Last Class

CSC 1051 – Data Structures and Algorithms I

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Course website:
www.csc.villanova.edu/~map/1051/

Some slides in this presentation are adapted from the slides accompanying Java Software Solutions by Lewis & Loftus
We learned

- Fundamental algorithms
  - processing lists
  - finding max/min
  - repeated interactive input
- Fundamental data structures
  - Classes that aggregate information (eg: Account, Book, Person)
  - Strings
  - Arrays
- The basics of Java
We studied many ways of controlling flow through a program...

**while Loop**

```
int count = 0;
while (count < 5)
{
    System.out.println (count);
    count++;
}
```

**do Loop**

```
int count = 0;
do {
    System.out.println (count);
    count++;
} while (count < 5);
```
We studied ways to structure data

• **Declaration:**
  
  ```java
  double[] scores = new double[10];
  ```

• **Initialization:**
  
  ```java
  scores[0] = 7.9;
scores[1] = 8.7;
scores[2] = 9.4;
scores[3] = 8.2;
scores[4] = 6.7;
scores[5] = 9.8;
scores[6] = 8.7;
scores[7] = 8.1;
scores[8] = 7.4;
scores[9] = 9.1;
  ```

• **Instantiation:**

  This array holds 10 values of type `double` that are indexed from 0 to 9
  
  The size of the array is given by:
  
  ```java
  scores.length = 10
  ```

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We wrote classes that work together

- Example: managing a collection of DVD objects

```java
Movies.java

+ main (args : String[]) : void

DVDCollection.java

- collection : DVD[]
- count : int
- totalCost : double

+ addDVD(title : String, director : String,
  year : int, cost : double, blu-ray : boolean) : void
+ toString() : String
- increaseSize() : void

DVD.java

- title : String
- director : String
- year : int
- cost : double
- blu-ray : boolean

+ toString() : String
```
We played around with GUIs and Applets
We ran a lot of programs!

```java
/**
 * Stars.java    Author: Lewis/Loftus
 *
 * Demonstrates the use of nested for loops.
 */

public class Stars {
    public static void main(String[] args) {
        final int MAX_ROWS = 10;

        for (int row = 1; row <= MAX_ROWS; row++) {
            for (int star = 1; star <= row; star++)
                System.out.print("*");

            System.out.println();
        }
    }
}
```

Output

```
* 
** ***
**** *****
****** *******
**************
*************
*************
************
***********
**********
*********
```
The basics of Java

- style
- comments
- identifiers
- variables
- constants
- assignment statement
- primitive types
- objects
- classes
- packages
- methods
- assignment
- arithmetic ops
- boolean ops
- casting

- algorithms
- comparison
- aliases
- formatting output
- instance variables
- visibility
- scope
- static
- return statement
- if-else
- while
- for
- do/while

- GUI classes
- Graphics
- Applets
- file input
- arrays
- arrays of objects
- 2D arrays
- from the Library
  - Strings
  - Scanner
  - Random
  - Math
  - GUI classes
- etc etc etc
So now we understand…

• What an algorithm is…
• How data can be represented and used…
• The basics of Java…
• What programming is …
• What object-orientation is …
• A little about computer architecture
• A way of thinking
• If we like computer science
  … or not
Final Exam

- Mendel 213, Monday Dec 17, 11:30am-2pm

- **Review session:** Mendel G86,
  Friday Dec 14, 10am -12pm.
Effect of Review Sessions

Numbers of students getting A’s, B’s, C’s and D’s or F’s

Disclaimer: This chart is totally made-up, but I needed a visual way of conveying the importance of review sessions. Although it is not based on actual data, it paints a pretty accurate picture of my observations teaching this course.
Final Exam

• Similar to quizzes and midterm .. but longer
• Same material:
  – algorithms
  – writing and using classes
  – tracing code
  – coding: proper naming, indentation but commenting not needed
    • statements
    • code fragments
    • methods
    • classes
• Partial credit available
  – Be legible
  – Check your work (eg, double check that you have the right type)
• Don’t get stuck
  – Don’t write more than you are asked to write