Constants

zyBook Chap 2.16

What?

A constant is a **fixed value**

- The value of a constant can be **set only at declaration**; it **cannot be reassigned.**

Why?

- Constants help to reduce complexity by eliminating magic numbers.
  - Magic number: numbers that make the program work, but have no obvious meaning in the program.
- Constants make our programs more readable and adaptable.

Class Constants

Declare and initialize **within the class** but **outside of the method**

public static final <type> <CONSTANT_NAME> = <value>;

- **Visible to the whole class**
- Naming convention: **All uppercase** with words separated by **underscores**

```
public class ClassConstantDemo {

    /** Class constant for interest rate */
    public static final double INTEREST_RATE = 3.5;

    public static void main(String[] args) {
        // More code here...
    }
}
```

Javadoc the class constants

Constants within a Method

Declare and initialize **within the method**

final <type> <CONSTANT_NAME> = <value>;

- **Visible within the method after it is declared**
- Naming convention: **All uppercase** with words separated by **underscores**

```
public class ClassConstantDemo {
    public static void main(String[] args) {

        /** Constant for interest rate */
        final double INTEREST_RATE = 3.5;

        // More code here...
    }
}
```

```java
import java.util.Scanner;

public class ReceiptInteractive {

    /** Class constant for tax rate, 7% */
    public static final double TAX_RATE = 0.07;
    /** Class constant for tip rate, 18%*/
    public static final double TIP_RATE = 0.18;

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        // Ask the user to enter the subtotal
        System.out.print("Enter the subtotal: ");

        // Read in the user input and store into subtotal
        double subtotal = input.nextDouble();

        double tax = subtotal * TAX_RATE;
        double tip = subtotal * TIP_RATE;
        double total = subtotal + tax + tip;

        System.out.printf("%-12s $%7.2f%n", "Subtotal", subtotal);
        System.out.printf("%-12s $%7.2f%n", "Tax", tax);
        System.out.printf("%-12s $%7.2f%n", "Tip", tip);
        System.out.printf("%-13s$%7.2f%n", "Total", total);
    }
}
```

```
$ javac ReceiptInteractive.java
$ java ReceiptInteractive
Enter the subtotal: 108.0
Subtotal     $ 108.00
Tax          $   7.56
Tip          $  19.44
Total        $ 135.00
```