Assignment 4

Note: You can introduce helper methods if needed.

1. Design a pseudo-code recursive method, findMax(L), that returns the maximum number in the list L. [You can regular array index approach, not necessary to use Sequence ADT].

   Input array [4 2 8 9 1] – Return 9 as output, which is max number.

2. Write a pseudo code function, *sum*(n), to recursively sum the first n natural numbers but divide the problem in half and make two recursive calls. [Refer Decrease and Conquer Approach] – Example: Multiple Recursion.

3. Write a pseudo code function, *isEven*(n) to recursively determine whether a natural number, n, is an even number.

4. Write a recursive pseudo code function, power(x, k), that computes x^k. Can you do this in log k time?

Interview Question

Describe a pseudo-code recursive algorithm, setOfSubsets(arr), that enumerates all of the subsets of the set of numbers for the given input array. What is the running time of your method?

Input: [1,2,3,4]
Output:
[ ]
[4]
[3]
[3, 4]
[2]
[2, 4]
[2, 3]
[2, 3, 4]
[1]
[1, 4]
[1, 3]
[1, 3, 4]
[1, 2]
[1, 2, 4]
[1, 2, 3]
[1, 2, 3, 4]