**Structures and Unions**

1. **WAP to demonstrate various ways of structure members initialization**

**//First way**

#include<stdio.h>

#include<string.h>

struct student

{

char name[20];

int r\_no;

float fees;

};

int main()

{

struct student s1,s2;

strcpy(s1.name,"Aniket");

s1.r\_no=12;

s1.fees=7899.7;

strcpy(s2.name,"Swapnil");

s2.r\_no=22;

s2.fees=99.7;

printf("%s %d %f",s1.name,s1.r\_no,s1.fees);

printf("\n%s %d %f",s2.name,s2.r\_no,s2.fees);

return 0;

}

**//Second way**

#include<stdio.h>

int main()

{

struct student

{

char name[20];

int r\_no;

float fees;

}s1={"Aniket",23,2450.50};

printf("%s %d %f",s1.name,s1.r\_no,s1.fees);

return 0;

}

**//Third way**

#include<stdio.h>

struct student

{

char name[20];

int r\_no;

float fees;

}s1,s2;

//struct student s1={"Aniket",23,230.56};

int main()

{

//struct student s1={"Aniket",23,230.56};

//struct student s2={"Suhail",24,550.56};

/\*strcpy(s1.name,"Suhail");

s1.r\_no=25;

s1.fees=230.98;

printf("%s %d %.2f",s1.name,s1.r\_no,s1.fees);

strcpy(s2.name,"Vijay");

s2.r\_no=28;

s2.fees=100.98;

printf("\n%s %d %.2f",s2.name,s2.r\_no,s2.fees);\*/

//printf("\n%s %d %.2f",s2.name,s2.r\_no,s2.fees);

return 0;

}

**2) WAP to read and display information of a student using structure**

//Write a program to read and display info of a student

#include <stdio.h>

struct student

{

char name[50];

int roll;

float marks;

};

int main()

{

struct student s;

printf("Enter information for first student:\n");

printf("Enter name: ");

gets(s.name);

printf("Enter roll number: ");

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

printf("Enter marks: ");

scanf("%f", &s.marks);

printf("Displaying Information:\n");

printf("Name: ");

puts(s.name);

printf("Roll number: %d\n",s.roll);

printf("Marks: %.1f\n", s.marks);

return 0;

}

**3) Write a program to read and display information of n number of books in a library using array of structures**

//Write a program to read and display information of n number of books in a library

#include <stdio.h>

struct Bookinfo

{

char bname[20];

int pages;

float price;

};

int main()

{

struct Bookinfo book[100];

int i,n;

printf("\nEnter number of records you want to enter(less than or equal to:100)");

scanf("%d",&n);

fflush(stdin);

for(i=0;i<n;i++)

{

printf("\nEnter the Name of Book : ");

gets(book[i].bname);

fflush(stdin);//It is used to clear the input buffer(stdin-Input taken from keyboard)

printf("\nEnter the Number of Pages : ");

scanf("%d",&book[i].pages);

fflush(stdin);

printf("\nEnter the Price of Book : ");

scanf("%f",&book[i].price);

fflush(stdin);

}

printf("\n--------- Book Details ------------ ");

for(i=0;i<n;i++)

{

printf("\nName of Book : %s",book[i].bname);

printf("\nNumber of Pages : %d",book[i].pages);

printf("\nPrice of Book : %.2f",book[i].price);

}

return 0;

}

**4) WAP to copy the data of one structure variable to another. [Copying in structures]**

#include <stdio.h>

struct student

{

char name[50];

int roll;

float marks;

};

int main()

{

struct student s,s1;

printf("Enter information:\n");

printf("Enter name: ");

scanf("%s", s.name);

printf("Enter roll number: ");

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

printf("Enter marks: ");

scanf("%f", &s.marks);

s1=s;//Copying structure variable to another

printf("Displaying Information:\n");

printf("Name: ");

puts(s1.name);

printf("Roll number: %d\n",s1.roll);

printf("Marks: %.1f\n", s1.marks);

return 0;

}

**5) WAP to compare marks of two students after comparing two structure variables[Comparison in structure]**

#include <stdio.h>

struct student

{

char name[50];

int roll;

float marks;

};

int main()

{

struct student s,s1;

printf("Enter information of first student:\n");

printf("Enter name: ");

scanf("%s", s.name);

printf("Enter roll number: ");

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

printf("Enter marks: ");

scanf("%f", &s.marks);

printf("Enter information of second student:\n");

printf("Enter name: ");

scanf("%s", s1.name);

printf("Enter roll number: ");

scanf("%d", &s1.roll);

printf("Enter marks: ");

scanf("%f", &s1.marks);

if(s.marks>s1.marks)

{

printf("\n Marks of first student are more..");

}

else

{

printf("\n Marks of second student are more..");

}

return 0;

}

**6) WAP to read and display information of 5 employees using array of structures**

//Write a program to read and display information of 5 employees

#include <stdio.h>

struct employee

{

char name[20];

char dept[20];

int id;

float salary;

}e[5];

int main()

{

int i;

fflush(stdin);

for(i=0;i<5;i++)

{

printf("\nEnter the Name : ");

gets(e[i].name);

fflush(stdin);

printf("\nEnter the department : ");

gets(e[i].dept);

fflush(stdin);

printf("\nEnter id : ");

scanf("%d",&e[i].id);

fflush(stdin);

printf("\nEnter salary : ");

scanf("%f",&e[i].salary);

fflush(stdin);

}

printf("\n--------- Employee Details ------------ ");

for(i=0;i<5;i++)

{

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

printf("\nDepartment: %s",e[i].dept);

printf("\nId : %d",e[i].id);

printf("\nSalary : %f",e[i].salary);

}

return 0;

}

**7) WAP to implement nested structure (standalone/ or separate structure)**

#include<stdio.h>

struct Address

{

char Housename[25];

char City[25];

char Streetname[25];

};

struct Employee

{

int Id;

char Name[25];

float Salary;

struct Address Add;

};

int main()

{

struct Employee E;

printf("\n\tEnter Employee Id : ");

scanf("%d",&E.Id);

printf("\n\tEnter Employee Name : ");

scanf("%s",E.Name);

printf("\n\tEnter Employee Salary : ");

scanf("%f",&E.Salary);

printf("\n\tEnter Employee House Name : ");

scanf("%s",E.Add.Housename);

printf("\n\tEnter Employee City : ");

scanf("%s",E.Add.City);

printf("\n\tEnter Employee street name : ");

scanf("%s",E.Add.Streetname);

printf("\nDetails of Employees");

printf("\n\tEmployee Id : %d",E.Id);

printf("\n\tEmployee Name : %s",E.Name);

printf("\n\tEmployee Salary : %f",E.Salary);

printf("\n\tEmployee House No : %s",E.Add.Housename);

printf("\n\tEmployee City : %s",E.Add.City);

printf("\n\tEmployee street name: %s",E.Add.Streetname);

}

**8) WAP to implement nested structure (Embedded structure-type of nested structure)**

#include <stdio.h>

struct Employee

{

char ename[20];

int ssn;

float salary;

struct dob

{

int date;

int month;

int year;

}db1;

}emp = {"Aniket",1000,1000.50,{22,6,1990}};

int main()

{

printf("\nEmployee Name : %s",emp.ename);

printf("\nEmployee SSN : %d",emp.ssn);

printf("\nEmployee Salary : %.2f",emp.salary);

printf("\nEmployee DOB : %d/%d/%d",emp.db1.date,emp.db1.month,emp.db1.year);

return 0;

}

**9) Write a program to display largest of three numbers using structure**

#include<stdio.h>

struct numbers

{

int a,b,c;

int largest;

};

int main()

{

struct numbers num;

printf("\n Enter the three numbers:");

scanf("%d %d %d",&num.a,&num.b,&num.c);

if(num.a>num.b&&num.a>num.c)

num.largest=num.a;

else if(num.b>num.a&&num.b>num.c)

num.largest=num.b;

else

num.largest=num.c;

printf("\n The largest number is:%d",num.largest);

return 0;

}

**10) Write a program to demonstrate pointer to structure concept in C**

#include <stdio.h>

struct car{

char name[20];

int seats;

float price;

};

int main()

{

struct car myCar = {"Renault",2, 500000};

struct car \*myCarPtr; //define a pointer to car

myCarPtr = &myCar; /\*assign address of myCar to myCarPtr \*/

//->:-Pointing-to operator or selection operator

printf("\n%s %f %d",myCar.name, myCar.price, myCar.seats);

printf("\n%s %f %d",myCarPtr->name, myCarPtr->price, myCarPtr->seats);

printf("\n%s %f %d",(\*myCarPtr).name, (\*myCarPtr).price, (\*myCarPtr).seats);

return 0;

} //end main

**11) WAP to demonstrate initialization of union members and way of accessing union members**

#include <stdio.h>

#include <string.h>

union Data {

int i;

float f;

char str[20];

char str1[20];

};

int main( ) {

union Data data;

data.i = 10;

printf( "data.i : %d\n", data.i);

data.f = 220.5;

printf( "data.f : %f\n", data.f);

strcpy( data.str, "C Programming");

printf( "data.str : %s\n", data.str);

strcpy( data.str1, "C++");

printf( "data.str : %s\n", data.str1);

return 0;

}

**12) WAP to read and display information of an employee using union**

#include<stdio.h>

union employee

{

char name[30];

int id;

float salary;

}u;

int main()

{

//union employee u;

printf("\n Enter name:");

gets(u.name);//Initialization

printf("\n Entered name is:%s",u.name);//Accessing

printf("\n Enter id:");

scanf("%d",&u.id);//Initialization

printf("\n Entered id is:%d",u.id);//Accessing

printf("\n Enter salary:");

scanf("%f",&u.salary);//Initialization

printf("\n Entered salary is:%.2f",u.salary);//Accessing

return 0;

}

**13) WAP to read and display information of n number of employees using array of unions**

#include<stdio.h>

union employee

{

char name[30];

int id;

float salary;

}u[100];

int main()

{

//union employee u[100];

int n,i;

printf("\n Enter value of n:");

scanf("%d",&n);

fflush(stdin);

for(i=0;i<n;i++)

{

printf("\n Enter name:");

fflush(stdin);

gets(u[i].name);

printf("\n Entered name is:%s",u[i].name);

printf("\n Enter id:");

fflush(stdin);

scanf("%d",&u[i].id);

printf("\n Entered id is:%d",u[i].id);

printf("\n Enter salary:");

fflush(stdin);

scanf("%f",&u[i].salary);

printf("\n Entered salary is:%.2f",u[i].salary);

}

return 0;

}

**Practice questions:**

WAP to read and display information of n number of doctors using array of structures

WAP to read and display information of n number of students using array of union

WAP to read and display information of staff using nested structure

WAP to read and display information of n number of students, and display the records of those students who are in section: K1990

WAP to read and display information of an employee using pointer to structure

WAP to compare salaries of two employees and display the name of employee with minimum salary