Announcements:
- If you are joining the class for the first time today after passing the CS 101 competency exam, the course web site is: 
  Carefully review the information on this site, particularly the syllabus on the main page and the schedule.
  a. Follow the link for Blackboard on that site and see the videos of last week's lectures (See Course Documents --> Class Recordings )
  b. Send me an email indicating that you've registered late for the class, and at the end of the semester if last week's missing lab/quiz/Codelab grades make a difference in your final grade, then I will make an adjustment.

- When you install Java on your own machine, use Java version 6, not 7. There are some compatibility problems between Eclipse and Java 7

- I'm assuming that you now have an iClicker. We will start using them today, and use them for a grade starting Wednesday.

How many times have you been arrested?

A  B  C  D  E

1  2  3  4+  

Clicker: How far are you on your Scratch program #1?

nothing done

A  B  C  D  E

- How prepared do you feel for this course?

Not at all

Extremely

- Program #2 has been posted, for those already done with program #1

- Lab this week: write a simple program using variables, if statements, input/output, a while loop

Questions?

Last Time:

Simple Java programs

Today:

Important facts to remember using basic Java constructs:
Important facts to remember using basic Java constructs:

- **Variables:**
  - remember to use camelCaseLikeThis
  - use a type cast when forcing a result into another compatible type
    
    E.g.
    ```java
    int dollars = 3;
    float interestRate = 0.10;
    dollars = (int) (dollars + (dollars * interestRate));
    // type incompatibility problem
    // How to fix this?
    ```

- **Comments:** You can nest single-line comments using // inside multi-line comments using /*...*/

- **Precedence:** when there is any doubt, use parenthesis. See the course web page for the precedence table. Note the difference in precedence between prefix and postfix.
  
  You probably remember the ++ operator, as well as the -- operator. Consider the difference precedence makes in the statements:
  ```java
  int x=3;
  int y=7;
  int z;
  z = x+++y;
  ```
  Consider the last line shown above. Which of the following two is it?
  - `z = (x++)+y;`  // postfix has precedence
  - `z = x+(++y);`  // prefix has precedence

- **Constants:** Use capitalization to denote constants. E.g.
  ```java
  final int WEIGHT_INCREMENT = 20;
  ```
  Pasted from [link]

- **The easiest way to format floating point numbers is using System.out.printf(...)**
  E.g.
  ```java
  System.out.printf("New amount is: %4.2f", savings);
  ```
  Pasted from [link]
- Simple Input and Output

See the **Scanner class example** on the course web site:

```java
import java.util.Scanner;
public class ConsoleScannerInput {
    public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);
        System.out.print( "Enter your first name: " );
        String first = keyboard.next(); // read a string
        System.out.print( "Enter your last name and your age: " );
        String last = keyboard.next(); // read a string
        int age = keyboard.nextInt(); // read an integer
        System.out.println( "Hello " + first + " " + last);
        System.out.printf( "In one year you will be %d years old", age + 1);
    }
}
```

- **Strings:**
  - To display a " character as part of the output, put a backslash in front of it, as in:
    ```java
    System.out.println("That is a \"nice\" program."); // Output: That is a "nice" program
    ```
  - Use the `.length()` method to find the length of a String
  - Use the `.equals()` method to compare two strings

- The **if** statement

  ```java
  if (expression) {
    action;
  }
  ```

  - Comparison (aka relational) operators:

    | Operator | Meaning       |
    |----------|---------------|
    | `<`      | less than     |
    | `>`      | greater than  |
    | `!=`     | not equal to  |
    | `==`     | equal to      |
Multiple Condition check:
We can also test for multiple conditions using if-else-if as follows (braces have been omitted for brevity):

```java
if (expression1)
    action1;
else if (expression2)
    action2;
else if (expression3)
    action3;
else
    defaultAction;
```

Note that since we are using this structure to represent choice between options all at the same level (e.g. "choose one of the following 3 menu options:"), we indent them all the same. If the checks for expressions 2 and 3 were logically inside the first else, we would indent as follows:

```java
if (expression1)
    action1;
else
    if (expression2)
        action2;
    else if (expression3)
        action3;
else
    defaultAction;
```

In this way we use indentation to represent the logical organization of our code.

Common Problems:

```java
boolean x = false;
if (x = true) {
    System.out.println("x is true");
} else {
    System.out.println("x is false");
}
```
int num = keyboard.nextInt();
if (num>=3)
  if (num==3)
    System.out.print("Is three.");
else
  System.out.print("Less than three. ");
System.out.println("Done.");

Does the else belong with the if on line 2, or the if on line 3?

/* Illustrating the switch statement

Assume a program that prompts for your weight on earth and then
gives you a menu of planet numbers to choose from for converting your weight
to what it would be on that planet. One approach is to use multiple if statements:

// Calculate weight on desired planet given earthweight and chosen planet
if (menuOption==1) {
  planetWeight = earthWeight * 0.39; // Mercury
}
else if (menuOption==2) {
  planetWeight = earthWeight * 0.91; // Venus
}
else if (menuOption==3) {
  planetWeight = earthWeight * 0.38; // Mars
}
else {
  planetWeight = earthWeight - 1; // marketing ploy
}

Instead, we can use the "switch" statement shown below:
*/

switch ( menuOption) {
  case 1: planetWeight = earthWeight * 0.39; // Mercury
    break;
  case 2: planetWeight = earthWeight * 0.91; // Venus
    break;
  case 3: planetWeight = earthWeight * 0.38; // Mars
    break;
  default: planetWeight = earthWeight - 1; // Earthweight - 1
            // People like to think they're losing weight (marketing)
    break;
}

cout << " Your new weight is " << planetWeight "\n";
Note that *switch* cannot be used with variables of type *String* or *float*.

- **Boolean Operators:**
  Inside an expression we can also use the following *boolean operators*:
  
<table>
<thead>
<tr>
<th>&amp; &amp;</th>
<th>And</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

  Pasted from <https://sites.google.com/site/learnjav/java/if-statement>

- **Note the alternative to using boolean operators:**

- **Short circuit operators in Java:**

  ```java
  if ( (kids != 0) & & ((numberOfCookies/kids) >= 2) ) {
      System.out.println("Please, only take two cookies each.");
  }
  ```