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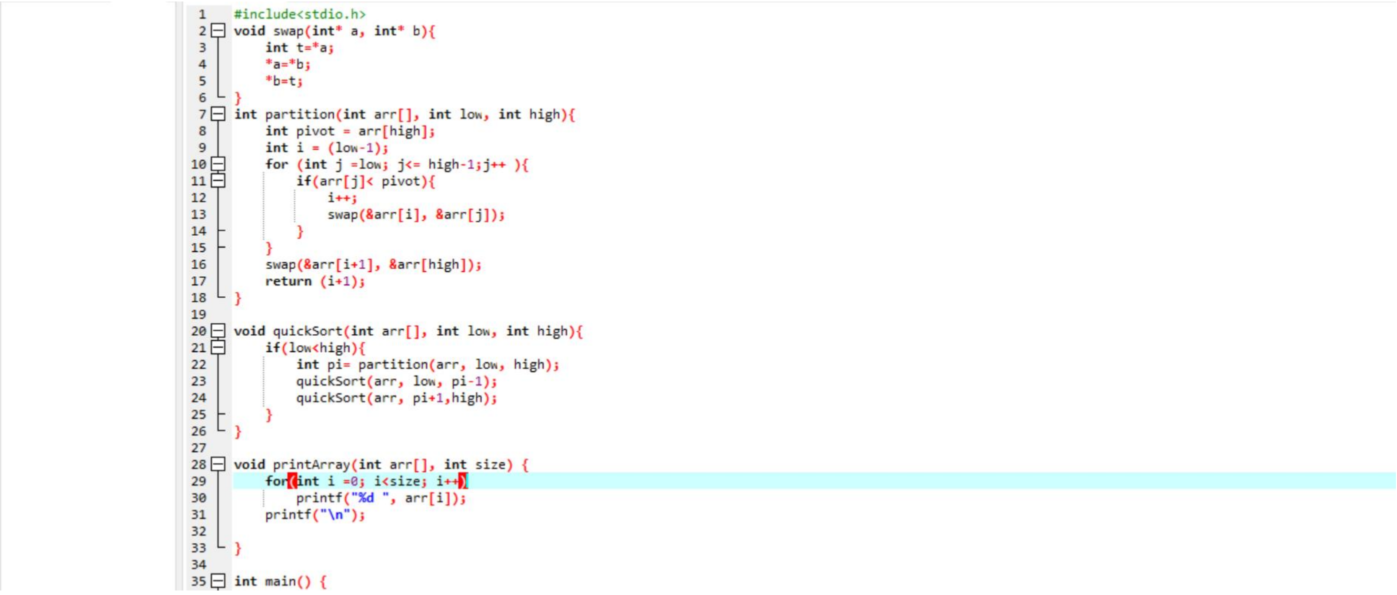
Q) Write a program for:

1. Quick sort

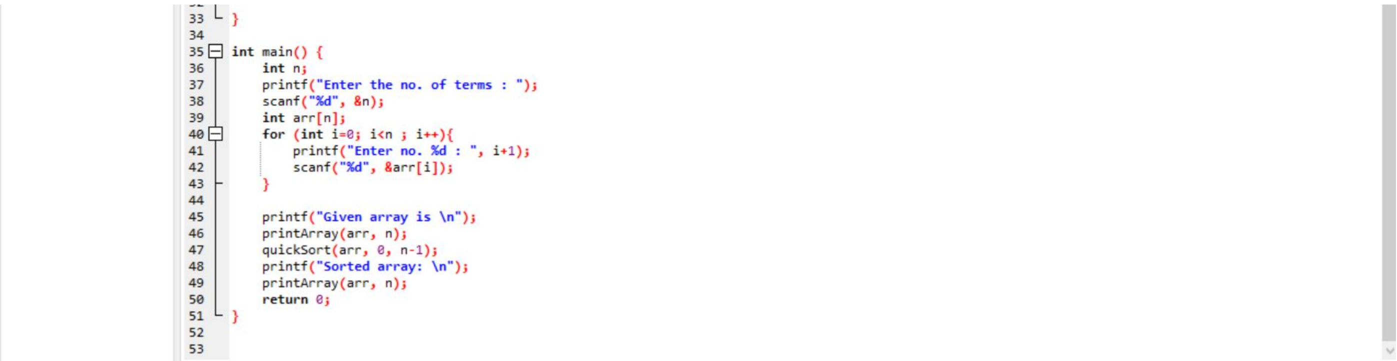
2. Merge sort

Code –

1)

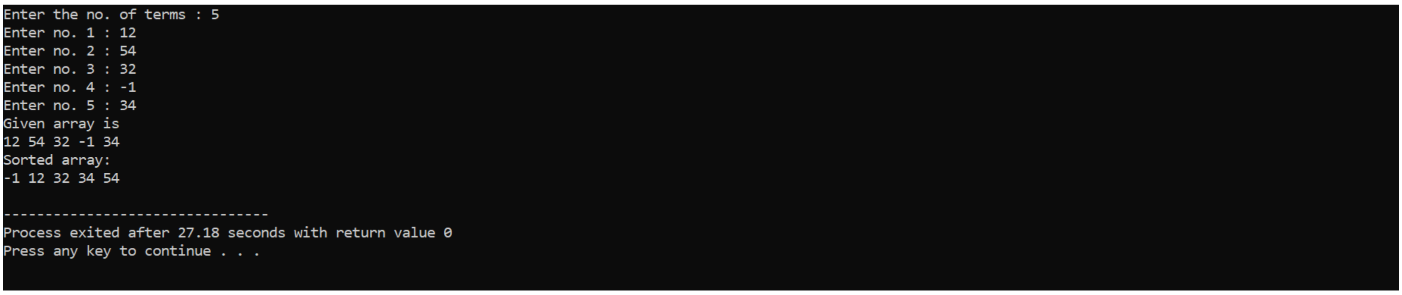


```
#include<stdio.h>
void swap(int* a, int* b){
    int t=*a;
    *a=*b;
    *b=t;
}
int partition(int arr[], int low, int high){
    int pivot = arr[high];
    int i = (low-1);
    for (int j =low; j<= high-1;j++ ){
        if(arr[j]< pivot){
            i++;
            swap(&arr[i], &arr[j]);
        }
    }
    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() {
```



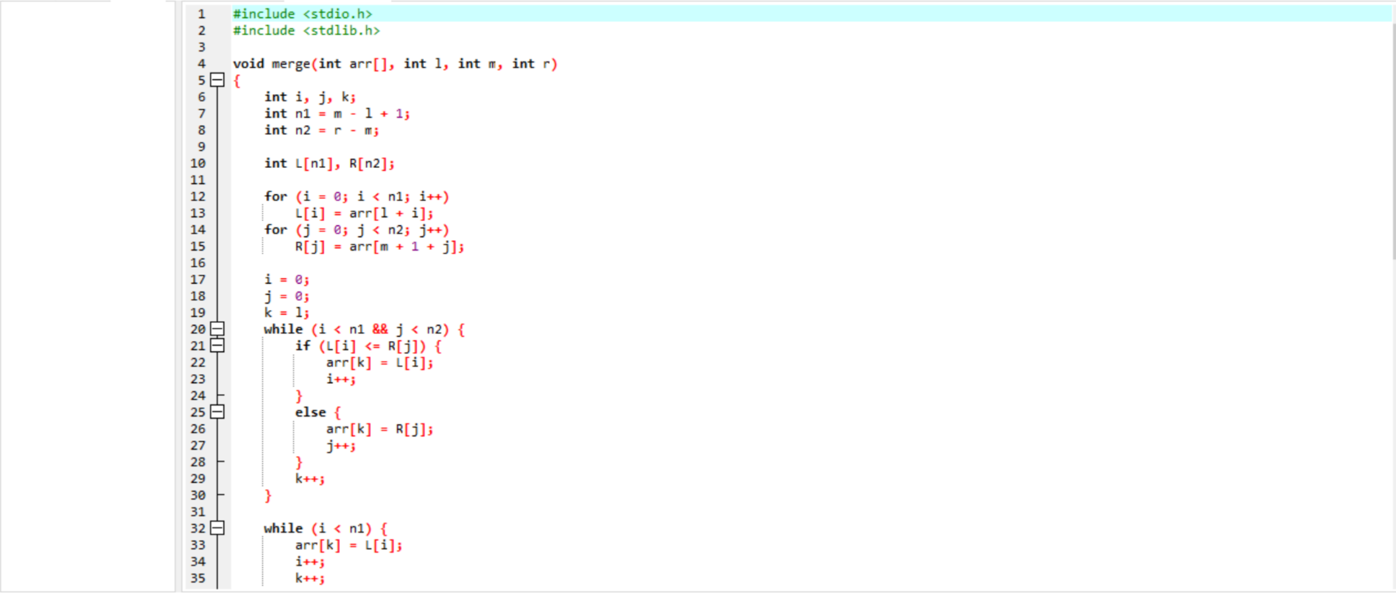
```
}

int main() {
    int n;
    printf("Enter the no. of terms : ");
    scanf("%d", &n);
    int arr[n];
    for (int i=0; i<n ; i++){
        printf("Enter no. %d : ", i+1);
        scanf("%d", &arr[i]);
    }

    printf("Given array is \n");
    printArray(arr, n);
    quickSort(arr, 0, n-1);
    printf("Sorted array: \n");
    printArray(arr, n);
    return 0;
}
```

Output –

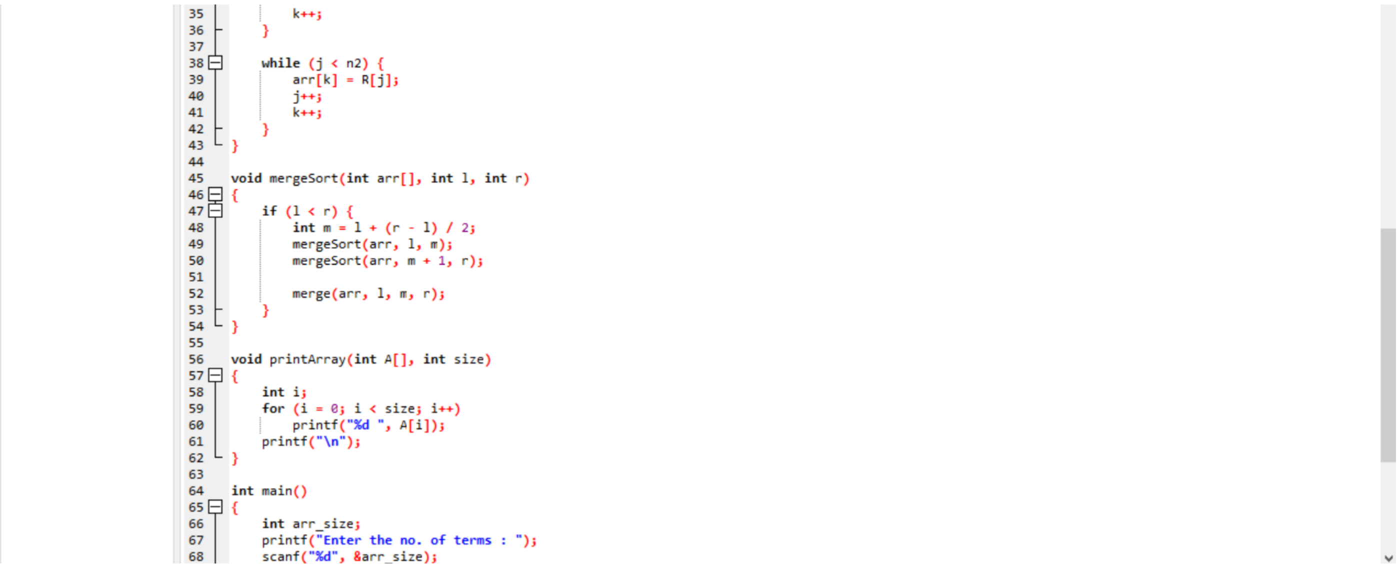


```
Enter the no. of terms : 5
Enter no. 1 : 12
Enter no. 2 : 54
Enter no. 3 : 32
Enter no. 4 : -1
Enter no. 5 : 34
Given array is
12 54 32 -1 34
Sorted array:
-1 12 32 34 54

--------------------------------
Process exited after 27.18 seconds with return value 0
Press any key to continue . . .
```

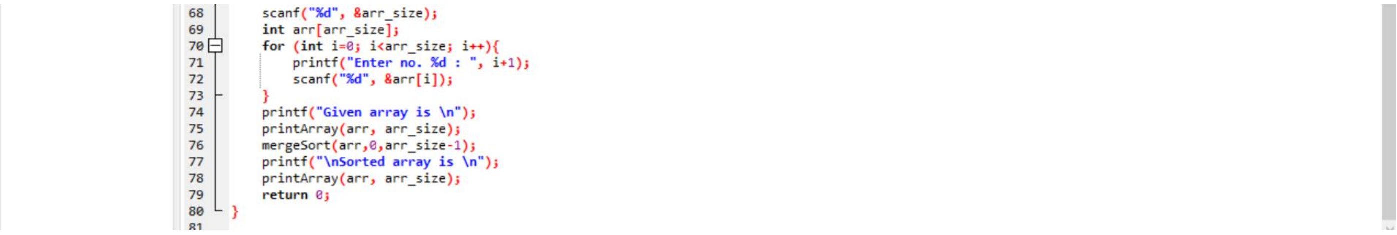
2)



```c
#include <stdio.h>
#include <stdlib.h>

void merge(int arr[], int l, int m, int r)
{
    int i, j, k;
    int n1 = m - l + 1;
    int n2 = r - m;

    int L[n1], R[n2];

    for (i = 0; i < n1; i++)
        L[i] = arr[l + i];
    for (j = 0; j < n2; j++)
        R[j] = arr[m + 1 + j];

    i = 0;
    j = 0;
    k = l;
    while (i < n1 && j < n2) {
        if (L[i] <= R[j]) {
            arr[k] = L[i];
            i++;
        }
        else {
            arr[k] = R[j];
            j++;
        }
        k++;
    }

    while (i < n1) {
        arr[k] = L[i];
        i++;
        k++;
```

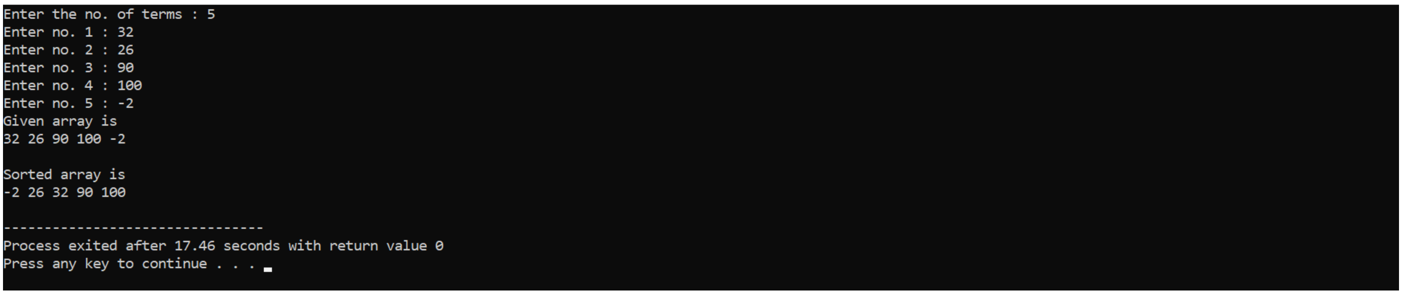


```c
        k++;
    }

    while (j < n2) {
        arr[k] = R[j];
        j++;
        k++;
    }
}

void mergeSort(int arr[], int l, int r)
{
    if (l < r) {
        int m = l + (r - l) / 2;
        mergeSort(arr, l, m);
        mergeSort(arr, m + 1, r);

        merge(arr, l, m, r);
    }
}

void printArray(int A[], int size)
{
    int i;
    for (i = 0; i < size; i++)
        printf("%d ", A[i]);
    printf("\n");
}

int main()
{
    int arr_size;
    printf("Enter the no. of terms : ");
    scanf("%d", &arr_size);
```



```c
    scanf("%d", &arr_size);
    int arr[arr_size];
    for (int i=0; i<arr_size; i++){
        printf("Enter no. %d : ", i+1);
        scanf("%d", &arr[i]);
    }
    printf("Given array is \n");
    printArray(arr, arr_size);
    mergeSort(arr,0,arr_size-1);
    printf("\nSorted array is \n");
    printArray(arr, arr_size);
    return 0;
}
```

Output –



```
Enter the no. of terms : 5
Enter no. 1 : 32
Enter no. 2 : 26
Enter no. 3 : 90
Enter no. 4 : 100
Enter no. 5 : -2
Given array is
32 26 90 100 -2

Sorted array is
-2 26 32 90 100

--------------------------------
Process exited after 17.46 seconds with return value 0
Press any key to continue . . .
```