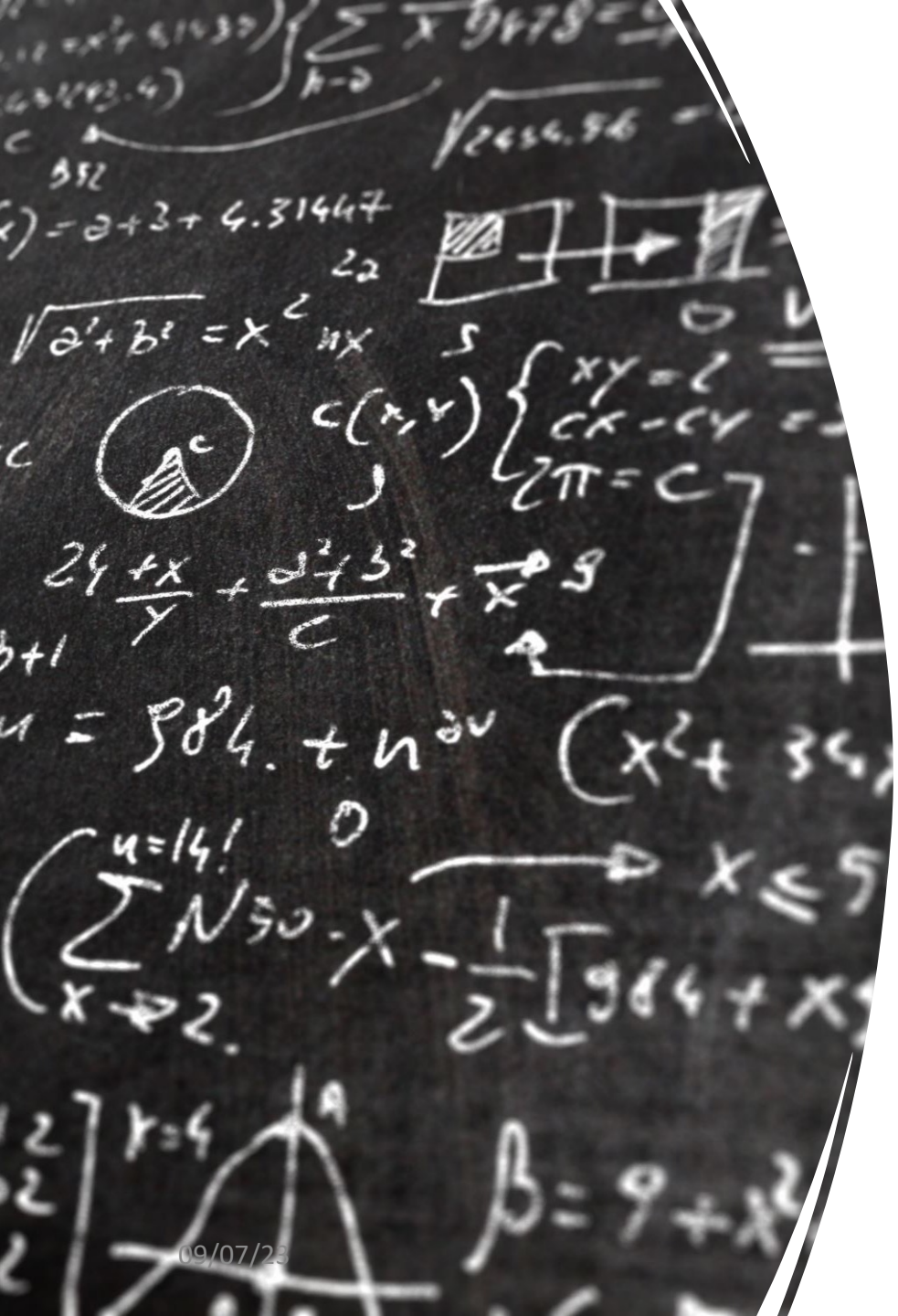


CS 113 – Computer Science I

Lecture 02 – Data Types, Variables, Expressions

Thursday 09/07/2023

Announcements

- HW00 – due Monday midnight
  - Survey
  - Growith-mindset
  - Fortune.java
  - Errors
  - *What is CS: Not Computers, not Science*
  - Submit on gradescope
- Office hours:
  - Monday: 2:45-4:00pm
  - Tuesday: 9:30-10:45am (I'll try to get there by 9:15)

Outline

Review

Reading in data

Data Types

Variables

Expressions

Operators

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 }
```

What are the errors here?

```
public clas SyntaxErrors {

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

        }
```

Navigating Linux Directory

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>`

Folders & Directories

- Computer is structured as a folder-system.
  - Folders (directories) can contain files and other directories
- Organizing programs in directories
- special directories:
  - .. (double dot) - parent directory

Reading in data

- Way to communicate to our program by passing data to our program
- System.console.readline();

Storing Data

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!

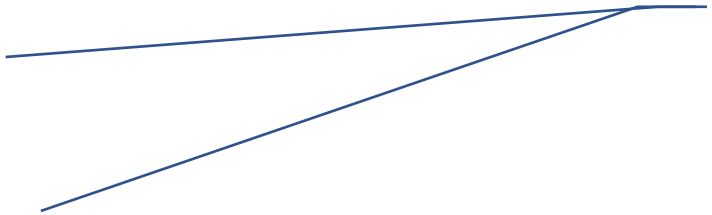
Variables - Holders for values

- `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?

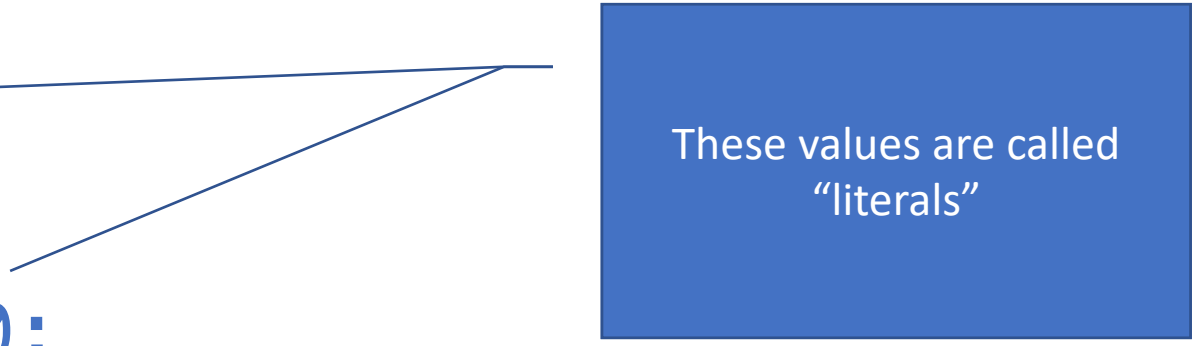
Variables - Holders for values

- `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;`



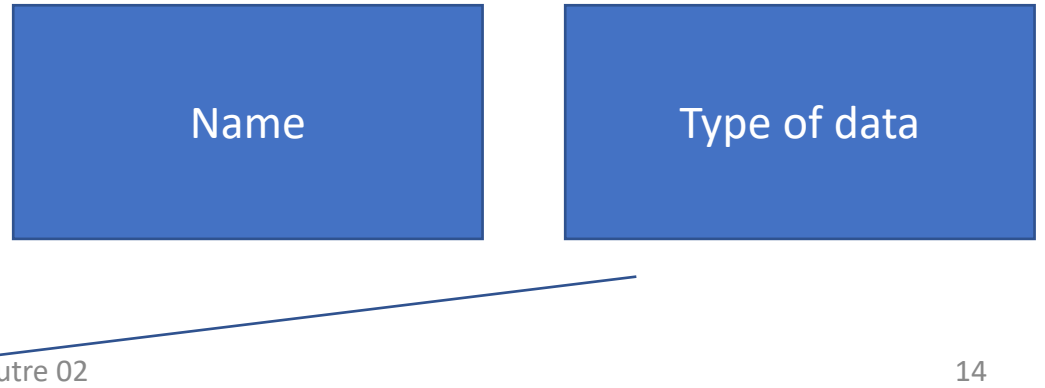
Properties of Variables

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 = “Coco”;`

a	b	c
undefined	undefined	-

Variable Examples

- `int a, b;`
- `String c = “Coco”;`

a	b	c
undefined	undefined	-
undefined	undefined	“Coco”

Variable Examples

- `int a, b;`
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Variable Examples

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

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

Variable Examples

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

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

Variable Examples

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

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

Variable Examples

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

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

Variable Examples

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

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

Variable Examples

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

a	b	c
undefined	undefined	-
undefined	undefined	“Coco”
3	undefined	“Coco”
5	3	“Coco”

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

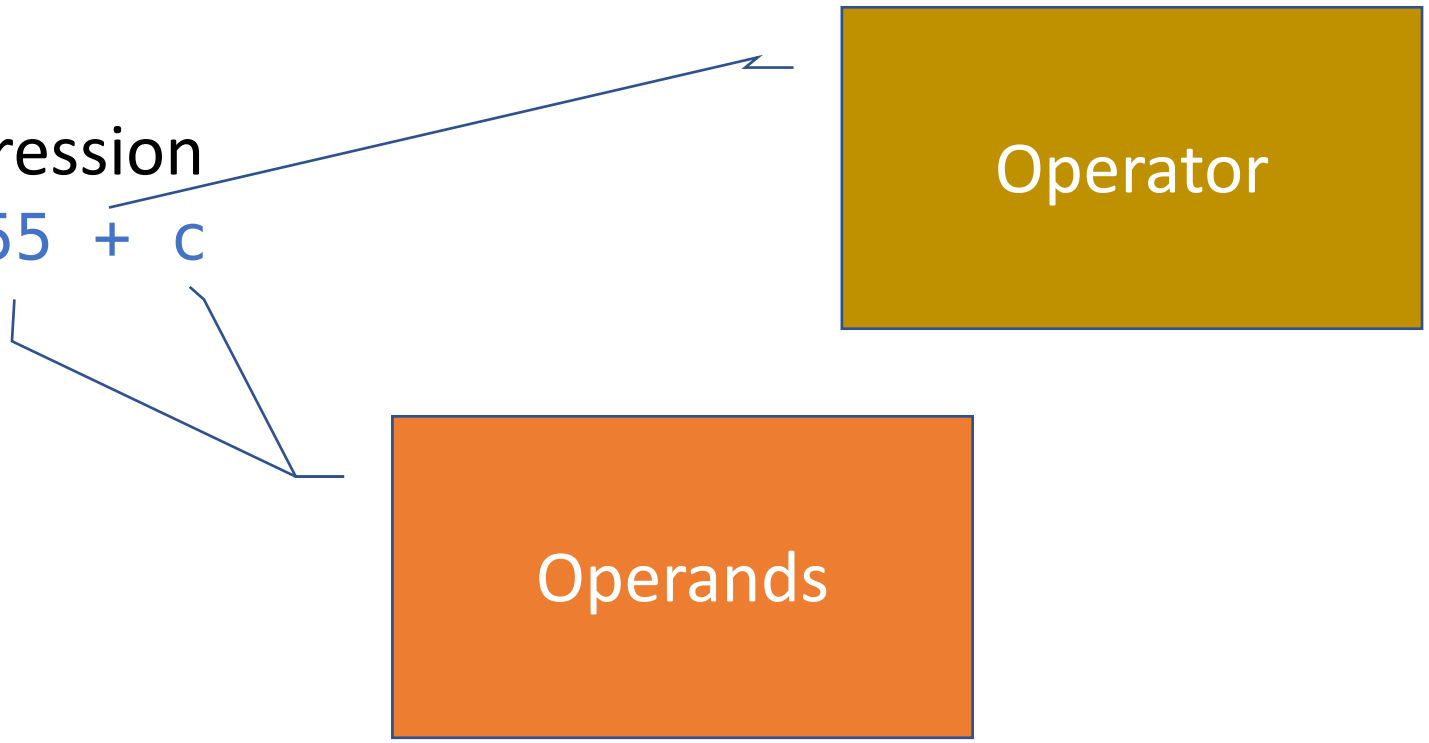
- Storing an integer as a double:
  - `double b = 6;`

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

Write a program called MilesToKMs.java that asks a user for miles and then prints out the distance in kilometers

- java MilesToKMs

  50 miles is 80 kilometers