

CS 1713, Example with C structs, Mon Apr 13 1998

```
runner$ cat freq_struct2.c
/* Calculate frequencies of letters in an input file */
#include <stdio.h>
#include <ctype.h>
struct table_tag {
    char letter;
    int count;
};
void bubble(struct table_tag table[]);
void swap(struct table_tag *table1, struct table_tag *table2);
void printfreq(struct table_tag table[], int tot);

void main(void)
{
    struct table_tag table[26];
    int i; /* index for lc array */
    int tot = 0; /* total number of alpha characters */
    int ch; /* int so that EOF will work */
    for (i = 0; i < 26; i++) {
        table[i].letter = (char) (i + 'a');
        table[i].count = 0;
    }
    while ((ch = getchar()) != EOF)
        if (isalpha(ch = tolower(ch))) {
            tot++;
            table[ch - 'a'].count++;
        }
    bubble(table);
    printfreq(table, tot);
}

/* bubble: sort lc array into decreasing order. Carry alf along */
void bubble(struct table_tag table[])
{
    int i, dum;
    for (dum = 0; dum < 25; dum++)
        for (i = 0; i < 25; i++)
            if (table[i].count < table[i+1].count)
                swap(&table[i], &table[i+1]);
}
void swap(struct table_tag *table1, struct table_tag *table2)
{
    struct table_tag temp;
    temp = *table1;
    *table1 = *table2;
    *table2 = temp;
}

/* printfreq: print out the frequency table */
void printfreq(struct table_tag table[], int tot)
{
    int i;
    printf("Frequency count of letters, out of total: %d\n\n", tot);
    printf(" Letter   Frequency (%)\n");
    for (i = 0; i < 26; i++)
        printf("%6c %13.3f%%\n", table[i].letter,
            (double)table[i].count/tot*100.0);
}
```

```
runner$ freq_struct2
```

```
AaAaA
```

```
bbbBBbbbbb
```

```
ZzZzZZZzzZzzzzz (ctrl-D)
```

```
Frequency count of letters, out of total: 30
```

Letter	Frequency (%)
z	50.000%
b	33.333%
a	16.667%