**Day 11- (Structure, union & enum)**

**Assignment 117**

**Create a structure with an integer and a float member. Create three variables V1, V2, V3. Add members of V1 and V2 and store them in V3.**

***Program code:***

#include<stdio.h>

void main()

{

struct xyz

{

int num\_i;

float num\_f;

};

struct xyz v1,v2,v3;

printf("Enter integer value of first variable: ");

scanf("%d",&v1.num\_i);

printf("Enter float value of first variable: ");

scanf("%f",&v1.num\_f);

printf("Enter integer value of second variable: ");

scanf("%d",&v2.num\_i);

printf("Enter integer value of second variable: ");

scanf("%f",&v2.num\_f);

v3.num\_i=v1.num\_i + v2.num\_i;

v3.num\_f=v1.num\_f+v2.num\_f;

printf("sum is: (%d, %.2f)",v3.num\_i,v3.num\_f);

}

***Output:***

Enter integer value of first variable: 12

Enter float value of first variable: 23.9

Enter integer value of second variable: 12

Enter integer value of second variable: 7.6

sum is: (24, 31.50)

**Assignment 118**

**A student can have following attributes:**

**Name(char[]), Roll(int), age(int), sex(char), marks(int)**

**Write a program to record n students with above attributes and find those students who are eligible to vote and find the higest and lowest boy or girl among them (mention Mr. or Ms. accordingly).**

***Program code:***

#include<stdio.h>

#include<stdlib.h>

#include<conio.h>

#include<ctype.h>

void main()

{

struct student

{

int roll;

char name[20];

char sex;

int age;

int marks;

};

typedef struct student stu;

stu s[10];

int nos,eligible[11],max,j;

do{

printf("Enter the number of students you want to record(max 10 records): ");

scanf("%d",&nos);

}while((nos>10)||(nos<0));

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

{

system("cls");

printf("Enter data for record %d\n",i+1);

printf("Enter name(Max 20 charecters): ");

fflush(stdin);

gets(s[i].name);

printf("Enter roll: ");

scanf("%d",&s[i].roll);

do{

printf("Enter sex(M/F): ");

s[i].sex=toupper(getche());

}while((s[i].sex!='M')&&(s[i].sex!='F'));

printf("\nEnter age: ");

scanf("%d",&s[i].age);

printf("Enter marks: ");

scanf("%d",&s[i].marks);

}

for(int i=0,j=1;i<nos;i++)

{

if(s[i].age>=18)

{

eligible[j]=i;

eligible[0]=j++;

}

}

max=s[0].marks;

for(int i=1;i<nos;i++)

if(s[i].marks > max)

max=s[i].marks;

printf("Student(s) with highest marks are:\n");

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

{

if(s[i].marks==max)

if(s[i].sex=='M')

printf("%3d\tMr. %20s\t%2c\t%3d\t%4d\n",s[i].roll,s[i].name,s[i].sex,s[i].age,s[i].marks);

else

printf("%3d\tMiss %20s\t%2c\t%3d\t%4d\n",s[i].roll,s[i].name,s[i].sex,s[i].age,s[i].marks);

}

printf("Those who are eligible to vote are:\n");

for(int i=1;i<=eligible[0];i++)

{

printf("%3d\t%20s\t%2c\t%3d\t%4d\n",s[eligible[i]].roll,s[eligible[i]].name,s[eligible[i]].sex,s[eligible[i]].age,s[eligible[i]].marks);

}

}

***Output:***

Enter the number of students you want to record(max 10 records): 2

Enter data for record 1

Enter name(Max 20 charecters): Akash Patra

Enter roll: 1

Enter sex(M/F): m

Enter age: 21

Enter marks: 57

Enter data for record 2

Enter name(Max 20 charecters): Ram Kumar

Enter roll: 2

Enter sex(M/F): f

Enter age: 23

Enter marks: 78

Student(s) with highest marks are:

2 Miss Ram Kumar F 23 78

Those who are eligible to vote are:

1 Akash Patra M 21 57

2 Ram Kumar F 23 78

**Assignment 119**

**Accept two points and display their coordinate of midpoint and distance.**

***Program code:***

#include<stdio.h>

#include<conio.h>

#include<math.h>

struct pt

{

int x,y;

};

typedef struct pt point;

point midpoint(point,point);

int distance(point,point);

void display(point);

void main()

{

point p1,p2,mid;

int dist;

printf("Enter the first point(coordinate x, y): ");

scanf("%d%d",&p1.x,&p1.y);

printf("Enter the second point(coordinate x, y): ");

scanf("%d%d",&p2.x,&p2.y);

mid=midpoint(p1,p2);

dist=distance(p1,p2);

printf("Coordinate of the mid point is:\n");

display(mid);

printf("\nDistance between the points is: %d",dist);

}

point midpoint(point c1,point c2)

{

point midpt;

midpt.x=(c1.x+c2.x)/2;

midpt.y=(c1.y+c2.y)/2;

return(midpt);

}

int distance(point pt1,point pt2)

{

int dist;

dist=sqrt(pow((pt1.x - pt2.x),2) + pow((pt1.y - pt2.y),2));

return(dist);

}

void display(point pt)

{

printf("x-coordinate: %d, y-coordinate: %d",pt.x,pt.y);

}

***Output:***

Enter the first point(coordinate x, y): 4 4

Enter the second point(coordinate x, y): 0 0

Coordinate of the mid point is:

x-coordinate: 2, y-coordinate: 2

Distance between the points is: 5

**Assignment 120**

**An angle is measured in degree and minutes. Input two angles and find sum of those angles.**

***Program code:***

#include<stdio.h>

struct angle

{

int deg,min;

};

typedef struct angle angle;

angle sumangle(angle,angle);

void display(angle);

void main()

{

angle a1,a2,sum;

printf("Enter first angle(Degree, minute): ");

scanf("%d%d",&a1.deg,&a1.min);

printf("Enter second angle(Degree, minute): ");

scanf("%d%d",&a2.deg,&a2.min);

sum=sumangle(a1,a2);

display(sum);

}

angle sumangle(angle x,angle y)

{

angle result;

result.deg=x.deg+y.deg;

result.min=x.min+y.min;

result.deg=result.deg+(result.min/60);

result.min=result.min%60;

result.deg=result.deg%360;

return(result);

}

void display(angle ang)

printf("Degree = %d, Minute = %d",ang.deg,ang.min);

***Output:***

Enter first angle(Degree, minute): 350 59

Enter second angle(Degree, minute): 309 1

Degree = 300, Minute = 0

**Assignment 121**

**Accept two complex number and display their sum, difference, modulus.**

***Program code:***

#include<stdio.h>

#include<math.h>

struct complex

{

float real,img;

};

typedef struct complex complex;

complex sum(complex,complex);

complex difference(complex,complex);

void displaymodulus(complex);

void main()

{

complex a1,a2,summ,diff;

printf("Enter first complex number(Real, Imaginary): ");

scanf("%f%f",&a1.real,&a1.img);

printf("Enter second complex number(Real, Imaginary): ");

scanf("%f%f",&a2.real,&a2.img);

summ=sum(a1,a2);

diff=difference(a1,a2);

printf("The result of the summation is: (%.2f) + i(%.2f)",summ.real,summ.img);

printf("\nThe result of the subtraction is: (%.2f) + i(%.2f)",diff.real,diff.img);

printf("\nThe modulus of the summation is: ");

displaymodulus(summ);

printf("\nThe modulus of the subtraction is: ");

displaymodulus(diff);

}

complex sum(complex c1,complex c2)

{

complex result;

result.real=c1.real+c2.real;

result.img=c1.img+c2.img;

return(result);

}

complex difference(complex c1,complex c2)

{

complex result;

result.real=c1.real-c2.real;

result.img=c1.img-c2.img;

return(result);

}

void displaymodulus(complex c)

{

float mod;

mod=sqrt(pow(c.real,2)+pow(c.img,2));

printf("The modulus is %.2f",mod);

}

***Output:***

Enter first complex number(Real, Imaginary): 1 3

Enter second complex number(Real, Imaginary): 3 1

The result of the summation is: (4.00) + i(4.00)

The result of the subtraction is: (-2.00) + i(2.00)

The modulus of the summation is: The modulus is 5.66

The modulus of the subtraction is: The modulus is 2.83

**Assignment 122**

**Create a union with one integer one float and one character member and display them.**

***Program code:***

#include<stdio.h>

void main()

{

union XYZ

{

int x;

float y;

char z;

};

union XYZ v1;

printf("Enter the values of union(int float char): ");

scanf("%d%f",&v1.x,&v1.y);

fflush(stdin);

scanf("%c",&v1.z);

printf("The data of the union is: %d, %f, %c",v1.x,v1.y,v1.z);

}

***Output:***

Enter the values of union(int float char): 12

22.3

c

The data of the union is: 1102210659, 22.299994, c

**Assignment 123**

**An employee of a company can have following attributes:**

**Name(char[]), EID(int),age(int), sex(char[]), department(enum), designation(enum), salary(int)**

**An employee can work in operation, marketing or research division as manager, assistant manager or senior officer. Write a program to record n employee and find the name of employee who gets highest salary (mention Mr. or Ms.).**

***Program code:***

#include<stdio.h>

#include<stdlib.h>

#include<ctype.h>

enum dept{

operation=1,marketing,research

};

enum desg{

manager=1,asst\_mngr,sr\_officer

};

struct emp{

int eid;

int age;

int salary;

char name[20];

char sex;

enum dept department;

enum desg designation;

};

void max\_sal(struct emp \*,int);

void main()

{

struct emp \*emp;

int noe;

printf("Enter the number of employee you want to record: ");

scanf("%d",&noe);

emp=(struct emp \*)malloc(sizeof(struct emp)\*noe);

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

{

printf("Enter the record %d:\n",i+1);

printf("Enter EID: ");

scanf("%d",&emp[i].eid);

printf("Enter name: ");

fflush(stdin);

gets(emp[i].name);

printf("Enter age: ");

scanf("%d",&emp[i].age);

do{

printf("Enter sex(M/F): ");

fflush(stdin);

scanf("%c",&emp[i].sex);

emp[i].sex=toupper(emp[i].sex);

}while((emp[i].sex!='M') && (emp[i].sex!='F'));

do{

printf("Enter department (1 for operation, 2 for marketing, 3 for research): ");

scanf("%d",&emp[i].department);

}while((emp[i].department<1) || (emp[i].department>3));

do{

printf("Enter designation (1 for manager, 2 for assistant manager, 3 for senior officer): ");

scanf("%d",&emp[i].designation);

}while((emp[i].designation<1) || (emp[i].designation>3));

printf("Enter salary: ");

scanf("%d",&emp[i].salary);

}

printf("EID NAME SEX AGE DESIGNATION DEPARTMENT SALARY\n");

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

{

printf("%3d %-20s %3c %3d",emp[i].eid,emp[i].name,emp[i].sex,emp[i].age);

switch(emp[i].designation)

{

case 1:

printf(" manager ");

break;

case 2:

printf(" asst\_mngr ");

break;

case 3:

printf(" sr\_officer ");

break;

default:

printf(" unknown ");

}

switch(emp[i].department)

{

case 1:

printf(" operation ");

break;

case 2:

printf(" marketing ");

break;

case 3:

printf(" research ");

break;

default:

printf(" unknown ");

}

printf(" %-d\n",emp[i].salary);

}

max\_sal(emp,noe);

free(emp);

}

void max\_sal(struct emp \*e,int emp\_num)

{

int max;

for(int i=1,max=0;i<emp\_num;i++)

{

if(e[i].salary > e[max].salary)

max=i;

}

printf("Employee(s) who have maximum salaries are:\n");

for(int i=0;i<emp\_num;i++)

{

if(e[i].salary==e[max].salary)

{

if(e[i].sex=='M')

printf("Mr. ");

else

printf("Ms. ");

fflush(stdin);

printf("%s\n",e[i].name);

}

}

}

***Output:***

Enter the number of employee you want to record: 3

Enter the record 1:

Enter EID: 1

Enter name: Akash

Enter age: 21

Enter sex(M/F): m

Enter department (1 for operation, 2 for marketing, 3 for research): 3

Enter designation (1 for manager, 2 for assistant manager, 3 for senior officer)

: 2

Enter salary: 100

Enter the record 2:

Enter EID: 2

Enter name: prakash

Enter age: 23

Enter sex(M/F): m

Enter department (1 for operation, 2 for marketing, 3 for research): 1

Enter designation (1 for manager, 2 for assistant manager, 3 for senior officer)

: 2

Enter salary: 200

Enter the record 3:

Enter EID: 3

Enter name: maya

Enter age: 22

Enter sex(M/F): f

Enter department (1 for operation, 2 for marketing, 3 for research): 2

Enter designation (1 for manager, 2 for assistant manager, 3 for senior officer)

: 3

Enter salary: 150

EID NAME SEX AGE DESIGNATION DEPARTMENT SALARY

1 Akash M 21 asst\_mngr research 100

2 prakash M 23 asst\_mngr operation 200

3 maya F 22 sr\_officer marketing 150

Employee(s) who have maximum salaries are:

Mr. prakash