Merge Sort

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#include<stdio.h>
#include<time.h>
#include<stdlib.h>

int n, a[10000], b[10000];

void merge_sort(int[], int, int);
void merge(int[], int, int, int);
void display();

int main(){
    clock_t start, end;
    printf("Enter the size of the array to be sorted: ");
    scanf("%d",&n);
    printf("\nEnter the array elements: ");
    srand(time(NULL));
    for(int i = 0 ; i < n ; i++){
        a[i] = rand() % 1000;
    }
    start = clock();
    merge_sort(a, 0, n-1);
    end = clock();
    display();
    double time_taken = ((double) (end-start) )/CLOCKS_PER_SEC;
    printf("\nTime taken to sort: %lf",time_taken);
    return 0;
}

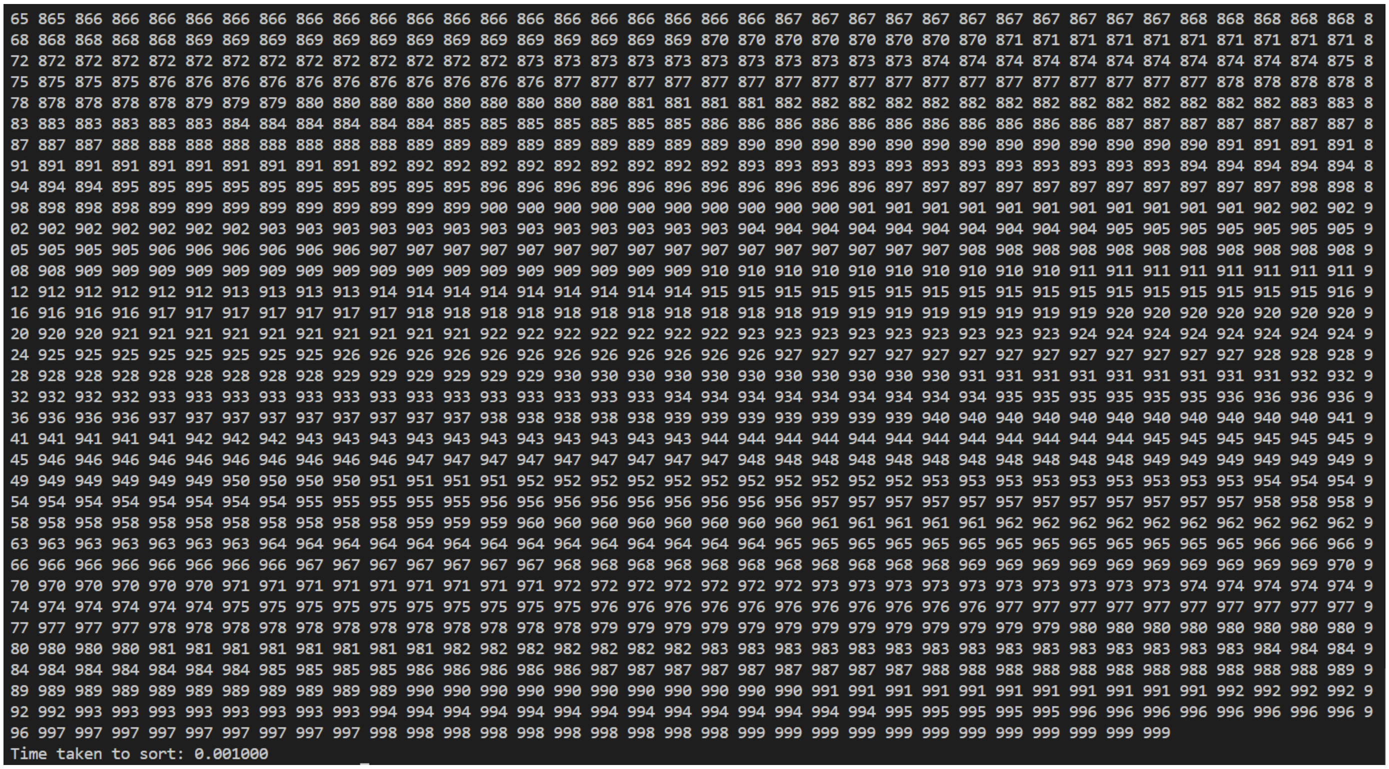
void merge_sort(int a[], int low, int high){
    if(low < high)
    {
        int mid = (low + high) / 2;
        merge_sort(a, low, mid);
        merge_sort(a, mid+1, high);
        merge(a, low, mid, high);
    }
}

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

    while(i <= mid){
        b[k] = a[i];
        k++;
        i++;
    }

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

void display(){
    printf("\nSorted elements are: ");
    for(int i = 0 ; i < n ; i++){
        printf("%d ",a[i]);
    }
}
```



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Time taken to sort: 0.001000
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