

Cardinality of a Set

Code

```
#include<bits/stdc++.h>
using namespace std;
```

```
int CheckDuplicate(char* c,int l)
{
    int co=0,x=1,m;
    for(int i=0; i<l; i++)
    {
        for(int j=i+1; j<l; j++)
        {
            if(c[i] == c[j])
            {
                co++;
                break;
            }
        }
        if(i==(l-1)){
            c[i]='\0';
            break;
        }
    }
    return co;
}
```

```
int main()
{
    int p,len,newlen,w;
    char c[40],d[40];

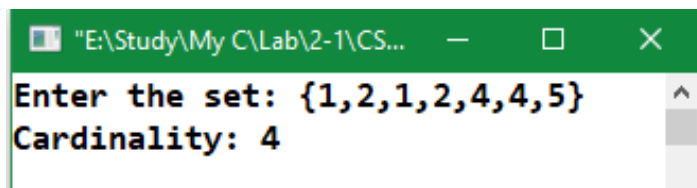
    cout<<"Enter the set: ";
    gets(c);

    len = strlen(c);
    newlen = ((len-2)/2)+1;

    for(int i=0,j=0;j!=newlen;i++)
    {
        if(('0'<=c[i] && c[i]<='9') || ('a'<=c[i] && c[i]<='z') || ('A'<=c[i] && c[i]<='Z')){
            d[j]=c[i];
            j++;
        }
    }
```

```
        if(j==(newlen)) {  
            d[j]='\0';  
            break;  
        }  
    }  
  
    w = strlen(d);  
    p = CheckDuplicate(d,w);  
  
    cout<<"Cardinality: "<<abs(newlen-p)<<endl;  
  
    return 0;  
}
```

Output



The screenshot shows a Windows command prompt window with a green title bar. The title bar text is "E:\Study\My C\Lab\2-1\CS...". The window contains the following text: "Enter the set: {1,2,1,2,4,4,5}" on the first line and "Cardinality: 4" on the second line. A vertical scrollbar is visible on the right side of the window.

Equivalency of two sets

Code

```
#include<bits/stdc++.h>
using namespace std;

char *GetDistinct(char *str)
{
    int resIndex=1, ipIndex=1;
    while (*(str+ipIndex))
    {
        if (*(str+ipIndex)!=*(str+ipIndex-1))
        {
            *(str+resIndex)=*(str+ipIndex);
            resIndex++;
        }
        ipIndex++;
    }
    *(str+resIndex)='\0';
    return str;
}

int main()
{
    int ActLen1,ActLen2,c=0,d=0;
    char set1[30],set2[30];
    char str1[15],str2[15];
    char *s1,*s2;

    while(1)
    {
        cout<<"Enter Set A: ";
        gets(set1);
        cout<<"Enter Set B: ";
        gets(set2);

        ActLen1=((strlen(set1)-2)/2)+1;
        ActLen2=((strlen(set2)-2)/2)+1;

        for(int i=0,j=0;i<strlen(set1);i++)
        {
            if(j==ActLen1){
                str1[j]='\0';
                break;
            }
        }
    }
}
```

```

        else if(set1[i]!='{' && set1[i]!='}' && set1[i]!=','){
            str1[j]=set1[i];
            j++;
        }
    }

    for(int i=0,j=0;i<strlen(set2);i++)
    {
        if(j==ActLen2){
            str2[j]='\0';
            break;
        }
        else if(set2[i]!='{' && set2[i]!='}' && set2[i]!=','){
            str2[j]=set2[i];
            j++;
        }
    }

    sort(str1,str1+ActLen1);
    sort(str2,str2+ActLen2);

    s1=GetDistinct(str1);
    s2=GetDistinct(str2);

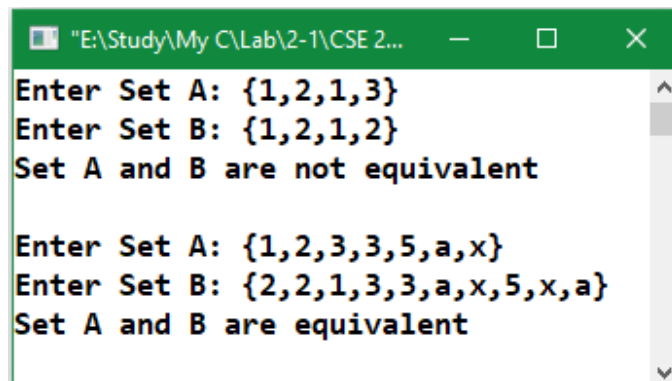
    if(strlen(s1)==strlen(s2)){

        for(int i=0;i<strlen(s1);i++)
        {
            for(int j=0;j<strlen(s1);j++)
            {
                if(s1[i]==s2[j])
                    c++;
            }
        }

        if(c==strlen(s1))
            cout<<"Set A and B are equivalent\n"<<endl;
        else
            cout<<"Set A and B are not equivalent\n"<<endl;
    }
    else
        cout<<"Set A and B are not equivalent\n"<<endl;
    }
    return 0;
}

```

Output



```
"E:\Study\My C\Lab\2-1\CSE 2..."  
Enter Set A: {1,2,1,3}  
Enter Set B: {1,2,1,2}  
Set A and B are not equivalent  
  
Enter Set A: {1,2,3,3,5,a,x}  
Enter Set B: {2,2,1,3,3,a,x,5,x,a}  
Set A and B are equivalent
```

The image shows a screenshot of a Windows command prompt window. The title bar is green and contains the text "E:\Study\My C\Lab\2-1\CSE 2...". The window has standard minimize, maximize, and close buttons. The command prompt displays two sets of input and output. In the first set, Set A is {1,2,1,3} and Set B is {1,2,1,2}, resulting in the output "Set A and B are not equivalent". In the second set, Set A is {1,2,3,3,5,a,x} and Set B is {2,2,1,3,3,a,x,5,x,a}, resulting in the output "Set A and B are equivalent". A vertical scrollbar is visible on the right side of the command prompt window.

Power set of a set

Code

```
#include<bits/stdc++.h>
using namespace std;
#define PowSetSize(SetSize) pow(2,SetSize)
int main()
{
    char set1[30],str1[15];

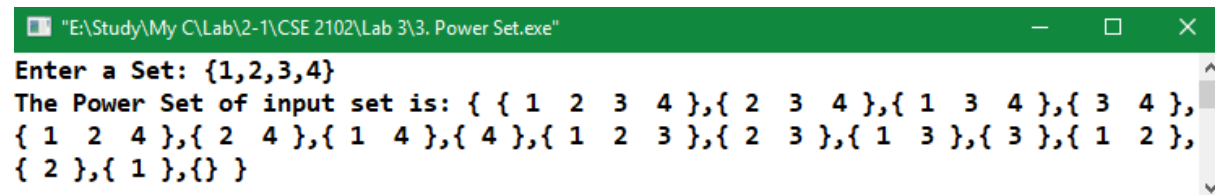
    cout<<"Enter a Set: ";
    gets(set1);

    int ActLen1=((strlen(set1)-2)/2)+1;

    for(int i=0,j=0;i<strlen(set1);i++)
    {
        if(j==ActLen1){
            str1[j]='\0';
            break;
        }
        else if(set1[i]!='{' && set1[i]!='}' && set1[i]!=','){
            str1[j]=set1[i];
            j++;
        }
    }

    int SetSize = strlen(str1);
    cout<<"The Power Set of input set is: ";
    cout<<"{ {";
    for(int i=0;i<PowSetSize(SetSize);i++)
    {
        for(int j=0;j<SetSize;j++)
        {
            if((i&1<<j)==0){
                cout<<" "<<str1[j] <<" ";
            }
        }
        if(i!=(PowSetSize(SetSize)-1))
            cout<<" "<<','<<"{";
        else
            cout<<"}";
    }
    cout<<" }"<<endl;
    return 0;
}
```

Output



```
"E:\Study\My C\Lab\2-1\CSE 2102\Lab 3\3. Power Set.exe"
Enter a Set: {1,2,3,4}
The Power Set of input set is: { { 1 2 3 4 }, { 2 3 4 }, { 1 3 4 }, { 3 4 },
{ 1 2 4 }, { 2 4 }, { 1 4 }, { 4 }, { 1 2 3 }, { 2 3 }, { 1 3 }, { 3 }, { 1 2 },
{ 2 }, { 1 }, { } }
```

Cartesian product of two sets

Code

```
#include<bits/stdc++.h>
using namespace std;

int main()
{
    char set1[30],set2[30],str1[15],str2[15],CP[100];
    int len1,len2,ActLen1,ActLen2,k=0;

    cout<<"Enter set A: ";
    cin>>set1;
    cout<<"Enter set B: ";
    cin>>set2;

    len1=strlen(set1);
    len2=strlen(set2);

    ActLen1=((len1-2)/2)+1;
    ActLen2=((len2-2)/2)+1;

    for(int i=0,j=0;i<len1;i++)
    {
        if(j==ActLen1)
            break;
        else if(set1[i]!='{' && set1[i]!='}' && set1[i]!=','){
            str1[j]=set1[i];
            j++;
        }
    }

    for(int i=0,j=0;i<len2;i++)
    {
        if(j==ActLen2)
            break;
        else if(set2[i]!='{' && set2[i]!='}' && set2[i]!=','){
            str2[j]=set2[i];
            j++;
        }
    }
}
```



```

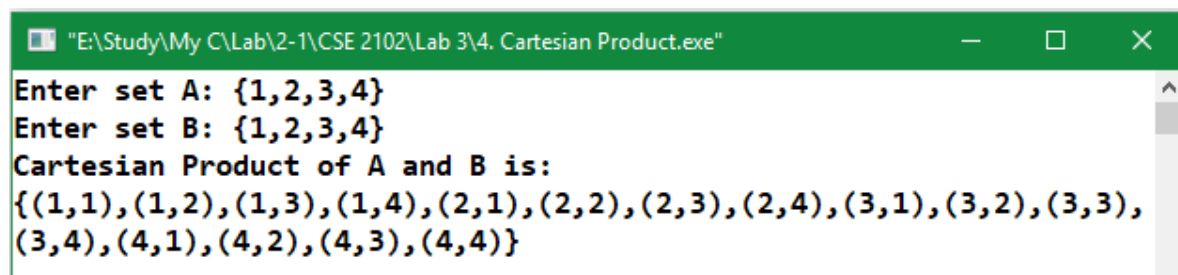
for(int i=0;i<ActLen1;i++)
{
    for(int j=0;j<ActLen2;j++)
    {
        CP[k]='(';
        CP[k+1]=str1[i];
        CP[k+2]=',';
        CP[k+3]=str2[j];
        CP[k+4]=')';
        if(j!=(ActLen2-1)||i!=(ActLen1-1)){
            CP[k+5]=',';
            k=k+6;
        }
        else
            k=k+5;
    }
}

cout<<"Cartesian Product of A and B is: "<<endl;
cout<<'{'<<CP<<'}'<<endl;

return 0;
}

```

Output



The screenshot shows a Windows command prompt window with the title bar "E:\Study\My C\Lab\2-1\CSE 2102\Lab 3\4. Cartesian Product.exe". The window contains the following text:

```

Enter set A: {1,2,3,4}
Enter set B: {1,2,3,4}
Cartesian Product of A and B is:
{(1,1),(1,2),(1,3),(1,4),(2,1),(2,2),(2,3),(2,4),(3,1),(3,2),(3,3),
(3,4),(4,1),(4,2),(4,3),(4,4)}

```