Ex. No. 10d **Quick Sort**

Date:

**Aim:**

To sort an array of N numbers using Quick sort.

**Algorithm:**

1. Start

2. Read number of array elements n

3. Read array elements Ai

4. Select an pivot element x from Ai

5. Divide the array into 3 sequences: elements < x, x, elements > x

6. Recursively quick sort both sets (Ai < x and Ai > x)

7. Stop

**Program:**

/\* quick sort \*/

/\* C implementation QuickSort \*/

#include<stdio.h>

// A utility function to swap two elements

void swap(int\* a, int\* b)

{

int t = \*a;

\*a = \*b;

\*b = t;

}

/\* This function takes last element as pivot, places

the pivot element at its correct position in sorted

array, and places all smaller (smaller than pivot)

to left of pivot and all greater elements to right

of pivot \*/

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

{

int pivot = arr[high]; // pivot

int i = (low - 1); // Index of smaller element

for (int j = low; j <= high- 1; j++)

{

// If current element is smaller than the pivot

if (arr[j] < pivot)

{

i++; // increment index of smaller element

swap(&arr[i], &arr[j]);

}

}

swap(&arr[i + 1], &arr[high]);

return (i + 1);

}

/\* The main function that implements QuickSort

arr[] --> Array to be sorted,

low --> Starting index,

high --> Ending index \*/

void quickSort(int arr[], int low, int high)

{

if (low < high)

{

/\* pi is partitioning index, arr[p] is now

at right place \*/

int pi = partition(arr, low, high);

// Separately sort elements before

// partition and after partition

quickSort(arr, low, pi - 1);

quickSort(arr, pi + 1, high);

}

}

/\* Function to print an array \*/

void printArray(int arr[], int size)

{

int i;

for (i=0; i < size; i++)

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

printf("n");

}

// Driver program to test above functions

int main()

{

int arr[] = {10, 7, 8, 9, 1, 5};

int n = sizeof(arr)/sizeof(arr[0]);

quickSort(arr, 0, n-1);

printf("Sorted array: n");

printArray(arr, n);

return 0;

}

**Output:**

**Result :**

Thus an array was sorted using quick sort's divide and conquer method**.**