JAC444 - Lecture 2

Interfaces

Segment 2

Interfaces

In this segment you will be learning about:

- Interfaces
- Default methods, Private methods
- Interface inheritance
- Annotations
- Functional interface

Interface Definition

Interface is a data type in Java. It is a collection of abstract methods. An interface may also contain constants, default methods, static methods, and nested types.

```
interface InterfaceName {
    abstract method declaration(s)
    constant(s) - final static fields
    default method(s)
    static method(s)
    nested types
}
```

An interface creates a new reference data type, just as class definition

```
InterfaceName refVariable;
```

Interface Structure

- All methods in an interface are abstract and public
  (a method without implementation is an abstract method)
- Variables declared in interface are public, static and final by default
- Java 8 allows *default method* - method with implementation
- Java 9 allows *private method -* improve code reusability

Interface Example

```
 public interface Conversion {
    double INCH_TO_MM = 25.4;
    double inchToMM(double inches);
 }

Conversion c;  // c is a reference of an object of type Conversion

public interface ConversionVersion2 {
    double INCH_TO_MM = 25.4;
    double inchToMM(double inches);
    default public void defaultMethod() {
       System.out.println("Special implementation");
    }
 }
```

Implementing an Interface

An interface defines a protocol of behavior.

A class obeys the protocol defined by interface by using the Java keyword **implements**

```
class MyConversion implements Conversion {
    double inchToMM(double inches) {
        //implementation
    }
}

Conversion c = new MyConversion();
double mm = c.inchToMM(…);
```

Private Method in Java 9

- Java 7 has only: **`public abstract methods`**
- Java 8 has: **`public static public default methods`**
- Java 9 has: **`private method`**

The valid combinations:

`public static`	- correct
`public abstract`	- correct
`public default`	- correct
`private static`	- correct
`private abstract`	- compile error
`private default`	- compile error
`private`	- correct

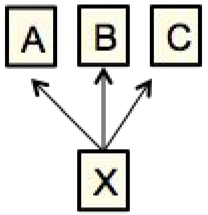
Multiple Inheritance

Implementing Interface

```
interface Iable { void methodOne(); }
class First implements Iable { void methodOne() { … } }
```

Extending Interface

```
interface Jable extends Iable { String methodTwo(int i); }
class Second implements Jable {
  void methodOne() { … }
  String methodTwo(int i) { … }
}
```



Interface Multiple inheritance

```
interface X extends A, B, C { … }
```

Marker Interface

- **A marker interface** is an interface with **no methods** (empty body)

```
interface Markable {
}
class Special implements Markable {
}

Markable obj = new Special();
```

Example: `java.io.Serializable`

Annotations

- Data that provides information about other data is called metadata
- **Annotation is a language construct** that **provides metadata** to Java source elements.
- Classes, methods, variables, parameters and interfaces may be annotated

```
// Declares the annotation Important.
public @interface Important {
}

// @Important is an annotation to method say().
@Important
public String say(char c) {
}
```

Functional Interface

- **A functional interface** is an interface with **an exactly one abstract method**

```
interface Workable {
    String work(int j);
}
```

- To emphasize that an interface is a Functional interface one can use annotation

```
@FunctionalInterface
interface Workable {
    String work(int j);
}
```