Input and Output
Remote access links on webpage

Maybe Wednesday class canceled?
- Will post announcement
System.out

System.out is an object (specifically a constant)

You can use this like any other object (see RenameSystemOut.java)

System.out has methods we have used frequently, such as: println()
printf (formatted output)

println() displays output to screen, but has no options about format

printf() is more complicated version of print() (the non-newline version of println() )

printf() uses a format specifier in place of concatenating numeric values with strings (See: Printf.java)
printf (formatted output)

Format specifiers:

%d = Integers
%f = Casual (normal) decimal numbers
%e = Scientific notation
%g = Computer decides %f or %e
%s = Strings
%c = Character

(can google it)
printf (formatted output)

Additional modifiers between the % and the format specifier character.

double ratio = 33.0/18;
System.out.printf("%5.2f", ratio);

5 = Minimum width
2 = Number of decimal places shown
printf (formated output)

Multiple formats:

System.out.printf("%f by %f", base, height);

printf arguments:
1. The formatted string to display (no newline)
2. The variable for first format specifier in arg 2
3. The variable for second format specifier in arg 3
4. The variable for third format specifier in arg 4
...

(See: PrintfFormating.java)
Output and input

C:\> If you're happy and you know it, syntax error!
Syntax error

C:\> If you're happy and you know it, syntax error!
Syntax error

C:\> If you're happy and you know it, and you really want to show it, if you're h
appy and you know it, syntax error!
Syntax error

C:\> _
Input from keyboard

Need to **import** Scanner class (library)

After **importing**, you can create objects with type Scanner (much like String)

Example: (Mindlessly copy text after equals)  
Scanner input = new Scanner(System.in);
Where to import?

```java
package classproject;

// Imports go here!
import java.util.Scanner;

cpyublic class InClass {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
    }
}
```
The created Scanner object (input) now has useful methods for getting keyboard input:

- `nextInt()` - reads the next integer
- `nextDouble()` - reads the next double
- `next()` - reads the next word
- `nextLine()` - reads until you hit return (newline character)

Example: `String read = input.nextLine();`
Example and errors

Now you can get input from keyboard! (See: BasicInput.java)

If the type of input expected and what the user types is incompatible, you will get a runtime error

This would happen if the user input “James” when asked for weight
Pitfalls

You must be careful when using anything but `nextLine()`

Any whitespace (space or enter) will denote a new input

In `BasicInput.java` when asked your favorite color, if you type: `green 713` you will set `gravitationalForce` to 713
Pitfalls

The `next___()` command will only pull off the appropriate type, then stop.

Any input remaining will stay in a “buffer” and can be immediately picked up by the next `next___()` command.

Must be careful with using `nextLine()` after another input, such as `nextInt()`.
Madlibs

(see: Madlibs.java)