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AIM:	Apply the concepts of structures/union to solve a given problem
Program 1	
PROBLEM STATEMENT :	A men's sports club keeps elaborate computerized records of all its members. The records contain typical information such as age, address, etc. of each person. But there is also information about whether a member is an active playing members, about whether he is married, and so on; if he is married the record contains information about his wife's name, the no. of children and their names. Write a program which demonstrates how such a system might be implemented. Show how the names of the wives of all active playing members might be printed.
ALGORITHM:	1. START 2. Define structure family with char array wife name, integer number of children and 2-D char array names as variables 3. Define union details with structure family and char array hobbies as variables 4. Define structure member with char array name, integer age, char array address characters active and married and union det as variables 5. Define void input function with member array c as variable 6. Loop from I = 0 to 1 Input all variables of members c[i] If c[i].married is equal to 'Y': Input all details of c[i].det.fam Else Input c[i].hobbies 7. Define function int main() 8. Declare variable c[i] of data type member 9. Call input(c) 10. Loop from I = 0 to 1 if c[i].married is equal to Y and c[i].active is equal to Y print c[i].name and c[i].det.fam.wife_name 11. STOP

FLOWCHART:	
PROGRAM:	#include<stdio.h> typedef struct family { char name_wife[20]; int numb_child; char name_child[10][20]; }family; typedef union details { family fam; char hobby[30]; }details; typedef struct member { char name[20]; int age; char addr[100]; char active,married; details det; }member;

```
void input(member c[2])
{
 for(int i=0;i<2;i++)
 {
 printf("\n\nEnter the name of the member: ");
 scanf(" %s",c[i].name);
 printf("Enter the age of the person: ");
 scanf("%d",&c[i].age);
 printf("Enter the address of the person: ");
 scanf(" %[^\n]",c[i].addr);
 printf("Enter active status (Y/N): ");
 scanf(" %c",&c[i].active);
 printf("Enter Marital Status (Y/N): ");
 scanf(" %c",&c[i].married);
 if(c[i].married=='Y')
 {
 printf("Enter name of the wife: ");
 scanf(" %s",c[i].det.fam.name_wife);
 printf("Enter the number of children: ");
 scanf("%d",&c[i].det.fam.numb_child);
 for(int i=0;i<c[i].det.fam.numb_child;i++)
 {
 printf("Enter name of the children: ");
 scanf(" %s",c[i].det.fam.name_child[i]);
 }
 }
 else
 {
 printf("Enter the hobby of the member: ");
 scanf(" %[^\n]",c[i].det.hobby);
 }
 }
}
int main()
{
 member c[2];
 input(c);
 printf("The list of married active players and their wives is as follows:\n");
 printf("Name\tWife");
 for(int i=0;i<2;i++)
```

```
{
if(c[i].active=='Y' && c[i].married=='Y')
printf("\n%s\t%s\n",c[i].name,c[i].det.fam.name_wife);
}
return 0;
}
```

RESULT:

```
Enter the name of the member: Adwait
Enter the age of the person: 18
Enter the address of the person: Kurla
Enter active status (Y/N): Y
Enter Marital Status (Y/N): N
Enter the hobby of the member: Table Tennis


Enter the name of the member: Rachit
Enter the age of the person: 36
Enter the address of the person: Pune
Enter active status (Y/N): Y
Enter Marital Status (Y/N): Y
Enter name of the wife: Madhuri
Enter the number of children: 2
Enter name of the children: Anil
Enter name of the children: Dinesh
The list of married active players and their wives is as follows:
Name    Wife
Rachit  Madhuri
```

Program 2

PROBLEM STATEMENT :

An airline reservation system maintains records for possible flights consisting of STARTING POINT 3 character code DESTINATION 3 character code STARTING TIME integer on scale (0001 – 2400) ARRIVAL TIME integer on scale (0001 – 2400) SEATS positive integer in suitable range. Your program is to read 20 such records followed by queries of the form STARTING POINT– DESTINATION, one to a line. For each query

	find whether there is a possible flight with a seat available; if so reduce the number of seats by one and print out the flight details (or an apology).
ALGORITHM:	1. START 2. Define structure airline_t with char array src, dest, integers start, arrive, seats and counts as variables 3. Define void function reset with airline_t variable c[] 4. Loop from I = 0 to 4 c[i].count is equal to 0 5. Define void function input with airline_t variable c[] 6. Loop from I = 0 to 4 Input all details of c[i] 7. Define int main() 8. Initialize airline_t variable c[5] 9. Call function input(c) 10. Do a. Input source and destination b. Flag = 0, D = 1 c. Loop from I = 0 to 4 If strcmp(c[i].src and source_) is equal to 0 and if strcmp(c[i].dest and dest) I. print c[i].start, c[i].arrive and c[i].seats II. c[i].count = d III. d++ IV. temp++ d.If temp is equal to 0 print sorry no flights available else I. input choice and number of seat II. Loop from 0 to 4 if n is equal to c[i].count if c[i].seats – seat >=0 c[i].seats -= seat print Booked and remaining seats else print Seats not available e. Input flag f. call reset(c) while flag is equal to 0 11. Return 0 12. STOP
FLOWCHART:	

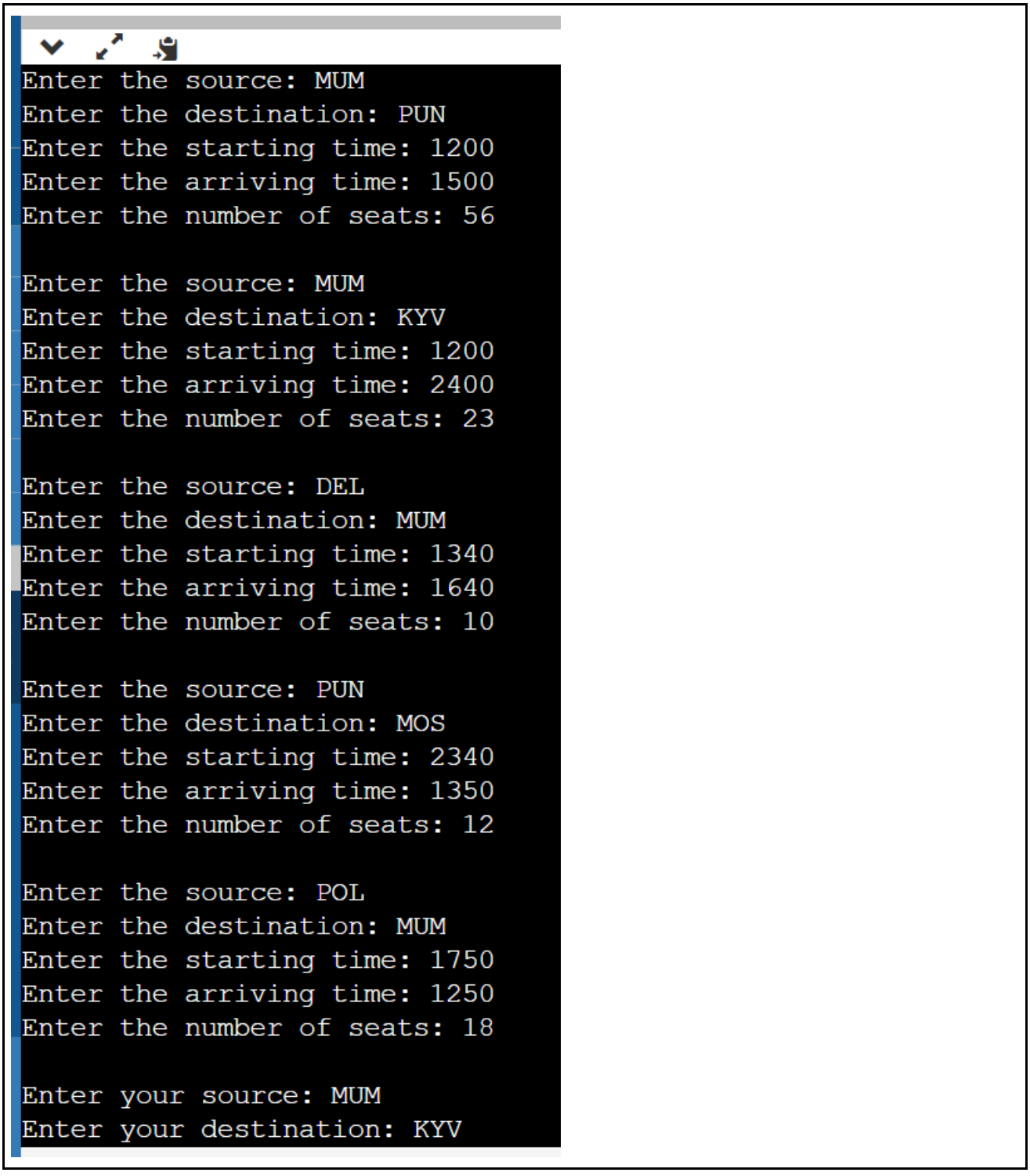
PROGRAM:	#include<stdio.h>
	#include<string.h>
	typedef struct air
	{
	char src[4];
	char des[4];
	int start;
	int arrival;
	int seats;
	int count;
	}airline_t;
	void reset(airline_t c[5])
	{
	for(int i=0;i<5;i++)
	c[i].count=0;
	}
	void input(airline_t c[5])
	{
	for(int i=0;i<5;i++)
	{
	printf("\nEnter the source: ");
	scanf("%s",c[i].src);
	printf("Enter the destination: ");
	scanf("%s",c[i].des);
	printf("Enter the starting time: ");
	scanf("%d",&c[i].start);
	printf("Enter the arriving time: ");
	scanf("%d",&c[i].arrival);
	printf("Enter the number of seats: ");
	scanf("%d",&c[i].seats);
	c[i].count=0;
	}
	}
	int main()
	{
	int d=1,temp=0,n,flag=0,seat;

```
airline_t c[5];
input(c);
char source[4], dest[4];
do
{
printf("\nEnter your source: ");
scanf("%s",source);
printf("Enter your destination: ");
scanf("%s",dest);
printf("\nStart\tEnd\tSeats\n");
for(int i=0;i<5;i++)
{
if(strcmp(c[i].src,source)==0 && strcmp(c[i].des,dest)==0 &&
c[i].seats>0)
{
printf("%d\t%d\t%d\n",c[i].start,c[i].arrival,c[i].seats);
c[i].count=d;
d++;
temp++;
}
}
if(temp==0)
{
printf("\nSorry we dont have any flights available");
}
else
{
printf("Enter the number of flight you want to take: ");
scanf("%d",&n);
printf("Enter the number of seats you want to book: ");
scanf("%d",&seat);
for(int i=0;i<5;i++)
{
if(n==c[i].count)
{
if(c[i].seats - seat >= 0)
{
c[i].seats -= seat;
printf("Your flight has been booked for %s to %s",c[i].src,c[i].des);
printf("\nTimings are follows: %d to %d",c[i].start,c[i].arrival);
```

```
printf("\nNo of seats remaining: %d",c[i].seats);
}
else
{
printf("The flight does not have %d seats available",seat);
printf("\nPlease select a different flight.");
}
}
}
}
printf("Enter 0 to continue booking or any other number to exit");
scanf("%d",&flag);
reset(c);
} while (flag==0);
return 0;

}
```

RESULT:


Enter the source: MUM
Enter the destination: PUN
Enter the starting time: 1200
Enter the arriving time: 1500
Enter the number of seats: 56
Enter the source: MUM
Enter the destination: KYV
Enter the starting time: 1200
Enter the arriving time: 2400
Enter the number of seats: 23
Enter the source: DEL
Enter the destination: MUM
Enter the starting time: 1340
Enter the arriving time: 1640
Enter the number of seats: 10
Enter the source: PUN
Enter the destination: MOS
Enter the starting time: 2340
Enter the arriving time: 1350
Enter the number of seats: 12
Enter the source: POL
Enter the destination: MUM
Enter the starting time: 1750
Enter the arriving time: 1250
Enter the number of seats: 18
Enter your source: MUM
Enter your destination: KYV

```
Enter your source: MUM
Enter your destination: KYV

Start   End     Seats
1200    2400    23
Enter the number of flight you want to take: 1
Enter the number of seats you want to book: 5
Your flight has been booked for MUM to KYV
Timings are follows: 1200 to 2400
No of seats remaining: 18Enter 0 to continue booking or any other number to exit7
```

Program 3	
PROBLEM STATEMENT:	A record in an organization's payroll consists of one line for each employee consisting of: NAME (20 characters), GENDER (1 character M or F), SALARY (integer), DATE OF BIRTH (3 integers YEAR MONTH DAY). Write a program which will input 10 such records. Your program must then take in 5 amendments in the record set which will be in the same form as the record structure itself. The amendments can contain new employees to be added (name different from existing ones), employees left (salary given as 0) and update of salary(more or less). Your program must then incorporate these amendments and also remove those employees who have reached retirement age(Age 60).
ALGORITHM:	1. START 2. Define structure employee with char array name, char gender, integers salary, day, month, year, age as variables 3. Define main function 4. Define employee variable c[10] 5. Define char array name[5][20] 6. Loop from I = 0 to 4 Input details of c[i] except age c[i].age = 2022 – c[i].year 7. Loop from k = 0 to 4 A. input name[k] B. Loop from j = 0 to 9 I. if strcmp(c[i].name and name[k]) is equal to 0 a. input choice b. if choice is equal to 1 c[j].salary is equal to 0 else input c[j].salary c. flag = 1 d. break II. If flag is equal to 0 input all details of c[i] c[i].age = 2022 – c[i].year 8. Loop from k = 0 to I If(c[k].age is less than 60 and c[k].salary is greater than 0) print all details of c[k]

	9. Return 0 10. STOP
FLOWCHART:	

PROGRAM:	#include<stdio.h>
	#include<string.h>
	typedef struct employee
	{
	char name[20];
	char gender;
	int salary;
	int day;
	int month;
	int year;
	int age;
	}employee;
	int main()
	{
	employee c[10];
	int i;
	char name[5][20];
	for(i=0;i<5;i++)
	{
	printf("Enter the name: ");
	scanf(" %s",c[i].name);
	printf("Enter the gender (M/F): ");
	scanf(" %c",&c[i].gender);
	printf("Enter the salary: ");
	scanf("%d",&c[i].salary);

```
 printf("Enter the Date of Birth (DD MM YYYY): ");
 scanf("%d %d %d",&c[i].day,&c[i].month,&c[i].year);
 c[i].age = 2022 - c[i].year;
 printf("\n");
 }
 printf("Amendments: ");
 for (int k=0;k<5;k++)
 {
 int flag=0;
 printf("\nEnter the name: ");
 scanf(" %s",name[k]);
 for(int j=0;j<10;j++)
 {
 if(strcmp(c[j].name,name[k])==0)
 {
 int choice;
 printf("Enter 1 if employee has left and 2 if employee if the
salary is to be modified: ");
 scanf("%d",&choice);
 if(choice == 1)
 c[j].salary = 0;
 else if(choice == 2)
 {
 printf("Enter the new salary: ");
 scanf("%d",&c[j].salary);
 }
 flag = 1;
 break;
 }
 }
 if(flag == 0)
 {
 strcpy(c[i].name,name[k]);
 printf("Enter the gender of the employee (M/F): ");
 scanf(" %c",&c[i].gender);
 printf("Enter the salary of the employee: ");
 scanf("%d",&c[i].salary);
 printf("Enter the date of birth (DD MM YYYY) : ");
 scanf("%d %d %d",&c[i].day,&c[i].month,&c[i].year);
 c[i].age = 2022 - c[i].year;
```

```
 i++;
 }
 }
 printf("Name\tGender\tSalary\tDate of Birth");
 for(int k=0;k<i;k++)
 {
 if(c[k].age <60 && c[k].salary != 0)
 printf("\n%s\t%c\t%d\t%d %d
%d",c[k].name,c[k].gender,c[k].salary,c[k].day,c[k].month,c[k].year);
 }
 return 0;
}
```

RESULT:

```
Enter the name: Adwait
Enter the gender (M/F): M
Enter the salary: 10000
Enter the Date of Birth (DD MM YYYY): 08 12 2003

Enter the name: Rahul
Enter the gender (M/F): M
Enter the salary: 10000
Enter the Date of Birth (DD MM YYYY): 08 12 2003

Enter the name: Kunal
Enter the gender (M/F): M
Enter the salary: 10000
Enter the Date of Birth (DD MM YYYY): 08 12 2003

Enter the name: Shesha
Enter the gender (M/F): M
Enter the salary: 10000
Enter the Date of Birth (DD MM YYYY): 08 12 2003

Enter the name: Vineet
Enter the gender (M/F): M
Enter the salary: 10000
Enter the Date of Birth (DD MM YYYY): 08 12 2003
```

```
Amendments:
Enter the name: Rahul
Enter 1 if employee has left and 2 if employee if the salary is to be modified: 1

Enter the name: Kunal
Enter 1 if employee has left and 2 if employee if the salary is to be modified: 8000

Enter the name: Adwait
Enter 1 if employee has left and 2 if employee if the salary is to be modified: 2
Enter the new salary: 20000

Enter the name: Udit
Enter the gender of the employee (M/F): M
Enter the salary of the employee: 10000
Enter the date of birth (DD MM YYYY) : 08 12 2003

Enter the name: Onam
Enter the gender of the employee (M/F): M
Enter the salary of the employee: 10000
Enter the date of birth (DD MM YYYY) : 08 12 2003
Name    Gender  Salary  Date of Birth
Adwait  M       20000   8 12 2003
Kunal   M       10000   8 12 2003
Shesha  M       10000   8 12 2003
Vineet  M       10000   8 12 2003
Udit    M       10000   8 12 2003
Onam    M       10000   8 12 2003
```

Program 4	
PROBLEM STATEMENT:	
ALGORITHM:	
FLOWCHART:	

PROGRAM:	
RESULT:	
Program 5	
PROBLEM STATEMENT:	
ALGORITHM:	
FLOWCHART:	
PROGRAM:	

RESULT:	
CONCLUSION:	We came to know that how we can use structures to store items of different type.We also learnt how to access the elements of the structures using the dot operator.We also learnt that structure can be called within a structure.