CS21 Practice QUIZ 5, Swarthmore College, Fall 2008

1. Write a **recursive** function called `removeRecur` that takes a value and a list and returns a **new** list where all instances of that value have been removed. For example, `removeRecur(-1, [-1, 0, -1, 1, 2])` would return a new list `[0, 1, 2]`.

2. Write an **iterative** version of the same function called `removeIter`.

3. What types of algorithms are particularly well suited for recursive solutions? Explain why and give the name of one such algorithm.

4. What is the minimum and maximum possible number of iterations linear search will need to find a value in a list of 64 items? What are the min and max for a binary search with N=64?

5. If my algorithm is O(x), where x is n**2, n, logn, or nlogn, which is the "best" for large n? Which is the worst?

6. Write a recursive function to calculate `h(n)`, where:

```
                1              if n==1
      h(n) =
                2*h(n-1) + 1   if n > 1
```

7. What does the following function do, and what would be the output of `mystery("hannah")`?

```
def mystery(astring):
  if len(astring) <= 1:
    return True
  else:
    if astring[0] == astring[len(astring)-1]:
      return mystery(astring[1:len(astring)-1])
    else:
      return False
```

   Trace through a call to `mystery("pop")` and draw the stack at the deepest point in the recursion.

8. Write a sort function (any sort, but don't use the built-in python sort method) that takes in a list and sorts it.