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FDS Assignment No.4

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#include<iostream>

using namespace std;

class sparse

{

int a[10][3],b[10][3],ar,ac,br,bc;

public:

void input();

void add();

void fast\_T();

void simple\_T();

};

void sparse::input()

{

int i,j;

cout<<"enter the order of matrix A="<<endl;

cin>>ar>>ac;

cout<<"enter the element of matrix A="<<endl;

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

{

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

{

cin>>a[i][j];

}

}

cout<<"A matrix"<<endl;

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

{

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

{

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

}

cout<<endl;

}

cout<<"enter the order of matrix B="<<endl;

cin>>br>>bc;

cout<<"enter the element of matrix B="<<endl;

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

{

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

{

cin>>b[i][j];

}

}

cout<<"B matrix"<<endl;

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

{

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

{

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

}

cout<<endl;

}

}

void sparse::add()

{

int c[10][3],i=1,j=1,k=1;

c[0][0]=a[0][0];

c[0][1]=a[0][1];

while (i<=a[0][2] && j<=b[0][2])

{

if (a[i][0]==b[j][0])

{

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

{

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

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

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

i++,j++,k++;

}

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

{

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

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

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

i++,k++;

}

else

{

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

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

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

j++,k++;

}

}

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

{

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

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

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

k++,i++;

}

else

{

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

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

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

k++,j++;

}

}

while(i<=a[0][2])

{

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

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

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

i++,k++;

}

while(j<=b[0][2])

{

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

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

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

k++,j++;

}

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

cout<<"addition of given matrix is :"<<endl;

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

{

for(j=0;j<3;j++)

{

cout<<c[i][j]<<" ";

}

cout<<endl;

}

}

void sparse::fast\_T()

{

int c[10][3],x[10],y[10],n,t,i,j;

n=a[0][1],t=a[0][2];

c[0][0]=a[0][1];

c[0][1]=a[0][0];

c[0][2]=a[0][2];

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

{

x[i]=0;

}

for(i=1;i<=t;i++)

{

x[a[i][1]]++;

}

y[0]=1;

for(i=1;i<n;i++)

{

y[i]=y[i-1]+x[i-1];

}

for(i=1;i<=t;i++)

{

j=y[a[i][1]];

c[j][0]=a[i][1];

c[j][1]=a[i][0];

c[j][2]=a[i][2];

y[a[i][1]]++;

}

cout<<"fast transpose of given matrix is :"<<endl;

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

{

for(j=0;j<3;j++)

{

cout<<c[i][j]<<" ";

}

cout<<endl;

}

}

void sparse::simple\_T()

{

int c[10][3],i,j,k=1,t,n;

c[0][0]=a[0][1];

c[0][1]=a[0][0];

c[0][2]=a[0][2];

n=a[0][1];

t=a[0][2];

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

{

for(j=1;j<=t;j++)

{

if(i==a[j][1])

{

c[k][0]=a[j][1];

c[k][1]=a[j][0];

c[k][2]=a[j][2];

k++;

}

}

}

cout<<"simple transpose of given matrix is :"<<endl;

{

for(j=0;j<3;j++)

{

cout<<c[i][j]<<" ";

}

cout<<endl;

}

}

int main()

{

sparse m;

int ch;

while(1)

{

cout<<"MENU"<<endl;

cout<<"1 add:"<<endl;

cout<<"2 simple T:"<<endl;

cout<<"3 fast T:"<<endl;

cout<<"enter the choice"<<endl;

cin>>ch;

switch(ch)

{

case 1:

m.input();

m.add();

break;

case 2:

m.input();

m.simple\_T();

break;

case 3:

m.input();

m.fast\_T();

break;

}

}

}