



CS 113 – Computer Science I

Lecture 2 – Variables, Operators Expressions

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Announcements

- Assignment 00
 - Survey
 - Fortune.java
 - Submit on dropbox.
 - Note: make sure to name your file “Fortune.java” (case sensitive)
- Office hours:
 - TA: Sunday – Thursday 6-10pm (Park 231)
 - Prof Poliak – Wednesday 10-11am (Park 220C)
 - Prof Normoyle – Wednesday 4-5pm (Park 200B)



Agenda

- Announcements
- Recap
 - Interacting with a program
- Data Types & Variables
- Expressions & Operators

Interacting with a program

```
7 public class Ask{
8
9     public static void main(String[] args){
10         System.out.println("What is your name?");
11         String name = System.console().readLine();
12         System.out.println(name + ", how are you doing?");
13     }
14
15 public class Ask{
16
17     public static void main(String[] args) {
18         // Print out the first argument to the command line
19         System.out.println("Hello World " + args[0]);
20     }
21 }
22
```

Interacting with a program

```
7 public class Ask{
8
9     public static void main(String[] args){
10         System.out.println("What is your name? ");
11         String name = System.console().readLine();
12         System.out.println(name + ", how are you doing?");
13     }
```

Interacts with user when running

```
14 public class Ask{
15
16     public static void main(String[] args) {
17         // Print out the first argument to the command line
18         System.out.println("Hello World " + args[0]);
19     }
20 }
```

Uses a command line argument

Data Types

- Way to store information in programs
- `int`: whole numbers
- `double`: numbers with decimal points
- `String`: anything between quotations

Variables - Holders for values

- `String greeting;`

- Creates a variable called “greeting” that can store a string

- `int a, b, c;`

- Creates 3 variables that can store integers

- `a = 3;`

Assignment statement

- `int d = 10;`

Declaration & Assignment statement
Best Practice!

Declaration
statements:
Do not store any value

Variables - Holders for values

- `String greeting;`

- Creates a variable called “greeting” that can store a string

- `int a, b, c;`

- Creates 3 variables that can store integers

- `a = 3;`

- `int d = 10;`



These values are called
“literals”

Variable Examples

a	b	c
-	-	-

Variable Examples

- `int a, b;`

a	b	c
-	-	-

Variable Examples

- `int a, b;`

a	b	c
undefined	undefined	-

Variable Examples

- `int a, b;`
- `String c = "Serena";`

a	b	c
undefined	undefined	-

Variable Examples

- `int a, b;`
- `String c = "Serena";`

a	b	c
undefined	undefined	-
undefined	undefined	"Serena"

Variable Examples

- `int a, b;`
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Variable Examples

- `int a, b;`
- `String c = "Serena";`
- `a = 3;`
- `b = a;`

a	b	c
undefined	undefined	-
undefined	undefined	"Serena"
3	undefined	"Serena"

Variable Examples

- `int a, b;`
- `String c = "Serena";`
- `a = 3;`
- `b = a;`

a	b	c
undefined	undefined	-
undefined	undefined	"Serena"
3	undefined	"Serena"
3	3	"Serena"

Rules for naming variables

- Case sensitive
- Can't:
 - start with a number
 - Contain special characters: *, +, -, /, %, \$, #, etc.
 - No spaces
 - Special words:
 - `String, int, main, for, while, ...`

Converting Types (Numbers)

- Double to integer:
 - `(int) 3.14;`
 - `int a = (int) 3.14; //` Store the converted double in a var
- Storing an integer as a double:
 - `double b = 6;`

Converting Types (Strings & Numbers)

- Integer to String

- `int a = 23;`

- `String numMajors = String.valueOf(a);`

- String to integer

- `int x = Integer.parseInt("40");`

- String to double

- `double a = Double.parseDouble("40.11");`

Operators & Expressions

- Examples of operators:

- +, -, /, *, %

- Expression

- 55 + c



Operator

Operands

Order of operations

- $24 + 10 / 2;$
- $(24 + 10) / 2;$

- Operations between floats and ints:
 - $1 / 3$
 - $1 / 3.0$

Math utilities

- `Math.round(40.11);`
- `Math.cos(0);`
- `Math.sqrt(9);`
- `Math.random();`

Exercise:

Expression	Value	Data Type
-4		
3.76		
"42.64"		
10 + 3.3		
9 - 5 * 1		
"hot" + "dog"		

Exercise: Miles to Kilometers

- `java MilesToKMs`

Enter distance in miles: 50

The distance in KMs is 80

Conditionals

A new data type: Booleans

- Contains two possible values:
 - `true; false;`
 - `bool isWet = true;`
- Conditional expression

Conditional Expressions & Relational Operators

- Conditional expression produces either `true` or `false`
- Relational Operators:
 - `>`
 - `>=`
 - `<`
 - `<=`
 - `==`
 - `!=`

Exercise: relational expressions

```
int temp = 68;
```

```
double val = 10.5;
```

```
boolean raining = true;
```

Expression	Value	Type
temp > 80		
val != 5.6		
val >= 10.1		
raining == true		
raining		
raining == false		

Logical Operators

- Way to combine Boolean expressions
- logical Operators:
 - `&&`
 - `||`
 - `!`