**B ADITYA BHAT**

**2019B2PS1057G**

**For merge\_sort.c -**

#include <stdio.h>

void main() {

int A[10] = {4,9,6,12,2,8,6,3,1,7} ;

int a=10, mid, end, B[10], size = 1;

while(size <= a) {

int i, j, k = 0, start = 0 ;

while(start+size<=a) {

mid = start + size ;

end = start + 2\*size - 1 ;

if(end >= a) {

end = a - 1 ;

}

i = start ;

j = mid ;

while((i < mid) && (j <= end)) {

if(A[i] <= A[j]) {

B[k++] = A[i++] ;

}

else {

B[k++] = A[j++] ;

}

}

while(i<mid) {

B[k++] = A[i++] ;

}

while(j<=end) {

B[k++] = A[j++] ;

}

start = end + 1 ;

}

for(i=start; k<a; i++){

B[k++] = A[i] ;

}

i=0;

while(i<a) {

int temp=A[i] ;

A[i]=B[i];

B[i]=temp;

i=i+1;

}

size = 2\*size ;

}

for (int i=0; i<a; i++){

printf("%d ", A[i]) ;

}

}

**Time Complexity - O (a/2)**

**For merge.c -**

void main()

{

int A[4]={2,4,6,8}

int B[5]={3,6,9,11,12};

int a=4,b=5;

int C[10];

int c=0;

int i=0;

int j=0;

while (i<a && j<b)

{

if (A[i]<=B[j])

{

C[c]=A[i];

c=c+1;

i=i+1;

}

else

{

C[c]=B[j];

c=c+1;

j=j+1;

}

}

while(i<a)

{

C[c]=A[i];

c=c+1;

i=i+1;

}

while(j<b)

{

C[c]=B[j];

b=b+1;

j=j+1;

}

}

**Time Complexity - O(a+b)**