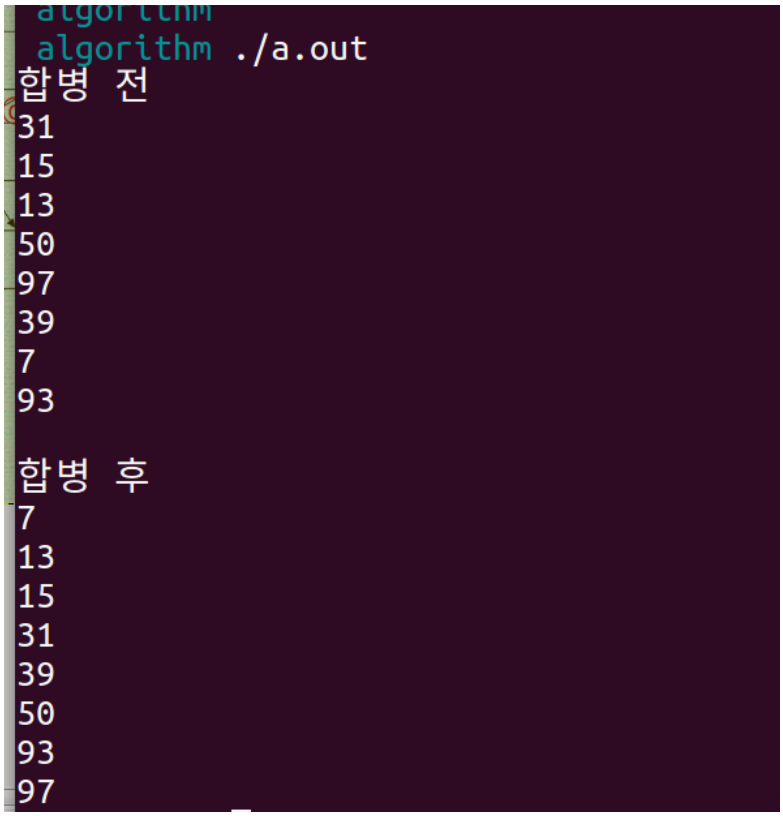
2013335004 고명진
컴퓨터 알고리즘

실행 결과



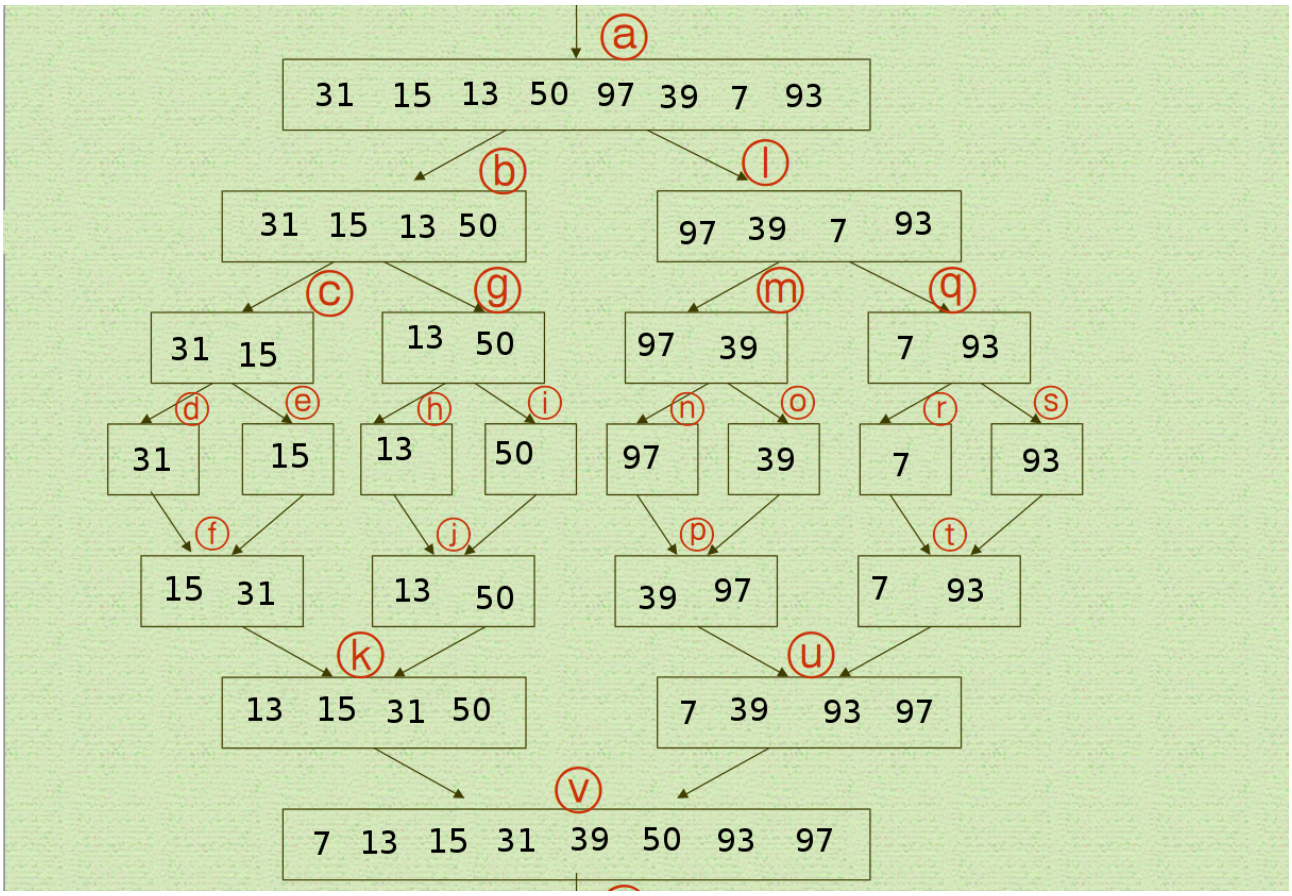
소스코드

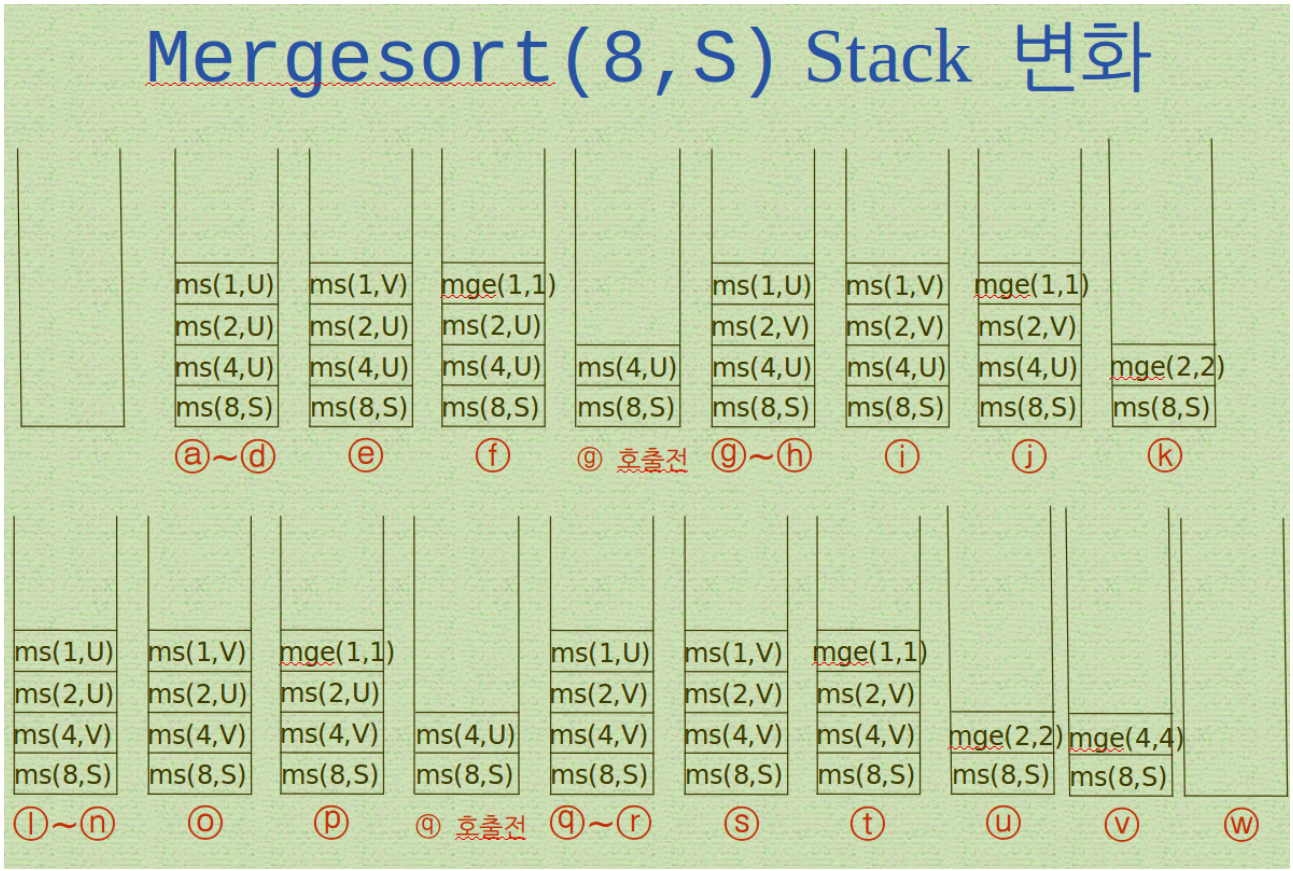
```
 1 #include <stdio.h>
 2 #include <stdlib.h>
 3 #include <time.h>
 4
 5 void merge_sort(int array[],int left ,int right);   // 분할
 6 void merge(int num[],int left,int mid,int right);   // 합병
 7 const int ITEMSIZE = 8;
 8
 9 int main(void)
10 {
11     int array[ITEMSIZE];
12
13     srand(time(NULL));
14
15     for(int i = 0; i < ITEMSIZE; i++)
16     {
17         array[i]=rand()%100;
18     }
19     printf("합병 전\n");
20
21     for(int j = 0; j < ITEMSIZE; j++)
```

```
22    {
23        printf("%d\n",array[j]);
24    }
25    putchar('\n');
26    printf("합병 후\n");
27
28    merge_sort(array, 0, ITEMSIZE - 1);
29
30    for(int k = 0; k < ITEMSIZE; k++)
31    {
32        printf("%d\n",array[k]);
33    }
34 }
35
36 void merge_sort(int array[], int left, int right)
37 {
38      int mid;
39
40    if(left < right)
41    {
42        mid = (left + right)/2;
43
44        merge_sort(array, left, mid);
45        merge_sort(array, mid+1, right);
46        merge(array, left, mid, right);
47    }
48 }
49
50 void merge(int array[], int left, int mid, int right)
51 {
52    int m;
53
54    int i = left;
55    int j = mid + 1;
56    int k = left;
57
58    int tempArray[ITEMSIZE];
59
60    while (i <= mid && j <= right)
61    {
62        if (array[i] < array[j])
63        {
64            tempArray[k] = array[i];
65            i++;
66        }
67        else
68        {
69            tempArray[k] = array[j];
70            j++;
71        }
72        k++;
73    }
```

```
74
75    if (i > mid)
76    {
77        for (m = j; m <= right; m++)
78        {
79            tempArray[k] = array[m];
80            k++;
81        }
82    }
83    else
84    {
85        for (m = i; m <= mid; m++)
86        {
87            tempArray[k] = array[m];
88            k++;
89        }
90    }
91
92    for(m = left; m <= right; m++)
93    {
94        array[m] = tempArray[m];
95    }
96 }
```

스택의 변화과정




Mergesort(8,S) Stack 변화
ms(1,U)
ms(2,U)
ms(4,U)
ms(8,S)
ms(1,V)
ms(2,U)
ms(4,U)
ms(8,S)
mge(1,1)
ms(2,U)
ms(4,U)
ms(8,S)
ms(4,U)
ms(8,S)
ms(1,U)
ms(2,V)
ms(4,U)
ms(8,S)
ms(1,V)
ms(2,V)
ms(4,U)
ms(8,S)
mge(1,1)
ms(2,V)
ms(4,U)
ms(8,S)
mge(2,2)
ms(8,S)
ⓐ~ⓓ
ⓔ
ⓕ
ⓖ 호출전
ⓖ~ⓗ
ⓘ
ⓙ
ⓚ
ms(1,U)
ms(2,U)
ms(4,V)
ms(8,S)
ms(1,V)
ms(2,U)
ms(4,V)
ms(8,S)
mge(1,1)
ms(2,U)
ms(4,V)
ms(8,S)
ms(4,U)
ms(8,S)
ms(1,U)
ms(2,V)
ms(4,V)
ms(8,S)
ms(1,V)
ms(2,V)
ms(4,V)
ms(8,S)
mge(1,1)
ms(2,V)
ms(4,V)
ms(8,S)
mge(2,2)
ms(8,S)
mge(4,4)
ms(8,S)
ⓛ~ⓝ
ⓞ
ⓟ
ⓠ 호출전
ⓠ~ⓡ
ⓢ
ⓣ
ⓤ
ⓥ
ⓦ