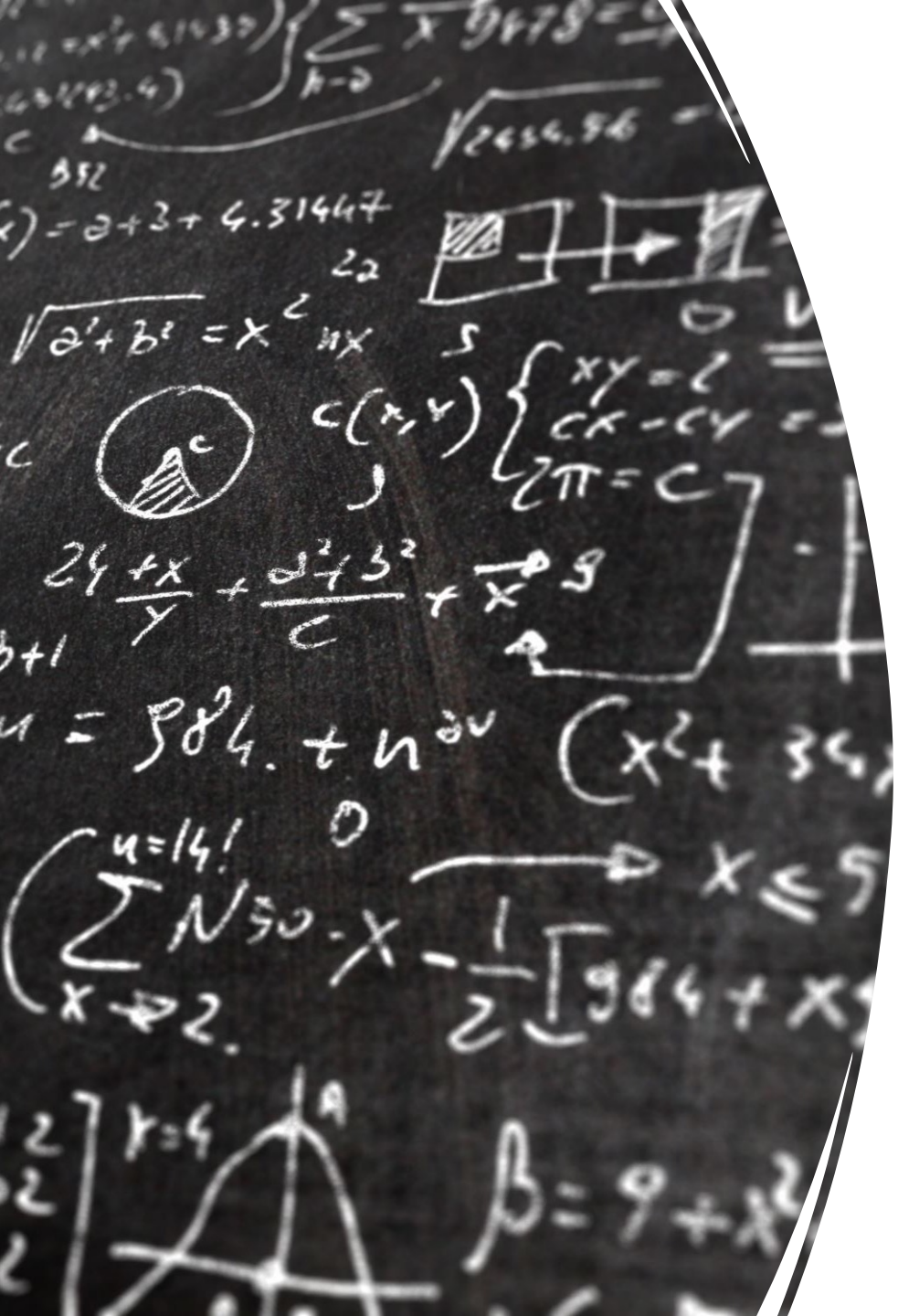


CS 113 – Computer Science I

Lecture 2 – Data Types, Variables, Expressions

Adam Poliak

01/19/2023

Announcements

- Assignment 00 – due Monday night
  - Survey
  - Fortune.java
  - Errors
  - *What is CS: Not about Computers, Not Science*

- Office hours:
  - Prof Poliak – Today 2:30-3:30pm (Park 200C/D)
  - TAs: still TBD

Policies

- Weekly homeworks:
  - No late assignments will be accepted
    - Reach out earlier for an extension if needed (email)
    - Emergencies happy, I'll work with you
  - Dropping lowest homework

- Labs:
  - Graded solely on effort
  - Checkpoints throughout the lab where the TA needs to check off your work
  - Allowing 1 unexcused absence
  - Partners
    - Switch partners every 3 weeks

Agenda

- Announcements
- Recap
- Data Types
- Variables
- Expressions
- Operators

What are the errors here?

```
public clas SyntaxErrors {

        public static void main(String args) {
                System.out.println(“Hello World);

        }
```

A simple java program

```
1 // A java program to print a message
2 public class HelloWorld {
3
4    public static void main(String[] args) {
5       // Prints out message to standard output
6       System.out.println("Hello World!");
7    }
8 }
```

Recap

- Print a message to output
  ```
  System.out.println("Hello World!");
  ```
- Terminal commands
  - List files
    - `ls`
  - Move directories
    - `Cd`
  - Print the path to working directory
    - `pwd`
  - Compile a java program
    - `javac <java file>`
  - Run a java program
    - `java <class name>`

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;`
- `int d = 10;`

Declaration statements:
Do not store any value

Assignment statement

Declaration & Assignment statement
Best Practice!

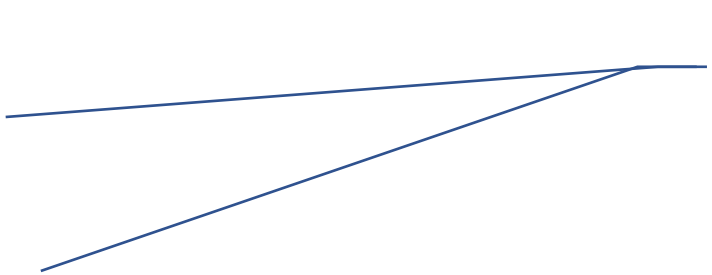
Variables - Holders for values

- `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;`



What are these (3 & 10) called?

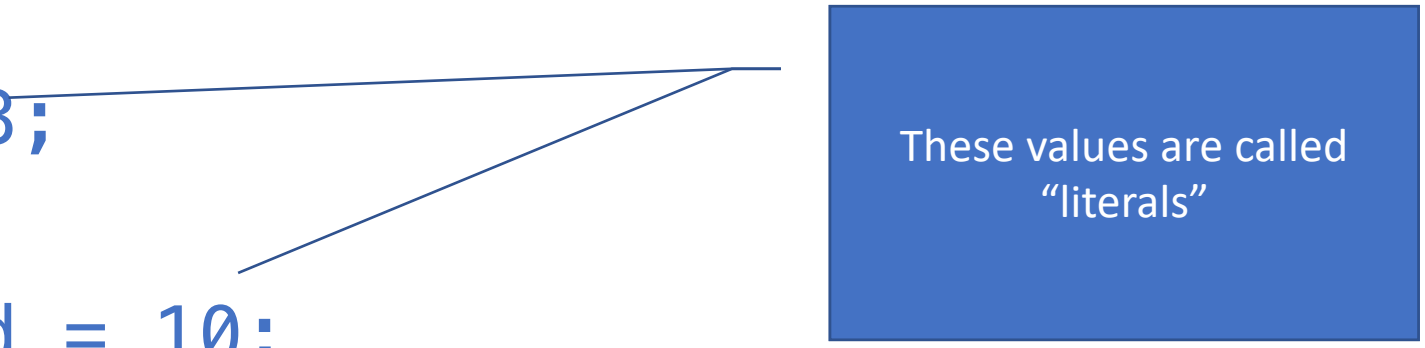
Variables - Holders for values

- `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;`



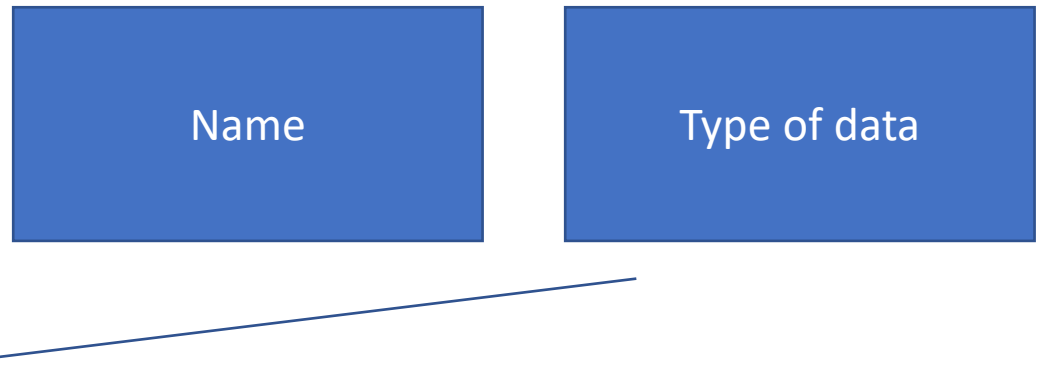
Properties of Variables

Variables have the following properties:

- Names
- Type of Data
- Location
  - Where on the computer the variable is stored

Example:

```
String greeting;
```



Printing Variables

- `int d = 10;`

- Creates 3 variables that can store integers

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;`
- `String c = “Serena”;`
- `a = 3;`

a	b	c
undefined	undefined	-
undefined	undefined	“Serena”

Variable Examples

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

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”

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”

Variable Examples

- `int a, b;`
- `String c = “Serena”;`
- `a = 3;`
- `b = a;`
- `a = 5;`

a	b	c
undefined	undefined	-
undefined	undefined	“Serena”
3	undefined	“Serena”
3	3	“Serena”

Variable Examples

- `int a, b;`
- `String c = “Serena”;`
- `a = 3;`
- `b = a;`
- `a = 5;`

a	b	c
undefined	undefined	-
undefined	undefined	“Serena”
3	undefined	“Serena”
3	3	“Serena”

Variable Examples

- `int a, b;`
- `String c = “Serena”;`
- `a = 3;`
- `b = a;`
- `a = 5;`

a	b	c
undefined	undefined	-
undefined	undefined	“Serena”
3	undefined	“Serena”
5	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)

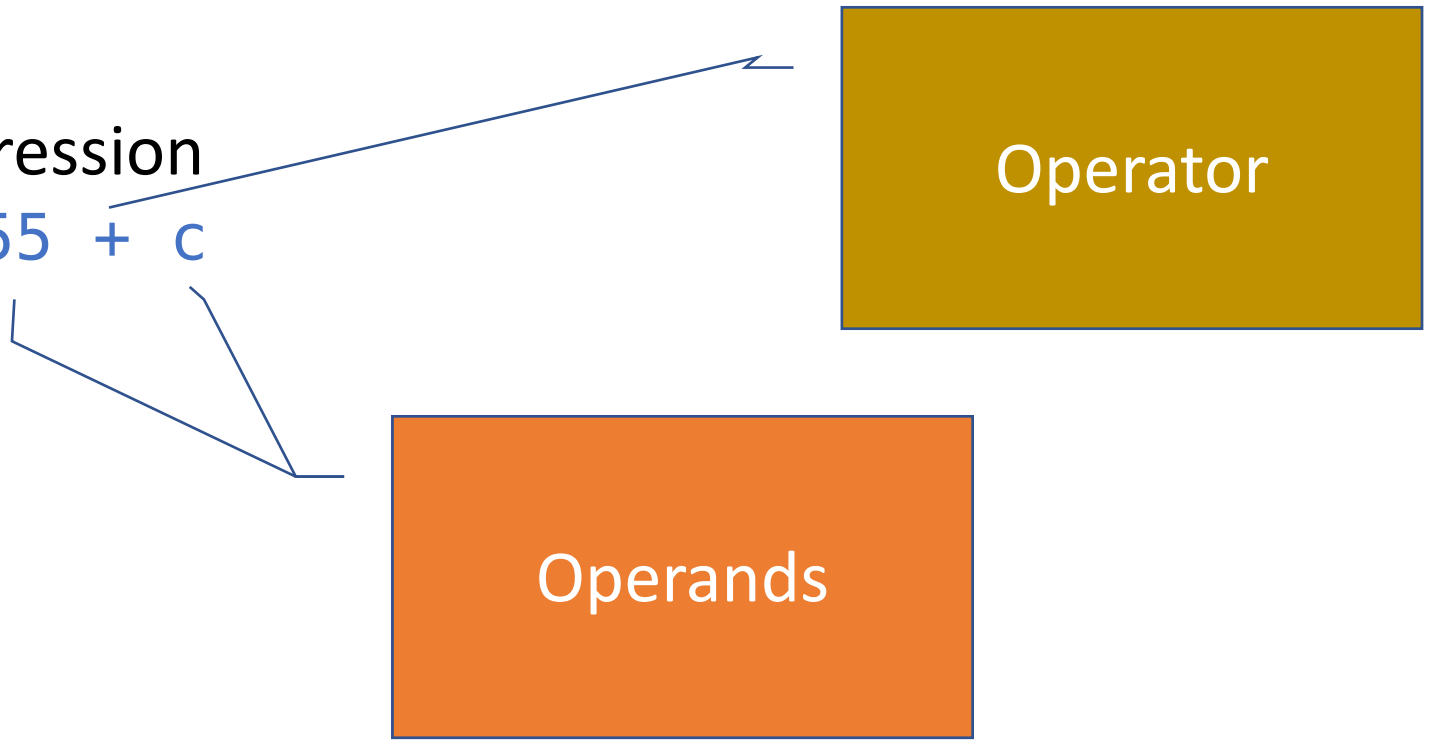
- Integer to String
  - `int a = 23;`
  - `String numMajors = String.valueOf(a);`

- 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`



Order of operations

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

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

String Operators (Textbook: 2.8)

What is the term for combining strings together?

- Concatenation

What is the concatenation operator?

- +

Exercise:

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

Exercise: Miles to Kilometers

- java MilesToKMs

  50 miles is 80 kilometers

Summary

- Data Types
- Variables
- Memory diagrams
- Operators