**EXPT 3**:

#include <stdio.h>

#include <stdlib.h>

#include <time.h>

#define MAX 200000

void getdata(int arr[]) {

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

arr[i] = rand(); // Limiting numbers to 0-99 for readability

printf("%d\t", arr[i]);

}

printf("\n");

}

void sort(int arr[], int low, int mid, int high) {

int i, j, k;

int b[MAX];

i = low;

j = mid + 1;

k = low;

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

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

b[k] = arr[i];

i++;

} else {

b[k] = arr[j];

j++;

}

k++;

}

while (i <= mid) {

b[k] = arr[i];

i++;

k++;

}

while (j <= high) {

b[k] = arr[j];

j++;

k++;

}

for (i = low; i <= high; i++) {

arr[i] = b[i];

}

}

void partition(int arr[], int low, int high) {

if (low < high) {

int mid = (low + high) / 2;

partition(arr, low, mid);

partition(arr, mid + 1, high);

sort(arr, low, mid, high);

}

}

int main(int argc, char \*argv[]) {

int arr[MAX];

clock\_t start, end;

getdata(arr);

start = clock();

partition(arr, 0, MAX - 1);

end = clock();

printf("Sorted array:\n");

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

printf("%d\t", arr[i]);

}

printf("\n");

printf("Time is = %f seconds\n", ((float)(end - start)) / CLOCKS\_PER\_SEC);

return 0;

}