

4a. Write a python program to implement insertion sort and merge sort using lists.

```
import random          # module name random used to generate random numbers
```

```
def insertionsort(list1):  
    for index in range(1,len(list1)):  
        current_element = list1[index]  
        pos = index  
  
        while current_element < list1[pos-1] and pos>0:  
            list1[pos] = list1[pos-1]  
            pos = pos-1  
        list1[pos] = current_element
```

```
def mergesort(mylist):  
    if len(mylist) > 1:  
        mid = len(mylist) // 2  
        left_list = mylist[:mid]  
        right_list = mylist[mid:]  
  
        mergesort(left_list)  
        mergesort(right_list)  
  
        i = j = k = 0  
  
        while i < len(left_list) and j < len(right_list):  
            if left_list[i] < right_list[j]:  
                mylist[k] = left_list[i]  
                i = i+1  
                k=k+1  
            else:  
                mylist[k] = right_list[j]  
                j = j+1  
                k = k+1  
  
        while len(left_list)>i:  
            mylist[k] = left_list[i]  
            i = i+1  
            k = k+1  
  
        while len(right_list)>j:  
            mylist[k] = right_list[j]  
            j = j+1  
            k = k+1
```

```
my_list = []
for index in range(5):
    my_list.append(random.randint(0, 50)) #generated random integer is appended to the
                                         my_list

print("\nUnsorted List")
print(my_list)
print("Sorting using Insertion Sort")
insertionsort(my_list)
print(my_list)

my_list = []
for i in range(5):
    my_list.append(random.randint(0, 50))

print("\nUnsorted List")
print(my_list)
print("Sorting using Merge Sort")
mergesort(my_list)
print(my_list)
```
