Optical failure localization practical course

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Task

- Identify the edges of the input graphs with the as few m-trails as possible
- The winner will be that team who
  - Has solution for all the graphs
  - The total number of their m-trails (i.e. the sum of the number of m-trails required) is minimal

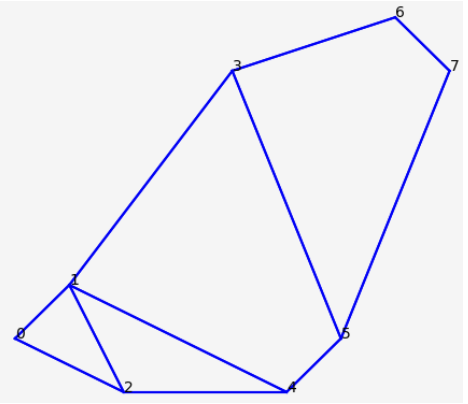
Sample input

- Input file format: example on G8

```
8                                   //Number of nodes = n
 0 1 1 0 0 0 0 0                    //Adjacency matrix n x n
 1 0 1 1 1 0 0 0
 1 1 0 0 1 0 0 0
 0 1 0 0 0 1 1 0
 0 1 1 0 0 1 0 0
 0 0 0 1 1 0 0 1
 0 0 0 1 0 0 0 1
 0 0 0 0 0 1 1 0
 1 1 0 0 0 0 0 0 0 0 0              //incidency matrix n x m
 -1 0 1 1 1 0 0 0 0 0 0
 0 -1 -1 0 0 1 0 0 0 0 0
 0 0 0 -1 0 0 1 1 0 0 0
 0 0 0 0 -1 -1 0 0 1 0 0
 0 0 0 0 0 0 -1 0 -1 1 0
 0 0 0 0 0 0 0 -1 0 0 1
 0 0 0 0 0 0 0 0 0 -1 -1
 2 4                                //coordinates of the nodes on the plane n x 2
 3 5
 4 3
 6 9
 7 3
 8 4
 9 10
 10 9
```

Sample output (for G8)

- First line: your Neptun codes
- Matrix:
  - Rows correspond to edges
  - Columns correspont to m-trails




```
#neptun1 neptun2
1 1 0 0 0 0 0 0          //edge 1
1 0 1 0 0 0 0 0          //edge 2
0 1 1 0 0 0 0 0          //etc.
0 1 0 1 0 0 0 0
0 1 0 0 1 0 0 0
0 0 1 0 1 0 0 0
0 0 0 1 0 1 0 0
0 0 0 1 0 0 1 0
0 0 0 0 1 1 0 0
0 0 0 0 0 1 0 1
0 0 0 0 0 0 1 1
```

```
#neptun
1 1 0 0 0 0 0
1 0 1 0 0 0 0
0 1 1 0 0 0 0
0 1 0 1 0 0 0
0 1 0 0 1 0 0
0 0 1 0 1 0 0
0 0 0 1 0 1 0
0 0 0 1 0 0 1
0 0 0 0 1 1 0
0 0 0 0 0 1 1
0 0 0 0 0 0 1
```

```
#neptun
1 1 0 0 0 0 0
1 0 1 0 0 0 0
0 1 1 0 0 0 0
0 1 0 1 0 0 0
0 1 0 0 1 0 0
0 0 1 0 1 0 0
0 0 0 1 0 1 0
0 0 0 1 0 0 1
0 0 0 0 1 1 0
1 0 0 0 0 1 0
1 0 0 0 0 0 1
```

```
#neptun
1 1 0 0 0 0
1 0 1 0 0 0
0 1 1 0 0 0
0 1 0 0 0 0
0 1 0 1 0 0
0 0 1 1 0 0
0 1 0 0 1 0
0 1 0 0 0 1
0 0 0 1 1 0
0 0 0 0 1 1
0 0 0 0 0 1
```

Usage of mtrail.py

- python mtrail.py -g G8 -m M8_1
  - In case of graph G8 and mtrail file M8_1 it returns sum of the number of connected components of the columns in the mtrail file (in this case: 8)
- python plot.py -g G8 -m M8_1 -c 2
  - Draws graph G8 with blue edges, and on top of it draws the edges from mtrail file M8_1 column 2 with red
- python plot.py -g G8
  - Draws graph G8