Homework Set #3

1. (10 points) Exercise 4.3-4 (page 75)
2. (40 points) Exercise 4-1 (page 85)
3. (30 points) Pseudo-code Analysis: For the pseudocode below for *Mystery*, find a tight ***upper*** bound on its worst-case asymptotic running time $T(n)$, where n is the length of the portion of array A that is processed by *Mystery*. That is, find $g(n)$ such that $T(n) \in O(g(n))$, where $n = right - left + 1$. You may assume that n is a power of 2. Justify your answer.

```
Mystery(A, k, left, right)
  if left = (right-1)
      then if A[left] = k
              then print "Match for " k " found at position " left "."
                   return k
           if A[right] = k
              then print "Match for " k " found at position " right "."
                   return k
           return −1
  sDouble ← √(right − left + 1)
  s ← ⌊sDouble⌋
  for i ← 1 to s
      do leftI ← left + (i − 1) * s
         rightI ← leftI + s − 1
         result ← Mystery(A, k, leftI, rightI)
         if result ≠ −1
            then return result
  return −1
```