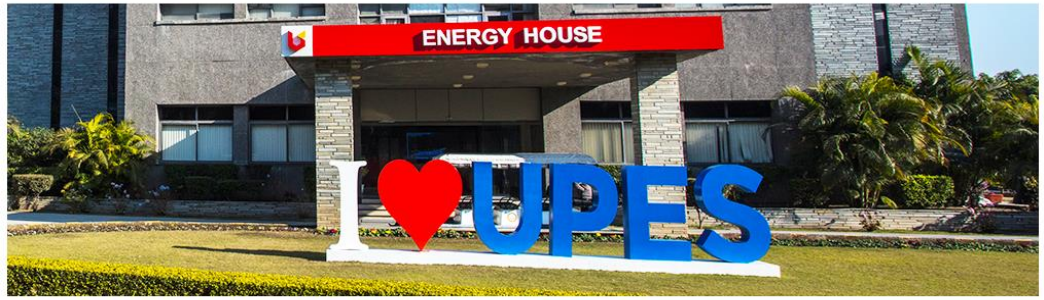

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Object Oriented Programming

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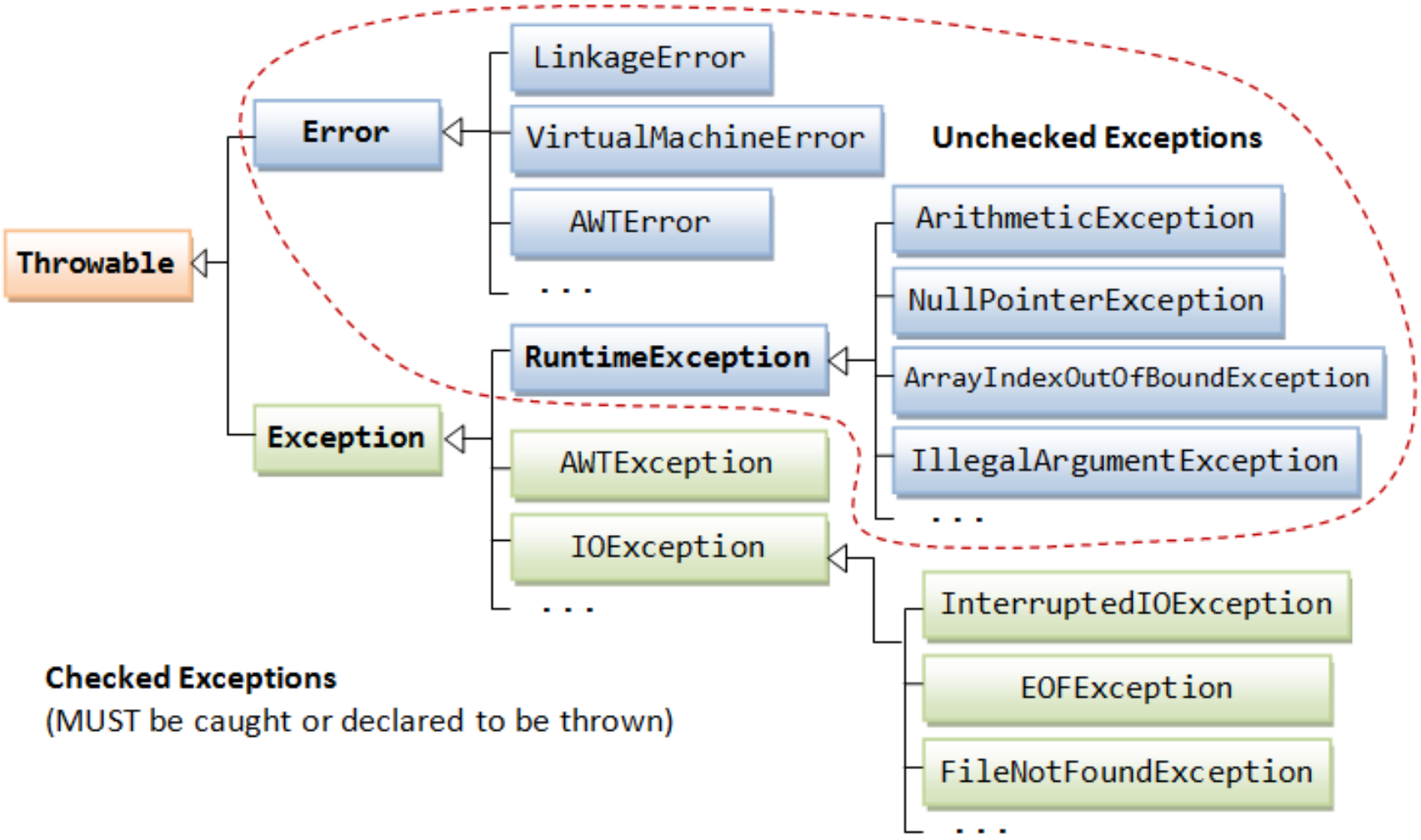
Exception Types



Source: https://www.ntu.edu.sg/home/ehchua/programming/java/J5a_ExceptionAssert.html

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Checked Exceptions

- Checked Exceptions forces programmers to deal with the exceptions that may be thrown.
- `IOException`, `SQLException`, `ClassNotFoundException` etc. are checked exceptions.
- “Checked” means they will be checked at compile time.
- Checked Exceptions are the exceptions that are checked at compile time. If some code within a method throws a checked exception, then the method must either handle the exception or it must specify the exception using *throws* keyword.

Custom Exceptions

- Java provides us facility to create our own exceptions which are basically derived classes of `Exception`.
- We pass the string to the constructor of the super class- Exception which is obtained using "`getMessage()`" function on the object created.

```
// A Class that represents user-defined exception
class MyException extends Exception
{
    public MyException(String s)
    {
        // Call constructor of parent Exception
        super(s);
    }
}

// A Class that uses above MyException
public class Main
{
    public static void main(String args[]) {
        try     {
            // Throw an object of user defined exception
            throw new MyException("UPES");
        }
        catch (MyException ex) {
            System.out.println("Caught");

            // Print the message from MyException object
            System.out.println(ex.getMessage());
        }
    }
}
```

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Java's Built-in Exceptions

Exception	Meaning
ArithmeticException	Arithmetic error, such as divide-by-zero.
ArrayIndexOutOfBoundsException	Array index is out-of-bounds.
ArrayStoreException	Assignment to an array element of an incompatible type.
ClassCastException	Invalid cast.
EnumConstantNotPresentException	An attempt is made to use an undefined enumeration value.
IllegalArgumentException	Illegal argument used to invoke a method.
IllegalMonitorStateException	Illegal monitor operation, such as waiting on an unlocked thread.
IllegalStateException	Environment or application is in incorrect state.
IllegalThreadStateException	Requested operation not compatible with current thread state.
IndexOutOfBoundsException	Some type of index is out-of-bounds.
NegativeArraySizeException	Array created with a negative size.
NullPointerException	Invalid use of a null reference.
NumberFormatException	Invalid conversion of a string to a numeric format.
SecurityException	Attempt to violate security.
StringIndexOutOfBounds	Attempt to index outside the bounds of a string.
TypeNotPresentException	Type not found.
UnsupportedOperationException	An unsupported operation was encountered.

Java's Unchecked **RuntimeException** Subclasses Defined in **java.lang**

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Java's Built-in Exceptions

Exception	Meaning
ClassNotFoundException	Class not found.
CloneNotSupportedException	Attempt to clone an object that does not implement the **Cloneable** interface.
IllegalAccessException	Access to a class is denied.
InstantiationException	Attempt to create an object of an abstract class or interface.
InterruptedException	One thread has been interrupted by another thread.
NoSuchFieldException	A requested field does not exist.
NoSuchMethodException	A requested method does not exist.
ReflectiveOperationException	Superclass of reflection-related exceptions.

The Methods Defined by Throwable

Method	Description
final void addSuppressed(Throwable *exc*)	Adds *exc* to the list of suppressed exceptions associated with the invoking exception. Primarily for use by the **try**-with-resources statement.
Throwable fillInStackTrace( )	Returns a **Throwable** object that contains a completed stack trace. This object can be rethrown.
Throwable getCause( )	Returns the exception that underlies the current exception. If there is no underlying exception, **null** is returned.
String getLocalizedMessage( )	Returns a localized description of the exception.
String getMessage( )	Returns a description of the exception.
StackTraceElement[ ] getStackTrace( )	Returns an array that contains the stack trace, one element at a time, as an array of **StackTraceElement**. The method at the top of the stack is the last method called before the exception was thrown. This method is found in the first element of the array. The **StackTraceElement** class gives your program access to information about each element in the trace, such as its method name.
final Throwable[ ] getSuppressed( )	Obtains the suppressed exceptions associated with the invoking exception and returns an array that contains the result. Suppressed exceptions are primarily generated by the **try**-with-resources statement.
Throwable initCause(Throwable *causeExc*)	Associates *causeExc* with the invoking exception as a cause of the invoking exception. Returns a reference to the exception.
void printStackTrace( )	Displays the stack trace.
void printStackTrace(PrintStream *stream*)	Sends the stack trace to the specified stream.
void printStackTrace(PrintWriter *stream*)	Sends the stack trace to the specified stream.
void setStackTrace(StackTraceElement *elements*[ ])	Sets the stack trace to the elements passed in *elements*. This method is for specialized applications, not normal use.
String toString( )	Returns a **String** object containing a description of the exception. This method is called by **println**( ) when outputting a **Throwable** object.

The Methods Defined by **Throwable**

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Write a program in Java to display the names and roll numbers of students. Initialize respective array variables for 10 students. Handle ArrayIndexOutOfBoundsExeption, so that any such problem doesn’t cause illegal termination of program.

References

Schildt, H. (2014). *Java: the complete reference*. McGraw-Hill Education Group.