

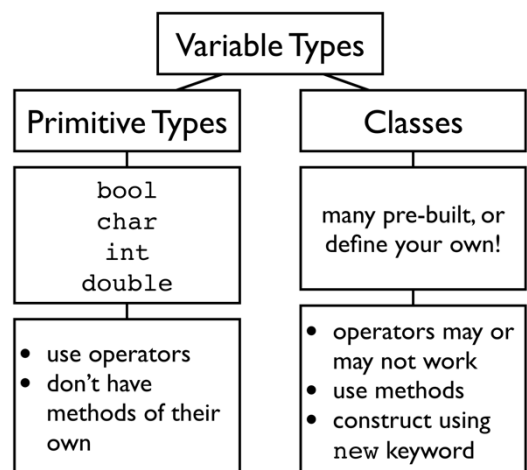
## Section #2: Lesson Plan

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This week, we're diving into Java in section for the first time. The main goal of section is getting students to understand control flow (as a sequence of steps the computer takes, including repeats and conditions) and variables (as named and typed 'boxes' that can store values).

### Key Concepts

- Console vs. graphics programs
- Variable types (see diagram at right, and maybe even copy it onto the board)
  - Classes – introduced because of GObjects. Don't need to go into full detail about them yet; just the points at right are all they need.
- Constants vs. local variables
- Variable scope
- Declaring, instantiating, accessing, and modifying variables
- For loops: nesting, using the counter, modifying step size, sentinel loops
- Operator precedence & Boolean logic
- Parameter(s) → method → return value



### Lecture Recap

Here's quick summaries of the relevant lectures for this week's section. Please check out the slides in full if you haven't been in lecture.

4. Variables
  - Variables as named boxes that you can put values into and read values from
5. Control flow in Java
  - Booleans, operator precedence, using for loop variables
6. Nested for loops + Graphics
  - Boolean logic, nested for loops, scope, intro to graphics & GRects
7. Methods part 2
  - Graphics, parameters, return values, decomposition, scoping
8. Tracing
  - Using the debugger, stepping through code, variable state & scope

## **Simple Java Problem(s)**

We have a sequence of problems this week that will hopefully solidify some of the key concepts above and help students as they work on Assignment 2. The handout is in priority order; our suggested section timeline starts with looking at problem 1 from a high level and using it to iron out major conceptual issues in students' understanding, and then applying those concepts to solve problem 2. Problem 3 switches gears a bit but exposes students to graphics in a very similar way to what they've been asked to do on Assignment 2 (i.e. centering a GLabel), so it would be great if you could at least get through these three! If there's time, the Robot Face is fun and really hammers home different GObjects, decomposition, and the arithmetic necessary to position things according to specification.

### **Mystery Calculation**

This is where students' more basic confusion about variables and loops will come up. If they blast through this, awesome, but if not, feel free to slow down a bit here and make sure people are on the same page. If a student really appears to be struggling, though, and the section isn't moving on to solving problems, feel free to tell them to ask you more after section or suggest that they go to Clair.

### **Fibonacci**

Hopefully they'll be clear in theory on a lot of the relevant concepts because of some fruitful discussion in the previous problem. This will give them a chance to apply those concepts to actually solving the problem. This problem can get a little bit tricky if students don't understand how reassigning the variables works, and there's also multiple ways to solve it. If you're feeling like they need it, slow down and make sure everyone understands the premise and is approaching it correctly.

### **Drawing Centered Text**

Go ahead and tell them that this is super similar to the assignment, and they can look at this problem's solution code while working on graphics programs that require centering (*\*cough\* tiles \*cough\**). If you have time, it's worth discussing the bonus question, because the concept of decomposition to handle slight modifications in a repeated task trips up a lot of people on Assignment 2.

### **Robot Face**

If you have time, great! This is a good one to show that you can solve the same problem multiple ways – point them to the two distinct versions of solution code.