Exercise #1 (No computers needed)  
Due Friday, 10/02/2015, at 11:59pm

What is programming?

• Explain these 3 terms:
  – Computer science, algorithm, programming, Base 2

• Convert 51 (base 10) to the base 2 equivalent.

• Describe how you will convert a base 10 (decimal) number to an 8-bit binary number.

Design and Testing (Assignment #1)

George Polya developed a well-known model for problem solving in mathematics that is based on these 4 principles.
  • Understanding the problem. (Recognizing what is asked.)
  • Devising a plan. (Responding to what is asked.)
  • Carrying out the plan. (Developing the result of the response.)
  • Looking back. (Checking. What does the result tell me? Did I do it right?)

Polya’s steps 1, 2, and 4 do not directly deal with writing the solution (in programming that is the C++ code itself), but rather, the steps you need to make sure you write a correct solution/program that solves the given problem statement. With this said, make yourself familiar assignment #1 and Polya’s steps 1, 2, and 4.

Understanding the Problem
In your own words, explain what YOU think the problem is asking you to do. Document your uncertainties about the problem and anything else that you feel was unclear or vague. This is to ensure that YOUR understanding matches MY understanding of the problem☺

Devising a Plan/Design
Provide an algorithm/pseudo code to help solve the problem. In addition, draw pictures/flow charts to help you devise your plan, as well as any other design decisions you make, such as how to manage your time, how to decompose the problem, where to start first, etc.

Looking back/Testing
This includes any checking/self-reflection you did while solving the problem, which includes using a calculator to make sure the output is correct, testing to make sure your code executes correctly and behaves the way you expect under specific circumstances, using sources of information to make sense of the results, etc. However, you need to think about the input prior to implementation!!!

Please see an example of this document: Polya_template.docx
Using Assignment #1, as a group, answer the following questions:

**Understanding the Problem** – Do you understand everything in the problem? Do you understand what is meant by macros from the climits library?

**Design** – What are the steps/equations used to convert decimal to binary? Write the flow-chart and/or pseudo-code for these steps.

**Testing** – Create a test plan with the test cases (bad, good, and edge cases). What do you hope to be the expected results?

For **take-home exercises completed in peer-led groups**, each student must participate and write answers to each of the questions on his/her own paper to show for credit. Your 1-2-3 grade will be based on the completion/understanding shown on your own piece of paper shown to your TA for a grade before leaving the group session!!!

For **take-home exercises completed on your own**, turn in your work electronically using the TEACH website!!!