ICS 103, Term 083

Computer Programming in C

**HW# 3 Solution**

**Due date: Sunday, August 23, 2009**

# 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.

## Write a function **histogram** that receives an input array and displays a histogram of ‘\*’ according to each element count. If an array element count is 0, that element should not be displayed. Then, use this function to display a histogram of the counted alphabetic characters read from the file.

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

|  |  |
| --- | --- |
| *Input file: hw3.txt* | *Histogram Display:* |
|  |  |

#include <stdio.h>

#include <stdlib.h>

#define SIZE 26

void histogram(int x[], int size);

int main(void)

{

 FILE \*inf;

 char infname[40], ch;

 int C[SIZE]={0}, i;

 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]++;

 }

 }

 histogram(C, SIZE);

 system("pause");

 return 0;

}

void histogram(int x[], int size){

 int i, j;

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

 if (x[i] !=0){

 printf("%c:",i+97);

 for (j=0;j<x[i];j++)

 printf("\*");

 printf("\n");

 }

}

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

## Ask the user to enter input file name and read from it students ID’s along with their exam scores.

## Ask the user to select the type of sorting required ( **a** for ascending sorting of scores and **d** for descending). Then, write the sorted IDs and scores in an output file with its name selected by the user. Assume that the default sorting will be descending.

## Ask the user to enter a student ID and display the rank of the student in the class. This process is repeated until the user enters 0 for the ID.

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



|  |  |
| --- | --- |
| ***scores.txt:*** | ***scores\_sorted.txt*** |
|  |  |

#include <stdio.h>

#include <stdlib.h>

#define SIZE 100

void bubble\_sort(int a[], double b[], int size, char stype);

void dswap(double \*a, double \*b);

void dswap(int \*a, int \*b);

int linear\_search(int a[], int target, int size);

int main(void)

{

 FILE \*inf, \*outf;

 char infname[40], outfname[40], stype;

 int IDs[SIZE], count=0, i, id, index;

 double Scores[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);

 }

 printf("Enter the output file name: ");

 gets(outfname);

 outf = fopen( outfname, "w");

 printf("Enter the sorting type (a for ascending & d for descending): ");

 scanf("%c", &stype);

 while ( fscanf(inf,"%d %lf",&IDs[count], &Scores[count]) != EOF ) {

 count++;

 }

// sorting scores & IDs according to scores

 bubble\_sort(IDs, Scores, count, stype);

// printing IDs & scores into output file

 fprintf(outf,"Student ID \t Score\n");

 fprintf(outf,"---------- \t -----\n");

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

 fprintf(outf, "%d \t %.1f\n",IDs[i], Scores[i]);

 printf("Scores sorted successfully...\n");

 do{

 printf("Enter a student id: ");

 scanf("%d",&id);

 if (id==0) break;

 index=linear\_search(IDs, id, count);

 if (index != -1)

 printf("Student with ID %d is ranked number %d in the class\n", id, index+1);

 else

 printf("Student with ID %d is not found!!\n", id);

 } while (1);

 system("pause");

 return 0;

}

void dswap(double \*a, double \*b) {

 double temp = \*a;

 \*a = \*b;

 \*b = temp;

}

void iswap(int \*a, int \*b) {

 int temp = \*a;

 \*a = \*b;

 \*b = temp;

}

void bubble\_sort(int a[], double b[], int size, char stype) {

 int i, pass = 1, swap\_occurs;

 switch(stype){

 case 'a': case 'A':

 do{

 swap\_occurs = 0;

 for(i = 1; i <= size - pass; i++)

 if (b[i - 1] > b[i]) {

 dswap(&b[i-1], &b[i]);

 iswap(&a[i-1], &a[i]);

 swap\_occurs = 1;

 }

 pass++;

 } while (swap\_occurs && pass <= size-1);

 break;

 default:

 do{

 swap\_occurs = 0;

 for(i = 1; i <= size - pass; i++)

 if (b[i - 1] < b[i]) {

 dswap(&b[i-1], &b[i]);

 iswap(&a[i-1], &a[i]);

 swap\_occurs = 1;

 }

 pass++;

 } while (swap\_occurs && pass <= size-1);

 }

}

int linear\_search(int a[], int target, int size)

{

 int i, found = 0, where=-1;

 i = 0;

 while (!found && i < size) {

 if (a[i] == target){

 found = 1;

 where = i;

 } else

 ++i;

 }

 return where;

}

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

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

## Ask the user to enter a string and read it. Assume that the string is of maximum 80 characters and that the string can include spaces.

## Count the number of occurrences of the string in the input file and display its count. Note that any matching string with the same letters regardless of being lower or upper case should be counted. If the string is not found, a message is printed indicating that the string was not found in the file.

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

|  |  |
| --- | --- |
| *Input file: hw3.txt* | *Histogram Display:* |
|  |  |

#include <stdio.h>

#include <stdlib.h>

#include <string.h>

void stolower (char str[], int size);

int main(void)

{

 FILE \*inf;

 char infname[40], ostr[81], str[81], ch;

 int i, count=0;

 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);

 }

 printf("Enter a string to search for in the file: ");

 gets(str);

 strcpy(ostr,str);

 stolower(str, 80);

 i=0;

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

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

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

 if (ch == str[i]) i++;

 else if (ch == str[0]) i=1;

 else i=0;

 if (i==strlen(str)) count++;

 }

 }

 if (count>0)

 printf("String \"%s\" occurred %d times in file %s\n",ostr, count, infname);

 else

 printf("String \"%s\" was not found in file %s\n", ostr, infname);

 system("pause");

 return 0;

}

void stolower (char str[], int size){

 for (int i=0; i<size; i++)

 if ((str[i]>='a' && str[i]<='z')||(str[i]>='A' && str[i]<='Z'))

 str[i] = str[i] | 32; // convert chararcters to lower case

}