Agenda

[- Python Notes
- Python videos]

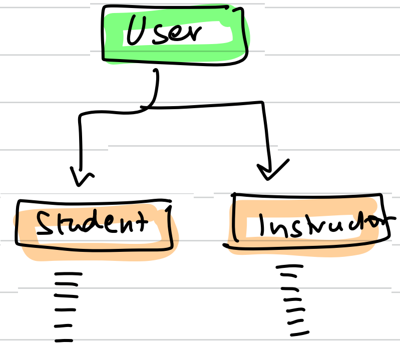
- Inheritance - Constructor Chaining + Assignment (next week)
  - Basics - Types - Diamond Prob
- Polymorphism
  - Subtyping
  - Compile Time
  - Run Time Polymorphism
  - Adv & Disadv

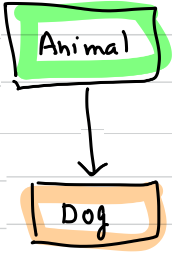
OOPS

- Abstraction
- Encapsulation
- Inheritance
- Polymorphism

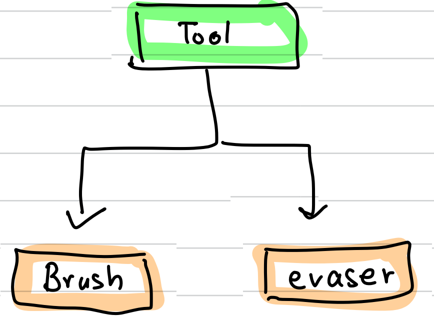
Inheritance :

Mechanism that allows one class to acquire all properties and methods of another class. The inheriting class is called as **Child Class** and the inheritance class is called or **Parent/Base Class.**





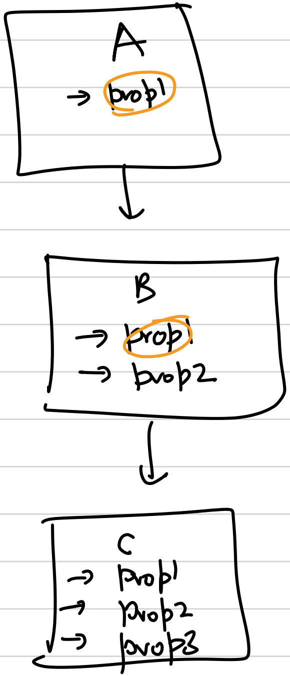
Dog is a Animal



(x,y)
(size)
:
onclick()

- Brush IS-A Tool
- Eraser IS-A Tool

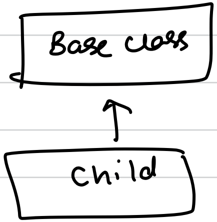
Constructor Chaining



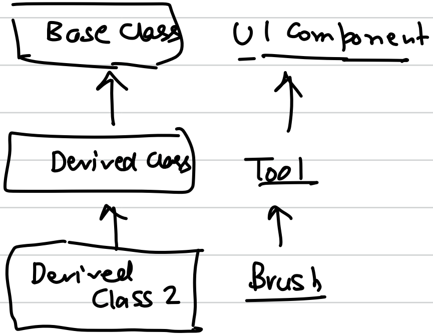
```
     1
A(param){
      prop1 =     ____;

   3
   ↑

  2
B(param){
      super(prop1);
      prop2 =     ____

   3
   ↑

   3
C(param){
     super(prop1, prop2),
     prop3 =    ____,
}
```

Types of Inheritance

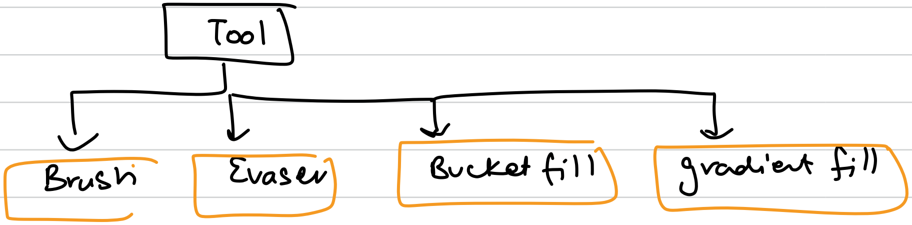
① Single Inheritance : when a class has only parent



② multi-level inheritance

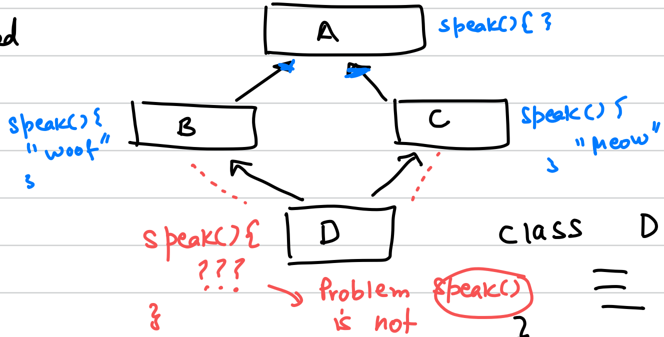


③ Hierarchical Inheritance : When 2 or more classes have same base class



④ Multiple Inheritance : When a class can have multiple parents.

Problem is called Diamond of Death



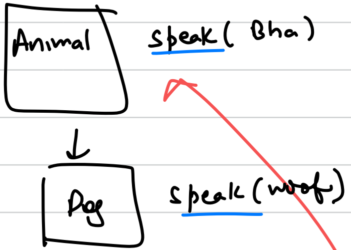
Problem speak() is not over-ridden by D

Not supported in Java.

```
class D extends ~~B,~~ C {
}
```

Java supports multiple inheritance using 'Interfaces'

POLY MORPHISM



Poly → many

Morphs → forms

An object/method can take many forms

Java

① Compile Time Polymorphism. → Method overloading vs Method over-riding inheritance

↑ Many methods with same name

② Runtime time polymorphism.

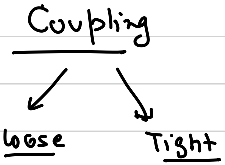
RUN-Time polymorphism

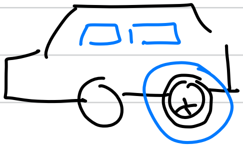
↳ Subtyping : Variable of base class can refer to a derived class object.

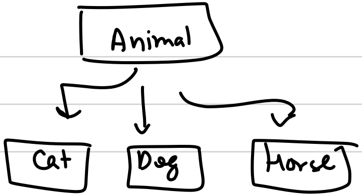
User u = new Student(),

10 min break

10·15

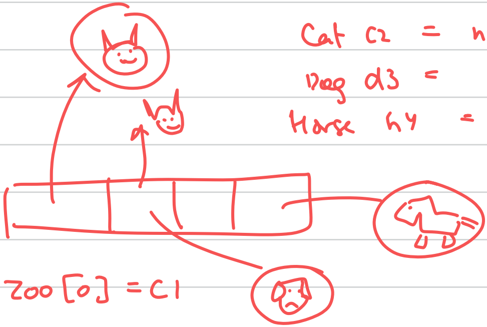






```
Cat c1 = new Cat(),
Cat c2 = new Cat()
Dog d3 = new Dog();
Horse h4 = new Horse(),
```

Animal [] Zoo =



Zoo [0] = C1

Object [] objs = [int , String , Dog , Cat , Hashmap]

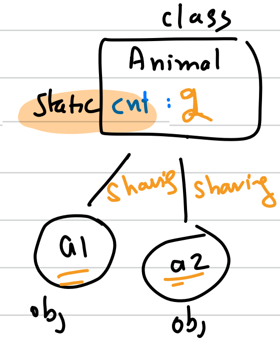
- Static variables : belongs to class
- Static methods.

↓
not tied to the instance of class.

Static classes → OP

Static Block → video 5min.

```
Animal() {
    cnt++;
}
```



→ Animal a1 = new Animal();

→ Animal a2 = new Animal();