Topics: Parts of a Java program; types; variable, declaration and assignment; DrJava demo
Reading: **(Java text)** Chapter 1 (exclude pp 36-42 on Classes & String methods), Sec 2.1

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`**

```
// Our first Java program  (What does it do?)

public class Mystery {

  public static void main(String[] args) {


    System.out.print( (12-32)*5/9.0 );

  }

}
```

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.
 */
```

Type

A type is a set of values along with a set of operations on those values. E.g., the set of *integers*

{…, -2, -1, 0, 1, 2, …}

along with the arithmetic operations

\+ - * / %

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 four primitive types most of the time: **`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.

Variable, Declaration, Assignment

- A 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
- In an assignment statement, the expression on the right is evaluated and the result is stored in the variable on the left
- Can declare a variable and assign an initial value to it in one statement.

```
int total;               // declaration
int count, tmp, result;
total= 200;              // assignment
int sum= 0;              // combine declaration and assignment
int base=32, max=149;

final int MIN_HEIGHT = 149;  // declare a constant and assign its value
```

Data Conversion

Arithmetic promotion: operators in expressions convert their operands

Casting: explicit conversion by specifying the type desired

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

Widening conversions are safe: 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`**).

The `Math` class

A collection of basic mathematical functions.

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

The `boolean` type

Represent conditions or states *true* or *false*. There're only two valid values for **`boolean`** type: **`true`**, **`false`**.
Relational operators: <, >, <=, >=, ==, **!=**
Logical operators: &&, ||, **!**