CMSC 131
Object-Oriented Programming I
Scanner, Conditionals, Logical Op
Dept of Computer Science
University of Maryland College Park

This material is based on material provided by Ben Bederson, Bonnie Dorr, Fawzi Emad, David Mount, Jan Plane
Overview

- Scanner
- Programming errors
- Debugging
- Conditionals
- Logical Operators
User Input in Java

- We've done output (System.out); what about input?
- Java 5.0 includes the **Scanner class** feature
  - Can use Scanner to create “scanner objects”
  - Scanner objects convert user input into data
- To use Scanner need to *import* a library:
  
  ```java
  import java.util.Scanner;
  ```
To create a scanner object:

```java
new Scanner(input_source);
```

- Input source can be keyboard (System.in), files, etc.
- Object must be assigned to a variable (e.g. sc)

### Operations

- `nextBoolean()`
- `nextByte()`
- `nextDouble()`
- `nextFloat()`
- `nextInt()`
- `nextLong()`
- `nextShort()`

- `next()` Returns sequence of characters up to next whitespace (space, carriage return, tab, etc.)

- `nextLine()` Returns sequence of characters up to next carriage return

**Example:** Scanner1.java, Scanner2.java
Objects

- About Scanner
  - `Scanner` is a class defined in `java.util.Scanner`
  - `System.in` is a predefined `object` for keyboard input
  - `sc = new Scanner(System.in)` creates a new `object` in the `Scanner` class and assigns it to `sc`

- Object?
  - A bundle of data (`instance variables`) and operations (`methods`)
  - A class defines both instance variables and methods for objects
  - A class is also a type for objects
  - `new` creates new objects in the given class

- We will learn (much) more about objects later
Programming Errors

- Syntax error
  - Violates language’s grammar
  - Compiler will catch them
  - Eclipse makes red squiggles under your code
- Run-time errors (exceptions in Java)
  - Something unexpected happens during program execution (e.g., dividing by 0, file not found)
- Semantical/logical errors
  - Program does not generates expected results
  - Can be challenging to uncover
Debugging

- Process of finding and fixing problems
- Important rule while writing programs and to avoid debugging: Incremental Code Development
- Incremental code development
  - Write a little bit, test thoroughly and continue
- Suggestions about writing computer programs can be found on the class web page (Resources section under “Suggestions for Writing Computer Programs”)
- A document about debugging essentials can be found on the class web page (Resources section under “Learning the Essentials of Debugging”)
Control Flow and Conditionals

- Control flow → the order in which statements are executed
  - General rule → top to bottom
  - Several Control Structures that change that
- Conditional statements → permit control flow to be dependent on (true/false) conditions
  - if
  - if-else
**if and if-else**

The if and if-else statements have the following forms:

- if `(condition)` {
  
  statements;

  }
  
  ◦ tests the condition
  ◦ if true statements are done; otherwise they are skipped

- if `(condition)` {
  
  statements1;

  }
  
  else {
  
  statements2;

  }
  
  ◦ tests the condition
  ◦ if true, statements1 is done; otherwise statements2 is done

**Example:** SimpleIf.java, SimpleIfElse.java
Logical Operators

Used for forming more complex conditions.

- **“and”** `&&`

  ```java
  if ( temp >= 97 && temp <= 99 ) {
      System.out.println( "Patient is healthy" );
  }
  ```

- **“or”** `||`

  ```java
  if ( months >= 3 || miles >= 3000 ) {
      System.out.println( "Change your oil" );
  }
  ```

- **“not”** `!

  ```java
  if ( ! phone.equals( "301-555-1212" ) ) {
      System.out.println( "Sorry, wrong number" );
  }
  ```

- Example: LogicalOps1.java, LogicalOps2.java