



Level: 1st year of computer science
Course: ADS1

Typical solution TD/TP N° : 08

Academic year: 2024/2025
Chapter 6 : structures

Exercice 1 : TD/TP

Exercise 1 : TD/TP

- Define a structure to store a complex number (real part, imaginary part).
- Write a program that:
 - Reads a real number (can be negative) and calculates and displays its square root.
 - Reads a complex number, then calculates and displays its modulus (magnitude).
 - Reads 2 complex numbers, then calculates and displays their sum and product.

```
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

typedef struct {
    float re, im;
} complex;

int main() {
    float x;
    complex a, b, s, p;
    printf("enter a real number \n");
    scanf("%f", &x);
    if (x >= 0) {
        a.re = sqrt(x);
        a.im = 0;
    } else {
        a.re = 0;
        a.im = sqrt(-x);
    }
    printf("the result is %.2f - %.2fi\n", a.re, a.im);
    printf("enter a complex nbr \n");
    scanf("%f%f", &a.re, &a.im);
    printf("the module is %.2f\n", sqrt(a.re*a.re + a.im*a.im));
    printf("enter first complex nbr \n");
    scanf("%f%f", &a.re, &a.im);
    printf("enter second nbr complex \n");
    scanf("%f%f", &b.re, &b.im);
    s.re = a.re + b.re;
    s.im = a.im + b.im;
    p.re = a.re*b.re - a.im*b.im;
    p.im = a.re*b.im + a.im*b.re;
    printf("the sum is %.2f - %.2fi\n", s.re, s.im);
    printf("the multiplication is %.2f - %.2fi\n", p.re, p.im);
    return 0;
}
```

Exercise 2 : TP

- Define a structure to store the date (day, month, and year).
- Define a structure to store contact information (contact name, contact phone, and contact birthday).



- Write a program that populates an array of "N" contacts. Then, it only displays the contacts that have a Mobilis phone number (phone number starting with 06).

```
#include <stdio.h>

typedef struct {
    int d,m,y;
} date;

typedef struct {
    char name [20],tel[14];
    date anv;
} contact;

int main() {
    contact C[100];
    int i,n;
    printf("enter number of contacts \n");
    scanf("%d",&n);
    for(i=0; i<n; i++) {
        getchar();
        printf("entrer le contact N: %d\n",i);
        printf("name:");
        gets(C[i].name);
        printf("Tel:");
        gets(C[i].tel);
        printf("date of birth:");
        scanf("%d%d%d",&C[i].anv.d,&C[i].anv.m,&C[i].anv.y);
    }
    printf("here are the contacts who have mobilis\n");
    printf("name \ttel\tdate of birth \n");
    for(i=0; i<n; i++)
        if(C[i].tel[1]=='6')
            printf("%s\t%s\t%d/%d/%d\n", C[i].name, C[i].tel, C[i].anv.d, C[i].anv.m,
                C[i].anv.y);
    return 0;
}
```

Exercise 3 : TD

- Define a structure to store the time (hour, minute).
- Define a structure to store the TV program of a channel (program name, program time, and duration in minutes).
- Write a program that populates an array of "N" TV programs. Then, it asks the user for a time to display the current program airing at that time

```
#include <stdio.h>

typedef struct {
    int h,m;
} hour;

typedef struct {
    char name [20];
    hour hr;
    int duration;
} programTV;
```



```
int main() {
    programTV P[100];
    hour h;
    int i,n;
    printf("enter number of programs \n");
    scanf("%d",&n);
    for(i=0; i<n; i++) {
        getchar();
        printf("enter program N: %d\n",i);
        printf("program name:");
        gets(P[i].name);
        printf("program time:");
        scanf("%d%d",&P[i].hr.h,&P[i].hr.m);
        printf("program duration:");
        scanf("%d",&P[i].duration);
    }
    printf("enter time:\n");
    scanf("%d%d",&h.h,&h.m);
    for(i=0; i<n; i++)
        if((h.h*60+h.m >= P[i].hr.h*60+P[i].hr.m) &&
            (h.h*60+h.m <= P[i].hr.h*60+P[i].hr.m+P[i].duree))
            printf("the program %s begins at %d:%d\n",P[i].nom,P[i].hr.h,P[i].hr.m);
    return 0;
}
```

Exercise 4 : TP

- Define a structure to store the results of the World Cup (names of the two teams and the score).
- Write a program that:
 - Populates an array with the results of the Round of 16 (eighth-finals).
 - Displays the names of the teams that are in the quarter-finals.
 - Saves the results of the Round of 16 in a text file.

```
#include <stdio.h>
typedef struct {
    char team1[20], team2[20];
    int goals1, goals2;
} matche;
int main() {
    FILE *f;
    matche m8[8];
    int i,n;
    for(i=0; i<2; i++) {
        printf("enter match info N: %d\n",i+1);
        printf("first team name:");
        gets(m8[i].team1);
        printf("name of second team:");
        gets(m8[i].team2);
        printf("enter score \n");
        scanf("%d%d",&m8[i].goals1,&m8[i].goals2);
        getchar();
    }
    printf("here are the teams in the quarter-finals \n",i);
    for(i=0; i<8; i++)
        if (m8[i].goals1>m8[i].goals2)
            printf("%d: %s\n",i+1,m8[i].team1);
        else
```



```
printf("%d: %s\n",i+1,m8[i]. team2);
f=fopen("d:/myFile.txt","w");
for(i=0; i<8; i++)
    fprintf(f,"%d: %s\t%d-%d\t%s\n", i+1, m8[i].team1, m8[i].goals1, m8[i].goals2,
        m8[i].team2);
fclose(f);
return 0;
}
```

Exercise 5 : TD

- Define a structure to store clothing data in a store (price, type "men or women," and quantity).
- Write a program that:
- Populates an array with the sales data for a day.
- Calculates and displays the total sales for each type of clothing.
- Saves the sales array to a binary file

```
#include <stdio.h>
typedef struct {
    int price, quantity;
    char type;
} clothing;
int main() {
    FILE *f;
    clothing sales [100];
    int i,n,vh,vf;
    printf("enter number of sales \n");
    scanf("%d",&n);
    for(i=0; i<n; i++) {
        printf("enter the sale N: %d\n",i+1);
        printf("price:");
        scanf("%d",&sales [i].price);
        printf("type:");
        getchar();
        sales [i].type=getchar();
        printf("quantity:");
        scanf("%d",&sales [i].quantity);
    }
    vh=0;
    vf=0;
    for(i=0; i<n; i++)
        if (sales [i].type=='h')
            vh=vh+ sales [i].price * sales [i].quantity;
        else
            vf=vf+ sales [i].price * sales [i].quantity;
    printf("total men's clothing sales: %d DA\n",vh);
    printf("total women's clothing sales: %d DA\n",vf);
    f=fopen("d:/myFile.dat","w");
    fwrite(sales,sizeof sales,1,f);
    fclose(f);
    return 0;
}
```