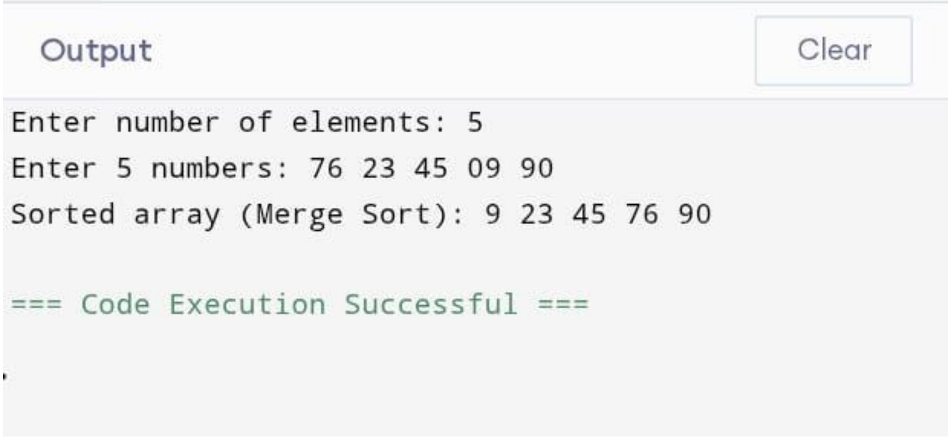
CSA0317-DATA STRUCTURES

Program 17

```
#include <stdio.h>
void merge(int arr[], int left, int mid, int right) {
   int n1 = mid - left + 1;
   int n2 = right - mid;
   int L[n1], R[n2];
   for (int i = 0; i < n1; i++)
      L[i] = arr[left + i];
   for (int j = 0; j < n2; j++)
      R[j] = arr[mid + 1 + j];
   // Merge the temp arrays back
   int i = 0, j = 0, k = left;
   while (i < n1 && j < n2) {
      if (L[i] <= R[j])
         arr[k++] = L[i++];
      else
         arr[k++] = R[j++];
   }

   // Copy remaining elements
   while (i < n1)
      arr[k++] = L[i++];
   while (j < n2)
      arr[k++] = R[j++];
```

```
}

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

int main() {
    int arr[100], n;

    printf("Enter number of elements: ");
    scanf("%d", &n);

    printf("Enter %d numbers: ", n);
    for (int i = 0; i < n; i++)
        scanf("%d", &arr[i]);
    mergeSort(arr, 0, n - 1);
    printf("Sorted array (Merge Sort): ");
    for (int i = 0; i < n; i++)
        printf("%d ", arr[i]);
    return 0;
}
```

Output:



```
Enter number of elements: 5
Enter 5 numbers: 76 23 45 09 90
Sorted array (Merge Sort): 9 23 45 76 90

=== Code Execution Successful ===
```