Concurrent Gaussian Eliminator

System requirements

- matplotlib==3.8.0
- numpy==1.26.2
- python_igraph==0.11.2

Installation

To install any required packages, you can simply run this code:

```
pip install -r requirements.txt
```

Configuration

In the main directory, you can find the config.py file.

In this file, you can modify input, output directories; printing, exporting options and verbose option.

How to Run

To run this program, open terminal in the same directory as run.py and execute this code:

```
python run.py <input_file>
```

Testing

To test this program with sample data, you can run program with these arguments:

```
python run.py input/sample.txt

python run.py input/sample2.txt

python run.py input/sample3.txt
```

Console output:

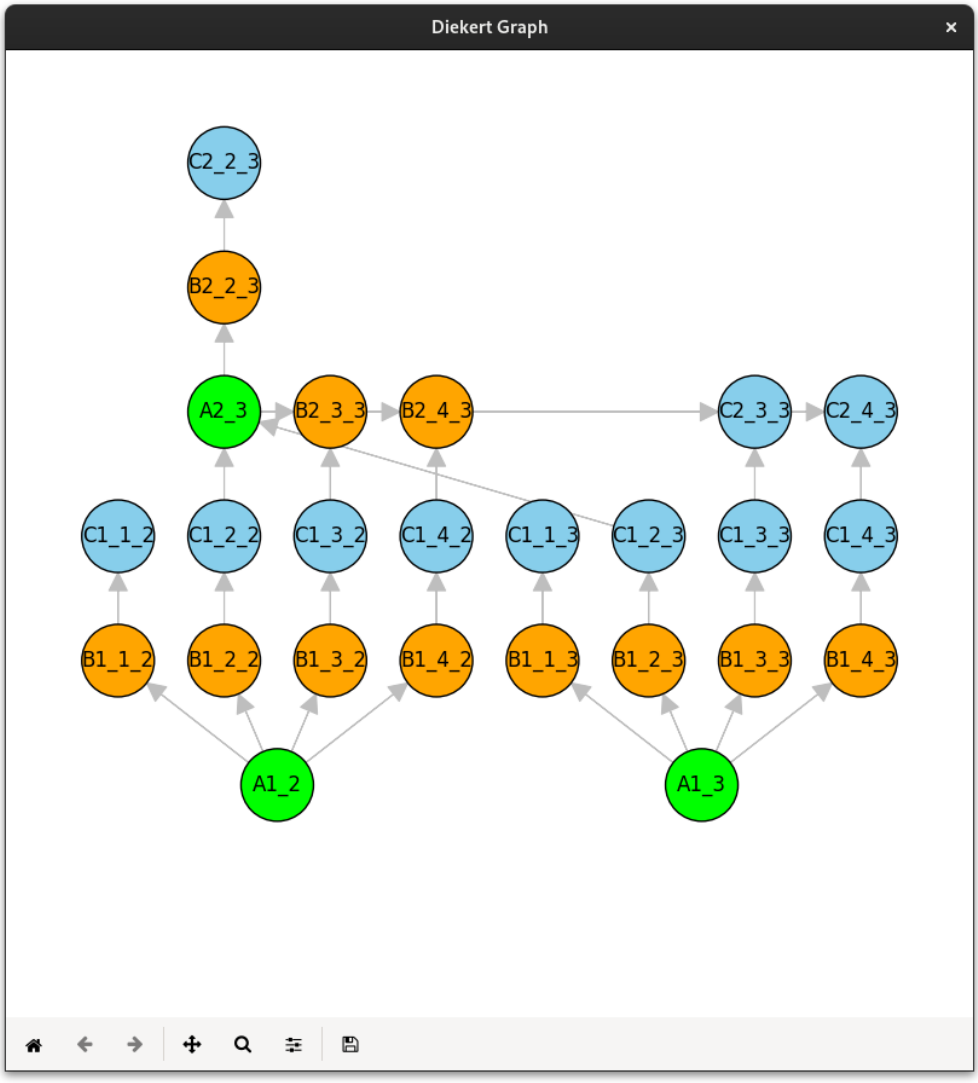
```
# sample:

Result matrix:
1.00 0.00 0.00 | 1.00
0.00 1.00 0.00 | 1.00
0.00 0.00 1.00 | 1.00

# sample2:
```

```
Result matrix:
1.00 0.00 0.00 0.00 | 0.50
0.00 1.00 0.00 0.00 | 0.50
0.00 0.00 1.00 0.00 | 0.50
0.00 0.00 0.00 1.00 | 1.50

# sample3:

Result matrix:
1.00 0.00 0.00 0.00 0.00 | -276.91
0.00 1.00 0.00 0.00 0.00 | 181.82
0.00 0.00 1.00 0.00 0.00 | -33.56
0.00 0.00 0.00 1.00 0.00 | 3.58
0.00 0.00 0.00 0.00 1.00 | 1.12
```

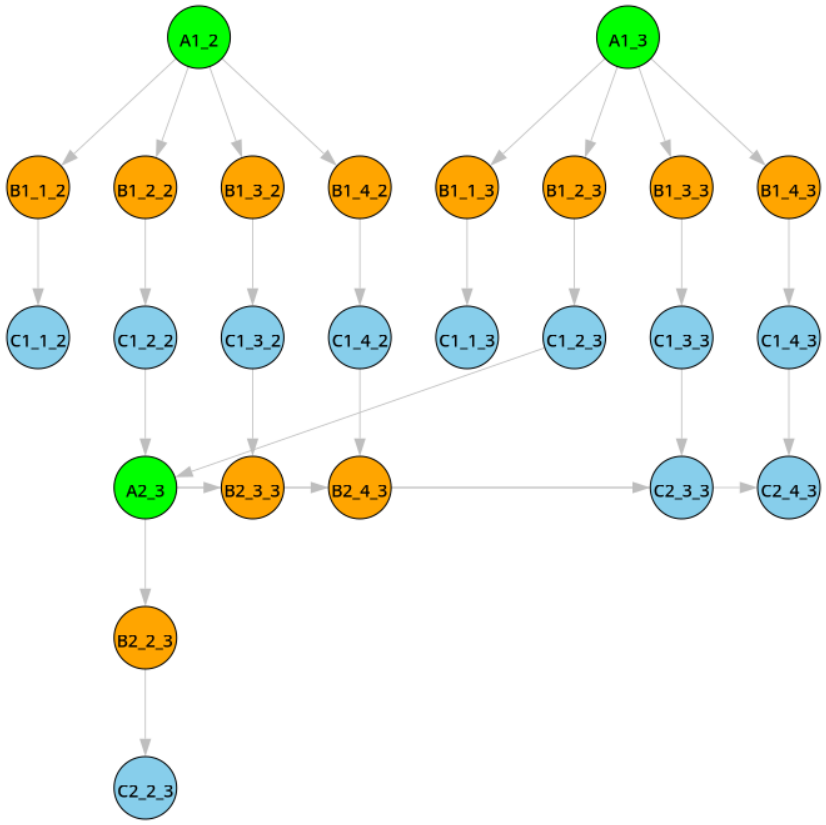
File output: *output/result.txt* for *sample.txt*:

```
3               # size of the coefficient matrix
1.0 0.0 0.0
0.0 1.0 0.0
0.0 0.0 1.0     # result coefficient matrix
1.0 1.0 1.0     # vector of constants
```

Result window with a plot for *sample.txt*:



Saved plot: *output/plot.png* for *sample.txt*:



The program can also save the result graph in a *.dot* file.

Input format

The input file should be in the following format:

```
<size of the coefficient matrix>    # (int)
<row 1 of the coefficient matrix>   # (float)
<row 2 of the coefficient matrix>   # (float)
...
<row n of the coefficient matrix>   # (float)
<vector of constants>               # (float)
```

For example:

```
3
2.0 1.0 3.0
4.0 3.0 8.0
6.0 5.0 16.0
6.0 15.0 27.0
```

Output file format

Same as input file format.