INTERFACES IN JAVA

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Outline

- What is an Interface?
- Contents and Uses
- Relationship between classes and interfaces
- Interface Declaration
- Multiple Inheritance
- Interfaces can be Extended
- Explore

What is an Interface?

- A blueprint/framework of a class

- A mechanism to achieve abstraction

- Specifies set of methods to be implemented by one or more classes

    - A class that includes an interface must implement all the methods with public access

    - A class that includes an interface may have its own methods

- Cannot have a method body

- Represents the IS-A relationship

- Cannot be instantiated

Contents and Uses

- Interfaces contain
  - Variable (Public, static and final implicitly)- must be initialized
  - Abstract methods- implicitly public- may have parameters

- Interfaces are used to
  - Achieve abstraction
  - Multiple inheritance

Relationship between classes and interfaces
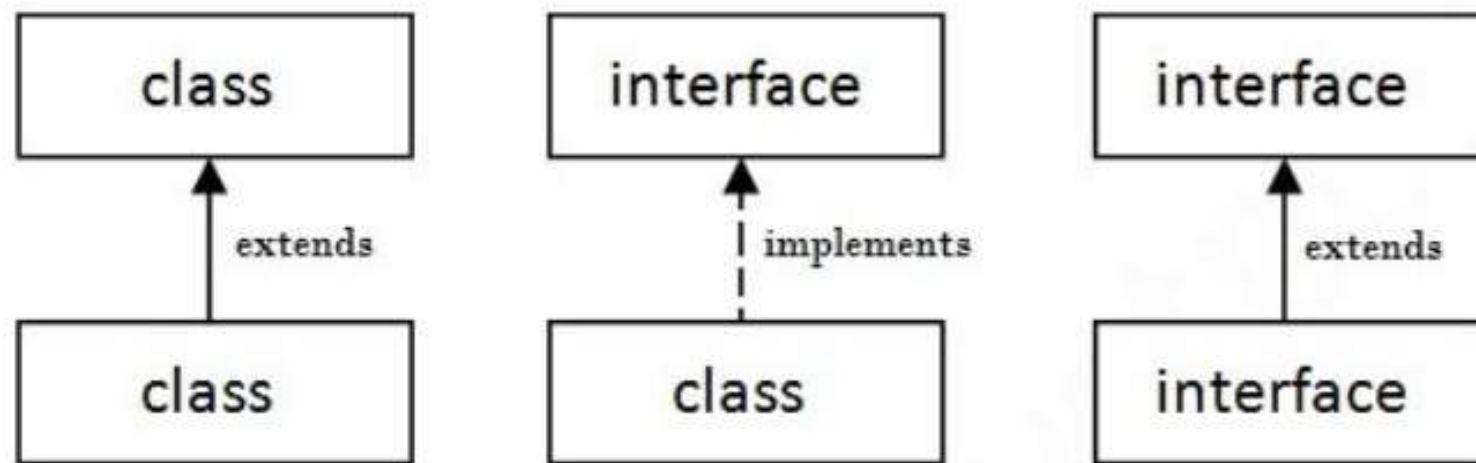
- A class can implement more than one interfaces, but can inherit only a single superclass !!
- Any number of classes can implement interface.
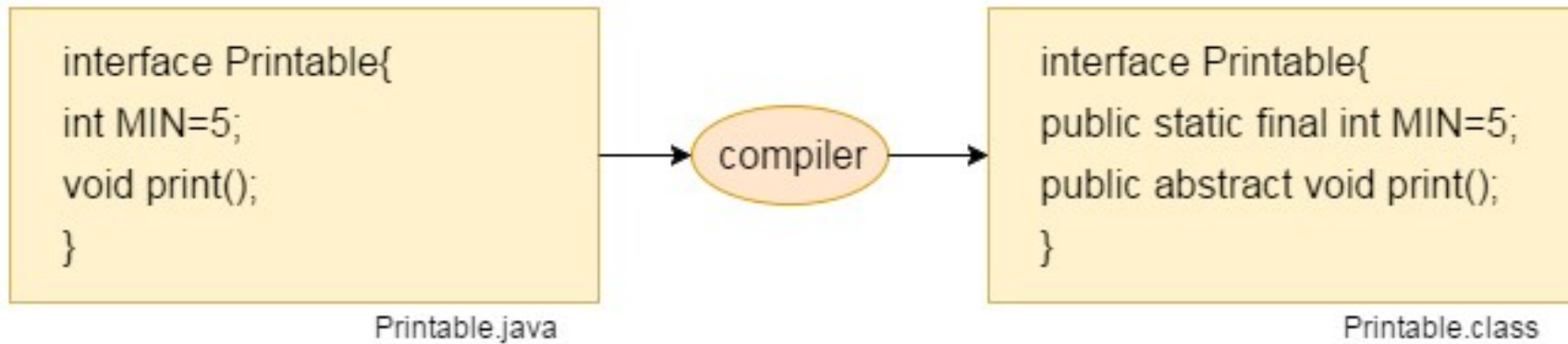
Interface Declaration

- Interface declaration syntax:

  interface <interface_name>{

  // declare constant fields

  // declare methods that abstract
  // by default.

  }

- Class that implements interface:

  class A implements <interface_name>

  {

  //override all abstract methods

  //methods must be public

  }

Interface Declaration…

interface Printable{

int MIN=5;

void print();

}

Printable.java

compiler

interface Printable{

public static final int MIN=5;

public abstract void print();

}

Printable.class

Interfaces can be Extended
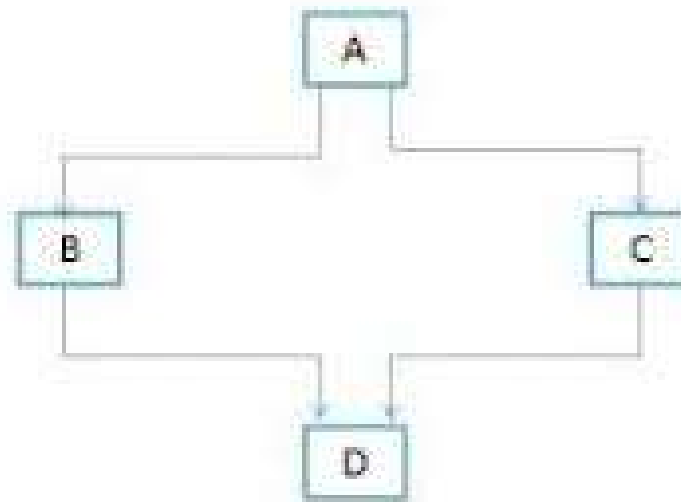
```
interface A {
        void method1();
        void method2();
}
interface B extends A {
        void method3();
}
class C implements B {    //Must implement all methods of A and B
        void method1();
        void method2();
        void method3();
}
```

Multiple Inheritance

- Java class- ambiguity in multiple inheritance
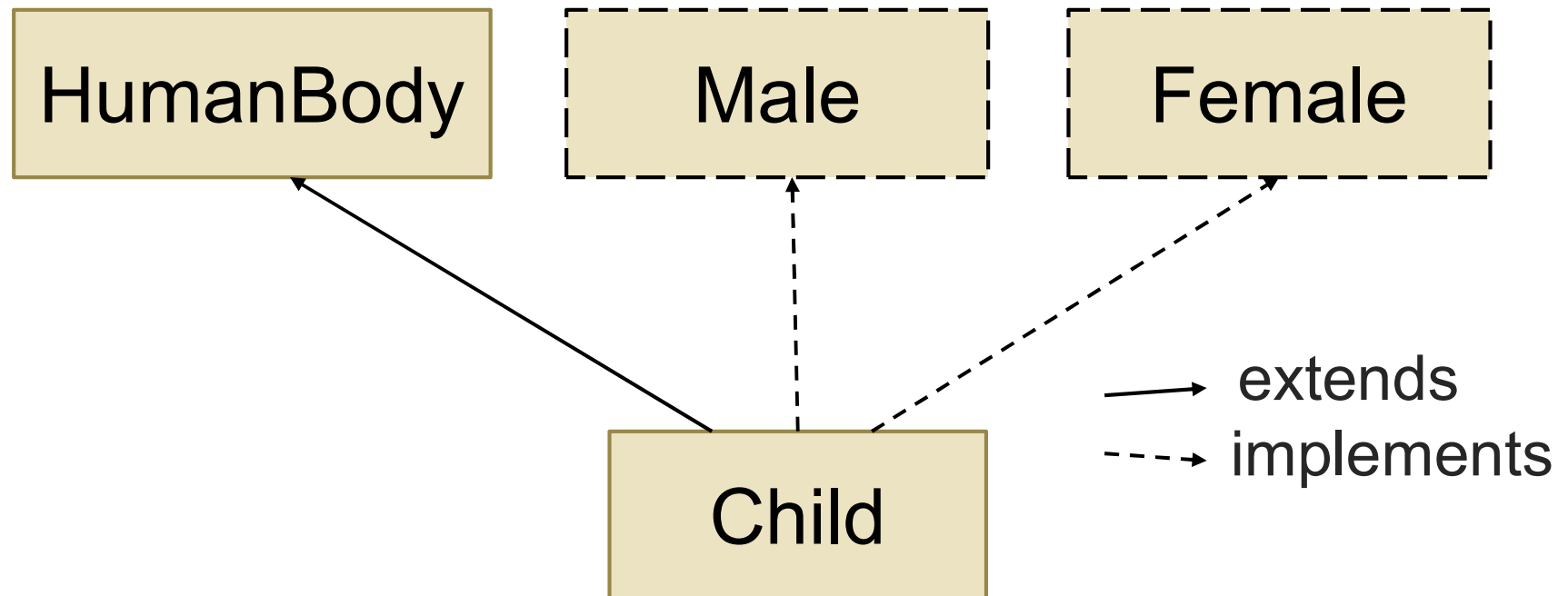- Use Interfaces for multiple inheritance
- EX:

Hybrid Inheritance

□ The composition of two or more types of inheritance

Hybrid Inheritance

Hybrid Inheritance can be achieved

□ Single and Multiple Inheritance (not supported but can be achieved through interface)

Hybrid Inheritance can be achieved…

- Multilevel and Hierarchical Inheritance
- Hierarchical and Single Inheritance
- Multiple and Multilevel Inheritance

Explore

- Static methods in an interface
- Private methods in an interface
- Default methods in an interface

Find Output

(1)

```java
class P {
    int a = 30;
    void display(){System.out.println("in P");}
}
class Q extends P {
    int a = 50;
    void display(){System.out.println("in Q");}
}
```

Find Output (1 continue)…

```
public class Mavenproject1 extends Q {
    public static void main(String[] args) {
        Q q = new Q();
        System.out.println(" Value of a: " +q.a);
        q.display();
        P p = new Q();
        System.out.println("Value of a: " +p.a);
        p.display();
    }
}
```