CS101 – Computer Programming
Quiz for Thursday – 24 September 2014

Q1. Consider the following main program for sorting the array A in descending order using selection sort. The call to the function 'findIndexOfMax(A, currTop, n)' returns the index of the maximum element of the array 'A' from 'currTop' to 'n-1'. The call to the function 'swap(A, currTop, currMaxIndex)' swaps an element of the array 'A' located at 'currTop' with that located at 'currMaxIndex'.

```
int main() {
    // Code for declarations and reading elements of array A of size n
    int currTop, currMaxIndex;
    for (currTop = 0; currTop < n; currTop++) { //main loop
        currMaxIndex = findIndexOfMax(A, currTop, n);
        swap(A, currTop, currMaxIndex);
    }
    // Rest of code
    return 0;
}
```

Here, the actual swaps occur when swapping indices are not the same, i.e., currTop!=currMaxIndex. Let us define the following quantity called Useful Work(UW) for an array as the ratio of the number of actual swaps performed to the total number of swaps.
With respect to UW, please choose an appropriate one from the following:

A. If A = {2k+1, 2k+2, ..., 100, 2k, 2k-1, ..., 1} for k<50, then UW = (50-k)/100
B. If A = {100, 99, 98, ..., 1}, then UW = 0.5
C. If A = {99, 98, ..., 1, 100}, then UW = 0.99
D. None of these

Q2. Consider the following code snippet. Here, 'A' is an integer array of size 'n' (n > 0). Assume A has been declared and initialized. The call to the function 'swap(A, currTop, currIndex)' swaps an element of the array 'A' located at 'currTop' with that located at 'currIndex'.

```
int currTop, currIndex;
for (currTop = 0; currTop < n; currTop++) {
    currIndex = findIndexOf(A, currTop, n);
    swap(A, currTop, currIndex);
}
```

Select your choices based on the following two statements about function 'findIndexOf' :
I. If a call to function 'findIndexOf(A,currTop, n)' returns the index of the maximum element in A[currTop] to A[n-1], then after the last iteration of the 'for' loop, the array 'A' is sorted in descending order.

II. Suppose function 'findIndexOf(A,currTop, n)' is defined in the following way: If currTop!=n-1, it returns the index of the second smallest element in A[currTop] to A[n-1], else it returns n-1. Then, after the last iteration of the above 'for' loop, the array 'A' is sorted in ascending order except the smallest element.

A. Only statement I is correct
B. Only statement II is correct
C. Both statements I and II are correct
D. None of these