

Writing a Java Program

Introduction
to
Programming

Laura Hobbes
LeGault

Review

Numeric
Variables

Expressions
with variables

User Input

Last time, we learned about the basic structure of a Java program. To review:

- 1 What are the basic building blocks of a Java program?
- 2 What are the parts of the Hello World program we looked at?

With a partner: write a program that prints out the product of 17 and 36.

Writing the same program - with variables!

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Quick review - what is a variable? What three things does it have? (draw a picture!)

How can we modify our program ($17*36$) to use variables?

Variable Names

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Definition

*Another word for a variable's name is its **identifier**. Identifier also refers to the name of a method, class, package, interface... anything with a name in your program.*

Convention: variables start with a *lower-case letter*, e.g. `myLength` or `film_name`.

Note: some words are *reserved* (you can't use them for variable names)!

Variable Values

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Assigning values to variables requires the = operator:

```
int x = 2;
```

```
double y = 3.5;
```

```
x = x+1;
```

```
y = 5;
```

NO: `x = 2.3;` (why not? how do we do this?)

Let's Practice

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Task: Write a program to calculate and output the surface area of paper in a ream of printer paper.

Relevant numbers:

- 1 paper dimensions: 8"x11"
- 2 number of sheets of paper in a ream: 500

Constants

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Some variables *don't* vary - they're called **constants**.

⇒ **Note:** 5 does not change its value, but it is a *literal*, not a constant.

Syntax: `final int MY_CONST = 5;`

What constants would be appropriate in the paper program?

Making Code Readable: Comments

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Adding comments makes code easier to read:

```
/* variable declarations */  
int l = 8; // length  
int w = 11; // width
```

```
/* calculate area */  
int a = l*w;  
System.out.println("Area = " + a);
```

The compiler ignores these; they're just for the programmer.

Expressions have two parts: *operators* and *operands*.

- 1 Math operators: $+$, $-$, $\times$, $\div$ become $+$, $-$, $*$, $/$
- 2 Integer division: $1/3 = ?$
- 3 Modulo: $5\%3 = ?$
- 4 Increment/decrement: $x++$; or $x--$;
- 5 Compound assignment: $x = x+1$ becomes $x += 1$

Using methods as expressions

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What about more complex operations, like powers or roots?

1 5^2 becomes `Math.pow(5,2)`

2 $\sqrt{25}$ becomes `Math.sqrt(25)`

Making Variables Variable

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We can do output *to* the user, how about input *from* the user?
Before your class declaration, include a new line:

```
import java.util.Scanner;
```

Inside your code, declare a new Scanner so you can use it:

```
Scanner in = new Scanner(System.in);
```

Using Scanner

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To read in an integer:

```
Scanner in = new Scanner(System.in);  
System.out.print("Enter an integer: "); // why?  
int x = in.nextInt();
```

To read in a double:

```
Scanner in = new Scanner(System.in);  
System.out.print("Enter a double: "); // why?  
double y = in.nextDouble();
```