Program Errors

zyBook 1.7

Three Types of Program Errors

- Syntax Errors / Compilation Errors
  - The code does not compile

- Runtime Errors
  - The code compiles, does not run

- Logic Errors
  - The compiles and runs, but the output is not correct

Syntax Errors / Compilation Errors

- A grammatical mistake in a program

- **Caught by** the **compiler**

- Examples:
  - Missing semicolon
  - Missing or mismatching curly braces
  - Missing keyword
  - Misspelling a keyword or identifier
  - Incorrect class name (mismatches the file name)

```
public class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello World!")
    }
}
```

```
$ javac HelloWorld.java
HelloWorld.java:3: error: ';' expected
        System.out.println("Hello World!")
                                          ^
1 error
```

Runtime Errors

- The program is grammatically correct and hence can be compiled, but the program cannot be run

- Examples
  - Missing main method
  - Incorrect spelling for main
  - Dividing by 0

```java
public class HelloWorld {
    public static void Main(String[] args) {
        System.out.println("Hello World!");
    }
}
```

```
$ javac HelloWorld.java
$ java HelloWorld
Error: Main method not found in class HelloWorld,
please define the main method as:
    public static void main(String[] args)
or a JavaFX application class must extend
javafx.application.Application
```

Logic Errors

- The program compiles and runs but it does not perform the task it is intended to perform

- Strategy → Test programs thoroughly!

```java
public class HelloWorld {
    public static void main(String[] args) {
        System.out.println("2 + 3 = " + 2 * 3);
    }
}
```

```
$ javac HelloWorld.java
$ java HelloWorld
2 + 3 = 6
```