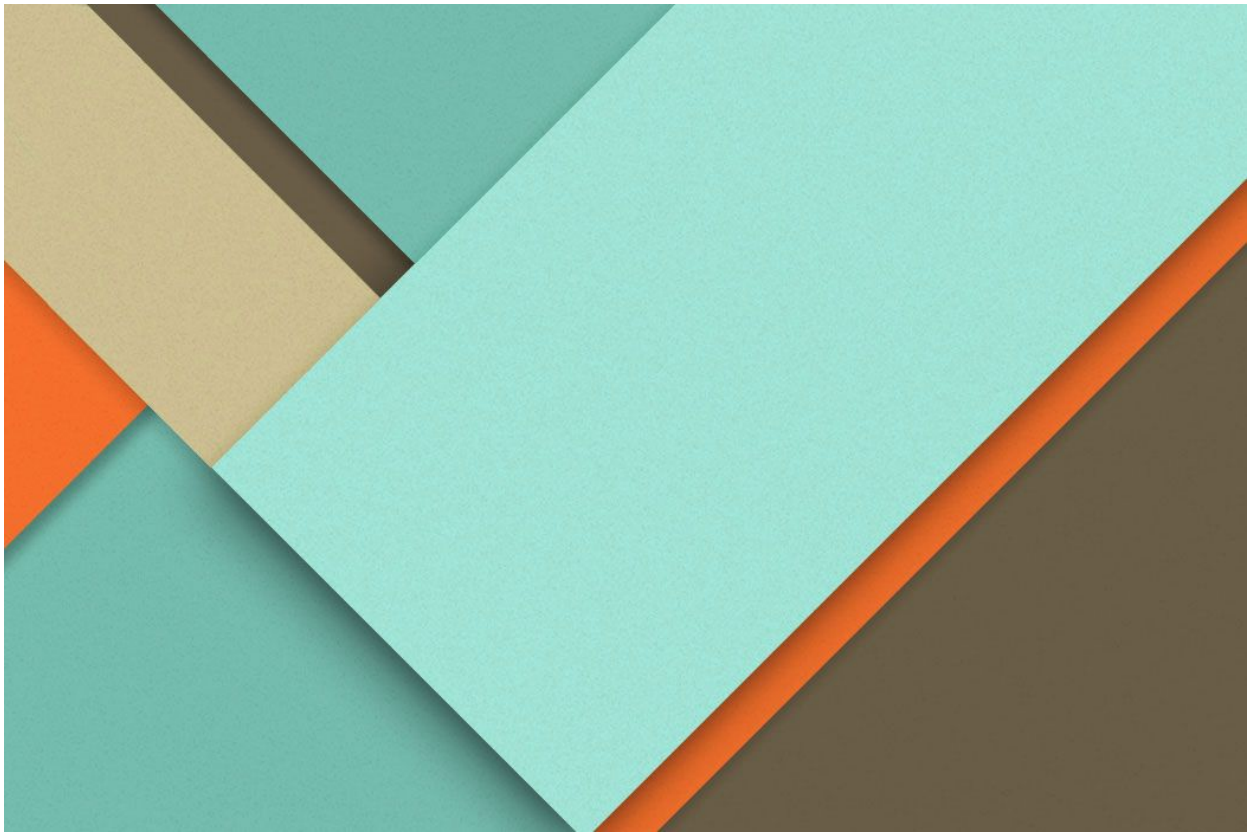

# DISCRETE MATHS ASSIGNMENT 1

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# Overview

This programme is designed to make some basic set operations implemented in c++ programming language in its functional diagram.

# Goals

1. Union,  intersection and difference operations implementation on sets.

# Specifications

This c++ code separated into some basic sections:

1. Take the members of the universal set by knowing its size then read its components.
2. Take number of subsets and read them one by one like done in univesel.
3. By using 2D bit mask array we could implement our sets as 1's and 0's.
4. By avoiding some possible errors may be done from the user we handled some of them.
5. Using bit wise operations we manipulate our sets.

## Bits

### 1-intersection:

since we made all our subsets to boolean array which having same size of Universal so traverse throw the two subset in same time and use "||" operation as we need it in at least one of them "true".

### 2-union:

with the same logic but we used "&&"operation as we need element in the two sets

### 3-difference

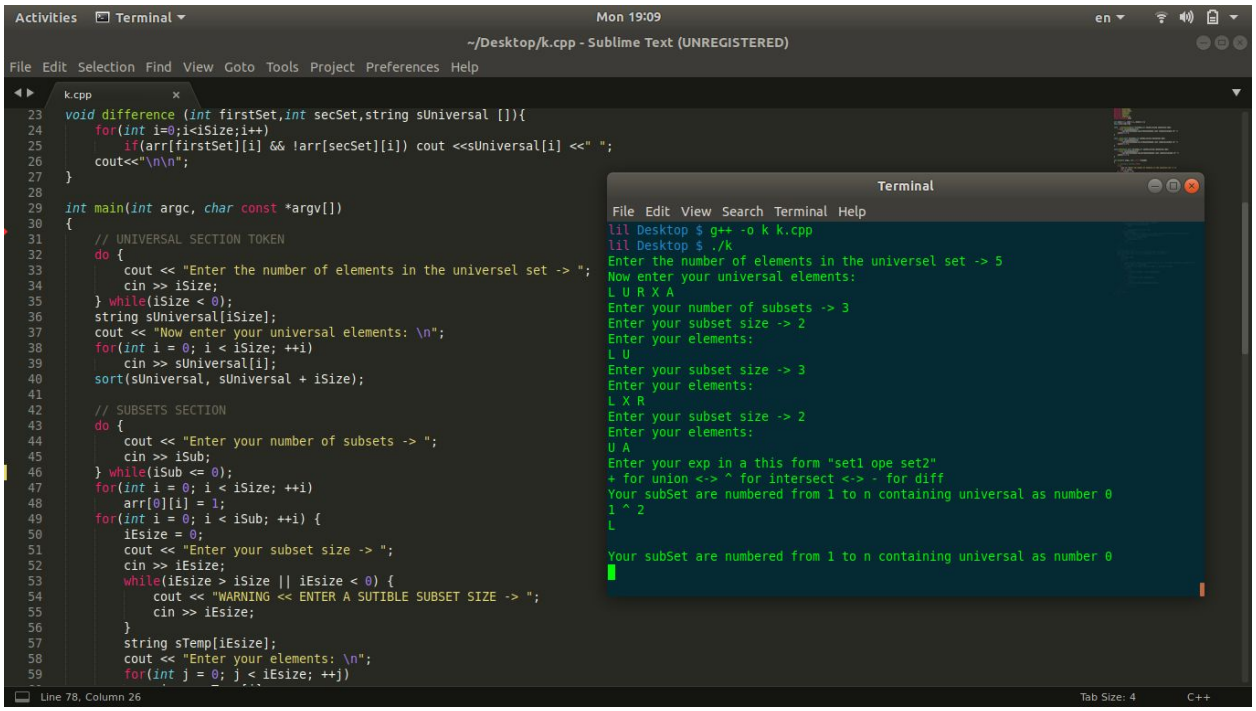
it was a bit complex as we need the element in the first set but not in the second set

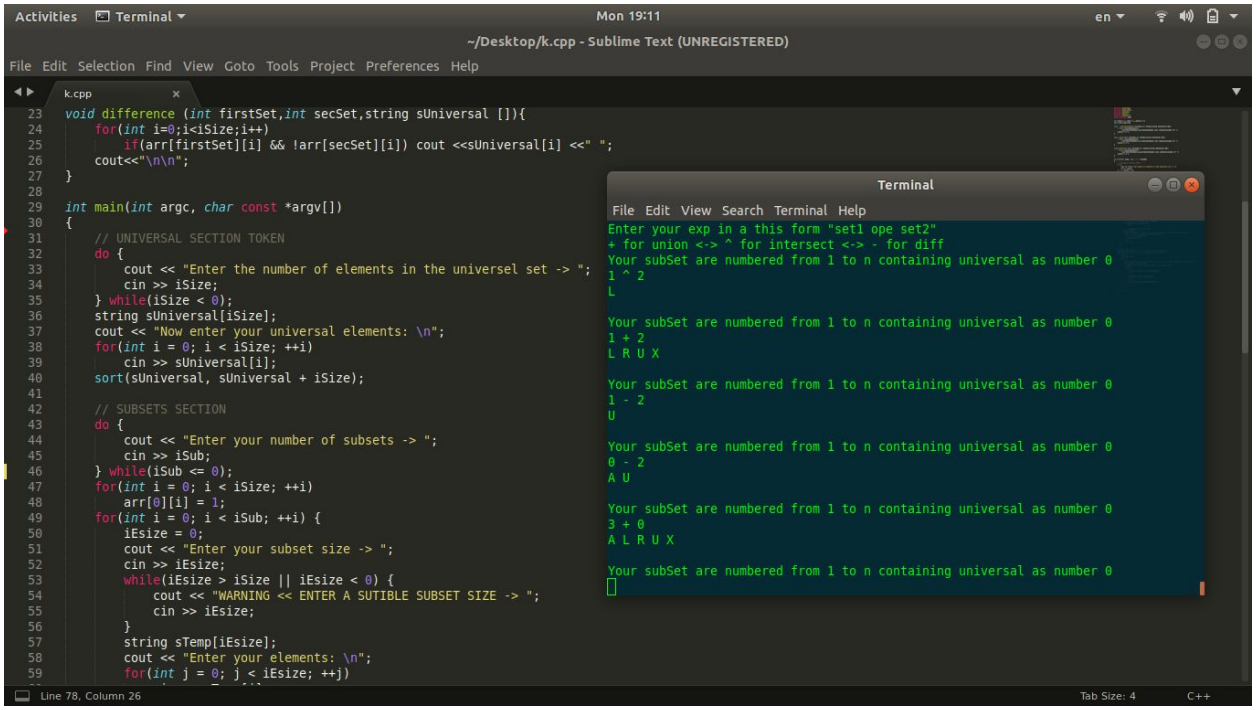
so we use "first && !second"

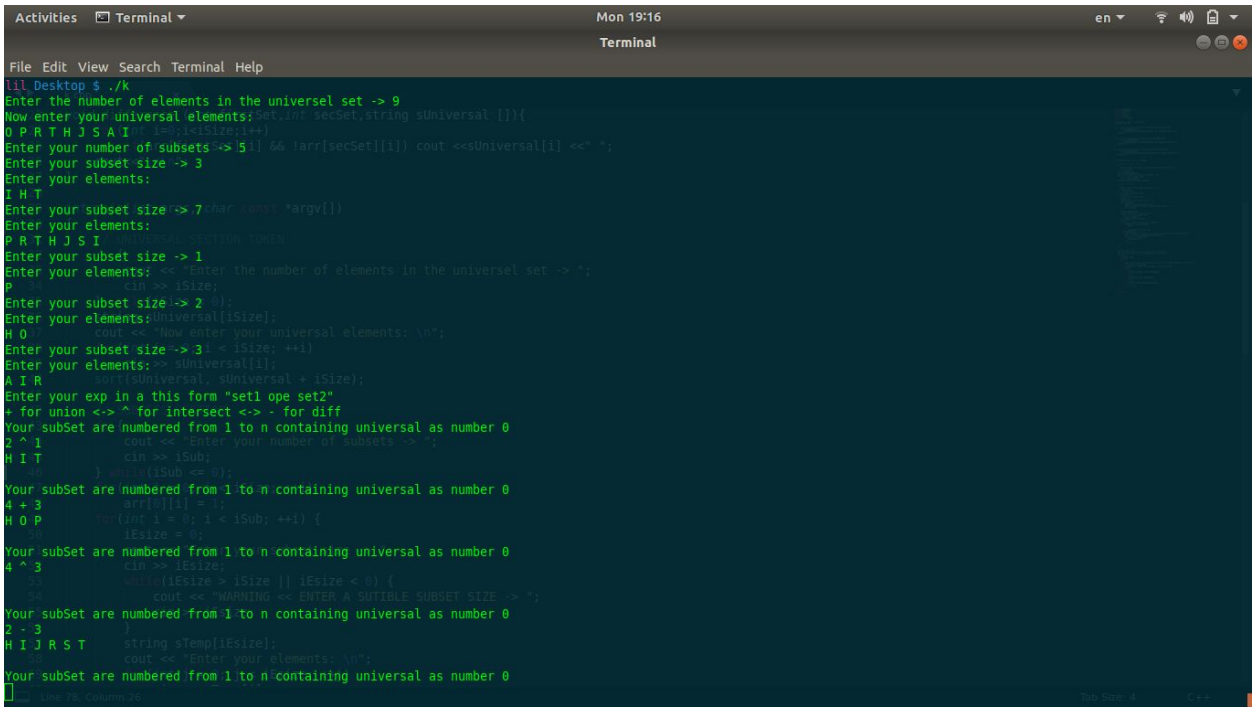
## Used data Structure

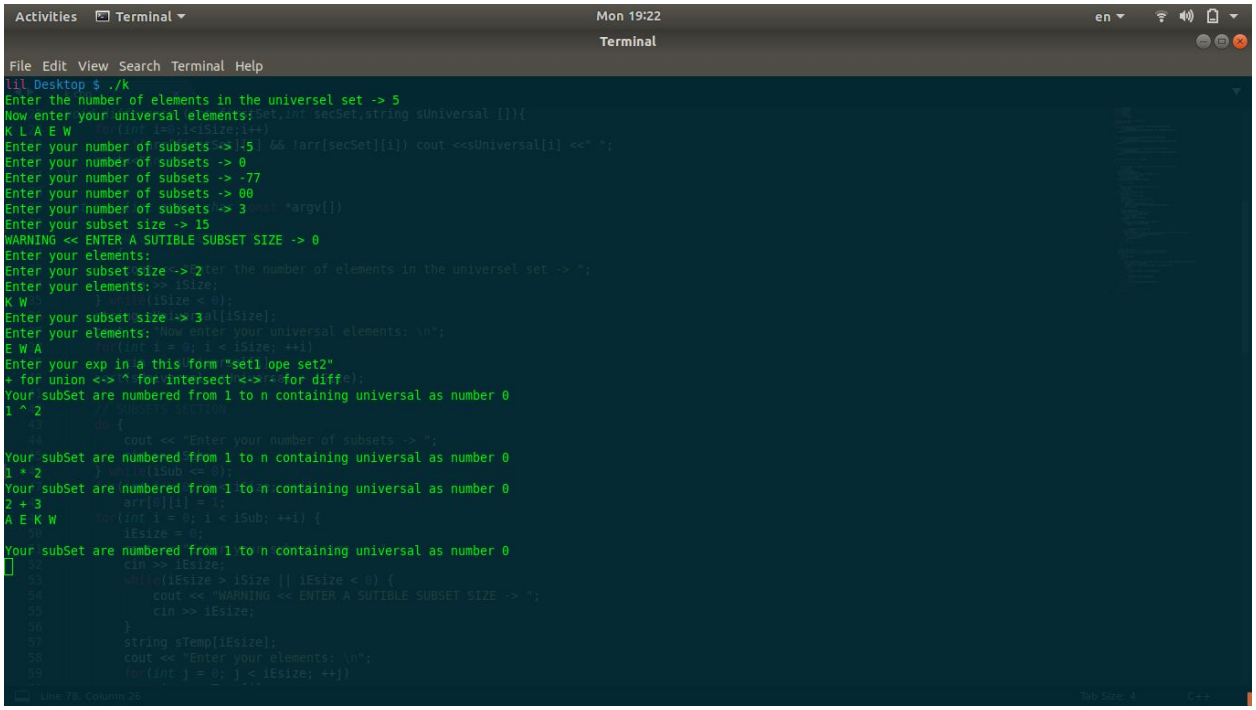
1. We use “ as a global variable ” a 2D bit mask array to mark our subsets.
2. Using 1D array for the universal set.
3. Temp array of size universal to read our sub sets.

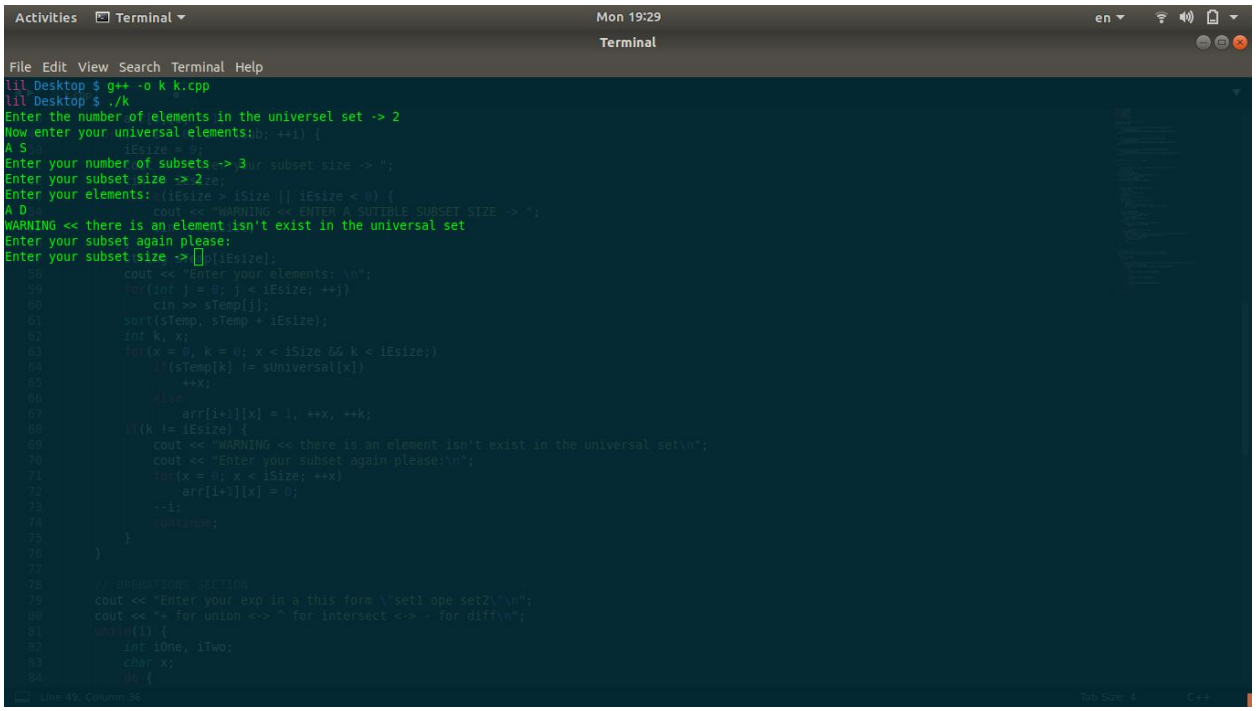
## Sample runs

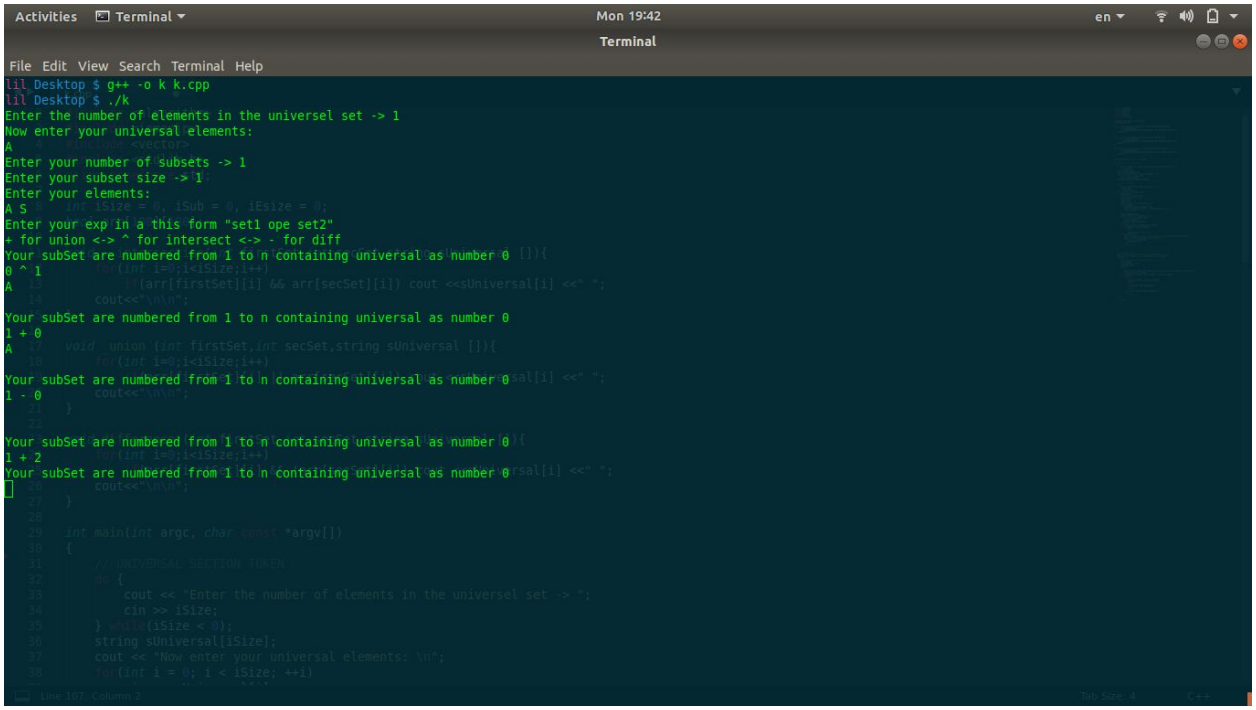


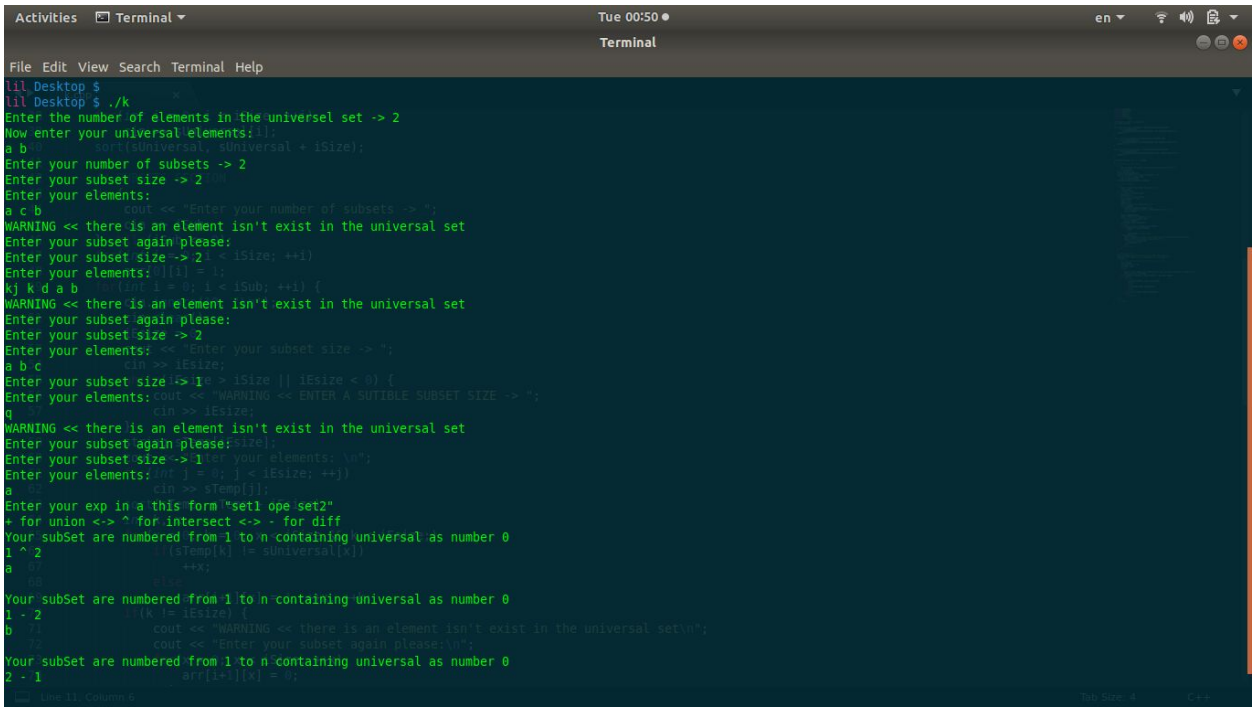

Activities
Terminal
Mon 19:11
en
~/Desktop/k.cpp - Sublime Text (UNREGISTERED)
File Edit Selection Find View Goto Tools Project Preferences Help
k.cpp
void difference (int firstSet,int secSet,string sUniversal []){
for(int i=0;i<iSize;i++)
if(arr[firstSet][i] && !arr[secSet][i]) cout <<sUniversal[i] <<" ";
cout<<"\n\n";
}
int main(int argc, char const *argv[])
{
// UNIVERSAL SECTION TOKEN
do {
cout << "Enter the number of elements in the universel set -> ";
cin >> iSize;
} while(iSize < 0);
string sUniversal[iSize];
cout << "Now enter your universal elements: \n";
for(int i = 0; i < iSize; ++i)
cin >> sUniversal[i];
sort(sUniversal, sUniversal + iSize);
// SUBSETS SECTION
do {
cout << "Enter your number of subsets -> ";
cin >> iSub;
} while(iSub <= 0);
for(int i = 0; i < iSize; ++i)
arr[0][i] = 1;
for(int i = 0; i < iSub; ++i) {
iEsize = 0;
cout << "Enter your subset size -> ";
cin >> iEsize;
while(iEsize > iSize || iEsize < 0) {
cout << "WARNING << ENTER A SUTIBLE SUBSET SIZE -> ";
cin >> iEsize;
}
string sTemp[iEsize];
cout << "Enter your elements: \n";
for(int j = 0; j < iEsize; ++j)
Terminal
File Edit View Search Terminal Help
Enter your exp in a this form "set1 ope set2"
+ for union <-> ^ for intersect <-> - for diff
Your subSet are numbered from 1 to n containing universal as number 0
1 ^ 2
L
Your subSet are numbered from 1 to n containing universal as number 0
1 + 2
L R U X
Your subSet are numbered from 1 to n containing universal as number 0
1 - 2
U
Your subSet are numbered from 1 to n containing universal as number 0
0 - 2
A U
Your subSet are numbered from 1 to n containing universal as number 0
3 + 0
A L R U X
Your subSet are numbered from 1 to n containing universal as number 0
Line 78, Column 26
Tab Size: 4
C++


Activities
Terminal
Mon 19:16
en
Terminal
File Edit View Search Terminal Help
lil Desktop $ ./k
Enter the number of elements in the universel set -> 9
Now enter your universal elements:
O P R T H J S A I
Enter your number of subsets -> 5
Enter your subset size -> 3
Enter your elements:
I H T
Enter your subset size -> 7
Enter your elements:
P R T H J S I
Enter your subset size -> 1
Enter your elements:
P
Enter your subset size -> 2
Enter your elements:
H O
Enter your subset size -> 3
Enter your elements:
A I R
Enter your exp in a this form "set1 ope set2"
+ for union <-> ^ for intersect <-> - for diff
Your subSet are numbered from 1 to n containing universal as number 0
2 ^ 1
H I T
Your subSet are numbered from 1 to n containing universal as number 0
4 + 3
H O P
Your subSet are numbered from 1 to n containing universal as number 0
4 ^ 3
Your subSet are numbered from 1 to n containing universal as number 0
2 - 3
H I J R S T
Your subSet are numbered from 1 to n containing universal as number 0


Activities
Terminal
Mon 19:22
en
Terminal
File Edit View Search Terminal Help
lil Desktop $ ./k
Enter the number of elements in the universel set -> 5
Now enter your universal elements:
K L A E W
Enter your number of subsets -> -5
Enter your number of subsets -> 0
Enter your number of subsets -> -77
Enter your number of subsets -> 00
Enter your number of subsets -> 3
Enter your subset size -> 15
WARNING << ENTER A SUTIBLE SUBSET SIZE -> 0
Enter your elements:
Enter your subset size -> 2
Enter your elements:
K W
Enter your subset size -> 3
Enter your elements:
E W A
Enter your exp in a this form "set1 ope set2"
+ for union <-> ^ for intersect <-> - for diff
Your subSet are numbered from 1 to n containing universal as number 0
1 ^ 2
Your subSet are numbered from 1 to n containing universal as number 0
1 * 2
Your subSet are numbered from 1 to n containing universal as number 0
2 + 3
A E K W
Your subSet are numbered from 1 to n containing universal as number 0


Activities
Terminal
Mon 19:29
en
Terminal
File Edit View Search Terminal Help
lil Desktop $ g++ -o k k.cpp
lil Desktop $ ./k
Enter the number of elements in the universel set -> 2
Now enter your universal elements:
A S
Enter your number of subsets -> 3
Enter your subset size -> 2
Enter your elements:
A D
WARNING << there is an element isn't exist in the universal set
Enter your subset again please:
Enter your subset size ->


Activities
Terminal
Mon 19:42
en
Terminal
File Edit View Search Terminal Help
lil Desktop $ g++ -o k k.cpp
lil Desktop $ ./k
Enter the number of elements in the universel set -> 1
Now enter your universal elements:
A
Enter your number of subsets -> 1
Enter your subset size -> 1
Enter your elements:
A S
Enter your exp in a this form "set1 ope set2"
+ for union <-> ^ for intersect <-> - for diff
Your subSet are numbered from 1 to n containing universal as number 0
0 ^ 1
A
Your subSet are numbered from 1 to n containing universal as number 0
1 + 0
A
Your subSet are numbered from 1 to n containing universal as number 0
1 - 0
Your subSet are numbered from 1 to n containing universal as number 0
1 + 2
Your subSet are numbered from 1 to n containing universal as number 0


Activities
Terminal
Tue 00:50
en
Terminal
File Edit View Search Terminal Help
lil Desktop $
lil Desktop $ ./k
Enter the number of elements in the universel set -> 2
Now enter your universal elements:
a b
Enter your number of subsets -> 2
Enter your subset size -> 2
Enter your elements:
a c b
WARNING << there is an element isn't exist in the universal set
Enter your subset again please:
Enter your subset size -> 2
Enter your elements:
kj k d a b
WARNING << there is an element isn't exist in the universal set
Enter your subset again please:
Enter your subset size -> 2
Enter your elements:
a b c
Enter your subset size -> 1
Enter your elements:
q
WARNING << there is an element isn't exist in the universal set
Enter your subset again please:
Enter your subset size -> 1
Enter your elements:
a
Enter your exp in a this form "set1 ope set2"
+ for union <-> ^ for intersect <-> - for diff
Your subSet are numbered from 1 to n containing universal as number 0
1 ^ 2
a
Your subSet are numbered from 1 to n containing universal as number 0
1 - 2
b
Your subSet are numbered from 1 to n containing universal as number 0
2 - 1