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].mark
s);
               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].mark
s);
     }
     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[eligibl
e[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
```