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TUTORIAL

Java : Introduction to Interfaces

Interfaces

Using the keyword interface, you can fully abstract a class' interface from its implementation. That is, using interface, you can specify what a class must do, but not how it does it. Interfaces are syntactically similar to classes, but they lack instance variables, and their methods are declared without any body. In practice, this means that you can define interfaces which don't make assumptions about how they are implemented.

Once it is defined, any number of classes can implement an interface. Also, one class can implement any number of interfaces. To implement an interface, a class must create the complete set of methods defined by the interface. However, each class is free to determine the details of its own implementation. By providing the interface keyword, Java allows you to fully utilize the "one interface, multiple methods" aspect of polymorphism. Interfaces are designed to support dynamic method resolution at run time.

Normally, in order for a method to be called from one class to another, both classes need to be present at compile time so the Java compiler can check to ensure that the method signatures are compatible. This requirement by itself makes for a static and non-extensible classing environment. Inevitably in a system like this, functionality gets pushed up higher and higher in the class hierarchy so that the mechanisms will be available to more and more subclasses. Interfaces are designed to avoid this problem. They disconnect the definition of a method or set of methods from the inheritance hierarchy. Since interfaces are in a different hierarchy from classes, it is possible for classes that are unrelated in terms of the class hierarchy to implement the same interface. This is where the real power of interfaces is realized.

Defining an Interface

An interface is defined much like a class. This is the general form of an interface:

```
access interface name
{
        return-type method-name1(parameter-list);
        return-type method-name2(parameter-list);
        type final-varname1 = value;
        type final-varname2 = value;
        // ...
        return-type method-nameN(parameter-list);
        type final-varnameN = value;
}
```

Here, access is either public or not used. When no access specifier is included, then default access results, and the interface is only available to other members of the package in which it is declared. When it is declared as public, the interface can be used by any other code. name is the name of the interface, and can be any valid identifier.

Notice that the methods which are declared have no bodies. They end with a semicolon after the parameter list. They are, essentially, abstract methods; there can be no default implementation of any method specified within an interface. Each class that includes an interface must implement all of the methods. Variables can be declared inside of interface declarations. They are implicitly final and static, meaning they cannot be changed by the implementing class. They must also be initialized with a constant value. All methods and variables are implicitly public if the interface, itself, is declared as public.

Here is an example of an interface definition. It declares a simple interface which contains one method called callback( ) that takes a single integer parameter.

```
interface Callback
{
        void callback(int param);
}
```