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*********************************************************************************
* Name:       Caroline Ta
* Date:       09.25.2020
* Class:      CS3010.01 - Numerical Methods
* Assignment: Programming Project 1 - Gaussian Elimination Partial Pivoting
*********************************************************************************

Would you like to input the matrix through command line or text file?
[0] - Exit the Program
[1] - Command Line
[2] - Text File

Enter choice: 1

Enter the number of equations: 3

Enter the coefficients:
2 3 0 8
-1 2 -1 0
3 0 2 9

Scale vectors: s = [3, 2, 3]

Ratio: r = {0.67, 0.50, 1.00}
The largest ratio found is 1.00 so we choose R3 and swap with R1

The matrix after R1 <-> R3
3.00    0.00    2.00    9.00
-1.00   2.00    -1.00   0.00
2.00    3.00    0.00    8.00

The matrix after scaled partial pivoting:
3.00    0.00    2.00    9.00
0.00    2.00    -0.33   3.00
0.00    3.00    -1.33   2.00

Scale vectors: s = [3, 2, 3]

Ratio: r = {1.00, 1.00}
The largest ratio found is 1.00 so we choose R2 and swap with R2 (matrix stays the same)

The matrix after R2 <-> R2
3.00    0.00    2.00    9.00
0.00    2.00    -0.33   3.00
0.00    3.00    -1.33   2.00

The matrix after scaled partial pivoting:
3.00    0.00    2.00    9.00
0.00    2.00    -0.33   3.00
0.00    0.00    -0.83   -2.50

The solution of the matrix:
x1 = 1.00
x2 = 2.00
x3 = 3.00

Thank you for using the program! [Press Enter to Close the Program]
```

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* Date:       09.25.2020
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Would you like to input the matrix through command line or text file?
[0] - Exit the Program
[1] - Command Line
[2] - Text File

Enter choice: 2

Enter file name: testCase_2.txt

Enter the number of equations: 4

Scale vectors: s = [13, 18, 6, 12]

Ratio: r = {0.23, 0.33, 1.00, 1.00}
The largest ratio found is 1.00 so we choose R3 and swap with R1

The matrix after R1 <-> R3
6.00    -2.00   2.00    4.00    16.00
-6.00   4.00    1.00    -18.00  -34.00
3.00    -13.00  9.00    3.00    -19.00
12.00   -8.00   6.00    10.00   26.00

The matrix after scaled partial pivoting:
6.00    -2.00   2.00    4.00    16.00
0.00    2.00    3.00    -14.00  -18.00
0.00    -12.00  8.00    1.00    -27.00
0.00    -4.00   2.00    2.00    -6.00

Scale vectors: s = [6, 18, 13, 12]

Ratio: r = {0.11, 0.92, 0.33}
The largest ratio found is 0.92 so we choose R3 and swap with R2

The matrix after R2 <-> R3
6.00    -2.00   2.00    4.00    16.00
0.00    -12.00  8.00    1.00    -27.00
0.00    2.00    3.00    -14.00  -18.00
0.00    -4.00   2.00    2.00    -6.00

The matrix after scaled partial pivoting:
6.00    -2.00   2.00    4.00    16.00
0.00    -12.00  8.00    1.00    -27.00
0.00    0.00    4.33    -13.83  -22.50
0.00    0.00    -0.67   1.67    3.00

Scale vectors: s = [6, 13, 18, 12]

Ratio: r = {0.24, 0.06}
The largest ratio found is 0.24 so we choose R3 and swap with R3 (matrix stays the same)

The matrix after R3 <-> R3
6.00    -2.00   2.00    4.00    16.00
0.00    -12.00  8.00    1.00    -27.00
0.00    0.00    4.33    -13.83  -22.50
0.00    0.00    -0.67   1.67    3.00

The matrix after scaled partial pivoting:
6.00    -2.00   2.00    4.00    16.00
0.00    -12.00  8.00    1.00    -27.00
0.00    0.00    4.33    -13.83  -22.50
0.00    0.00    0.00    -0.46   -0.46
```

```
The solution of the matrix:
x1 = 3.00
x2 = 1.00
x3 = -2.00
x4 = 1.00

Thank you for using the program! [Press Enter to Close the Program]
```