CSE 20
Intro to Computing I

Lecture 2 – Output in Java

Data Types

Variables

Announcements

- Output in Java, Data Types and Variables
- Labs
  - Lab 1 due this week (9/15 – 9/21) with an additional 3 days grace period
  - Lab 2 (Getting to Know Everything) assigned this week
    - Due in one week (plus additional **3 days** grace period)
    - Make sure to demo your work to a TA (or me) after submission
    - Demo is REQUIRED to receive credit for assignment
- Reading Assignments
  - Reading 01 (1.1 – 1.11, 2.1 – 2.5) due Sep 23
  - Reading 02 (2.6 – 2.18, 2.20) due Oct 7
    - Complete Participation Activities in each section to receive grade towards Participation
    - IMPORTANT: Make sure to **submit score to CatCourses** by using the link provided on CatCourses

Extra Credit

- Up to 5 percentage points of total grade
- Based on completion of challenge activities of reading assignment sections
  - 20% complete = 1% of total grade
  - 40% complete = 2% of total grade
  - 60% complete = 3% of total grade
  - 80% complete = 4% of total grade
  - 100% complete = 5% of total grade
- Scores evaluated at the end of semester

PEER ASSISTED LEARNING SUPPORT

- Go to **learning.ucmerced.edu**
- Click on **“Programs”**
- Scroll down and click on **Peer Assisted Learning Support (PALS) to find out more**
- Click on the **“Learning Support Schedule”**

OR

use this shortcut to go straight to the schedule:

http://bit.ly/PALS_Schedule

“Peer Assisted Learning Support,
Your learning community.”

What is Computing?

- The discipline of computing is the systematic study of algorithmic processes that describe and transform information: their theory, analysis, design, efficiency, implementation, and application. The fundamental question underlying all computing is '**What can be (efficiently) automated?**'

Perfect for lazy people!

- Computer program: a sequence of actions we want a machine (computer) to perform
  - Think about a list of chores from your parents

How well do you know …

- What type of files do you have in your computer?
  - Essays in Word Documents?
    - 25-100 KB (Kilo-Bytes)
  - Music - MP3's?
    - 3-5 MB (Mega-Bytes)
  - Movies – mov, mp4?
    - 2-4 GB (Giga-Bytes)
- How fast is your internet connection?
  - DSL
    - 356 Kbps to 6 Mbps (Kilo-/Mega-bits per second)
  - Cable
    - ~ 6-200+ Mbps
- How long does it take to download 5 MB file using DSL of 1 Mbps?

Need to convert Bytes into bits!

What are they?

What's in a bit?

- Could be two values :
  - 0 or 1 (On or Off)
- How many values would 2 bits take on?
  - 00
  - 01
  - 10
  - 11
- In computer, information is always stored as power of 2's
  - Digital system
  - N bits → 2^N possible values
- Byte is the basic unit in computer storage
  - 1 Byte = 8 bits
  - 5 MB = 40Mb (it requires 40 sec to download using DSL of 1 Mbps)
- Will learn more about numbers in next lecture

Your first Java code: outputs in Java

- Outputs: ways a computer to communicate with us
  - Displays (monitors), printers, speakers…
- To display a statement on a monitor:

```
System.out.print("Test print");
```

Output:

```
Test print     (Doesn't end with a newline)
```

Outputs in Java

- Outputs: ways a computer to communicate with us
  - Displays (monitors), printers, speakers…
- To display a statement on a monitor:

```
System.out.print("Test print");
System.out.println("Test println");
```

Output:

```
Test printTest println   (Ends with a newline)
```

Outputs in Java

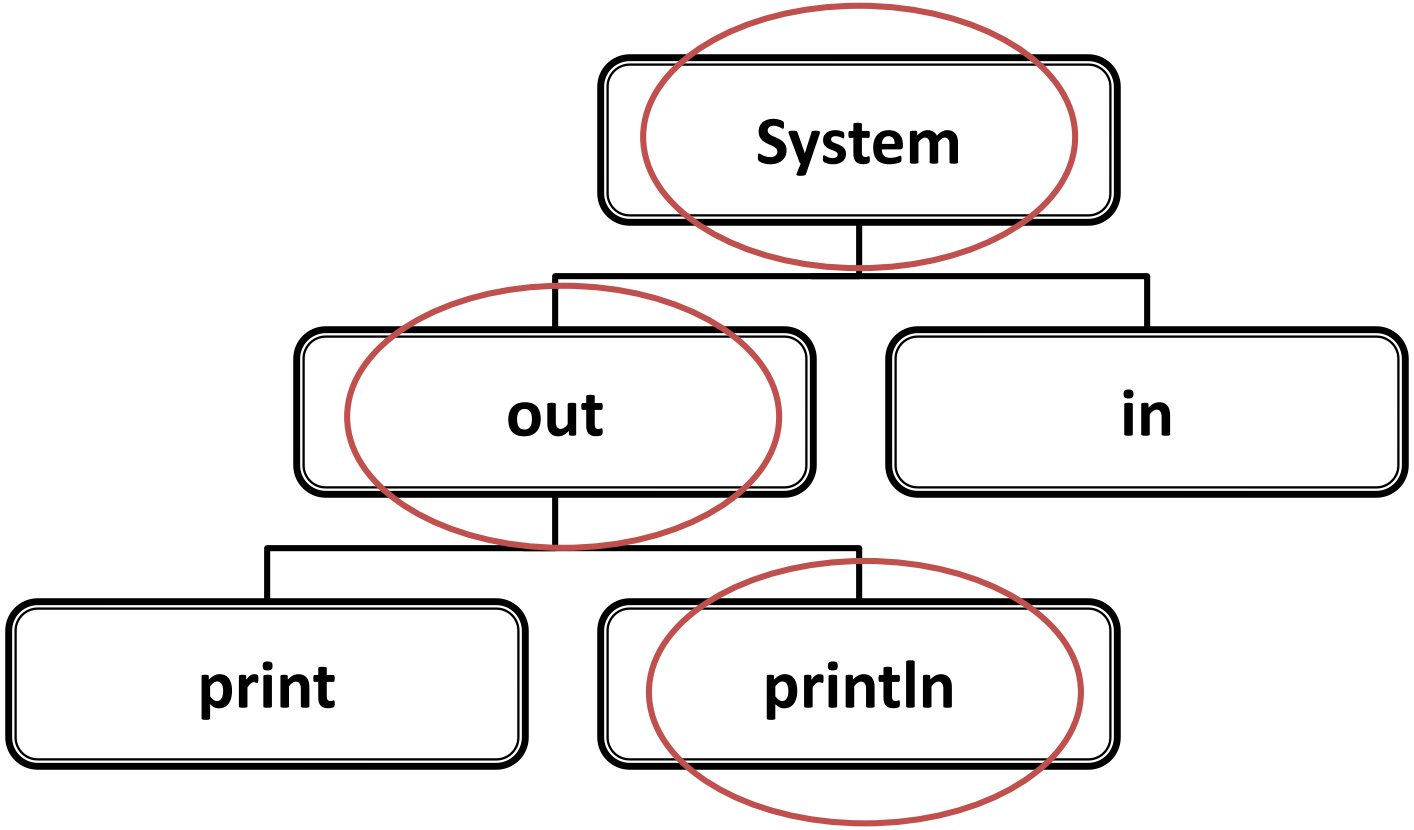
- Outputs: ways a computer to communicate with us
  - Displays (monitors), printers, speakers…
- To display a statement on a monitor:

```
System.out.print("Test print");
System.out.println("Test println");
System.out.print("Done");
```

Output:

```
Test printTest println
Done
```

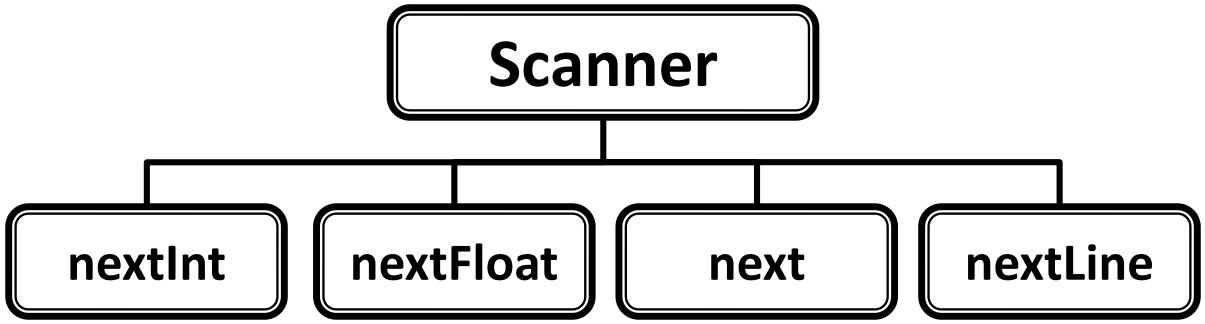
System Objects in Java




```
System.out.println("World");
```

Input from keyboard – Scanner

- We can interact with the program using input devices:
  - **Keyboards**, mice, microphones




```
Scanner input = new Scanner(System.in);
input.nextInt();
input.nextFloat();
input.next();
input.nextLine();
```

We will learn more about this in future labs

Data Types

- **boolean**: 1-bit
  - 2 values, range : 0-1
- **byte**: 8 bits (2 bytes)
  - 2^8 values, range : -128 to 127
- **short**: 16-bits (2 bytes)
  - 2^{16} values, range : -32,768 to 32,767
- **char**: 16-bits (2 bytes)
  - 2^{16} values, range : 0 to 65,535
- **int**: 32-bits (4 bytes)
  - 2^{32} values, range : -2,147,483,648 to +2,147,483,647
- **float**: 32-bits (4 bytes)
  - Scientific format : $\pm 3.4 \times 10^{\pm 38}$
- **long**: 64-bits (8 bytes)
  - 2^{64} values, range : -2^{63} to $+2^{63} - 1$
- **double** : 64–bits (8 bytes)
  - $\pm 1.7 \times 10^{\pm 308}$
- **String** : Any length (string of characters)

Numbers: Operations

Arithmetic operator	Description
+	addition
-	subtraction
*	multiplication
/	division
%	modulo (remainder)

Using Numbers

Using Numbers

- Add names/identifiers to each as a way of referring to them.

Using Numbers

- Add names/identifiers to each as a way of referring to them.
  - They can be any word.
  - Try to choose the names that **make sense**.

Variables

- Add names/identifiers to each as a way of referring to them.
  - They can be any word.
  - Try to choose the names that make sense.
- Need to know the data types.

Variable Names are Case Sensitive

- MAIN
- Main
- main
- mAin
- maIn
- maiN
- mAIn
- MaiN
- Everything above is a different “word”!

Variable Naming Convention

- Begin with letter or _
- Class (program) names capitalized
  - Averages
  - FirstProgram

  UpperCamelCase
- Variable names
  - Begins with lowercase letter
    - main
    - average
    - result
  - Combining words
    - toUpper
    - toUpperCase
    - theSquare

    lowerCamelCase