Lab 5
Due Date: 10/20/2014
New Beginnings
Professor York

Reminder: For each algorithm that you code, fill out an algorithm summary sheet and include it in your portfolio along with a printout of your code.

1. Given a positive integer, n, generate the binary reflected gray code of order n.

2. Given an array of n elements, $A[0, \ldots, n-1]$ sorted in ascending order and a search key, K, perform a non-recursive binary search. Output the index of the array's element that is equal to K or -1 if there is no such element. The input file for your C program is named "data8.txt" and it has the same format as "data1.txt". You should test your code with various elements from the list (eg 1910, 9218, 24459) as well as elements not on the list (eg. 1895, 14416)..

3. Compute the function $f(n) = a^n$, for some $a \neq 0$ and n an integer ≥ 0, using an algorithm that utilizes the ***decrease by a constant method***. Your C program should accept two values as input, a and n. In the first version, both a and n should be positive integers. In the second version, let a be a non-zero floating point number and let n be a positive integer. Make the third version the same as the second version, except that n may be a negative integer.

4. Compute the function $f(n) = a^n$, for some $a \neq 0$ and n an integer ≥ 0, using an algorithm that utilizes the ***decrease by a constant factor method***. Your C program should accept two values as input, a and n. In the first version, both a and n should be positive integers. In the second version, let a be a non-zero floating point number and let n be a positive integer. Make the third version the same as the second version, except that n may be a negative integer.

5. Computer the function $gcd(m, n) = gcd(n, m \bmod n), for\ m, n\ integers \geq 1$, using an algorithm that utilizes the decrease by variable size method.