2. Exception Handling :: Runtime Exceptions

A **runtime exception** is an object of the class *java.lang.RuntimeException* or one of its subclasses and runtime exceptions are a form of **unchecked exception**. Runtime exceptions are generally thrown because of bugs in the code. For example, an attempt to divide by zero will cause an instance of *java.lang.ArithmeticException* to be thrown.

```
public class DivideByZero {
  public static void main(String[] args) {
    new DivideByZero();  // Line 3
  }
  public DivideByZero() {
    int a = 10;
    for (int i = 0; i < 10; ++i) {
      System.out.print(a / i);  // Line 8
    }
  }
}
```

```
Exception in thread "main" java.lang.ArithmeticException: / by zero
  at DivideByZero.<init>(DivideByZero.java:8)
  at DivideByZero.main(DivideByZero.java:3)
```

2. Exception Handling :: Runtime Exceptions (continued)

Other examples of commonly encountered *runtimeException*s include:

java.lang.IndexOutOfBoundsException

Thrown to indicate that an index of some sort (such as to an array, to a string, or to a vector) is out of range. For example, the following code will throw an *IndexOutOfBoundsException* when i is 10 because a does not have an element at index 10 (the index of the last element is 9).

```
int[] a = new int[10];
for (int i = 0; i <= 10; ++i) {
  a[i] = 0;  // Will throw IndexOutOfBoundsException when i = 10
}
```

java.util.InputMismatchException

Thrown by a *Scanner* object when a token is retrieved that is not of the expected data type.

2. Exception Handling :: Runtime Exceptions (continued)

java.lang.NullPointerException

Thrown when an application attempts to use **null** in a case where an object is required.

```
public class NullPtr {
  public static void main(String[] args) {
    Student steve = new Student();
    System.out.println(steve.getInitials());  // Line 4
  }
}

class Student {
  private String firstName;
  private String lastName;
  public Student() {
  }
  public String getInitials() {
    return "" + firstName.charAt(0) + lastName.charAt(0);  // Line 14
  }
}
```

```
Exception in thread "main" java.lang.NullPointerException
  at Student.getInitials(NullPtr.java:14)
  at NullPtr.main(NullPtr.java:4)
```