

CS21 Fall 2007, Swarthmore College, Practice Quiz 5

NAME:

1. Below is the implementation of another sorting algorithm.

```
def anotherSort(ls):
    for i in range(len(ls)-1):
        for j in range(len(ls)-i-1):
            if ls[j] > ls[j+1]:
                ls[j], ls[j+1] = ls[j+1], ls[j]
            print i, j, ls # show progress of sort
```

- (a) (4 points) The print statement at the end of the inner loop shows the progress of the sort. Using the table below, show what will be displayed as the contents of the list by this print statement when the function is called as follows: `anotherSort([9,6,3,1,5])`.

| i | j | Show contents of ls |
|---|---|---------------------|
| 0 | 0 | |
| 0 | 1 | |
| 0 | 2 | |
| 0 | 3 | |
| 1 | 0 | |
| 1 | 1 | |
| 1 | 2 | |
| 2 | 0 | |
| 2 | 1 | |
| 3 | 0 | |

- (b) (3 points) Explain the basic idea behind this algorithm. How does it accomplish the sorting of the list?

- (c) (3 points) In terms of running time, is this algorithm more similar to selection sort or to merge sort? Explain.

2. (4 points) Write a **recursive** function called `removeRecur` that takes a value and a list and returns a list where all instances of that value have been removed. For example, `removeRecur(-1, [-1, 0, -1, 1, 2])` would return `[0, 1, 2]`.

3. (4 points) Write an **iterative** version of the same function called `removeIter`.

4. (2 points) What types of algorithms are particularly well suited for recursive solutions? Explain why and give the name of one such algorithm.