



Values, Variables, and Types

Chapter 2

For Next Time



- Read Chapter 2
- Don't forget to come to lab this week
 - Your laptops are welcome, and we can make sure Java and DrJava are properly installed and working (install via CD instead of over the 'net)
 - Please stop by HSC 116 (the General Computing Lab) sometime **before** your lab meets to make sure you can log in OK
 - Be sure to read Chapter 2 **before** your lab meets

Numeric Values



- Integers

- int, long, short, byte, char

- Floating point

- float, double

- Limitations of numeric values

Nonnumeric Values

- Boolean

- `boolean`

- String

- `String`

- Objects

- Programmer defined types

The Primitive Types

Name	Meaning	Range	Size
byte	byte	$-128 \dots +127$	8 bits
short	short integer	$-32,768 \dots +32,767$	16 bits
char	Unicode character	$0 \dots +65,536$	16 bits
int	integer	$-2,147,483,648 \dots +2,147,483,647$	32 bits
long	long integer	$-9,223,372,036,854,775,808 \dots +9,223,372,036,854,775,807$	64 bits
float	single-precision floating point	$\pm 3.4 \times 10^{+38} \dots \pm 1.4 \times 10^{-45}$ with at least 7 decimal digits of precision	32 bits
double	double-precision floating point	$\pm 1.7 \times 10^{+308} \dots \pm 4.9 \times 10^{-324}$ with at least 15 decimal digits of precision	64 bits
boolean	Boolean	false or true	8 bits

Scientific Notation



- Floating point values can be expressed in exponential form
- 4.7×10^{-5} is expressed as $4.7e-5$
- Use e instead of E to improve readability

Variables and Assignment



- Variables store values
- The assignment operator (=) assigns a value to a variable
- Declarations
 - Java programs: all variables within a program must be declared
 - DrJava Interactions environment: variable declaration is optional (type deduced from the assignment)

Constants



- “Variables” that do not change
- The `final` specifier denotes a constant
- Compiler ensures a constant will not change
- Attempts to modify a constant results in an error

Identifiers



- Used to name variables
 - Used to name other things, also
- Must start with a letter, underscore, or \$
 - Java style says don't use underscore or \$
- The rest of the name can a mixture of letters, underscores, \$'s, and digits
- Java is case sensitive
- The exceptions?

Java's Reserved Words

abstract
boolean
break
byte
case
catch
char
class
const
continue
default
do
double

else
extends
false
final
finally
float
for
goto
if
implements
import
instanceof
int

interface
long
native
new
null
package
private
protected
public
return
short
static
strictfp

super
switch
synchronized
this
throw
throws
transient
true
try
void
volatile
while

Reserved Words

- Also called *keywords*
- You'll find a list in Chapter 2
- You may not use a reserved word as an identifier (e.g., variable name)
- No need to memorize them
 - The compiler will let you know if you use one accidentally

Type Conversions



- `int` → `double`, is this OK
- `double` → `int`, is this OK?
- Use a *cast* if you know it is safe to use it
 - Note: casting truncates



Arithmetic expressions