Switch, Rounding Errors, Libraries

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Accessing Private Instance Variables

- **IMPORTANT:** Remember that methods of a class can access private elements of parameters that belong to the same class.
- Assume we have a `Student` class with a private instance variable called `name` and a method called `checking`.

```java
public boolean checking(Student p) {
    // We can access p.name here even though it is private
    // We don’t need a get method. The method `checking`
    // can access its own private instance variables and
    // also those of objects that belong to the same class
}
```
Ternary Operator

• We can rewrite your maximum method by using the ternary operator:

\[
\text{Expr} \ ? \ \text{exprValueIfExprIsTrue} : \ \text{exprValueIfExprIsFalse};
\]

• Rewriting maximum

```java
int maximum = x > y ? x : y;
```
Switch Statement

• You can use a switch statement instead of a cascaded if statement if the expression you are testing is an integer, string or enum type (to be seen later on)

• **Example:** SwitchExample.java
About Naming Constants

• If a constant is static then use uppercase letters

```
final static int MAX = 10;
```

• If a constant is not static then **do not** use uppercase letters
  • Use camel case

```
final int maxPressure = 50;
```

• **Example:** ScienceExperiment.java
Floating Point Calculations

• What is the output of the following code:

    double difference = 3.9 - 3.8;

• **Example:** FloatCalculations.java
• Floating point numbers in Java are stored in binary representation, and frequently numbers that are easily represented in base 10 cannot be represented precisely in base 2
• What can we do?
Floating Point Calculations

Two important rules:

• You can never use `==` to compare floating point values. Instead, check if two numbers are within a certain tolerance of each other:

  \[
  \text{Math.abs}((3.9 - 3.8) - 0.1) < \text{EPSILON}
  \]

• Never use floating point values to represent money, e.g., 3.52 to represent $3.52. Instead, use integer 352 to represent 352 pennies
Libraries in Java

- Library
  - Implementation of useful routines shared by different programs
- Java mechanism for creating libraries: packages
  - Package: group of related classes
  - Example: java.util (contains Scanner class)
- To create a package in Eclipse use

  File → New → Package
Libraries in Java

- To use a class from a package you can use a fully qualified name
  - Fully qualified name → package name + class name

  ```java
  java.util.Scanner s = new java.util.Scanner(System.in);
  ```

- You can also import the class in the beginning of the file

  ```java
  import java.util.Scanner;
  ```

- To import class in a package:

  ```java
  import java.util. *
  ```

  Imports Scanner as well as other classes in package
Package `java.lang`

- A special package containing widely used classes:
  - String
  - Math
  - etc.
- `java.lang.*` is automatically imported by every Java program
A class can be added to a package by including in the source file (usually very first line):

```
package <name of package>;
```

- The variables/methods provided by a class/package are often called its API (= Application Programmers Interface)
- APIs should be documented
- java.lang documentation:
  