

Application Based on Merge Sort

Title : Online Shopping Price Manager

Program Code :

```
#include <stdio.h>

#include <string.h>

#define SIZE 50

struct Product {

    char name[50];

    float price;

};

void merge(struct Product arr[], int left, int mid, int right) {

    int n1 = mid - left + 1;

    int n2 = right - mid;

    struct Product L[n1], R[n2]; // ? Variable Length Arrays

(modern C)

    int i, j, k;

// Copy left half

    for (i = 0; i < n1; i++)

        L[i] = arr[left + i];

// Copy right half
```

```
for (j = 0; j < n2; j++)  
    R[j] = arr[mid + 1 + j];  
  
i = 0;  
  
j = 0;  
  
k = left;  
  
// Merge two halves  
  
while (i < n1 && j < n2) {  
    if (L[i].price <= R[j].price) // ascending order  
        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++];  
}  
  
void mergeSort(struct Product 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()

{

    struct Product arr[SIZE];

    int n, i;

    printf("Enter number of products (max %d): ", SIZE);

    scanf("%d", &n);

    for (i = 0; i < n; i++) {

        printf("\nEnter details for Product %d\n", i + 1);

        printf("Name: ");

        scanf(" %[^\n]", arr[i].name);

        printf("Price: ");

        scanf("%f", &arr[i].price);

    }

    mergeSort(arr, 0, n - 1);
```

```
printf("\nProducts sorted by Price (lowest first):\n");

printf("Name\tPrice\n");

for (i = 0; i < n; i++) {

    printf("%s\t%.2f\n", arr[i].name, arr[i].price);

}

return 0;

}
```

Output :

```
C:\Users\USER\Desktop\241410128\Merge Sort Application.exe
Enter number of products (max 50): 4

Enter details for Product 1
Name: Laptop
Price: 60000

Enter details for Product 2
Name: Keyboard
Price: 1500

Enter details for Product 3
Name: Headphone
Price: 2000

Enter details for Product 4
Name: Mobile
Price: 20000

Products sorted by Price (lowest first):
Name          Price
Keyboard      1500.00
Headphone     2000.00
Mobile        20000.00
Laptop        60000.00

-----
Process exited after 45.18 seconds with return value 0
Press any key to continue . . .
```

