Data Structure

Sorting Algorithms

1. Sort the following sequence of numbers into ascending order. Only show 5 iterations.

Insertion Sort

i round	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
–	60	50	20	35	40	91	65	110	70	10
1										
2										
3										
4										
5										
							Total			

Quick Sort (Circle the pivot at the end of each pass through the algorithm)

i round	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
–	60	50	20	35	40	91	65	110	70	10
1										
2										
3										
4										
5										
							Total			

Merge Sort

i round	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
–	60	50	20	35	40	91	65	110	70	10
1										
2										
3										
4										
5										
							Total			

2. Sort the following sequence of numbers into *descending* order with heap sort.

i round	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
–	60	50	20	35	40	91	65	110	70	10
Step 1										
Step 2.0										
Step 2.1										
Step 2.2										
Step 2.3										
Step 2.4										
Step 2.5										
…					Total					

3. Please sort the following records into lexical order using radix sort

```
#typedef struct {
        char id[5]; /* k0=id[0],k1=id[1],k2=id[2],k3=id[3],k4=id[4]*/
        int item;
    } goods_type;
goods_type goods[10];
```

Each good has an id of character string with length 5.
The goal is to sort the goods with the following 10 ids by alphanumeric order, where numbers is less than alphabet.

LSD (k4, k3, k2, k1, k0) Radix Sort

[i]	[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
goods [i].k	k[0]=A k[1]=C k[2]=D k[3]=6 k[4]=D	k[0]=5 k[1]=D k[2]=D k[3]=6 k[4]=C	k[0]=C k[1]=A k[2]=B k[3]=8 k[4]=D	k[0]=K k[1]=B k[2]=I k[3]=8 k[4]=A	k[0]=X k[1]=V k[2]=J k[3]=7 k[4]=D	k[0]=5 k[1]=C k[2]=I k[3]=8 k[4]=C	k[0]=A k[1]=A k[2]=I k[3]=9 k[4]=D	k[0]=5 k[1]=A k[2]=J k[3]=8 k[4]=A	k[0]=K k[1]=V k[2]=I k[3]=8 k[4]=A	k[0]=B k[1]=C k[2]=J k[3]=9 k[4]=D
round										
1										
2										
3										
4										
5										

MSD (k0, k1, k2, k3, k4) Radix Sort

[i]	[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
goods [i].k	k[0]=A k[1]=C k[2]=D k[3]=6 k[4]=D	k[0]=5 k[1]=D k[2]=D k[3]=6 k[4]=C	k[0]=C k[1]=A k[2]=B k[3]=8 k[4]=D	k[0]=K k[1]=B k[2]=I k[3]=8 k[4]=A	k[0]=X k[1]=V k[2]=J k[3]=7 k[4]=D	k[0]=5 k[1]=C k[2]=I k[3]=8 k[4]=C	k[0]=A k[1]=A k[2]=I k[3]=9 k[4]=D	k[0]=5 k[1]=A k[2]=J k[3]=8 k[4]=A	k[0]=K k[1]=V k[2]=I k[3]=8 k[4]=A	k[0]=B k[1]=C k[2]=J k[3]=9 k[4]=D
round										
1										
2										
3										
4										
5										