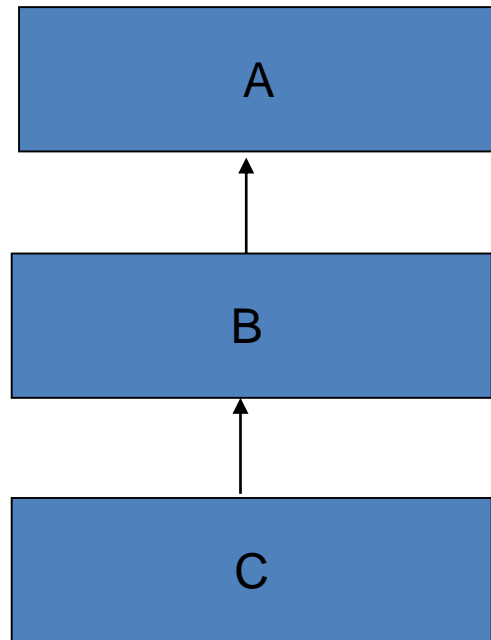
Types of Inheritance : Multi-Level

Multi Level (Tree) Inheritance

A

B

C

```
class A
{
          .....
}// End of class A

class B extends A
{
          .....
}// End of class B

class C extends B
{
          .....
}// End of class C
```
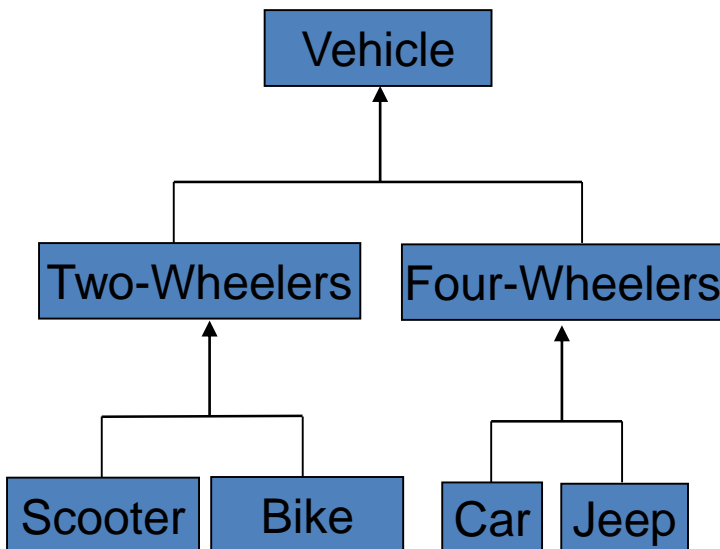
Types of Inheritance : Multi-Level

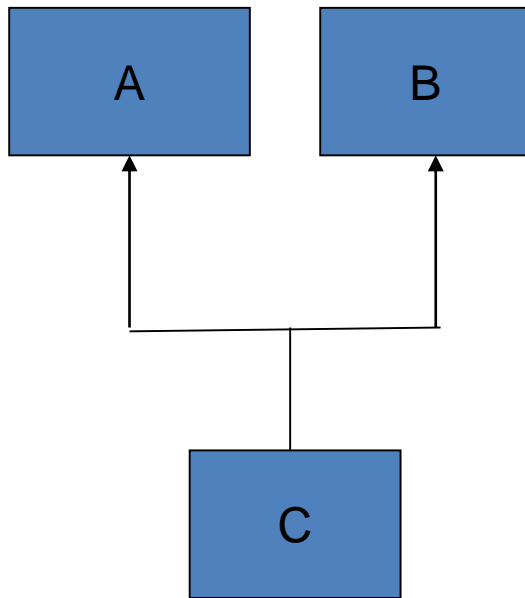## Multi Level (Tree) Inheritance

```
            Vehicle
              ↑
    ┌─────────┴─────────┐
Two-Wheelers      Four-Wheelers
    ↑                  ↑
 ┌──┴──┐            ┌──┴──┐
Scooter  Bike      Car   Jeep
```

⟹

```
class Vehicle
{
        …..
}// End of class Vehicle
class Two-Wheeler extends Vehicle
{
        …..
}// End of class Two-Wheeler
class Four-Wheeler  extends Vehicle
{
        …..
}// End of class Four-Wheeler
class Scooter extends Two-Wheeler
{

}// End of class Scooter


…………………………….
```

Types of Inheritance : Multiple

Multiple Inheritance

Not Supported in Java Directly

```
class A
{
        ....
} // End of class A
class B
{
        ....
}// End of class B
class C extends A, B
{
        ....
} // End of class C
```

Wrong Not Allowed in Java

Thank You

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