

You will attach this as a cover sheet to your entire, stapled problem set. Continue following instructions detailed in Problem Sets 1 & 2.

*Step 1 Exercises*

1. Read Chapter 3 in your textbook. Write down the objectives at the start of the chapter and attach. Please exclude section 3.7 for this assignment – we'll come back to it later. You may need to read and re-read Chapter 3 several times over the course of this semester – the material can be hard to absorb because it is so literal and information-packed.
2. *Ranges of integers and doubles.* Take a look at Table 3-2 on p. 60. As you can see, an integer (or `int`) has a range that is (roughly) negative two billion to positive two billion. This is because integers are only stored in 4 bytes (32 bits, since there are 8 bits in a byte). Of these 32 bits, one is used to refer to the sign of the integer (positive vs. negative). Show that the remaining 31 bits are enough to describe numbers up to 2,147,483,648.
3. What is the difference between *declaration* of a variable and *initialization* of that same variable? Can you create a metaphor from everyday life that helps explain this idea to a novice?

4. What is wrong with the following declaration and assignment of the value 5 to the integer `z`?

```
int z;  
5 = z
```

5. Skim Appendix C in your textbook – you may need to refer to this table from time to time.
6. Work Exercise 3.2 #s 8, 9, 10, 11 (p. 63), 12, 13, (p. 66), 14, 15, (p. 67), 16, 17 (p. 68), 18, 19 (p. 70)
7. You might be asking: where do all these problems come from? Why can't we do math with computers like we do in math class? The answer looks something like this: in math, you have an infinite number of numbers to work with – you can keep, say, dividing a number in half forever. On a computer, however, we are limited in resolution – we can only store a finite number of numbers in a computer. (We looked into this a bit in Chapter 1 when talking about taking an analog sound signal and converting it to digital.) Draw a unique sketch or number line that conveys this idea to a novice.
8. Type in, compile, and execute Example 3.1 on p.74. Upload a screenshot of your success to the appropriate place on the Catlink weblog.
9. Type in, compile, and execute the Income Tax calculator on p. 80. Upload a screenshot of your success to the appropriate place on the Catlink weblog.
10. Write down a short sentence describing each of the Run-Time errors and Logic errors described in Section 3.5.
11. Work Exercise 3.6 #2 on p. 88.
12. Read – but do not work – Case Study 2: Count the Angels beginning on p. 88.

*Step 2 Exercise*

13. Work Projects 3-4 and 3-5 on p. 103.