THE UNIVERSITY OF DODOMA

COLLEGE OF INFORMATICS AND VIRTUAL EDUCATION

CP 213: DATA STRUCTURE AND ALGORITHM ANALYSIS

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REG NO: T/UDOM/2020/00345

COURSE: BSc-SE

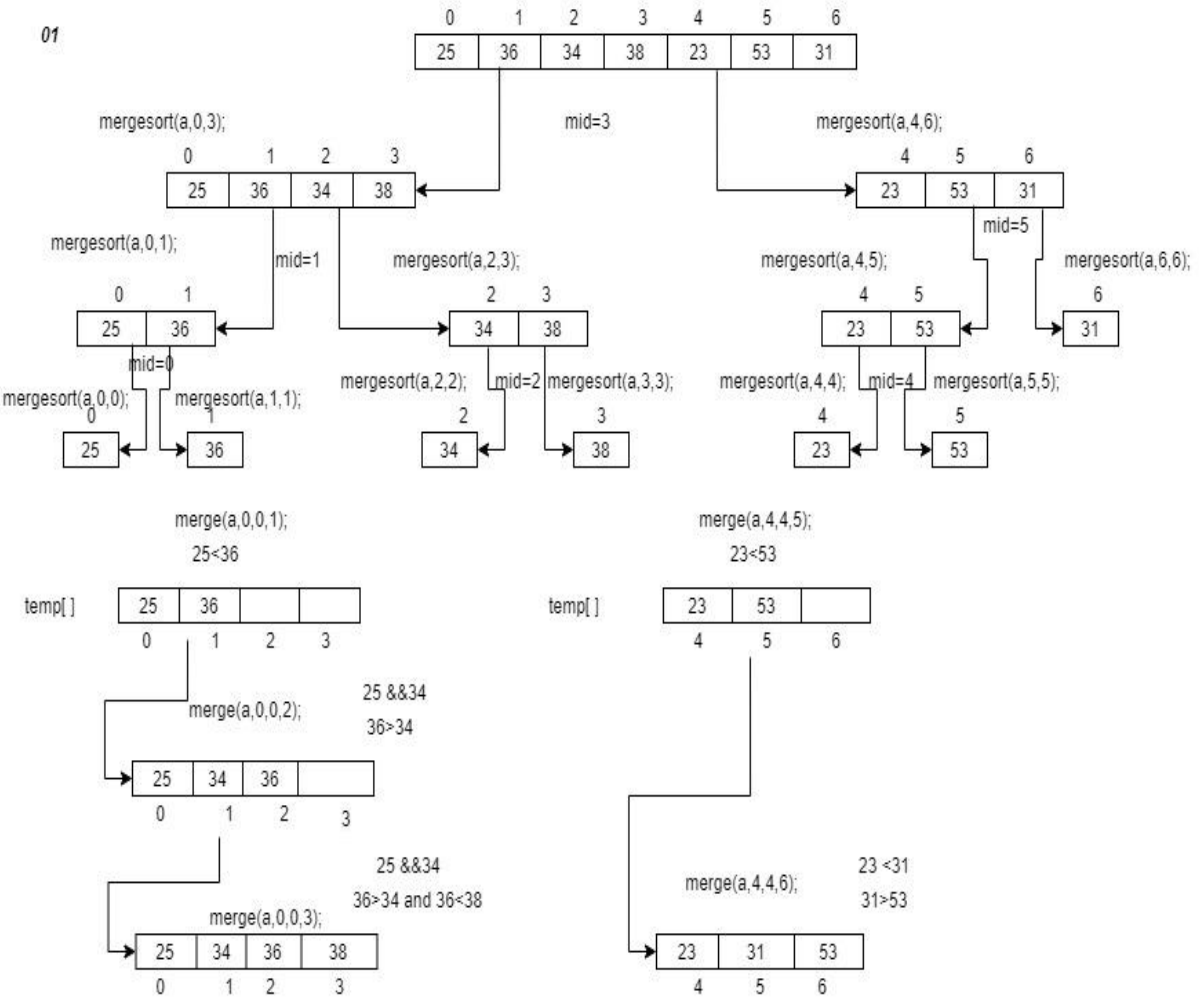
ASSIGNMENT

```
01:
#include<iostream>
using namespace std;
void mergesort(int *,int,int);
void merge(int *,int,int,int);
int a[7],i;
int main()
{
  int a[7]={25,36,34,98,23,53,31};
   mergesort(a,0,6);
   cout <<" \n Numbers After Sort: \n";
   for(i=0; i<7; i++)
      cout << a[i] << " ";
   return 0;
}
void mergesort(int a[],int i,int j)
{
   int mid;
   if(i<j)
   {
      mid=(i+j)/2;
      mergesort(a,i,mid);
      mergesort(a,mid+1,j);
      merge(a,i,mid,j);
   }
}
void merge(int a[],int low,int mid ,int high)
{  int b[7];
   int i,j,k=low;
```

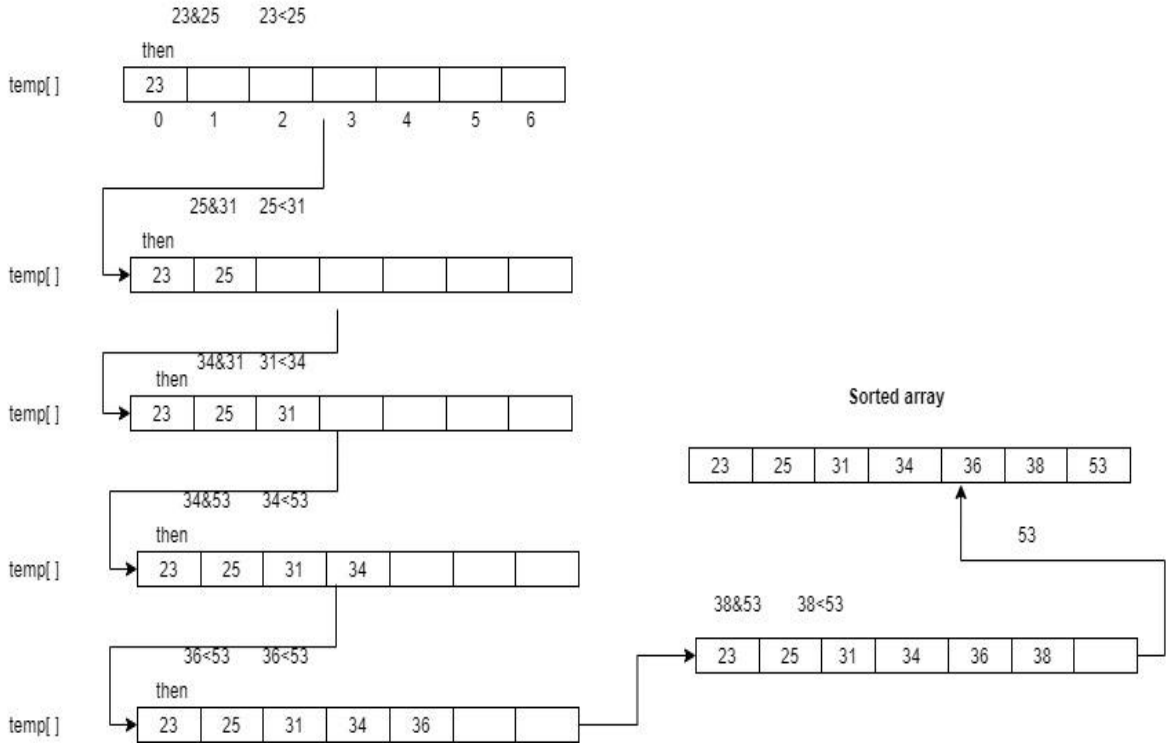
```
  i=low;
  j=mid+1;
  while(i<=mid && j<=high)
  {
     if(a[i]<=a[j]){
           b[k]=a[i];
         i++;
                  }
     else{
           b[k]=a[j];
         j++;
                  }
                  k++;
  }
  while( i<= mid){
           b[k]=a[i];
           i++;
           k++;
           }

 while( j<=high){
           b[k]=a[j];
           j++;
           k++;}
           for(int s=low; s<=high; s++){
                    a[s]=b[s];
           }

}
```


01
0 1 2 3 4 5 6
25 36 34 38 23 53 31
mergesort(a,0,3);
mid=3
mergesort(a,4,6);
0 1 2 3
25 36 34 38
4 5 6
23 53 31
mergesort(a,0,1);
mid=1
mergesort(a,2,3);
mid=5
mergesort(a,4,5);
mergesort(a,6,6);
0 1
25 36
2 3
34 38
4 5
23 53
6
31
mid=0
mergesort(a,0,0);
mergesort(a,1,1);
mergesort(a,2,2);
mid=2
mergesort(a,3,3);
mergesort(a,4,4);
mid=4
mergesort(a,5,5);
0
25
1
36
2
34
3
38
4
23
5
53
merge(a,0,0,1);
25<36
temp[ ]
25 36
0 1 2 3
merge(a,0,0,2);
25 &&34
36>34
25 34 36
0 1 2 3
25 &&34
36>34 and 36<38
merge(a,0,0,3);
25 34 36 38
0 1 2 3
merge(a,4,4,5);
23<53
temp[ ]
23 53
4 5 6
merge(a,4,4,6);
23 <31
31>53
23 31 53
4 5 6

Compares


23&25 23<25
then
temp[ ]
23
0 1 2 3 4 5 6
25&31 25<31
then
temp[ ]
23 25
34&31 31<34
then
temp[ ]
23 25 31
34&53 34<53
then
temp[ ]
23 25 31 34
36<53 36<53
then
temp[ ]
23 25 31 34 36
38&53 38<53
23 25 31 34 36 38
53
Sorted array
23 25 31 34 36 38 53