#include<iostream>

using namespace std;

struct SLLNode\* createSLL(int cnt, struct SLLNode \*head);

void displaySLL(struct SLLNode \*head);

void A\_U\_B();

void A\_int\_B();

void A\_Min\_B();

void B\_Min\_A();

void U\_Min\_A\_U\_B();

struct SLLNode

{

char data;

struct SLLNode \*next;

}\*headU, \*headA, \*headB;

int main()

{

int i,no;

cout<<"\n\n\t How many Linked Lists: ";

cin>>no;

headU = headA = headB = NULL;

for(i=1; i<=no; i++)

{

if(i == 1)

{

cout<<"\n\n\t Enter 10 Students of SE Comp : ";

headU = createSLL(10, headU);

cout<<"\n";

displaySLL(headU);

}

if(i == 2)

{

cout<<"\n\n\t Enter 5 Students who like Vanilla Icecreme: ";

headA = createSLL(5, headA);

cout<<"\n";

displaySLL(headA);

}

if(i == 3)

{

cout<<"\n\n\t Enter 5 Students who like Butterscotch Icecreme: ";

headB = createSLL(5, headB);

cout<<"\n";

displaySLL(headB);

}

}

cout<<"\n\n Input Sets:------------------------";

cout<<"\n\n Set 'U': ";

displaySLL(headU);

cout<<"\n\n Set 'A': ";

displaySLL(headA);

cout<<"\n\n Set 'B': ";

displaySLL(headB);

cout<<"\n\n Output Sets:------------------------";

A\_U\_B();

A\_int\_B();

A\_Min\_B();

B\_Min\_A();

U\_Min\_A\_U\_B();

cout<<"\n\n";

return 0;

}

//.........................................................Function to create Linked List as Sets.

struct SLLNode\* createSLL(int cnt, struct SLLNode \*head)

{

int i;

struct SLLNode \*p, \*newNode;

for(i=0; i<cnt; i++)

{

newNode = new(struct SLLNode); // 1. DMA

cout<<"\n\t Enter Student Initial: "; // 2. Data & Address Assignment

cin>>newNode->data;

newNode->next = NULL;

if(head == NULL) // 3. Add node in the list

{

head = newNode;

p = head;

}

else

{

p->next = newNode;

p = p->next;

}

}

return head;

}

//...............................................Function to display Linked Lists as Sets.

void displaySLL(struct SLLNode \*head)

{

struct SLLNode \*p;

p = head;

while(p != NULL)

{

cout<<" "<<p->data;

p = p->next;

}

}

//................................................Function for Set A U B .

void A\_U\_B()

{

int i,j;

char a[10];

struct SLLNode \*p, \*q;

i = 0; //Index of Resultant Array

p = headA; //pointer to Set 'A'

q = headB; //pointer to Set 'B'

while(p != NULL && q != NULL)

{

if(p->data == q->data)

{

a[i] = p->data;

i++;

p = p->next;

q = q->next;

}

else

{

a[i] = p->data;

i++;

p = p->next;

}

}

if(p == NULL) //Set 'A' copied completely

{

while(q != NULL) //Copy remaining elements of Set 'B'

{

a[i] = q->data;

i++;

q = q->next;

}

}

if(q == NULL) //Set 'B' copied completely

{

while(p != NULL) //Copy remaining elements of Set 'A'

{

a[i] = p->data;

i++;

p = p->next;

}

}

cout<<"\n\n\t Set A U B: ";

for(j=0; j < i; j++)

cout<<" "<<a[j];

}

//................................................Function for Set A ^ B .

void A\_int\_B()

{

int i,j;

char a[10];

struct SLLNode \*p, \*q;

i = 0; //Index of Resultant Array

p = headA; //pointer to Set 'A'

while(p != NULL)

{

q = headB; //pointer to Set 'B'

while(q != NULL)

{

if(p->data == q->data)

{

a[i] = p->data;

i++;

}

q = q->next;

}

p = p->next;

}

cout<<"\n\n\t Set A ^ B: ";

for(j=0; j < i; j++)

cout<<" "<<a[j];

}

//................................................Function for Set A - B .

void A\_Min\_B()

{

int i,j,flag;

char a[10];

struct SLLNode \*p, \*q;

i = 0; //Index of Resultant Array

p = headA; //pointer to Set 'A'

while(p != NULL)

{

flag = 0;

q = headB; //pointer to Set 'B'

while(q != NULL)

{

if(p->data == q->data)

{

flag = 1;

}

q = q->next;

}

if(flag == 0)

{

a[i] = p->data;

i++;

}

p = p->next;

}

cout<<"\n\n\t Set A - B: ";

for(j=0; j < i; j++)

cout<<" "<<a[j];

}

//................................................Function for Set B - A.

void B\_Min\_A()

{

int i,j,flag;

char a[10];

struct SLLNode \*p, \*q;

i = 0; //Index of Resultant Array

q = headB; //pointer to Set 'B'

while(q != NULL)

{

flag = 0;

p = headA; //pointer to Set 'A'

while(p != NULL)

{

if(q->data == p->data)

{

flag = 1;

}

p = p->next;

}

if(flag == 0)

{

a[i] = q->data;

i++;

}

q = q->next;

}

cout<<"\n\n\t Set B - A: ";

for(j=0; j < i; j++)

cout<<" "<<a[j];

}

//................................................Function for Set U - (A U B).

void U\_Min\_A\_U\_B()

{

int i,j,flag;

char a[10];

struct SLLNode \*p, \*q, \*r;

i = 0; //Index of Resultant Array

p = headU; //pointer to Set 'U'

while(p != NULL)

{

flag = 0;

q = headA; //pointer to Set 'A'

r = headB; //pointer to Set 'B'

while(q != NULL)

{

if(p->data == q->data)

{

flag = 1;

}

q = q->next;

}

while(r != NULL)

{

if(p->data == r->data)

{

flag = 1;

}

r = r->next;

}

if(flag == 0)

{

a[i] = p->data;

i++;

}

p = p->next;

}

cout<<"\n\n\t Set U - (A U B): ";

for(j=0; j < i; j++)

cout<<" "<<a[j];

}

Output:

/tmp/42wCehZimO.o

How many Linked Lists: 5

Enter 10 Students of SE Comp :

Enter Student Initial: a

Enter Student Initial: b

Enter Student Initial: c

Enter Student Initial: d

Enter Student Initial: e

Enter Student Initial: f

Enter Student Initial: g

Enter Student Initial: h

Enter Student Initial: i

Enter Student Initial: j

a b c d e f g h i j

Enter 5 Students who like Vanilla Icecreme:

Enter Student Initial: a

Enter Student Initial: e

Enter Student Initial: d

Enter Student Initial: i

Enter Student Initial: j

a e d i j

Enter 5 Students who like Butterscotch Icecreme:

Enter Student Initial: a

Enter Student Initial: i

Enter Student Initial: j

Enter Student Initial: d

Enter Student Initial: g

a i j d g

Input Sets:------------------------

Set 'U': a b c d e f g h i j

Set 'A': a e d i j

Set 'B': a i j d g

Output Sets:------------------------

Set A U B: a e d i j d g

Set A ^ B: a d i j

Set A - B: e

Set B - A: g

Set U - (A U B): b c f h