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1  /*
2  -----
3  File name      : main.cpp
4  Lab name       : Lab 7, Vectors and matrices
5  Authors        : Miguel Jalube, Leandro Saraiva Maia
6  Creation date  : 07.12.2021
7
8  Description    : This program tests the functions given by the matrixUtilites
9                  library.
10 Remark(s)      : An empty matrix is considered as square and regular. irregular
11                  matrices are ignored.
12
13 Compiler       : Mingw-w64 g++ 11.1.0
14 -----
15 */
16
17 #include <cstdlib>           // required for EXIT_SUCCESS
18 #include <iostream>          // required for cout
19 #include <limits>             // required for numeric_limits<...>
20 #include <vector>             // required because of hidden use of vector
21 #include "matrixUtilities.h" // required for matrix manipulations
22
23 using namespace std ;
24
25 void test(Matrix& matrix);
26
27 int main() {
28     cout << boolalpha;
29
30     Matrix testMatrices[] = {
31         // ----- Square cases -----
32         {{ 1, 4,-2}},
33         { 2, 2, 2}},
34         {-1,-1, 3}},
35
36         {{ 3,-1, 2, 1}},
37         { 4, 1, 0,-2}},
38         { 0, 1, 3,-4}},
39         {-3, 0, 2,-4}},
40
41         {{1,5}},
42         {3,1}},
43
44         {{ 0, 0, 0}},
45         { 0, 0, 0}},
46         { 0, 0, 0}},
47
48         // ----- Regular cases -----
49         {{ 1, 2, 2}},
50         { 0, 1,-1}},
51         { 0, 0, 2}},
52         { 4, 5, 6}},
53
54         {{ 1, 3, 2, 4}},
55         { 0, 1,-1, 4}},
56
57         {{ 1, 2, 3, 4, 5}},
58
59         {{ 0, 0, 0, 0}},
60         { 0, 0, 0, 0}},
61
62         // ----- Irregular cases -----
63         {{ 1, 4}},
64         { 0, 3, 0}},
65         { 1, 5, 3}},
66
67         {{ 3, 0}},
68         { 1,-1}},
69         {-5}},
70
71         {{ 4, 0, -1, 1, -1, 0}},
72         { 1,-1},
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73         { 2, 1}},
74
75         // ----- Empty cases -----
76         {},
77
78         {{}},
79
80         {{},
81         {}},
82
83         {{0,0,0},
84         {}},
85         {{0,0}},
86
87         {},
88         {{}},
89         {{0}},
90     };
91
92     for (Matrix& testMatrix : testMatrices) {
93         test(testMatrix);
94     }
95
96     //----- End of program -----
97     cout << "Press ENTER to quit.";
98     cin.ignore(numeric_limits<streamsize>::max(), '\n'); // empty buffer
99     return EXIT_SUCCESS;
100 }
101
102 void test(Matrix& matrix){
103     cout << "Display vector          : ";
104     if(matrix.empty()) {
105         cout << "()";
106     }else{
107         cout << matrix.at(0);
108     }
109     cout << endl;
110     cout << "Display matrix          : " << matrix << endl;
111     cout << "Is square                : " << isSquare(matrix) << endl;
112     cout << "Is regular                 : " << isRegular(matrix) << endl;
113     cout << "Minimum row size           : " << minRow(matrix) << endl;
114     cout << "Row sum                    : " << sumRow(matrix) << endl;
115     cout << "Column sum                 : " << sumColumn(matrix) << endl;
116     cout << "Vector minimal sum         : " << vectSumMin(matrix) << endl;
117     shuffleMatrix(matrix);
118     cout << "Matrix after shuffle : " << matrix << endl;
119     sortMatrix(matrix);
120     cout << "Matrix after sort      : " << matrix << endl;
121     cout << "-----" << endl;
122 }

```