Topics: Java fundamentals, DrJava demo

Reading (JV): Sec 1.3, 2.0-2.5

Java Program Structure

In the Java programming language:
• A program is made up of one or more classes
• A class contains one or more methods
• A method contains program statements
A Java application always contains a method called main

```java
// Hello World: a first program
// Authors: millions of programmers
public class Hello {
    public static void main(String[] args) {
        System.out.println("Hello, world!");
        System.out.print("Hey ");
        System.out.println("you!");
    }
}
```

Comments

// this comment runs to the end of the line
/* this comment runs to the terminating symbol, even across line breaks */
/* Here is a nicer looking (?) comment format * that many programmers use. */

Variable, Declaration, Assignment

• Variable must be declared: specify variable's name and type of information that will be held in it
• Multiple variables can be created in one declaration statement
• Can give variable an initial value in the declaration

```java
int total;  // declaration
int count, tmp, result;
int sum = 0;  // combine declaration, assignment
int base=32, max=149;

final int MIN_HEIGHT = 149;  // declare a constant and assign value
```
**Primitive Data: 8 types**

Four types of integers: **byte, short, int, long**
Two types of floating point numbers: **float, double**
One character type: **char**
One logical type: **boolean** (only two valid values: **true, false**)

We will use only four primitive types in CS100M: **int, double, char, boolean**

**Integer Division and Remainder Operator**

If both operands to the division operator `/` are integers, the result is an integer.

The remainder operator `%` is an arithmetic operator that returns the remainder after dividing the second operand into the first.

**The Math class**

A collection of basic mathematical functions. See Lewis & Loftus p. 84 for details.

```java
double tmp = Math.exp(1);
tmp = 3*Math.sin(2);
tmp = Math.random();
tmp = Math.floor(Math.random());
```

**Data Conversion** (not covered in lecture—read section 2.4)

*Widening conversions* are safest: go from small data type to larger one (e.g., a **short** to an **int**).
*Narrowing conversions* can lose information: go from large data type to smaller one (e.g., an **int** to a **short**).

*Assignment conversion*: a value of one type is assigned to a variable of another type

*Arithmetic promotion*: operators in expressions convert their operands

*Casting*: explicit conversion by specifying the type desired