

Lab #5

Exercises

Structured Programming 2017/2018



# Exercise #1

Write a program that asks the user to enter **1]** 5×5 matrix of values zeros and ones  
**2]** friend1 & friend 2. Whereas the indices of matrix represent people. Your program should output friend1 & 2 common friends if they have and if not it the message “ they don’t have common friends” will be displayed. Note: the value 1 refers to row i is a friend with column j and zero otherwise. Use structure with person number and his friends list.

Enter matrix elements:

0	1	0	1	1
1	0	1	0	1
0	1	0	0	0
1	0	0	0	1
1	1	0	1	0

Enter friend1 & friend 2:

0 4

Their common friends are 1 and 3

# Solution

```
#include <iostream>
using namespace std;

int main()
{
    int mat[5][5];

    cout<<"Enter matrix elements:"<<endl;
    for(int row=0;row<5;row++){
        for(int col=0;col<5;col++){
            cin>> mat[row][col];
        }
    }

    cout <<"Enter friend1 & friend 2";
    int ff,fff;
    cin>>ff>>fff;
```

# Solution

```
int common[5]={0};
int u=0;
for (int col = 0; col < 5; col++){
    if (mat[ff][col] == mat[fff][col] && mat[ff][col] == 1){

        common[u]= col;
        u++;
    }
}
```

# Solution

```
cout << "The Common Friends are : ";  
for (int i = 0; i < u; i++){  
    cout << common[i]<<endl;  
}  
}
```

## Exercise #2

Write a program that represent a movie as a structure. Each movie has Name, Number of views. Your program should read from the user the data of several movies and display the movies sorted based on their number if views.

### Sample Execution:

```
Enter movies data:
```

```
  M1  160
```

```
  M2  200
```

```
  M3  150
```

```
Sorted movies are:
```

```
  M2
```

```
  M1
```

```
  M3
```

# Solution

```
#include <iostream>
using namespace std;
struct movie
{
    char name[50];
    int num_of_views;
};
void main()
{
    movie movies[3],temp;
    cout<<"Enter movies data:";
    for(int i=0;i<3;i++)
    {
        movie m;
        cin>>m.name;
        cin>>m.num_of_views;
        movies[i]=m;
    }
}
```

# Solution

```
for(int y=0;y<3;y++)
{
    for(int x=0;x<2;x++)
    {
        if(movies[x].num_of_views>movies[x+1].num_of_views)
        {
            temp=movies[x];
            movies[x]=movies[x+1];
            movies[x+1]=temp;
        }
    }
}
cout<<"Sorted movies are:";
for(int j=0;j<3;j++)
{
    cout<<movies[j].name<<endl;
}
system("pause");
}
```



## Exercise #3

Write a program that represent An employee as a structure. Each employee has Name, salary and year of employment. Your program should read from the user the data of several employees and display the data of them after upgrading the salaries by 20% for ones who employed more than or equal 10 years.

### Sample Execution:

Enter employees data:

ahmed 7000 2017

mai 12000 2008

islam 9000 2015

Employees with new salaries are:

ahmed 7000 2017

mai 14400 2008

islam 9000 2015

# Solution

```
#include <iostream>
using namespace std;
struct employee
{
    char name[50];
    float salary;
    int year;
};
int main()
{
    employee emps[3];
    cout<<"Enter employees data";
    for(int i=0;i<3;i++)
    {
        employee e;
        cin>>e.name;
        cin>>e.salary;
        cin>>e.year;
        emps[i]=e;
    }
}
```

# Solution

```
for(int y=0;y<3;y++)
{
    if((2018-emp[y].year)>=10)
    {
        emp[y].salary+=(emp[y].salary*0.2);
    }
}
cout<<"Employees with new salaries are";
for(int j=0;j<3;j++)
{
    cout<<emp[j].name<<" " <<emp[j].salary<<" " <<emp[j].year<<endl;
}
return 0;
}
```

## Exercise #4

Write a program that takes from the user 1] size of array, 2] array of integer numbers , 3] number. Your program should search for the number in the array of integers. If the number exists the program will return its number of occurrence and array of its positions and if not exist print message to the user "number not exist"

### Sample Execution:

```
Enter size of array:
```

```
11
```

```
Enter your numbers:
```

```
1, 2, 3, 4, 2, 4, 10, 4, 2, 5, 4
```

```
Enter number you want to search for:
```

```
4
```

```
The number repeated 4 times at positions:
```

```
3, 5, 7, 10
```

# Solution

```
#include <iostream>
using namespace std;

int main()
{
    int numbers[30],size,num;
    cout<<"Enter size of array";
    cin>>size;
    cout<<"Enter your numbers";
    for(int i=0;i<size;i++)
    {
        cin>>numbers[i];
    }
    cout<<"Enter number you want to search for:";
    cin>>num;
```

# Solution

```
int occur=0;
int pos[30];
for(int y=0;y<size;y++)
{
    if(num==numbers[y])
    {
        pos[occur]=y;
        occur++;
    }
}
```

# Solution

```
if(occur != 0)
{
    cout<<"The number repeated "<<occur<<" times at positions:"<<endl;
    for(int j=0;j< occur;j++)
    {
        cout<<pos[j]<<endl;
    }
}

else
{
    cout<<"number not exist";
}

system("pause");
return 0;
}
```

## Exercise #5

Write a program that takes from the user 1] array of integer numbers. Your program should search for the even numbers in the array. If exist your program should multiply them by 2 and display the array. If not exist print message to the user "no even numbers in array"

### Sample Execution:

Enter your numbers:

3, 6, 7, 9, 10

The new array is:

3, 12, 7, 9, 20



# Solution

```
#include <iostream>
using namespace std;
int main()
{
    int numbers[5];
    cout<<"Enter your numbers";
    for(int i=0;i<5;i++)
    {
        cin>>numbers[i];
    }
    bool flag = false;
    for(int y=0;y<5;y++)
    {
        if(numbers[y]%2 == 0)
        {
            flag = true;
            numbers[y]*=2;
        }
    }
}
```

# Solution

```
if(flag == true)
{
    cout<<"The new array is:"<<endl;
    for(int j=0;j<5;j++)
    {
        cout<<numbers[j]<<"\t";
    }
}
else
{
    cout << "no even numbers in array" <<endl;
}

return 0;
}
```

Thank you!

