ICS 103, Term 093

Computer Programming in C

**HW# 4 Solution**

**Due date: Wednesday, August 18, 2010**

# You are required to write a C program to do the following:

## Ask the user to enter an input file name and read it.

## Count the number of occurrences of each of the alphabetic characters in the input file i.e. ‘a’ to ‘z’ regardless whether the character is small letter or capital.

## Print the characters in descending order of their occurrence along with their number of occurrences printing only characters with non-zero count.

*A sample execution of the program is shown below:*

|  |  |
| --- | --- |
| *Input file: hw4.txt* | *Histogram Display:* |
|  |  |

**#include <stdio.h>**

**#include <stdlib.h>**

**#define SIZE 26**

**void sort(int CC[], char C[], int size);**

**int main(void)**

**{**

**FILE \*inf;**

**char infname[40], ch;**

**int CC[SIZE]={0}, i;**

**char C[SIZE];**

**printf("Enter the input file name: ");**

**gets(infname);**

**inf = fopen( infname, "r");**

**if (inf == NULL){**

**printf("Cannot open %s for reading \n", infname);**

**system("pause");**

**exit(1);**

**}**

**while ( fscanf(inf,"%c",&ch) != EOF ) {**

**if ((ch>='a' && ch<='z')||(ch>='A' && ch<='Z')){**

**ch = ch | 32; // convert chararcters to lower case**

**C[(int)ch-97]=ch;**

**CC[(int)ch-97]++;**

**}**

**}**

**sort(CC, C, SIZE);**

**for (i=0; i<SIZE;i++)**

**if (CC[i] !=0)**

**printf("%c: %d\n",C[i], CC[i]);**

**system("pause");**

**return 0;**

**}**

**void sort(int CC[], char C[], int size){**

**int k,j,minpos,temp;**

**char ctemp;**

**for (k=0; k < size - 1; k++) {**

**minpos = k;**

**for(j = k+1; j < size; j++){**

**if(CC[j] > CC[minpos])**

**minpos = j;**

**}**

**temp = CC[minpos]; ctemp = C[minpos];**

**CC[minpos] = CC[k]; C[minpos] = C[k];**

**CC[k] = temp; C[k] = ctemp;**

**}**

**}**

# Write a C program that displays the following menu:

1. Read Array
2. Print Array
3. Reverse a row
4. Reverse a column
5. Exit

Assume that the entered array will be a two dimensional array of integers and that the maximum number of rows and columns in the array is 15. Implement each of the menu options 1 to 4 as separate functions. Print the array after reversing a row or reversing a column. The menu should continue to be displayed as long as choice 5 is not selected. If a choice other than between 1 and 5 is entered, the statement “Invalid Choice” should be displayed.

*A sample execution of the program is shown below:*

|  |  |
| --- | --- |
|  |  |

**#include <stdio.h>**

**#include <stdlib.h>**

**#define MAX 15**

**void read\_array (int a[][MAX], int nr, int nc);**

**void print\_array (int a[][MAX], int nr, int nc);**

**void reverse\_row (int a[][MAX], int nc, int r);**

**void reverse\_col (int a[][MAX], int nr, int c);**

**void menu();**

**int main (void){**

**int a[MAX][MAX], nr, nc, i, j, r, c, ch;**

**do{**

**menu();**

**scanf("%d", &ch);**

**switch (ch){**

**case 1:**

**printf("Enter number of rows: ");**

**scanf("%d",&nr);**

**printf("Enter number of columns: ");**

**scanf("%d",&nc);**

**printf("Enter %d integers:\n",nr\*nc);**

**read\_array (a, nr, nc);**

**break;**

**case 2:**

**print\_array(a, nr, nc);**

**break;**

**case 3:**

**printf("Enter a row number: ");**

**scanf("%d",&r);**

**reverse\_row(a, nc, r);**

**print\_array(a, nr, nc);**

**break;**

**case 4:**

**printf("Enter a column number: ");**

**scanf("%d",&c);**

**reverse\_col(a, nr, c);**

**print\_array(a, nr, nc);**

**break;**

**case 5: break;**

**default: printf("Invalid Choice \n");**

**}**

**} while (ch != 5);**

**system ("pause");**

**return 0;**

**}**

**void menu(){**

**printf("Select a choice:\n");**

**printf("1. Read Array \n");**

**printf("2. Print Array \n");**

**printf("3. Reverse a row \n");**

**printf("4. Reverse a column \n");**

**printf("5. Exit \n");**

**}**

**void read\_array (int a[][MAX], int nr, int nc){**

**int i, j;**

**for(i=0; i<nr; i++)**

**for (j=0; j<nc; j++)**

**scanf("%d", &a[i][j]);**

**}**

**void print\_array (int a[][MAX], int nr, int nc){**

**int i, j;**

**for(i=0; i<nr; i++){**

**for (j=0; j<nc; j++)**

**printf("%3d", a[i][j]);**

**printf("\n");**

**}**

**}**

**void reverse\_row (int a[][MAX], int nc, int r){**

**int i, t;**

**for(i=0; i<nc/2; i++){**

**t=a[r][i];**

**a[r][i]=a[r][nc-i-1];**

**a[r][nc-i-1]=t;**

**}**

**}**

**void reverse\_col (int a[][MAX], int nr, int c){**

**int i, t;**

**for(i=0; i<nr/2; i++){**

**t=a[i][c];**

**a[i][c]=a[nr-i-1][c];**

**a[nr-i-1][c]=t;**

**}**

**}**

# Write a C program that asks the user to enter a string of characters, str1, and another string of characters, str2. Then the program replaces all occurrences of str2 in str1 by \*. Assume that the maximum length of str1 and str2 is 80.

*A sample execution of the program is shown below:*

**

**#include <stdio.h>**

**#include <stdlib.h>**

**#include <string.h>**

**#define MAX 80**

**int main (void){**

**char str1[MAX], str2[MAX], \*index;**

**printf("Enter a string: ");**

**gets(str1);**

**printf("Enter another string: ");**

**gets(str2);**

**index=strstr(str1, str2);**

**while (index != NULL){**

**for (int i=0; i<strlen(str2); i++)**

**index[i]='\*';**

**index=strstr(index+strlen(str2), str2);**

**}**

**printf("Updated string: ");**

**puts(str1);**

**system ("pause");**

**return 0;**

**}**