Chapter 3: Variables and Arithmetic

- Numeric (primitive) data types

  - declaring

  - precision

  - assignment

    * literal constants

      · shortcut casting (using `d, l` and `f`)

      · scientific notation

    * cascading assignments

    * memory diagrams

    * contrast with object assignments

      · copying a primitive type variable (*e.g.* `x = y`) copies
        the *value* of the right-hand variable into the left-hand
        variable (overwriting whatever was in the left-hand
        variable to begin with); copying an object variable

makes the left-hand variable point to the *same* object as the right-hand variable — the object itself is not copied.

∗ losing and gaining precision

· losing precision causes compiler error (unless casting is used)

· gaining precision is OK

- Arithmetic

  – `+`, `-` (unary and binary), `*`, `/`, `%`, `()`

  – order of operations (precedence)

  – examples (p. 97)

  1. $3 + 5/7$
  2. $3 * 3 + 3\%2$
  3. $3 + 2/5 + -2 * 4$
  4. $2 * (1 + -(3/4)/2) * (2 - 6\%3)$

5. $(3 + 5)/7$

6. $(3 + 5)/(\texttt{float})7$

7. $(\texttt{float})((3 + 5)/7)$

8. how do we write $\frac{-b(c+34)}{2a}$?

- The JDK `Math` class

  - example of a *library* class

  - no need to instantiate or import

  - contains useful math functions:

    * `log(double)`
    * `pow(double, double)`
    * `abs(int)`, `abs(long)`, `abs(float)`, `abs(double)`
    * `sqrt(double)`
    * `(a)sin(double)`, `(a)cos(double)`, `(a)tan(double)`

  - how do we write $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$?

More Javabook Classes

- InputBox

  - constructor takes "parent" `MainWindow` object
  - `getXXX()` and `getXXX(String)` methods
    * `XXX = Double, Float, Integer, String`
    * optional argument is prompt `String`
  - pops up window (with optional prompt), and waits for use to enter an appropriate piece of data

- OutputBox

  - constructor takes "parent" `MainWindow` object
  - `print(<type>)` and `printLine(<type>)` methods
    * `<type> = boolean, char, double, long, String`
  - `skipLine(int)` method
  - the `'\n'` character causes text to move to start of next line