

Generic Vs Non Generic

Exception handling in Overriding

Instance flow execution In Inheritance class

Interface Vs Abstract class (After java 8)

Why Notify() , NotifyAll(), wait() defines in the Object class.

Sleep() Vs Yield()

AL l = new AL();

① It is the non Generic version of ArrayList object

② For this ArrayList, we can add any type of object and hence it is not Type-Safe.

③ At the time of retrieval, we should perform type-casting, otherwise we will get compile-time error. Type-casting is the bigger issue in non-generic collections.

AL<String> l = new AL<String>();

① It is the Generic version of ArrayList object

② For this ArrayList, we can add only String type of objects and hence it is type-safe.

③ At the time of retrieval, it is not required to perform type-casting. Hence Type-casting headaches are not there in Generic Collections

Exception handling in overriding.

1. **Problem 1:** If The SuperClass doesn't declare an exception
2. **Problem 2:** If The SuperClass declares an exception

Let us discuss different cases under these problems and perceived their outputs.

Problem 1: If The SuperClass doesn't declare an exception

In this problem, two cases that will arise are as follows:

- **Case 1:** If SuperClass doesn't declare any exception and subclass declare checked exception **error**
- **Case 2:** If SuperClass doesn't declare any exception and SubClass declare Unchecked exception **no error**

```
class SubClass extends SuperClass {  
  
    // method() declaring Checked Exception IOException  
    void method() throws IOException {  
  
        // IOException is of type Checked Exception  
        // so the compiler will give Error  
  
        System.out.println("SubClass");  
    }  
  
    // Driver code  
    public static void main(String args[]) {  
        SuperClass s = new SubClass();  
        s.method();  
    }  
}
```

Output:

```
mayankso@lanki@Mayanks-MacBook-Air test % javac GFG.java  
GFG.java:20: error: method() in SubClass cannot override method() in SuperClass  
    void method() throws IOException {  
        ^  
    overridden method does not throw IOException  
1 error  
mayankso@lanki@Mayanks-MacBook-Air test %
```





Case 1: If SuperClass doesn't declare any exception and subclass declare checked exception.

Example

Java

```
// Java Program to Illustrate Exception Handling  
// with Method Overriding  
// Where SuperClass does not declare any exception and  
// subclass declare checked exception  
  
// Importing required classes  
import java.io.*;  
  
class SuperClass {  
  
    // SuperClass doesn't declare any exception  
    void method() {  
        System.out.println("SuperClass");  
    }  
}  
  
// SuperClass inherited by the SubClass  
class SubClass extends SuperClass {  
  
    // method() declaring Checked Exception IOException  
    void method() throws IOException {  
  
        // IOException is of type Checked Exception  
        // so the compiler will give Error  
  
        System.out.println("SubClass");  
    }  
}
```

Case 2: If SuperClass doesn't declare any exception and SubClass declare Unchecked exception



```
// Java Program to Illustrate Exception Handling
// with Method Overriding
// Where SuperClass doesn't declare any exception and
// SubClass declare Unchecked exception

// Importing required classes
import java.io.*;

class SuperClass {

    // SuperClass doesn't declare any exception
    void method()
    {
        System.out.println("SuperClass");
    }
}

// SuperClass inherited by the SubClass
class SubClass extends SuperClass {

    // method() declaring Unchecked Exception ArithmeticException
    void method() throws ArithmeticException
    {

        // ArithmeticException is of type Unchecked Exception
        // so the compiler won't give any error

        System.out.println("SubClass");
    }

    // Driver code
    public static void main(String args[])
    {
        SuperClass s = new SubClass();
        s.method();
    }
}
```

Output

SubClass

Now dwelling onto the next problem associated with that is if The SuperClass declares an exception. In this problem 3 cases will arise as follows:

Case 1: If SuperClass declares an exception and SubClass declares exceptions other than the child exception of the SuperClass declared Exception.

```
class SuperClass {  
    // SuperClass declares an exception  
    void method() throws RuntimeException {  
        System.out.println("SuperClass");  
    }  
}  
  
// SuperClass inherited by the SubClass  
class SubClass extends SuperClass {  
  
    // SubClass declaring an exception  
    // which are not a child exception of RuntimeException  
    void method() throws Exception {  
  
        // Exception is not a child exception  
        // of the RuntimeException  
        // So the compiler will give an error  
  
        System.out.println("SubClass");  
    }  
  
    // Driver code  
    public static void main(String args[]) {  
        SuperClass s = new SubClass();  
        s.method();  
    }  
}
```

Output:

```
mayanksolanki@Mayanks-MacBook-Air test % javac GFG.java  
GFG.java:18: error: method() in SubClass cannot override method() in SuperClass  
    void method() throws Exception {  
        ^  
    overridden method does not throw Exception  
1 error  
mayanksolanki@Mayanks-MacBook-Air test %
```


Case 2: If SuperClass declares an exception and SubClass declares a child exception of the SuperClass declared Exception.

```
import java.io.*;

class SuperClass {

    // SuperClass declares an exception
    void method() throws RuntimeException
    {
        System.out.println("SuperClass");
    }

    // SuperClass inherited by the SubClass
    class SubClass extends SuperClass {

        // SubClass declaring a child exception
        // of RuntimeException
        void method() throws ArithmeticException
        {

            // ArithmeticException is a child exception
            // of the RuntimeException
            // So the compiler won't give an error
            System.out.println("SubClass");
        }

        // Driver code
        public static void main(String args[])
        {
            SuperClass s = new SubClass();
            s.method();
        }
    }
}
```

OUTPUT:Subclasses

Case 3: If SuperClass declares an exception and SubClass declares without exception.

```
// Importing required classes
import java.io.*;

class SuperClass {

    // SuperClass declares an exception
    void method() throws IOException
    {
        System.out.println("SuperClass");
    }

    // SuperClass inherited by the SubClass
    class SubClass extends SuperClass {

        // SubClass declaring without exception
        void method()
        {
            System.out.println("SubClass");
        }

        // Driver code
        public static void main(String args[])
        {
            SuperClass s = new SubClass();
            try {
                s.method();
            } catch (IOException e) {
                e.printStackTrace();
            }
        }
    }
}
```

OUTPUT:Subclasses

Conclusions:

As perceived from above 3 examples in order to handle such exceptions, the following conclusions derived are as follows:

- If SuperClass does not declare an exception, then the SubClass can only declare unchecked exceptions, but not the checked exceptions.*
- If SuperClass declares an exception, then the SubClass can only declare the same or child exceptions of the exception declared by the SuperClass and any new Runtime Exceptions, just not any new checked exceptions at the same level or higher.*
- If SuperClass declares an exception, then the SubClass can declare without exception.*

Instance flow example explain in hierarchical

```
class parent {  
    parent ()  
    { s.o.p ("parent class constructor");  
    }  
    {  
        s.o.p ("Instance blocks of Parent");  
    }  
    static { s.o.p ("static block of Parent");  
    }  
}  
  
class child extends parent {  
    child () {  
        s.o.p ("child constructor");  
    }  
    {  
        s.o.p ("Instance blocks of child");  
    }  
    static { s.o.p ("static block of child");  
    }  
}
```

```
{ p.som (string args[])  
    Parent obj = new child();  
}
```

static block of Parent

static block of child

Instance blocks of Parent

parent class constructor

Instance blocks of child

child class constructor

static → Parent → child, static variable
mem allocation

instance block Parent, Constructor

instance child, child constructor

after java 8

type	Abstract class	Interface
------	----------------	-----------

Constructors	yes	No
--------------	-----	----

fields

static	yes	yes
non static	yes	no
final	yes	yes
non-final	yes	no
public	yes	yes
private	yes	no
protected	yes	no

Methods

static	yes	yes
non static	yes	no
final	yes	no
non-final	yes	yes
public	yes	yes
private	yes	yes
protected	yes	no
defaults	no	yes

when to use Interface ?

When to use Abstract class?

Reason Why Wait, Notify, and NotifyAll are in Object Class.

1. Wait and notify is not just normal methods or synchronization utility, more than that they are **communication mechanism between two threads in Java**. And Object class is the correct place to make them available for every object if this mechanism is not available via any java keyword like synchronized.

wait() Vs sleep()

Wait()

Wait() method belongs to Object class.

Wait() method releases lock during Synchronization.

Wait() should be called only from Synchronized context.

Wait() is not a static method.

Wait() Has Three Overloaded

```
public final void wait(long timeout)
```

Sleep()

Sleep() method belongs to Thread class.

Sleep() method does not release the lock on object during Synchronization.

There is no need to call sleep() from Synchronized context.

Sleep() is a static method.

Sleep() Has Two Overloaded Methods:

```
public static void sleep(long millis) throws InterruptedException
```

sleep method throw exception

2. **Locks are made available on per Object basis**, which is another reason wait and notify is declared in [Object](#) class rather than Thread class.

3. In Java in order to enter a critical section of [code](#), Threads needs lock and they wait for lock, they don't know which threads hold lock instead they just know the lock is hold by some thread and they should wait for lock instead of knowing which thread is inside the synchronized block and asking them to release lock. this analogy fits with wait and notify being on object class rather than a thread in Java.

Difference between yield and sleep in Java

The major difference between yield and sleep in Java is that `yield()` method **pauses the currently executing** thread temporarily for giving a chance to the remaining waiting threads of the same priority to execute. If there is no waiting thread or all the waiting threads have a lower priority then the same thread will continue its execution.

The yielded thread when it will get the chance for execution is decided by the thread scheduler whose behavior is vendor dependent. Yield method doesn't guarantee that the current thread will pause or stop but it guarantees that CPU will be relinquished by current Thread as a result of a call to `Thread.yield()` method in java. See [Java Concurrency in Practice](#) for more details.