LAB 6- Quick Sort

Sort a given set of N integer elements using quick sort technique.

Code:

```
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
void swap(int *a, int *b) {
int t = *a;
*a = *b;
*b = t;
}
int partition(int arr[], int low, int high) {
int pivot = arr[high];
int i = (low - 1);
for (int j = low; j <= high - 1; j++) {
if (arr[j] < pivot) {
i++;
swap(&arr[i], &arr[j]);
}
}
swap(&arr[i + 1], &arr[high]);
return (i + 1);
}
void quickSort(int arr[], int low, int high) {
if (low < high) {
int pi = partition(arr, low, high);
quickSort(arr, low, pi - 1);
quickSort(arr, pi + 1, high);
}
}
void printArray(int arr[], int size) {
for (int i = 0; i < size; i++)
printf("%d ", arr[i]);
printf("\n");
}
int main() {
int n;
printf("Enter the number of elements: ");
scanf("%d", &n);
int arr[n];
printf("Enter %d elements: ", n);
for (int i = 0; i < n; i++) {
scanf("%d", &arr[i]);
}
quickSort(arr, 0, n - 1);
printf("Sorted array: \n");
printArray(arr, n);
return 0;
}
```

Output:

```
1:For manual entry of N value and array elements
2:To display time taken for sorting number of elements N in the range 500 to 14500
3:To exit
Enter your choice:1

Enter the number of elements: 10

Enter array elements: 42
73
11
98
36
72
65
10
88
78

Sorted array is: 10     11      36      42      65      72      73      78      88      98
 Time taken to sort 10 numbers is 0.000000 Secs
1:For manual entry of N value and array elements
2:To display time taken for sorting number of elements N in the range 500 to 14500
3:To exit
Enter your choice:2

 Time taken to sort 500 numbers is 0.000000 Secs
 Time taken to sort 1500 numbers is 0.000000 Secs
 Time taken to sort 2500 numbers is 0.000000 Secs
 Time taken to sort 3500 numbers is 0.000000 Secs
 Time taken to sort 4500 numbers is 0.000000 Secs
 Time taken to sort 5500 numbers is 0.000000 Secs
 Time taken to sort 6500 numbers is 0.000000 Secs
 Time taken to sort 7500 numbers is 0.000000 Secs
 Time taken to sort 8500 numbers is 0.000000 Secs
 Time taken to sort 9500 numbers is 0.000000 Secs
 Time taken to sort 10500 numbers is 0.000000 Secs
 Time taken to sort 11500 numbers is 0.000000 Secs
 Time taken to sort 12500 numbers is 0.000000 Secs
 Time taken to sort 13500 numbers is 0.000000 Secs
 Time taken to sort 14500 numbers is 0.000000 Secs
1:For manual entry of N value and array elements
2:To display time taken for sorting number of elements N in the range 500 to 14500
3:To exit
Enter your choice:3

Process returned 0 (0x0)   execution time : 332.739 s
Press any key to continue.
```

N value	Time Taken(Secs)
500	0.001
1500	0.001
2500	0.002
3500	0.003
4500	0.004
5500	0.007
6500	0.009
7500	0.011
8500	0.015
9500	0.019
10500	0.023
11500	0.027
12500	0.031
13500	0.037
14500	0.042