CS1110 19 April 2010

Exceptions in Java. Read chapter 10.

HUMOR FOR LEXOPHILES (LOVERS OF WORDS):

Police were called to a day care; a three-year-old was resisting a rest.

Did you hear about the guy whose whole left side was cut off? He's all right now.

The butcher backed into the meat grinder and got a little behind in his work.

When fish are in schools they sometimes take debate.

A thief fell and broke his leg in wet cement. He became a hardened criminal.

Thieves who steal corn from a garden could be charged with stalking.

When the smog lifts in Los Angeles, U.C.L.A.

What happens when an error of some sort occurs?

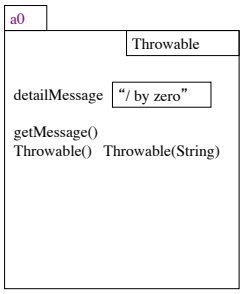
```
// String s is supposed to contain an integer.
// Store that integer in variable b.
b= Integer.parseInt(s);
```

```
/** Parse s as a signed decimal integer and return
    the integer. If s does not contain a signed decimal
    integer, throw a NumberFormatException. */
public static int parseInt(String s)
```

parseInt, when it find an error, does not know what caused the error and hence cannot do anything intelligent about it. So it "throws the exception" to the calling method. The normal execution sequence stops!

Exceptions and Errors

In Java, there is a class Throwable:



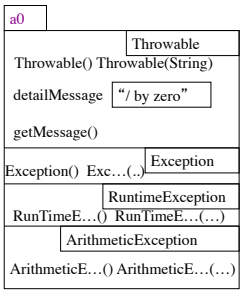
When some kind of error occurs, an exception is "thrown" —you'll see what this means later.

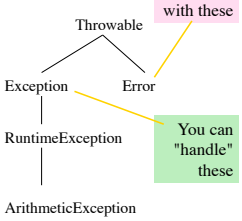
An exception is an instance of class Throwable

(or one of its subclasses)

Exceptions and Errors

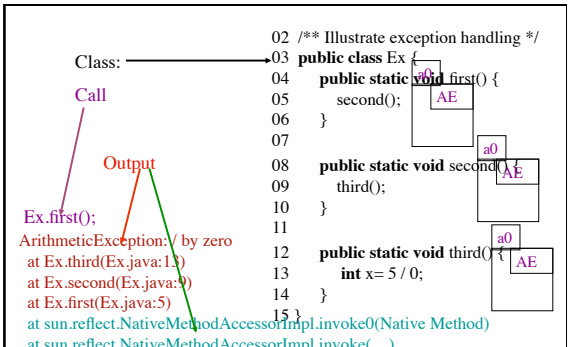
So many different kind of exceptions that we have to organize them.

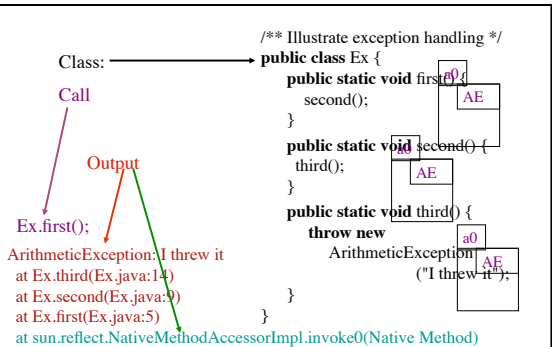




Do nothing with these

You can "handle" these





```
/** An instance is an exception */
public class OurException extends Exception {

   /** Constructor: an instance with message m*/
   public OurException(String m) {
      super(m);
   }

   /** Constructor: an instance with no message */
   public OurException() {
      super();
   }
}
```

Won't compile. Needs a "throws clause, see next slide

Class: →

```
/** Illustrate exception handling */
public class Ex {
   public static void first() {
      second();
   }
   public static void second() {
      third();
   }
   public static void third() {
      throw new
         MyException("mine");
   }
}
```

Call

Output

```
Ex.first();
ArithmeticException: mine
  at Ex.third(Ex.java:14)
  at Ex.second(Ex.java:9)
  at Ex.first(Ex.java:5)
  at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
  at sun.reflect.NativeMethodAccessorImpl.invoke(…)
  at sun.reflect.DelegatingMethodAccessorImpl.invoke(…)
  at java.lang.reflect.Method.invoke(Method.java:585)
```

The "throws" clause

```
/** Class to illustrate exception handling */
public class Ex {
   public static void first() throws MyException {
      second();
   }
   public static void second() throws MyException {
      third();
   }
   public static void third() throws MyException {
      throw new MyException("mine");
   }
```

Catching a thrown exception

```
public class Ex1 {
   public static void first() throws MyException{
      try {
         second();
      }
      catch (MyException ae) {
         System.out.println
           ("Caught MyException: " + ae);
      }
      System.out.println
           ("procedure first is done");
   }
   public static void second() throws MyException {
      third();
   }
   public static void third() throws MyException {
      throw new MyException("yours");
   }
}
```

Execute the try-block. If it finishes without throwing anything, fine.

If it throws a MyException object, catch it (execute the catch block); else throw it out further.

```
/** Input line supposed to contain one int, maybe whitespace on either
    side. Read line, return the int. If line doesn't contain int, ask user again
   */
public static int readLineInt() {
     String input= readString().trim();
     // inv: input contains last input line read; previous
     // lines did not contain a recognizable integer.
     while (true) {
        try {
           return Integer.valueOf(input).intValue();
        }
        catch (NumberFormatException e) {
           System.out.println( "Input not int. Must be an int like");
           System.out.println("43 or -20. Try again: enter an int:");
           input= readString().trim();
        }
     }
  }
```