**Sparse matrix.**

#include <iostream>

using namespace std;

class Sparsing{

public:

int rows=0,cols=0,k;

int a[10][10],b[10][10],trans[10][10],add[10][10];

void acceptMatrix(){

cout<<endl<<"Enter number of rows and columns:";

cin>>rows>>cols;

cout<<endl<<"Enter elements:";

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

for(int j=0;j<cols;j++){

cin>>a[i][j];}}

}

void sparse(){

b[0][0]=rows;

b[0][1]=cols;

k=1;

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

for(int j=0;j<cols;j++){

if(a[i][j]!=0){

b[k][0]=i;

b[k][1]=j;

b[k][2]=a[i][j];

k++;}}}

b[0][2]=k-1;

sparseDisplay(b);

}

void transpose(){

trans[0][0]=b[0][1];

trans[0][1]=b[0][0];

trans[0][2]=b[0][2];

int n=b[0][2];

int k=1;

for(int i=0;i<b[0][1];i++){

for(int j=1;j<=n;j++){

if(i==b[j][1]){

trans[k][0]=i;

trans[k][1]=b[j][0];

trans[k][2]=b[j][2];

k++;}}}

sparseDisplay(trans);

}

void sparseDisplay(int a[10][10]){

int len=a[0][2];

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

cout<<a[i][0]<<"\t"<<a[i][1]<<"\t"<<a[i][2];

cout<<endl;}}

void sparseAccept(int s[10][10]){

int r=0,c=0,value=0;

cout<<endl<<"Enter number of rows and columns:";

cin>>r>>c;

cout<<endl<<"Enter number of triplets:";

cin>>value;

s[0][0]=r;

s[0][1]=c;

s[0][2]=value;

for(int i=1;i<=value;i++){

cout<<endl<<"Enter triple(row,column,value):";

cin>>s[i][0]>>s[i][1]>>s[i][2];

}

}

void addition(){

sparseAccept(a);

sparseAccept(b);

int t1,t2,i,j,k;

t1=a[0][2];

t2=b[0][2];

i=j=k=0;

add[0][0]=a[0][0];

add[0][1]=a[0][1];

while(i<=t1 && j<=t2){

if(a[i][0]<b[j][0]){

add[k][0]=a[i][0];

add[k][1]=a[i][1];

add[k][2]=a[i][2];

i++;

k++;

}else if(b[j][0]<a[i][0]){

add[k][0]=b[j][0];

add[k][1]=b[j][1];

add[k][2]=b[j][2];

j++;

k++;

}else{

if(a[i][1]<b[j][1]){

add[k][0]=a[i][0];

add[k][1]=a[i][1];

add[k][2]=a[i][2];

i++;

k++;

}else if(b[j][1]<a[i][1]){

add[k][0]=b[j][0];

add[k][1]=b[j][1];

add[k][2]=b[j][2];

j++;

k++;

}else{

add[k][0]=a[i][0];

add[k][1]=a[i][1];

add[k][2]=a[i][2]+b[j][2];

i++;

j++;

k++;

}

}

}

add[0][2]=k-1;

sparseDisplay(add);

}

};

int main()

{

Sparsing s1;

int ch;

do{

cout<<endl<<"\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*SPARSE MATRIX IMPLEMENTATION\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*";

cout<<endl<<"1.create sparse matrix...\n2.Simple transpose.....\n3.fast transpose....\n4.Addition of two sparse matrices...\n5.Exit...";

cout<<endl<<"Enter your choice:";

cin>>ch;

switch(ch){

case 1:

s1.acceptMatrix();

s1.sparse();

break;

case 2:

s1.transpose();

break;

case 3:

break;

case 4:

s1.addition();

break;

case 5:

break;

}

}while(ch!=5);

return 0;

}