"Heaven's Light is Our Guide"

Rajshahi University of Engineering & Technology

Department of Computer Science & Engineering

Lab Report

Course Code:	CSE 2102
Course Name:	Discrete Mathematics Sessional
Experiment No:	LAB3
Experiment Name:	Provided in Report
Date of Experiment:	3rd Week Lab
Date of Submission:	April 29, 2023

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Year: 2nd Year, 1st Semester	

Problem(L3Q1): Write a program to input two sets and output Union, Intersection, Complement/Difference, Symmetric Difference.

```
#include <iostream>
#include <cstring>
using namespace std;
int last[1000], k = 0, r = 0;
int cop[1000];                                                    Union
void print(int a[], int s)
{
    for (int i = 0; i < s; i++)
    {
        if (a[i] != 0)
            cout << a[i] << " ";
    }
}
void Union(int a[], int s)
{
    bool h = true;
    for (int i = 0; i < s; i++)
    {
        if (i != 0)
        {
            for (int j = 0; j < i; j++)
            {
                if (a[i] == a[j])
                {
                    h = false;
                    break;
                }
                else
                    h = true;
            }
        }
        if (h)
        {
            last[k] = a[i];
            k++;
        }
    }
}
void removedup(int a[], int s)
{
    int i, j;
    for (i = 0; i < s; i++)
    {
        for (j = 0; j < r; j++)
        {
            if (last[i] == cop[j])
                break;
```

```
        }

        if (j == r)
        {
            cop[r] = last[i];
            r++;
        }
    }
}
int main()
{
    int n, m;
    cout << "input size" << endl;
    cin >> n >> m;
    int a[n], b[m];
    cout << "Set A : ";
    for (int i = 0; i < n; i++)
        cin >> a[i];
    cout << "Set B : ";
    for (int j = 0; j < m; j++)
        cin >> b[j];
    Union(a, n);
    Union(b, m);
    removedup(last, n + m);
    cout << "Union : " << endl;
    print(cop, n + m);
}
```

```
PS C:\Users\Tonmo\Document
input size
5 5
Set A : 1 2 4 4 5
Set B : 5 6 7 8 9
Union :
1 2 4 5 6 7 8 9
PS C:\Users\Tonmo\Documents
```

Intersection

```
#include <iostream>
using namespace std;
int last[1000], k = 0, r = 0;
int ans[1000];
void print(int a[], int s)
{
    for (int i = 0; i < s; i++)
    {
        if (a[i] != 0)
            cout << a[i] << " ";
    }
}
void intersect(int a[], int b[], int s, int s2)
{
    for (int i = 0; i < s; i++)
    {
```

```
        for (int j = 0; j < s2; j++)
        {
            if (a[i] == b[j])
            {
                last[k] = a[i];
                k++;
                break;
            }
        }
    }
}

void removedup(int a[], int s)
{
    int i, j;
    for (i = 0; i < s; i++)
    {
        for (j = 0; j < r; j++)
        {
            if (last[i] == ans[j])
                break;
        }

        if (j == r)
        {
            ans[r] = last[i];
            r++;
        }
    }
}

int main()
{
    int n, m;
    cout << "input size" << endl;
    cin >> n >> m;
    int a[n], b[m];
    cout << "Set A" << endl;
    for (int i = 0; i < n; i++)
        cin >> a[i];
    cout << "Set B" << endl;
    for (int j = 0; j < m; j++)
        cin >> b[j];
    cout << "Intersection : " << endl;
    intersect(a, b, n, m);
    removedup(ans, n + m);
    print(ans, n + m);
}
```

```
input size
5 5
Set A
1 2 3 4 5
Set B
3 4 5 6 7
Intersection :
3 4 5
PS C:\Users\Tonmo\Documents\
```

```cpp
#include <iostream>
using namespace std;
int last[1000], k = 0, r = 0;
int ans[1000];
void print(int a[], int s)
{
    for (int i = 0; i < s; i++)
    {
        if (a[i] != 0)
            cout << a[i] << " ";
    }
}
void difference(int a[], int b[], int s, int s2)
{
    for (int i = 0; i < s; i++)
    {
        for (int j = 0; j < s2; j++)
        {
            if (a[i] == b[j])
            {
                a[i] = 0;
                break;
            }
        }
    }
}

int main()
{
    int n, m;
    cout << "input size" << endl;
    cin >> n >> m;
    int U[n], a[m];
    cout << "Set A" << endl;
    for (int i = 0; i < n; i++)
        cin >> U[i];
    cout << "Set B" << endl;
    for (int j = 0; j < m; j++)
        cin >> a[j];
    cout << "A-B" << endl;
    difference(U, a, n, m);
```

Complement/Difference

```
    print(U, n);
}
```

```
input size
5 5
Set A
1 2 3 4 5
Set B
3 4 6 7 8
A-B
1 2 5
PS C:\Users\Tonmo\Documents\New folde
```

Symmetric Difference

```
#include <iostream>
#include <cstring>
using namespace std;
int last[1000], k = 0, r = 0;
int cop[1000];
int clo[1000];
void print(int a[], int s)
{
    for (int i = 0; i < s; i++)
    {
        if (a[i] != 0)
            cout << a[i] << " ";
    }
}
void Union(int a[], int s)
{
    bool h = true;
    for (int i = 0; i < s; i++)
    {
        if (i != 0)
        {
            for (int j = 0; j < i; j++)
            {
                if (a[i] == a[j])
                {
                    h = false;
                    break;
                }
                else
                    h = true;
            }
        }
        if (h)
        {
            last[k] = a[i];
            k++;
        }
    }
}
```

```
void difference(int a[], int b[], int s, int s2)
{
    for (int i = 0; i < s; i++)
    {
        for (int j = 0; j < s2; j++)
        {
            if (a[i] == b[j])
            {
                a[i] = 0;
                break;
            }
        }
    }
}

void removedup(int a[], int s)
{
    int i, j;
    for (i = 0; i < s; i++)
    {
        for (j = 0; j < r; j++)
        {
            if (last[i] == cop[j])
                break;
        }

        if (j == r)
        {
            cop[r] = last[i];
            r++;
        }
    }
}
int main()
{
    int n, m;
    cout << "input size" << endl;
    cin >> n >> m;
    int a[n], b[m];
    for (int i = 0; i < n; i++)
    {
        cin >> a[i];
        clo[i] = a[i];
    }
    for (int j = 0; j < m; j++)
        cin >> b[j];
    difference(a, b, n, m);
    difference(b, clo, m, n);
    cout << "A - B : ";
    print(a, n);
```

```
    cout << endl;
    cout << "B - A : ";
    print(b, m);
    Union(a, n);
    Union(b, m);
    removedup(last, n + m);
    cout << endl;
    cout << "(A - B) U (B - A) : ";
    print(cop, n + m);
}
```

```
input size
8 7
1 2 3 4 5 6 7 8
1 3 5 6 7 8 9
A - B : 2 4
B - A : 9
(A - B) U (B - A) : 2 4 9
PS C:\Users\Tonmo\Documents\New
```

One-One Function

```
#include <iostream>
#include <cmath>
using namespace std;
int main()
{
    int n, m, cnt = 0;
    int prev;
    cout << "Domain and range size : ";
    cin >> n >> m;
    int a[n], b[m];
    cout << "Domains : ";
    for (int i = 0; i < n; i++)
        cin >> a[i];
    cout << "Ranges : ";
    for (int j = 0; j < m; j++)
        cin >> b[j];
    int y, x = 0;
    int choice = 0, choice2;
    cout << "Enter your choice >\n1. (x^2)+1\n2. (x^3)+(x^2)-x-1\n3. (x^5)+(x^2)-x\n";
    while (choice == 0)
    {
        cin >> choice;
        switch (choice)
        {
        case 1:
            choice2 = 1;
            break;
        case 2:
            choice2 = 2;
            break;
        case 3:
```

```
            choice2 = 3;
            break;
        }
    }
    for (int i = 0; i < n; i++)
    {
        x = a[i];
        if (choice2 == 1)
            y = pow(x, 2) + 1;
        else if (choice2 == 2)
            y = pow(x, 3) + pow(x, 2) - x - 1;
        else if (choice2 == 3)
            y = pow(x, 5) + pow(x, 2) - x;
        for (int j = 0; j < m; j++)
        {
            // cout << "y value =" << y << endl;
            if (y == b[j] && prev != y)
            {
                cnt++;
                prev = y;
                break;
            }
        }
    }
    if (cnt == n)
        cout << "Function is one-one" << endl;
    else
        cout << "Function is not one-one" << endl;
}
```

```
Domain and range size : 3 3
Domains : 1 2 3
Ranges : 2 5 10
Enter your choice >
1. (x^2)+1
2. (x^3)+(x^2)-x-1
3. (x^5)+(x^2)-x
1
Function is one-one
PS C:\Users\Tonmo\Documents\
```

```
Domain and range size : 3 3
Domains : 1 2 3
Ranges : 0 9 32
Enter your choice >
1. (x^2)+1
2. (x^3)+(x^2)-x-1
3. (x^5)+(x^2)-x
2
Function is one-one
PS C:\Users\Tonmo\Documents\Ne
```

```
Domain and range size : 3 3
Domains : 1 2 3
Ranges : 1 34 249
Enter your choice >
1. (x^2)+1
2. (x^3)+(x^2)-x-1
3. (x^5)+(x^2)-x
3
Function is one-one
PS C:\Users\Tonmo\Documents\
```

```
#include <iostream>
#include <cmath>
using namespace std;
int main()
{
    int n;
    cout << "input set size" << endl;
    cin >> n;
    int a[n];
    cout << "enter set values" << endl;
    for (int i = 0; i < n; i++)
```

Power SET

```
        cin >> a[i];
    int p = pow(2, n);
    cout << "Power Sets are: \n";
    cout << "{ ";
    for (int j = 0; j < p; j++)
    {
        int jj;
        cout << "{ ";
        for (jj = 0; jj < n; jj++)
        {
            if (j & 1 << jj)
                cout << a[jj] << " ";
        }
        cout << "}, ";
    }
    cout << " }";
}
```

```
input set size
3
enter set values
1 2 3
Power Sets are:
{ { }, { 1 }, { 2 }, { 1 2 }, { 3 }, { 1 3 }, { 2 3 }, { 1 2 3 },  }
PS C:\Users\Tonmo\Documents\New folder>
```