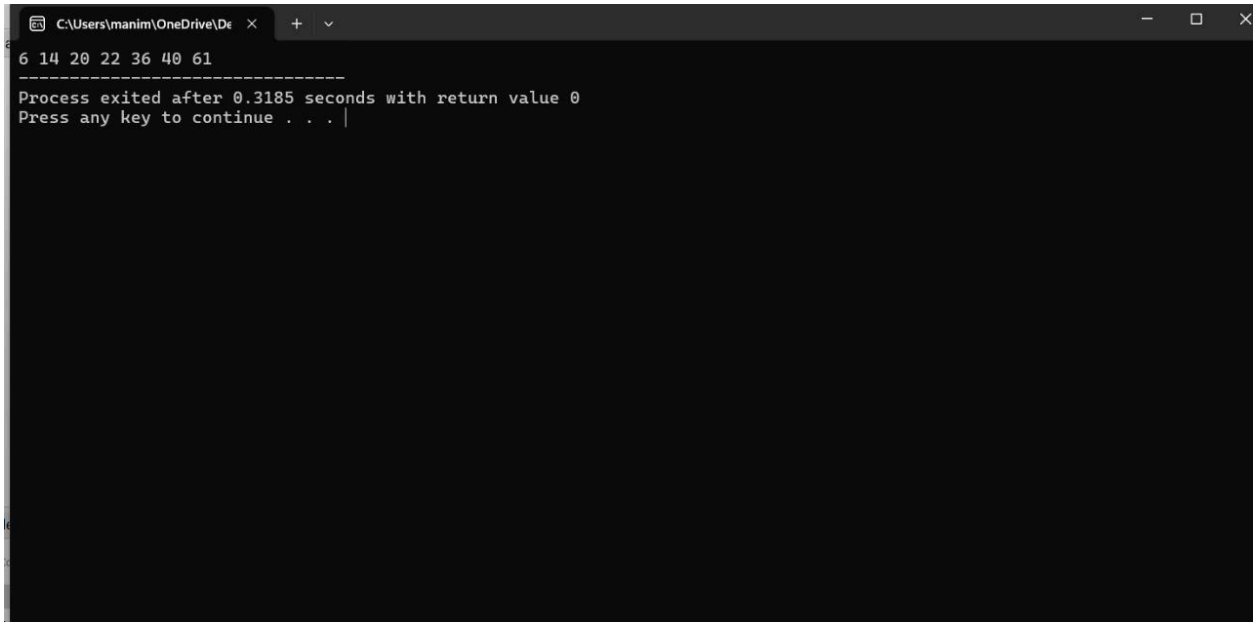
1. **MERGE SORT**

```
#include <stdio.h>
#include <stdlib.h>
void merge(int arr[], int left, int mid, int right)
 {
   int i, j, k;
   int n1 = mid - left + 1;
   int n2 = right - mid;
   int leftarr[n1], rightarr[n2];
   for (i = 0; i < n1; i++)
   {

      leftarr[i] = arr[left + i];
   }
         for (j = 0; j < n2; j++)
   {
            rightarr[j] = arr[mid + 1 + j];
   }
         i = 0;
   j = 0;
   k = left;
   while (i < n1 && j < n2)
         {
      if (leftarr[i] <= rightarr[j])
                  {
         arr[k] = leftarr[i];
         i++;
      }
      else
                  {
         arr[k] = rightarr[j];
         j++;
      }
      k++;
   }

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

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

void mergeSort(int arr[], int left, int right)
 {
    if (left < right)
          {
        int mid = left + (right - left) / 2;
        mergeSort(arr, left, mid);
        mergeSort(arr, mid + 1, right);
        merge(arr, left, mid, right);
    }
}

int main()
{
    int arr[] = { 36,22,14,20,6,61,40 };
    int n = sizeof(arr) / sizeof(arr[0]);
    mergeSort(arr, 0, n - 1);
    for (int i = 0; i < n; i++)
      {
                    printf("%d ", arr[i]);
      }
          return 0;
}
```

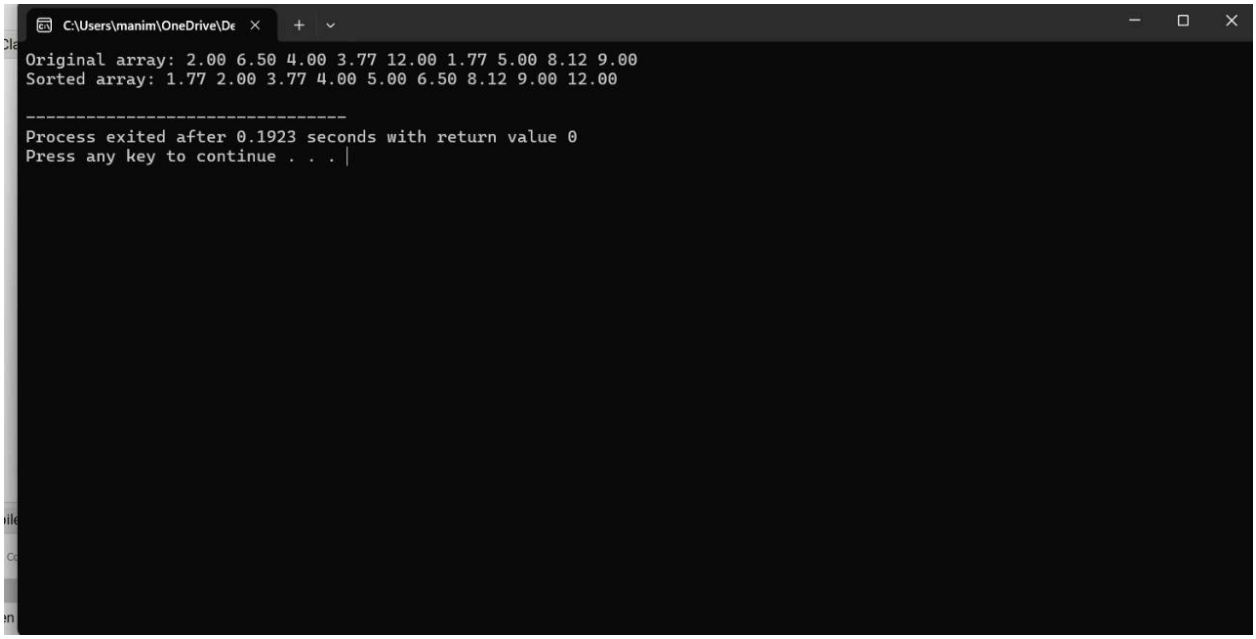


2. **Bucketsort**

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

void bucketsort(float arr[], int n)
{
   float max_val = arr[0];
   for (int i = 1; i < n; i++)
   {
      if (arr[i] > max_val)
         max_val = arr[i];
   }

   float norm_arr[n];
   for (int i = 0; i < n; i++)
   {
      norm_arr[i] = arr[i] / max_val;
   }

   float buckets[n][n];
   int bucketcount[n];
   for (int i = 0; i < n; i++)
   {
      bucketcount[i] = 0;
   }
```

```
    for (int i = 0; i < n; i++)
    {
        int bucketindex = (int)(n * norm_arr[i]);
        if (bucketindex == n) bucketindex = n - 1;
        buckets[bucketindex][bucketcount[bucketindex]++] = norm_arr[i];
    }

    for (int i = 0; i < n; i++)
    {
        for (int j = 1; j < bucketcount[i]; j++)
        {
            float key = buckets[i][j];
            int k = j - 1;
            while (k >= 0 && buckets[i][k] > key)
            {
                buckets[i][k + 1] = buckets[i][k];
                k--;
            }
            buckets[i][k + 1] = key;
        }
    }

    int index = 0;
    for (int i = 0; i < n; i++)
    {
        for (int j = 0; j < bucketcount[i]; j++)
        {

            arr[index++] = buckets[i][j] * max_val;
        }
    }
}

int main()
{
    float arr[] = {2,6.5,4,3.77,12,1.77,5,8.12,9};
    int n = sizeof(arr) / sizeof(arr[0]);

    printf("Original array: ");
    for (int i = 0; i < n; i++)
    {
        printf("%.2f ", arr[i]);
    }
    printf("\n");
```

```
    bucketsort(arr, n);

    printf("Sorted array: ");
    for (int i = 0; i < n; i++)
    {
        printf("%.2f ", arr[i]);
    }
    printf("\n");

    return 0;
}
```



3. **Quick Sort**

```
#include<stdio.h>
void quicksort(int a[],int left,int right)
{
        if(left>=right)return;
        int pivot=a[right];
        int i=left,j;
        for(j=left;j<right;j++)
        {
                if(a[j]<pivot)
                {
                        int temp=a[i];
```

```
                        a[i]=a[j];
                        a[j]=temp;
                        i++;
                }
        }
        int temp=a[i];
        a[i]=a[right];
        a[right]=temp;
        quicksort(a,left,i-1);
        quicksort(a,i+1,right);

}
int main()
{
        int a[]={2,6,5,17,3,8,9,10};
        int n= sizeof(a)/sizeof(a[0]);
        int i;
        quicksort(a,0,n-1);
        printf("sorted array: ");
        for(i=0;i<n;i++)
        {
                printf("%d ",a[i]);
        }
        return 0;
}
```