Please go through the desired work, with all the steps and details, just keep the calm, write step by step all functions with proper arguments & what array part is available to that function.

Hand Written, proper pages, stapled, in my office F202, 30th of April

Question 1

```
void MergeSort (int *arr, int first, int last){
        if (first < last) {                          //Line 1
                int mid = first + (last – first)/2;  //Line 2 (Integer Division)
                MergeSort (arr, first, mid);         // Line 3
                MergeSort (arr, mid+1, last);        // Line 4
                Merge (arr, first, mid, last);       // Line 5
        }
}
```

//Use Merge function code from the Algorithm Book by Cormen

Let arr = {9, 8, 6, 13, 8, 10, 12, 4, 7, 5, 3, 12, 5} **indexing starts from 0**

Line reached means → what argument values we are passing to that function

Solve the following:

a) Write the values of "**mid**" and "**last**" when "**Line 3**" is reached for 3rd time.

b) Write the values of "**first**" and "**mid**" when "**Line 4**" is reached for 4th time.

c) Write the values of "**first**" and "**mid**" and "**last**" when "**Line 5**" is reached for 2nd time.

d) Write the contents of "arr" after the 5th execution of "**Line 5**".

e) Write the contents of "arr" after the 8th execution of "**Line 5**".

Question 2

```
INSERTION-SORT(A)
1  for j = 2 to A.length
2      key = A[j]
3      // Insert A[j] into the sorted sequence A[1 .. j − 1].
4      i = j − 1
5      while i > 0 and A[i] > key
6          A[i + 1] = A[i]
7          i = i − 1
8      A[i + 1] = key
```

Solve the following for A = {6, 4, 5, 4, 12, 11, 2, 6, 9, 1, 3}. (**Note**: **Indexing** starts from **1**.)

a) Write the value of '**key'** and contents of array '**A**' (here content means all updated array at that time) when **L8** is reached for the 3rd time (but not executed).

b) Write the values of '**key', 'A[i]'** and contents of '**A**' when **L6** is executed for the 6th time. **(keep it in mind that means control comes inside while)**

c) Write content of array '**A**' when **L5** has been run for 11 times

d) What will be the updated array content, when on **L7 i** has gained value 0 for the 2nd time

e) We have 7 elements to settle in the sorted order (first 7 elements are in sorted position), how many times **L5** will be executed – **Keep loop break added to your count**