

MERGE SORT PROGRAM

PROGRAM :-

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#include<stdio.h>
#include<stdlib.h>
#include<time.h>
clock_t start1,end1;
void merge_sort(int [ ],int,int);
void merge(int [ ], int, int, int);

int main()
{
    int i,n,a[100];
    srand(time(0));
    printf("Enter the size of array\n");
    scanf("%d",&n);
    start1=clock();
    for(i=0; i<n; i++){
        a[i]=rand()%100;
        printf("%d\t",a[i]);
    }
    printf("\n");
    merge_sort(a,0,n-1);
    for (int c = 1; c <= 8000; c++) for (int d = 1; d <= 8000; d++) { }
    end1=clock();
    printf("Sorted array\n");
    for(i=0;i<n;i++)
    {
        printf("%d\t",a[i]);
    }
    printf("\n");
    double cpu_time1 = (double) (end1-start1)/CLOCKS_PER_SEC;
    printf("Time taken: %f",cpu_time1);
}
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    printf("Time taken: %f",cpu_time1);
    return 0;
}
void merge_sort(int a[],int low,int high)
{
    int mid;
    if(low<high)
    {
        mid=(low+high)/2;
        merge_sort(a,low,mid);
        merge_sort(a,mid+1,high);
        merge(a,low,mid,high);
    }
}

void merge(int a[], int low, int mid ,int high)
{
    int i,j,k,c[100];
    i=low;
    k=low;
    j=mid+1;
    while(i<=mid && j<=high)
    {
        if (a[i]<a[j]){
            c[k++]=a[i++];
        }
        else{
            c[k++]=a[j++];
        }
    }
}

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        while(i<=mid){
            c[k++]=a[i++];
        }
        while(j<=high){
            c[k++]=a[j++];
        }
    for(i=low;i<=high;i++){
        a[i]=c[i];
    }
}

```

OUTPUT:-

```

Enter the size of array
50
44      56      51      86      97      71      73      50      61      24      88      78      98      12      32      1      63      61
   66      13      59      10      51      43      21      68      42      26      52      52      6      48      8      57      86
   5      29      59      56      90      83      96      20      82      9      4      35      24      66      54
Sorted array
1      4      5      6      8      9      10      12      13      20      21      24      24      26      29      32      35      42
   43      44      48      50      51      51      52      52      54      56      56      57      59      59      61      61      63
   66      66      68      71      73      78      82      83      86      86      88      90      96      97      98
Time taken: 0.148479

...Program finished with exit code 0
Press ENTER to exit console.

```