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//Assignment - Magic Square
//simple code version
//author: Professor
//last compiled: March 16, 2015

#include <iostream>
using namespace std;

int const Maxsize=10;

int main(){
    int inmatrix[Maxsize][Maxsize]; // array to hold data
    int ndim; // dimension
    int i,j; // index variables
    int testsum, sum, tempsum;
    bool ismagic;

    // read size of matrix
    cout << "Dimension of data matrix is = "; cin >> ndim;

    // read matrix
    for (i=0; i<ndim ; i++){
        cout << "values in row " << i+1 << " are? " << endl;
        for (j=0; j<ndim; j++){
            cout << "value " << j+1 << "? "; cin >> inmatrix[i][j];
        }
    }

    //echo print matrix input
    cout << "Your square:\n";
    for (i=0; i<ndim ; i++){
        for (j=0; j<ndim; j++)
            cout << inmatrix[i][j];
        cout << endl;
    }

    // now test if magic square
    // get sum of first row
    sum=0;
    for (j=0 ; j< ndim ; j++)
        sum += inmatrix[0][j];

    // test rows
    ismagic= true;
    for (i=1; i< ndim; i++){
        tempsum=0;
        for (j=0 ; j< ndim ; j++)
            tempsum += inmatrix[i][j];
        if (tempsum != sum) ismagic=false;
    }

    // now test cols
    for (j=0; j< ndim; j++){
        tempsum=0;
        for (i=0 ; i< ndim ; i++)
            tempsum += inmatrix[i][j];
        if (tempsum != sum) ismagic=false;
    }
}

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// now diag 1
testsum=0;
for (i=0; i< ndim; i++)
    testsum += inmatrix[i][i];
if (testsum != sum)
    ismagic=false;

// now diag 2
testsum=0;
for (i=0; i< ndim; i++)
    testsum += inmatrix[i][ndim-i-1];
if (testsum != sum)
    ismagic=false;

if (ismagic)
    cout << "\n Matrix is a magic square \n\n";
else
    cout << "\n Matrix is not a magic square \n\n";

return 0;
}
```