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//For searching as stated in the assaignment, I used sequential search. Its best case O(1), worst case O(n).

//According to sample output it is O(n) as it is not ordered. There are just one loop and iterates only "n" times,

//That's why its worst case is o(n).

//For sorting as stated in the assaignment, I used insertion sort. Its best case O(n), worst case O(n^2).

//There are two loops nested, and for the average and vorst case n\*n = it is o(n^2) obvious.

//for ordered inputs(for best case) it is O(n) because only the first loop iterates, second loop will not be iterated because

//the condition of tmp<a[j-1] is never going to be true.

#include <stdio.h>

#include <stdlib.h>

#include <string.h>

struct songsInfo{

char songName[25];

char artistName[25];

int songYear;

};

void displaySongs(struct songsInfo \*info, int num\_lines);

void sortSongsYear(struct songsInfo \*info, int num\_lines);

void searchSong(struct songsInfo \*info, int num\_lines);

int main(){

FILE \*fptr;

char ch;

int num\_lines=1, i;

fptr=fopen("songs.txt","r");

if (fptr == NULL){

printf("Error occured while reading the file!");

exit(1);

}

while((ch = fgetc(fptr)) != EOF ){

if (ch == '\n')

num\_lines++;

}

struct songsInfo \*info;

info= (struct songsInfo\*)malloc(num\_lines\*sizeof(struct songsInfo)); //ALLOCATION HERE

if (info== NULL){

printf("Error occured while allocating the memory!\n");

exit(1);

}

fseek(fptr, 0L, SEEK\_SET); //go to start of the file

i=0;

while(fscanf(fptr, "%[^;];%[^;];%d\n",info[i].songName,info[i].artistName,&info[i].songYear)!=EOF)

i++;

fclose(fptr);

char choice;

printf("The songs.txt file has been loaded successfully!\n\n");

do{

fflush(stdin);

printf("1)Display songs\n");

printf("2)Sort songs\n");

printf("3)Search songs\n");

printf("4)Exit\n");

printf("What would you like to do? ");

scanf("%c",&choice);

if(choice == '1'){

printf("\n");

displaySongs(info, num\_lines);

}

else if (choice == '2'){

sortSongsYear(info, num\_lines);

}

else if (choice == '3'){

searchSong(info, num\_lines);

}

else{

if(choice == '4')

continue;

printf("Please enter a valid number AS LISTED AT THE MENU!\n\n");

}

}while(choice!= '4');

return 0;

}

void displaySongs(struct songsInfo \*info, int num\_lines){

int i;

for(i=0;i<num\_lines;i++){

printf(" %s;%s;%d\n",info[i].songName,info[i].artistName,info[i].songYear);

}

printf("\n");

}

void sortSongsYear(struct songsInfo \*info, int num\_lines){

int i,j;

struct songsInfo temp;

for(i=1;i<num\_lines;i++){

temp = info[i];

for(j=i; j>0 && temp.songYear>info[j-1].songYear;j--)

info[j] = info[j-1];

info[j] = temp;

}

printf("\n");

displaySongs(info, num\_lines);

}

void searchSong(struct songsInfo \*info, int num\_lines){

int i, year, flag=0, index; //index for tracing the index of the array of the struct's year

printf("\n\n Enter song year: ");

scanf("%d",&year);

for(i=0;i<num\_lines;i++){

if (year == info[i].songYear){

flag= 1;

index= i;

}

}

if (flag==1)

printf(" %s;%s;%d\n\n",info[index].songName,info[index].artistName,info[index].songYear);

else

printf("There is not any song which is released in %d!\n\n",year);

}