CSCI 1301 Lecture 40

What we will cover:
Project 10: Tic-Tac-Toe
Semester Review

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See Williams10Basic.java and Williams10Advanced.java

Semester Review
You are responsible for all material in the covered book chapters (1-7, 20), all lecture notes on the website, all class exercises, and all previous exams. Just because a topic is not mentioned in the following outline does not mean you will not be tested on it.

- Chapter 1 – Computers
  - Computer Basics (Hardware, Software, OS, WWW, etc.)
  - Java Language, API, JDK, and IDEs
    - Definitions, purpose
  - Simple Java Programs
    - Keywords, main method, types of comments
  - Creating, Compiling, and Running Java programs
    - Eclipse IDE, source code, byte code, JVM, JOptionPane
- Chapter 2 – Simple Programs
  - Algorithms for writing programs
  - Identifiers, Variables, Constants, Primitive Data Types
  - Assignment, Operators (including modulo division), Shorthand Operators
  - Input and Output with Console and GUI
  - Naming Conventions, Indention and Spacing
  - chars and Strings, Unicode, ASCII
  - Type Conversion and type casting
  - Programming Errors
    - Types of errors (syntax, runtime, logic), debugging techniques
- Chapter 3 – Selections
  - Boolean data type and operations
    - true, false, Logical NOT, AND, OR, XOR
  - Comparison operators (<, <=, >, >=, ==, !=)
  - Control structures
    - if statements, if-else, if-else if
    - nested if statements
    - switch statements
    - ternary operator (condition ? true: false)
    - Structure and common errors (braces, grouping, parentheses, semi-colons, etc.)
  - String and output formatting (System.out.printf())
- Chapter 4 – Loops
  - while loops
  - Loop design – Sentinels and counting loops
  - Swaps
  - Input and output redirection at the command-line
  - do-while and for loops
  - pre-test vs. post-test loops
  - Which loop to use, switching between loops
  - Variable Scope
• Chapter 5 – Methods
  o Method headers, parameter lists, return types, signatures
  o Defining and invoking (calling) a method
  o Call stacks
  o Void vs value-returning
  o Pass by value vs. pass by reference
  o Overloading methods, variable scope (again)

• Chapter 6 – Arrays
  o Declaring and creating arrays
    ▪ Initialization, default values
  o Array index variables (zero-based, accessing, etc.)
  o Processing arrays (length property, for loop, copying arrays)
  o Methods and arrays
    ▪ Passing and returning arrays
    ▪ Pass by reference
  o Variable length argument lists (... in parameter list)
  o Searching arrays
    ▪ Linear search, binary search
  o Sorting arrays
    ▪ Bubble sort, selection sort, insertion sort

• Chapter 7 – Two-Dimensional Arrays
  o Declaring and creating 2d arrays
  o Length property of 2d arrays
  o Ragged 2d arrays
  o Processing 2d arrays (nested for loop, copying 2d arrays)
  o 2d arrays and methods

• Misc Topics
  o String comparison (.equalsTo, .compareTo, etc.)
  o Command-line arguments
  o String versions of searches and sorts

• Chapter 20 – Recursion
  o Recursion
  o Recursive methods
    ▪ Factorial, Fibonacci numbers, Palindromes
    ▪ Selection sort, binary search
    ▪ Towers of Hanoi