CSC 102 – Assignment # 1

Assigned: Thursday, Jan 28, 2010
Due: Thursday, Feb 4, 2010 at beginning of class

Source Code: Please include a header section at the top of your source code with your name, date, purpose, and pseudocode. All submitted source code must compile as-is on orca and the executable must be able to run on orca.

Email submission: Send source code as an attachment to preetam.ghosh@usm.edu. The subject line of your email should have the following form:

CSC 102, name, hw 

Purpose of this assignment:
1. Learn to use loops.
2. Learn to use functions.
3. Begin writing 'real' programs.

Assignment:
1. Write a program that can convert a sequence of positive integers from base-10 (decimal) to base-2 (binary).
2. In main() you will:
   (a) Prompt the user for starting and stopping integer values in the range of 0 <= start <= stop <= 255.
   (b) Have a function that tests the input to make sure it is in the proper range and order.
   (c) Pass each of these values to a function that will print out the number in base-10 (the original value) and base-2. The base-2 number should have eight bits (Binary digITs).

Additional requirements:
1. Your program should have a minimum of three functions (besides main()): one to check the validity of the input, one to perform the conversion, and one to raise a positive integer to a positive integer power.
2. In the function that checks the validity of the input, if the input is invalid you should tell the user what the problem is and then exit. To exit, use the exit() function. You use it like this:
   ```c
   #include <stdio.h>
   #include <stdlib.h>

   int main(void)
   {
     /* a bunch of code */
     if(num < 0)
     {
       cout<<"That number is too small."
   ```
3. To perform the conversion, you will need to be able to raise a number to a power. Write a function to do this. The function declaration will look like this:
   int power(int base, int exp);
To use the function, for example to calculate $2^6$, your code might look like this:
   int answer;
   answer = power(2, 6);
This function should be able to raise any positive integer to a positive integer power (within the machine limits), not just raise 2 to some power.
4. Do not use any library functions besides cin, cout, and exit().
5. Do not use arrays or strings.
6. Include pseudocode of your solution.
7. Test your program with several values and show this in your included output.
An example of what your output might look like is
   Please provide starting and stopping integers, each in the range 0 <= number < 256.

   Starting number: 1
   Stopping number: 4

   1 00000001
   2 00000010
   3 00000011
   4 00000100