MUFIC 2nd Year DS Midterm Exam (Time: 60 minutes)

Name:_____ ID:_____

Question 1: 7 Marks

(a) Draw the (1)stack and (2) queue data structures in array implementations for "each step" in the following sequence: add(A), add(B), add(C), remove, add(D), add(E), remove, add(F), add(G). Assume an initial size of 5 for the array implementation. Note that add and remove are equals push and pop in the stack. Remember to show TOP (top of the stack) for stack and both Front and Rear for the queue?

(b) The following code shows a sorting method called Dumb-Sort. What does the array A look like after the 1st , 2nd and 3rd paths of the following dumb-Sort ?

```
public class sortingQuestion {
 static int[] A={3, 1, 5, 4, 2, 6, 9, 8};
 public static void main(String[] args) {
  dumbSort(A);
 }
 static void dumbSort(int[] A){
  for (int i=0;i<A.length-1;i++){
   for (int j=i+1;j<A.length;j++){
    if (A[i] > A[j]){
     int f = A[i];
     A[i]=A[j];
     A[j]=f;}}}}}
```

1- 1st Path:---------- 2- 2nd Path:---------- 3- 3rd Path:----------

© Write the Heapify method?

1/2

8 Marks

Question 2:

(a) We need to sort the following array of integers [3 1 5 4 2 6 9 8] into descending order: Select heap sort algorithm and write the contents of the array each time that the sort algorithm changes it.?

(b) Suppose the following array [6 2 7 3 5 1 4] is to be sorted in ascending order using quicksort. Show what the array looks like just before the two halves are quick sorted. Use the first element (6) as the pivot?

(c) Write the Java code of the partition function in Quick sort algorithm?

(d) Write the java code of shellSort method?