Here are several lab projects. Remember that the goal is for you to learn the material by practicing programming. Make sure you understand what you are doing and why. If you have questions or need help just ask. Try to evolve your programs!

1. Before doing any coding for this lab I want you to just trace the following code section and predict what it will output. Don't forget to create a memory "trace" of what is going on internally when the code executes. Show your predicted output in the space provided.

```
Doodad first = new Doodad();
Doodad second = new Doodad();

first.setName("Harry");
second.setName("Sally");
System.out.println(second.getName());
second.setNumber(first.getName().length());
first.setNumber(second.getNumber() + 3);
System.out.println(first.getNumber());
System.out.println(second.getNumber());
first = second;
second.setNumber(37);
System.out.println(first.getName());
System.out.println(first.getNumber());
System.out.println(second.getName());
System.out.println(second.getNumber());
```

2. See the web site's For Projects section for a program that allows you to test your answers to the previous problem. Use it to verify that your answers were correct. If they were not correct then try to figure out what you did wrong. If you can't figure it out, get some help. Write a sentence about how all of this turned out:

3. You are to create a program that instantiates a Doodad object `christmas`, sets it so that its name is "Holly", its number is 25, its color is "Christmas Green", it likes ice cream and it is not injured. The program should then "print" the Doodad `(System.out.println(christmas);)` Next the program should include two lines as follows, that print the Doodad's response to the question "Do you like Christmas?"

```
System.out.println("Holly, do you like Christmas?");
System.out.println(christmas.answer("Holly, do you like Christmas?"));
```

Create a report and attach it to this sheet. Include at least two sample runs of the program in your report.

How long (minutes) do you predict this exercise will take? __________

How long did it actually take? __________
4. Create a program that prompts the user to enter a string, reads in the string, and then outputs the string, its length, the first character of the string (the character at index 0), the last character of the string, the string in all uppercase, the string with all of its e's and E's replaced with 3's.

For example, if the input string is "Alfred E. Neuman" then the output would be

    Alfred E. Neuman
    16
    A
    n
    ALFRED E. NEUMAN
    Alfr3d 3. N3uman

The list of String class methods on page 119 should help you with this problem.

Demonstrate your program to your lab instructor and have him/her initial here: ______
Or create a report if this is not completed in "lab".

How long (minutes) do you predict this exercise will take? __________
How long did it actually take? __________

5. Write a program that creates an object of the Random class, uses it to generate a random number between 1 and 100, prints that number, and then generates and prints a second random number between 1 and 100. Finally it prints whether the second number is less than, greater than, or equal to the first number.

Demonstrate your program to your lab instructor and have him/her initial here: ______
Or create a report if this is not completed in "lab".

How long (minutes) do you predict this exercise will take? __________
How long did it actually take? __________

6. Create a program that gets the radius of a circle from the user and then prints the radius, diameter, and circumference of the circle, showing only 2 decimal places. Note: The Math class defines a constant PI that defines the value of π to a large number of decimal points ... you can use this static constant by just typing "Math.PI" in your code. Create a report.

How long (minutes) do you predict this exercise will take? __________
How long did it actually take? __________

How long (minutes) do you predict this exercise will take? __________
How long did it actually take? __________

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How long did it actually take? __________

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How long did it actually take? __________