Experiment 3: Merge Sort

```
#include <stdio.h>

void merge(int Arr[], int start, int mid, int end) {
   int temp[end - start + 1], i = start, j = mid + 1, k = 0;

   while (i <= mid && j <= end) {
      if (Arr[i] <= Arr[j])
         temp[k++] = Arr[i++];
      else
         temp[k++] = Arr[j++];
   }

   while (i <= mid)
      temp[k++] = Arr[i++];
   while (j <= end)
      temp[k++] = Arr[j++];

   for (int p = start, q = 0; p <= end; p++, q++)
      Arr[p] = temp[q];
}

void mergeSort(int Arr[], int start, int end) {
   if (start < end) {
      int mid = (start + end) / 2;
      mergeSort(Arr, start, mid);
      mergeSort(Arr, mid + 1, end);
      merge(Arr, start, mid, end);
   }
}

int main() {
   int arr_size;
   printf("Enter the number of elements in the array: ");
   scanf("%d", &arr_size);
   int Arr[arr_size];

   printf("Enter the elements in the array:\n");
   for (int i = 0; i < arr_size; i++)
      scanf("%d", &Arr[i]);

   mergeSort(Arr, 0, arr_size - 1);

   printf("Sorted array is:\n");
   for (int i = 0; i < arr_size; i++)
      printf("%d ", Arr[i]);
   printf("\n");

   return 0;
}
```

```
(base) computer@computer:~/Desktop/karan$ gcc -o merge merge.c
(base) computer@computer:~/Desktop/karan$ ./merge
Enter the number of elements in the array: 6
Enter the elements in the array:
12
65
89
65
11
9
Sorted array is:
9 11 12 65 65 89
(base) computer@computer:~/Desktop/karan$
```