#include <stdio.h>

#include <stdlib.h>

#include <string.h>

//struct declaration

typedef struct {

int patientRegNum;

char firstName[30];

char sirName[30];

int gender;

int age;

int weight;

int height;

float bloodTest1;

float bloodTest2;

float bloodTest3;

}patientT;

//declaration of all functions

void init(patientT\* patientDetails, int size);

void savePatientDB(patientT\* patientDetails, int size);

void mainMenu(patientT\* patientDetails, int size);

void addPatient(patientT\* patientDetails, int size);

void editPatient(patientT\* patientDetails, int size);

void searchPatient(patientT\* patientDetails, int size);

void findDiabetes(patientT\* patientDetails, int size);

void main() {

patientT\* patientLibrary;

FILE\* fp;

int numOfPatients;

int choice;

printf("Enter 1 to load a previous Patient DB or Enter 2 to create a new patient DB: \n");

scanf("%d", &choice);

if (choice == 1) {//loads the previous saved database

fp = fopen("patient.txt", "r");

if (fp == NULL) {

printf("Cannot open file");

}

else {

fscanf(fp, "%d", &numOfPatients);

patientLibrary = (patientT\*)malloc(numOfPatients \* sizeof(patientT));

for (int i = 0; i < numOfPatients; i++) {

fscanf(fp, "%d %s %s %d %d %d %d %f %f %f",

&(patientLibrary + i)->patientRegNum, &(patientLibrary + i)->firstName, &(patientLibrary + i)->sirName, &(patientLibrary + i)->gender,

&(patientLibrary + i)->age, &(patientLibrary + i)->weight, &(patientLibrary + i)->height,

&(patientLibrary + i)->bloodTest1, &(patientLibrary + i)->bloodTest2, &(patientLibrary + i)->bloodTest3);

}

fclose(fp);

mainMenu(patientLibrary, numOfPatients);

}

}

else if (choice == 2) {//creates a new database

printf("Please enter the number of patients you would like to have:\n");

scanf("%d", &numOfPatients);

patientLibrary = (patientT\*)malloc(numOfPatients \* sizeof(patientT));

//initialising the library

init(patientLibrary, numOfPatients);

mainMenu(patientLibrary, numOfPatients);//calls mainMenu function and prompts user to add a new patient

}

}

//initializes the patientT variables

void init(patientT\* patientDetails, int size) {

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

(patientDetails + i)->patientRegNum = 0;

strcpy((patientDetails + i)->firstName, "");

strcpy((patientDetails + i)->sirName, "");

(patientDetails + i)->gender = 0;

(patientDetails + i)->age = 0;

(patientDetails + i)->weight = 0;

(patientDetails + i)->height = 0;

(patientDetails + i)->bloodTest1 = 0.0;

(patientDetails + i)->bloodTest2 = 0.0;

(patientDetails + i)->bloodTest3 = 0.0;

}

}

//function to allow for the saving of the patient database to the file patient.txt

void savePatientDB(patientT\* patientDetails, int size) {

FILE\* fp;

fp = fopen("patient.txt", "w");

if (fp == NULL) {

printf("Cannot open file!\n");

}

else {

fprintf(fp, "%d\n", size);

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

if ((patientDetails + i)->patientRegNum != 0) {//populates the file if there is a patient in the array

fprintf(fp,"%d %s %s %d %d %d %d %f %f %f\n",

(patientDetails + i)->patientRegNum, (patientDetails + i)->firstName, (patientDetails + i)->sirName, (patientDetails + i)->gender,

(patientDetails + i)->age, (patientDetails + i)->weight, (patientDetails + i)->height,

(patientDetails + i)->bloodTest1, (patientDetails + i)->bloodTest2, (patientDetails + i)->bloodTest3);

}

else {//populates the file with "empty" if that index of the array has no patient

fprintf(fp, "%d %s %s %d %d %d %d %f %f %f",

(patientDetails + i)->patientRegNum, "Empty", "Empty", 0, 0, 0, 0, 0.0, 0.0, 0.0);

}

}

fclose(fp);

printf("Your file has been saved!\n\n");

}

}

//menu method allows the user to decide what they want to do with the database

void mainMenu(patientT\* patientDetails, int size) {

int menuChoice = 0;

while (menuChoice != -1) {//menu loop

printf("\nEnter 1 to add a new patient\nEnter 2 to edit a patient\nEnter 3 to search for a patient\nEnter 4 to search for patients with Diabetes\nEnter 5 to save db\nEnter -1 to exit\n");

scanf("%d", &menuChoice);

if (menuChoice == 1) {

addPatient(patientDetails, size);

}

else if (menuChoice == 2) {

editPatient(patientDetails, size);

}

else if (menuChoice == 3) {

searchPatient(patientDetails, size);

}

else if (menuChoice == 4) {

findDiabetes(patientDetails, size);

}

else if (menuChoice == 5) {

savePatientDB(patientDetails, size);

}

else if (menuChoice == -1) {

break;

}

else {

printf("The number you have entered is not an option, please try again!\n");

menuChoice = 0;

}

}

}

//function that allows the user to add a patient to the database

void addPatient(patientT\* patientDetails, int size) {

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

if ((patientDetails + i)->patientRegNum == 0) {

printf("Please enter the patient Registration number:\n");

scanf("%d", &(patientDetails + i)->patientRegNum);

printf("Please enter First Name:\n");

scanf("%s", (patientDetails + i)->firstName);

printf("Please enter Surname:\n");

scanf("%s", (patientDetails + i)->sirName);

printf("Please enter gender, 1 for male or 2 for female:\n");

scanf("%d", &(patientDetails + i)->gender);

printf("Please enter age:\n");

scanf("%d", &(patientDetails + i)->age);

printf("Please enter weight:\n");

scanf("%d", &(patientDetails + i)->weight);

printf("Please enter height:\n");

scanf("%d", &(patientDetails + i)->height);

printf("Please enter blood test 1:\n");

scanf("%f", &(patientDetails + i)->bloodTest1);

printf("Please enter blood test 2:\n");

scanf("%f", &(patientDetails + i)->bloodTest2);

printf("Please enter blood test 3:\n");

scanf("%f", &(patientDetails + i)->bloodTest3);

return;

}

}

printf("Sorry the library is full\n");

}

//function that allows you to change the blood sugar test results of the patient

void editPatient(patientT\* patientDetails, int size) {

int findpatient;

printf("\nPlease enter the patient registration number of the patient that you want to edit:\n");

scanf("%d", &findpatient);

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

{

if ((patientDetails + i)->patientRegNum == findpatient) {

printf("Please enter the new blood test 1:\n");

scanf("%f", &(patientDetails + i)->bloodTest1);

printf("Please enter the new blood test 2:\n");

scanf("%f", &(patientDetails + i)->bloodTest2);

printf("Please enter the new blood test 3:\n");

scanf("%f", &(patientDetails + i)->bloodTest3);

return;

}

}

//throws error if the patient reg number could not be found

printf("The patient Registration number %ld could not be found!\n", findpatient);

}

//function to allow the user to search for a patient and display all of the data related to them

void searchPatient(patientT\* patientDetails, int size) {

int findPatient;

printf("Please enter the patient registration number of the patient that you want to find:\n");

scanf("%d", &findPatient);

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

{

if ((patientDetails + i)->patientRegNum == findPatient) {

printf("Patient Reg Number: %d\nFirst Name:%s\nSurname: %s\n Gender(1 for male, 2 for female): %d\nAge: %d\nWeight: %d\nHeight: %d\nBlood Sugar Test 1: %f\nBlood Sugar Test 2: %f\nBlood Sugar Test 3: %f\n",

(patientDetails + i)->patientRegNum, (patientDetails + i)->firstName, (patientDetails + i)->sirName, (patientDetails + i)->gender,

(patientDetails + i)->age, (patientDetails + i)->weight, (patientDetails + i)->height,

(patientDetails + i)->bloodTest1, (patientDetails + i)->bloodTest2, (patientDetails + i)->bloodTest3);

return;

}

}

printf("The patient could not be found!\n");

}

//function that allows the user to find the patients that have diabetes based on the parameters set in the IF statement

void findDiabetes(patientT\* patientDetails, int size) {

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

if ((patientDetails + i)->bloodTest1>= 11.1 && (patientDetails + i)->bloodTest2 >= 7.0 && (patientDetails + i)->bloodTest3 >= 9.1) {

printf("\nPatient Reg Number: %d\nFirst Name:%s\nSurname: %s\n Gender(1 for male, 2 for female): %d\nAge: %d\nWeight: %d\nHeight: %d\nBlood Sugar Test 1: %f\nBlood Sugar Test 2: %f\nBlood Sugar Test 3: %f\n",

(patientDetails + i)->patientRegNum, (patientDetails + i)->firstName, (patientDetails + i)->sirName, (patientDetails + i)->gender,

(patientDetails + i)->age, (patientDetails + i)->weight, (patientDetails + i)->height,

(patientDetails + i)->bloodTest1, (patientDetails + i)->bloodTest2, (patientDetails + i)->bloodTest3);

return;

}

}

}