Prerequisites
- Read Humphrey, Chapters 1 and 2 (PSP and PSP0)

Individual Program 2 Problem Statement and Requirements
   Using PSP0, write a program that performs *binary addition*.

   <u>Definitions</u>:
   binary addition is similar to the longhand addition of decimal numbers. Start by adding the
   bits (digits) one column at a time, from right to left:

```
            0 + 0 = 0
            1 + 0 = 1
            0 + 1 = 1
            1 + 1 = 10
        1 + 1 + 1 = 11
```

Just as with decimal addition, when the sum in one column is a two-bit (two-digit) number, the
least significant figure is written as part of the total sum and the most significant figure is
"carried" to the next left column. Consider the following examples:

```
                                11   1   ← carry bits →        11
        10011              1001001                        1000111
      + 00100            +   11001                      + 1010110
        10111              1100010                       10011101
```

The addition problem on the left did not require any bits to be carried, since the sum of bits in
each column was either `0` or `1`, not `10` or `11`. In the other two problems, there were bits to be
carried.

The intended users of the program provide you with these requirements and bits of information.
From these, you must derive further requirements in order to devise your solution:
1. Only two binary numbers are added at a time.
2. Each binary number input can vary from 1 to 32 bits in length.
3. The users don't want to see the output until after all binary number pairs are entered.
4. When the users need to perform these calculations, they can have anywhere from 1 to
   1000 of these binary addition problems in a problem set. It gets tedious keeping track of
   which problem number that they are entering, so any prompt for data entry should let
   them know for which problem number that they are entering the data. There should also
   be a correlating problem number reference in the output.
5. The resultant output must be in ascending order of the binary result value and not include
   leading 0's (unless the result is 0). For comparison purposes, one may think of the values
   as unsigned.

Thoroughly test the program. Don't forget to develop and implement a reasonable set of test cases for your program, including cases with invalid input.

Documentation and Submission
For each document described below, "[NAME]" refers to your last name and first initial.

1. Provide a Word document that lists the requirements to which you developed your solution. Next to each requirement, it should state whether this was an explicit requirement (stated directly), or implicit (something that wasn't directly stated, but that you felt was necessary in order to meet another explicit or implicit requirement). Name the file "IP02_Rqmts_[NAME].doc" and be sure to include identifying information such as name, course number, and date within the file as well.

2. Use the PSP0 Project Plan Summary, PSP0 Time Recording Log, and the PSP0 Defect Recording Log while completing this assignment. Apply the scripts to your IP #2 solution efforts, referring to Humphrey, Chapters 1 and 2 for details. Fill out copies of these forms to record the results of your PSP planning, development, and postmortem activities for this project. Perform three phases of the project in order, verifying that you have satisfied each phase's exit criteria before proceeding to the next phase.

While you are expected to produce your own estimates, designs, code, and completed logs and summary, **please feel free to have others *review* your work** and you may then change your work as a result of such reviews. Note any help that you receive on the bottom of your Project Plan Summary, log the amount of time that you and your associates spend reviewing your work in your Time Recording Log, and log the particular defects that were uncovered in your Defect Recording Log.

When you have completed your project, transcribe your information into soft-copies of the three PSP forms, available in the CS325 Web site in Moodle.

Place your soft copies in a single Word document named "IP02_PSP0_[NAME].doc. Be sure that you've properly filled out the header information (such as your name) on the soft-copies of the forms.

Both documents should be archived as a ZIP. Name the archive "IP02_[NAME].zip".

The ZIP archive for the assignment is due to be uploaded to the Moodle Web site no later than Wednesday, 09 September 2009, prior to 11AM.

Late submissions will be accepted up to 48 hours from this date and time. However, late submission penalties will be applied as described in the syllabus.

This assignment is worth 25 points. 5 points will be earned for your requirements document, 10 points will be earned based upon your program solution to the problem, and 10 points will be earned based upon how well you follow the PSP0 process.