# 一共实现10个功能分别为子函数

集合运算代码：

#include<bits/stdc++.h>

using namespace std;

int rand\_num();//生成100以内的随机数200个

int readSet(int a[],int b[]);//文件读取并返回a和b较长的lenth

int print\_set(const int a[],const int b[]);//打印

bool Belong(const int a[]);//输入一个数判断是否属于a

int sumSet(int sum[],const int a[],const int b[]);//合集

int subSet(int sub[],const int a[],const int b[]);

bool isEmpty(const int a[]);

int DiffSet(int diff[],const int a[],const int b[]);//差集

int subNum(const int a[]);

bool isSubSet(const int a[],const int b[]); //b是否为a的子集

bool isRealSub(const int a[],const int b[]);//b是否为a的真子集

void oppsDiffSet(int opps[],const int a[],const int b[]);//对称差集

bool isEqual(const int a[],const int b[]); //判断是否相等

int a\_len=0,b\_len=0,sum\_len=0,sub\_len=0,diff\_len=0,opps\_len=0;//j\_len , k\_len ,sum\_len and sub\_len is a[] , b[] ,sum[] and sub[] lenth;

const int max\_len=105;//固定长度的字符常数

int main() {

int a[1000],b[1000],sum[1000],sub[1000],diff[1000],opps[1000];

int choice;

do {

cout<<"1: rand\_num 2:readSet 3:print set a and b 4: judge num belong a"<<endl;

cout<<"5: get sumSet and put it into a sum.txt 6:subSet 7:isEmpty "<<endl;

cout<<"8:DiffSet 9:isSubSet 10:is realSub 11:opps 12:isEqual"<<endl;

cout<<"enter your operator:";

cin>>choice;

switch(choice) {

case 0:

break;

case 1:

rand\_num();

break;

case 2:

readSet(a,b);//文件读取

break;

case 3:

print\_set(a,b);//打印到屏幕

break;

case 4:

Belong(a);//属于

break;

case 5:

sumSet(sum,a,b);//合集

break;

case 6:

subSet(sub,a,b);//交集

break;

case 7:

isEmpty(a);//judge empty or not

break;

case 8:

DiffSet(diff,a,b);

break;

case 9:

isSubSet(a,sub);

break;

case 10:

isRealSub(a,sub);

break;

case 11:

oppsDiffSet(opps,a,b);

break;

case 12:

isEqual(a,b);

break;

default:

cout<<"error intput"<<endl;

}

cout<<endl;

} while(choice);//intput 0 let it down

}

int rand\_num() {

fstream in\_a,in\_b;

in\_a.open("a.txt",ios::out);

in\_b.open("b.txt",ios::out);//打开文件a.txt and b.txt for produce rand\_num

srand(time(0));//rand seed with time

for(int i=0; i<200; i++) {

if(i%20==0&&i!=0)

in\_a<<endl;

in\_a<<rand()%100+1<<" ";

if(i%20==0&&i!=0)

in\_b<<endl;

in\_b<<rand()%100+1<<" ";

}

in\_a.close();

in\_b.close();

return 0;

}

int readSet(int a[],int b[]) {

fstream in\_a,in\_b;

in\_a.open("a.txt",ios::in);

in\_b.open("b.txt",ios::in);//d=打开指定文件读取数据

int aTemp[max\_len],bTemp[max\_len];

memset(aTemp,0,sizeof(aTemp));

memset(bTemp,0,sizeof(bTemp));

for(int i=0;i<200;i++){

in\_a>>a[i];

in\_b>>b[i];

}

for(int i=0;i<200;i++){

aTemp[a[i]]++;

bTemp[b[i]]++;

}

for(int i=0;i<max\_len;i++){

if(aTemp[i]!=0)

a[a\_len++]=i;

if(bTemp[i]!=0)

b[b\_len++]=i;

}

in\_a.close();

in\_b.close();

return 0;

}

int print\_set(const int a[],const int b[]){

cout<<"a:"<<endl;

for(int i=0;i<a\_len;i++){

if(i%20==0&&i!=0)

cout<<endl;

cout<<a[i]<<" ";

}

cout<<endl;

cout<<"b:"<<endl;

for(int i=0;i<b\_len;i++){

if(i%20==0&&i!=0)

cout<<endl;

cout<<b[i]<<" ";

}

cout<<endl;

return 0;

}

bool Belong(const int a[]){

int x;

cout<<"enter x:";

cin>>x;

int i;

for( i=0;i<a\_len;i++){

if(x==a[i]){

cout<<"x belong set a"<<endl;//遍历a集合若存在x则跳出并返回true

return true;

}

}

cout<<"x is not belong set a"<<endl;

return false;

}

int sumSet(int sum[],const int a[],const int b[]){

int sumTemp[max\_len];

memset(sumTemp,0,sizeof(sumTemp));

for(int i=0;i<max\_len;i++){

sumTemp[a[i]]++;

sumTemp[b[i]]++;//利用桶排序思想除去重复

}

for(int i=0;i<max\_len;i++){

if(sumTemp[i]!=0)

sum[sum\_len++]=i;//给sum赋值并计算sum的长度

}

fstream out("sum.txt",ios::out) ;

for(int i=0;i<sum\_len;i++){

if(i%20==0&&i!=0)//every 20 num turn a row

out<<endl;

out<<sum[i]<<" ";

}

out.close();

//cout<<sum;

return 0;

}

int subSet(int sub[],const int a[],const int b[]){

int aTemp[max\_len],bTemp[max\_len];

memset(aTemp,0,sizeof(aTemp));

memset(bTemp,0,sizeof(bTemp));

for(int i=0;i<max\_len;i++){

aTemp[a[i]]++;

bTemp[b[i]]++;

}

for(int i=0;i<max\_len;i++){

if(aTemp[i]!=0&&bTemp[i]!=0)

sub[sub\_len++]=i;

}

fstream out("sub.txt",ios::out) ;

for(int i=0;i<sub\_len;i++){

if(i%20==0&&i!=0)//every 20 num turn a row

out<<endl;

out<<sub[i]<<" ";//输入文件sub.txt

}

out.close();

return 0;

}

bool isEmpty(const int a[]){

for(int i=0;i<100;i++){

if(a[i]!=0){

cout<<"not empty"<<endl;//利用数字初始化为0的特点

return false;

}

}

cout<<"empty"<<endl;

return true;

}

int DiffSet(int diff[],const int a[],const int b[]){

int aTemp[max\_len],bTemp[max\_len];

memset(aTemp,0,sizeof(aTemp));

memset(bTemp,0,sizeof(bTemp));

for(int i=0;i<max\_len;i++){//筛选

aTemp[a[i]]++;

bTemp[b[i]]++;

}

for(int i=0;i<max\_len;i++){

if(aTemp[i]!=0&&bTemp[i]==0)

diff[diff\_len++]=i;

}

fstream out("diff.txt",ios::out) ;

for(int i=0;i<diff\_len;i++){

if(i%20==0&&i!=0)//every 20 num turn a row

out<<endl;

out<<diff[i]<<" ";//输入文件diff.txt

}

out.close();

return 0;

}

int subNum(const int a[]){//子集个数

int n=0;

while(a[n++]);//获取长度

return 1<<n;

}

bool isSubSet(const int a[],const int b[]){

int aTemp[max\_len],bTemp[max\_len];

memset(aTemp,0,sizeof(aTemp));

memset(bTemp,0,sizeof(bTemp));

for(int i=0;i<max\_len;i++){//先转换

aTemp[a[i]]++;

if(b[i]>0&&b[i]<106)

bTemp[b[i]]++;

}

for(int i=0;i<max\_len;i++){

if(aTemp[i]==0&&bTemp[i]!=0){

cout<<"is not subSet"<<endl;

return false;

}

}

cout<<"is subSet"<<endl;

return true;

}

bool isRealSub(const int a[],const int b[]){

int aTemp[max\_len],bTemp[max\_len];

memset(aTemp,0,sizeof(aTemp));

memset(bTemp,0,sizeof(bTemp));

for(int i=0;i<max\_len;i++){//先转换

aTemp[a[i]]++;

if(b[i]>0&&b[i]<106)

bTemp[b[i]]++;

}

bool flag=false;

for(int i=0;i<max\_len;i++){

if(aTemp[i]==0&&bTemp[i]!=0){

cout<<"is not isRealSub"<<endl;

return false;

}

if(aTemp[i]!=0&&bTemp[i]==0)

flag=true;

}

if(flag){

cout<<"is isRealSub"<<endl;

return true;

}

else {

cout<<"is not isRealSub"<<endl;

return false;

}

}

void oppsDiffSet(int opps[],const int a[],const int b[]){

int aTemp[max\_len],bTemp[max\_len];

memset(aTemp,0,sizeof(aTemp));

memset(bTemp,0,sizeof(bTemp));

for(int i=0;i<max\_len;i++){//筛选

aTemp[a[i]]++;

bTemp[b[i]]++;

}

int diff\_a\_b[1000],diff\_b\_a[1000];

memset(diff\_a\_b,0,sizeof(diff\_a\_b));

memset(diff\_b\_a,0,sizeof(diff\_b\_a));

for(int i=0;i<max\_len;i++){

if(aTemp[i]!=0&&bTemp[i]==0)

diff\_a\_b[i]++;

if(bTemp[i]!=0&&aTemp[i]==0)

diff\_b\_a[i]++;

}

for(int i=0;i<max\_len;i++){

if(diff\_a\_b[i]!=0||diff\_b\_a[i]!=0)

opps[opps\_len++]=i;

}

fstream out("opps.txt",ios::out) ;

for(int i=0;i<opps\_len;i++){

if(i%20==0&&i!=0)//every 20 num turn a row

out<<endl;

out<<opps[i]<<" ";//输入文件opps.txt

}

out.close();

return ;

}

bool isEqual(const int a[],const int b[]){

int aTemp[1000],bTemp[1000];

memset(aTemp,0,sizeof(aTemp));

memset(bTemp,0,sizeof(bTemp));

for(int i=0;i<max\_len;i++){

aTemp[a[i]]++;

bTemp[b[i]]++;

}

for(int i=0;i<max\_len;i++){

if(aTemp[i]!=bTemp[i]){

cout<<"not equal"<<endl;

return false;

}

}

cout<<"equal"<<endl;

return true;

}

运行图：







