**PROGRAM CODE:**

#Insertion sort

def insertionSort(list):

for i in range(1,len(list)):

key = list[i]

j = i-1

#while list i-1 >list [i]

while j>=0 and list[j]>key:

#list i=list[i-1]

list[j+1]=list[j]

j = j-1

list[j+1]=key

return(list)

list = [54,2,39,17,77,31,44,55,20]

print('The list is ',list)

print('The sorted list is ',insertionSort(list))

**OUTPUT:**

The list is [54, 2, 39, 17, 77, 31, 44, 55, 20]

The sorted list is [2, 17, 20, 31, 39, 44, 54, 55, 77]

**PROGRAM CODE:**

#selection sort

def selectionsort(a):

for j in range(0,len(a)):

smallest=a[j]

for i in range(j,len(a)):

if smallest>a[i]:

(smallest,a[i])=(a[i],smallest)

a[j]=smallest

print('At the end of iteration',j+1,'the list is ',a)

return(a)

n=int(input('Enter no of elements: '))

list=[]

for i in range (0,n):

e=int(input('Enter element{}: '.format(i+1)))

list.append(e)

print('The list is ',list)

print('The sorted list is ',selectionsort(list))

**OUTPUT:**

Enter no of elements: 8

Enter element1: 54

Enter element2: 62

Enter element3: 93

Enter element4: 17

Enter element5: 7

Enter element6: 31

Enter element7: 44

Enter element8: 55

The list is [54, 62, 93, 17, 7, 31, 44, 55]

At the end of iteration 1 the list is [7, 62, 93, 54, 17, 31, 44, 55]

At the end of iteration 2 the list is [7, 17, 93, 62, 54, 31, 44, 55]

At the end of iteration 3 the list is [7, 17, 31, 93, 62, 54, 44, 55]

At the end of iteration 4 the list is [7, 17, 31, 44, 93, 62, 54, 55]

At the end of iteration 5 the list is [7, 17, 31, 44, 54, 93, 62, 55]

At the end of iteration 6 the list is [7, 17, 31, 44, 54, 55, 93, 62]

At the end of iteration 7 the list is [7, 17, 31, 44, 54, 55, 62, 93]

At the end of iteration 8 the list is [7, 17, 31, 44, 54, 55, 62, 93]

The sorted list is [7, 17, 31, 44, 54, 55, 62, 93]

**PROGRAM CODE:**

#split

def mergesort(list,p,r):

if p<r:

m=(p+r)//2

mergesort(list,p,m)

mergesort(list,m+1,r)

merge(list,p,m,r)

#merge

def merge(list,p,q,r):

m=(p+r)//2

L=list[:m]

R=list[m:]

i=0

j=0

k=0

while i < len(L) and j < len(R):

if L[i]<=R[j]:

list[k]=L[i]

i=i+1

else:

list[k]=R[j]

j=j+1

k+=1

while i<len(L):

list[k]=L[i]

(i,k)=(i+1,k+1)

while j<len(R):

list[k]=R[j]

(j,k)=(j+1,k+1)

list=[]

n=int(input('Enter no of elements: '))

for i in range (0,n):

e=int(input('Enter element{}: '.format(i+1)))

list.append(e)

print('The list is ',list)

mergesort(list,0,(len(list)-1))

print('The sorted list is ',list)

**OUTPUT:**

Enter no of elements: 8

Enter element1: 54

Enter element2: 62

Enter element3: 89

Enter element4: 17

Enter element5: 2

Enter element6: 35

Enter element7: 52

Enter element8: 45

The list is [54, 62, 89, 17, 2, 35, 52, 45]

The sorted list is [2, 35, 45, 52, 54, 62, 89, 17]