Algorithm Efficiency – Study Questions

- Using Big O notation, indicate the worst case time requirement of each of the following tasks.
  - Computing the sum of the first n even integers by using a for loop
  - Displaying all n integers in an array
  - Displaying all n integers in a sorted linked chain
  - Displaying all items in n linked chains of size n each
  - Displaying one array element
  - Displaying the last integer in a linked chain
  - Searching an array for one particular value
  - Searching a sorted array for one particular value
  - Adding an item to a stack of n items
  - Adding an item to a bag of n items

- What is the Big O run time for the following algorithm? Justify your answer. Assume that the operations that are not shown are independent of n.

```
for (int pass = 1; pass <= n; pass++)
{
    for (int index = 0; index < n; index++)
    {
          for (int count = 1; count < 10; count++)
          {
                //operations here independent of n

          }//end for
    }//end for
}//end for
```

- Consider an array of length n containing positive and negative integers in random order. Write C++ code that rearranges the integers so that the negative integers appear before the positive integers. Your solution should be O(n).
- Prove that T(n) = 25n+14 is O(n) (i.e. find n_0 and k such that, for all n >= n_0 25n+14>= kn)