

Algorithmische Graphentheorie

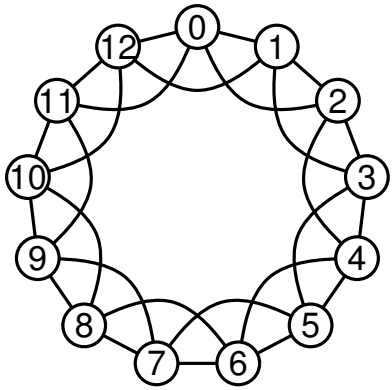
Übung 3

Übung 3 · 27. November 2014
Thomas Bläsius

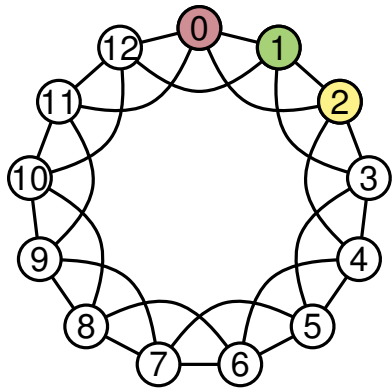
INSTITUTE OF THEORETICAL INFORMATICS · ALGORITHMICS GROUP

$$\begin{pmatrix}
 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 \\
 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 \\
 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\
 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 \\
 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1
 \end{pmatrix} \cdot \begin{pmatrix}
 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 \\
 1 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 \\
 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 \\
 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\
 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\
 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\
 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\
 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\
 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\
 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 \\
 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 \\
 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 \\
 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\
 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\
 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0
 \end{pmatrix}^T = \begin{pmatrix}
 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 \\
 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 \\
 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 \\
 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 \\
 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 \\
 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 1 \\
 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 0
 \end{pmatrix}$$

Partitionierbare Graphen – C_{13}^2



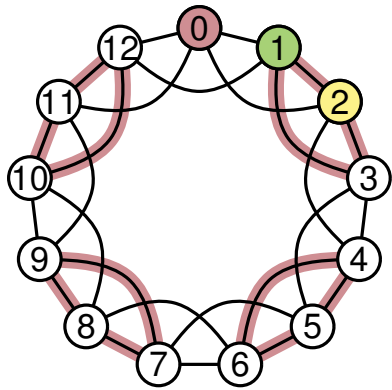
Partitionierbare Graphen – C_{13}^2



0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	0	0	0	0	0	0	0	0	0	0

- wähle maximale Clique $\{0, 1, 2\}$

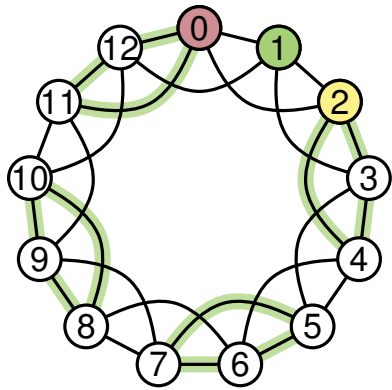
Partitionierbare Graphen – C_{13}^2



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0

- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0

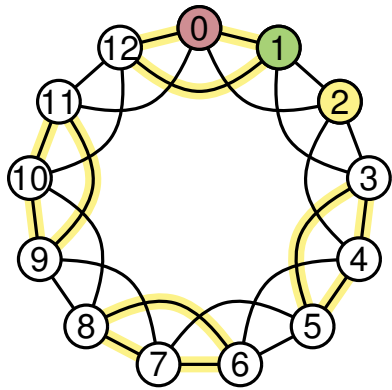
Partitionierbare Graphen – C_{13}^2



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	1	0	0	0	0	0	0	0	0	0	0
2	1	1	1	0	0	0	0	0	0	0	0	0	0
3	0	0	0	1	1	1	0	0	0	0	0	0	0
4	0	0	0	1	1	1	0	0	0	0	0	0	0
5	0	0	0	1	1	1	0	0	0	0	0	0	0
6	0	0	0	0	0	0	1	1	1	0	0	0	0
7	0	0	0	0	0	0	1	1	1	0	0	0	0
8	0	0	0	0	0	0	1	1	1	0	0	0	0
9	0	0	0	0	0	0	0	0	0	1	1	1	0
10	0	0	0	0	0	0	0	0	0	1	1	1	0
11	0	0	0	0	0	0	0	0	0	1	1	1	0
12	1	0	0	0	0	0	0	0	0	0	0	1	1

- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1

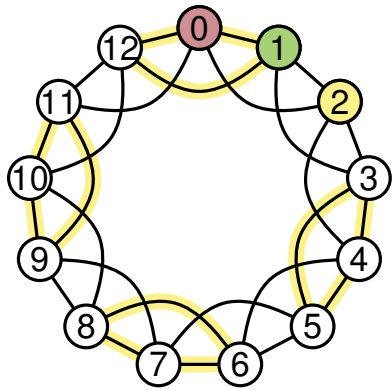
Partitionierbare Graphen – C_{13}^2



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	0	1	1	1	0	0
8	1	0	0	0	0	0	0	0	0	0	0	1	1
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	0	1	1	1	0
12	1	1	0	0	0	0	0	0	0	0	0	0	1

- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2

Partitionierbare Graphen – C_{13}^2

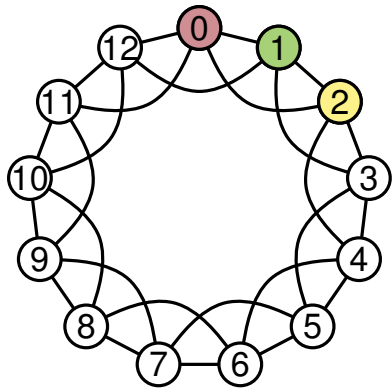


$A =$

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	0	1	1	1	0	0
8	1	0	0	0	0	0	0	0	0	0	0	1	1
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	0	1	1	1	0
12	1	1	0	0	0	0	0	0	0	0	0	0	1

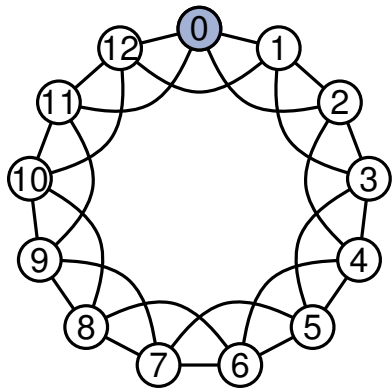
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2

Partitionierbare Graphen – C_{13}^2



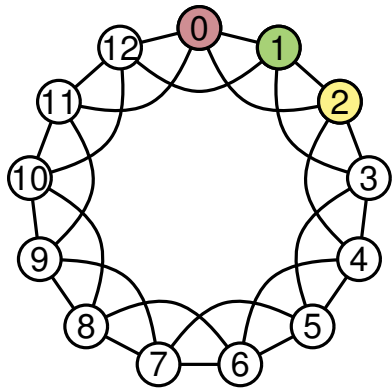
$A =$

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	0	1	1	1	0	0
8	1	0	0	0	0	0	0	0	0	0	0	1	1
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	0	1	1	1	0
12	1	1	0	0	0	0	0	0	0	0	0	0	1



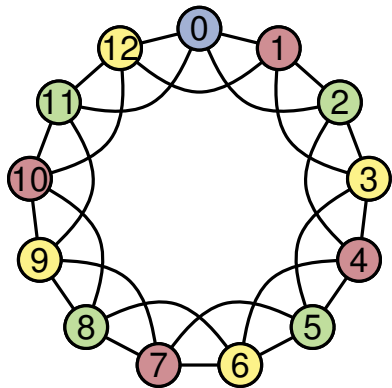
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i

Partitionierbare Graphen – C_{13}^2



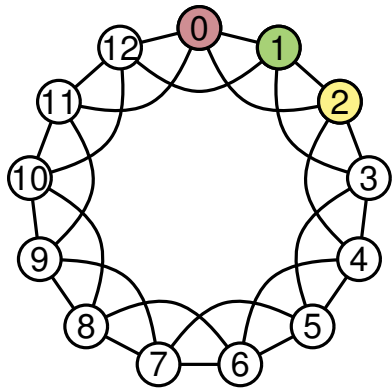
$A =$

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	0	1	1	1	0	0
8	1	0	0	0	0	0	0	0	0	0	0	1	1
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	0	1	1	1	0
12	1	1	0	0	0	0	0	0	0	0	0	0	1



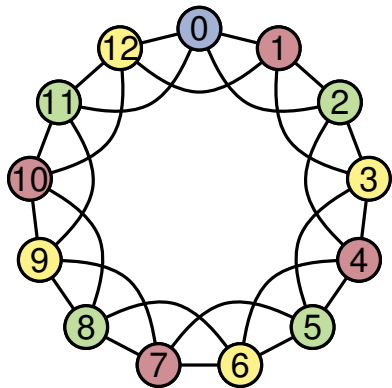
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v

Partitionierbare Graphen – C_{13}^2



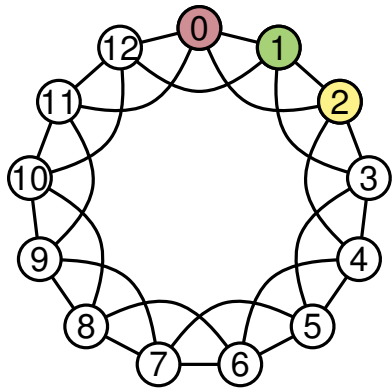
$A =$

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



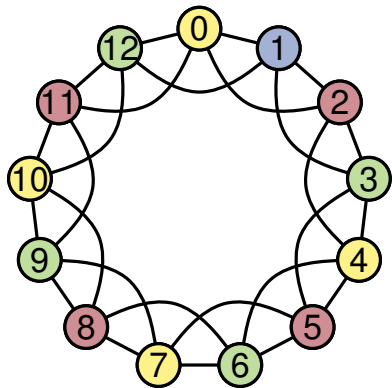
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

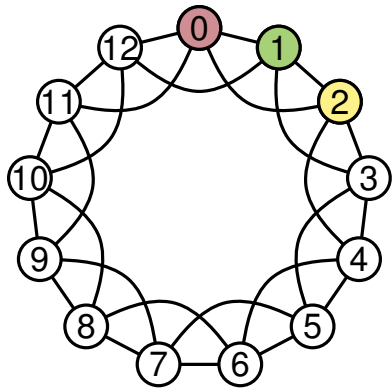
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0

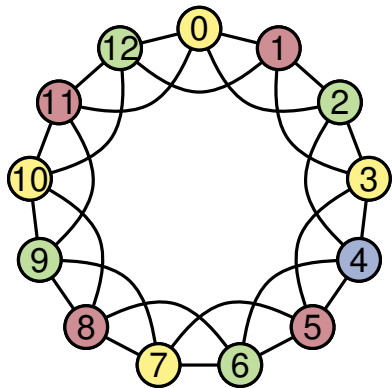
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

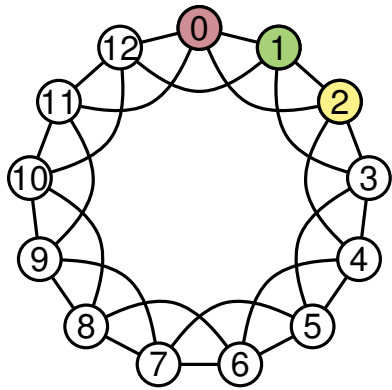
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	0	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0

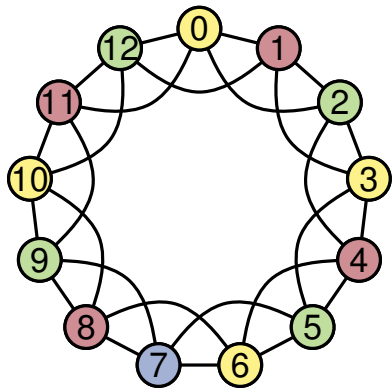
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

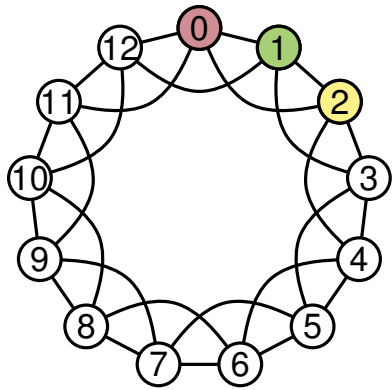
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	0	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0

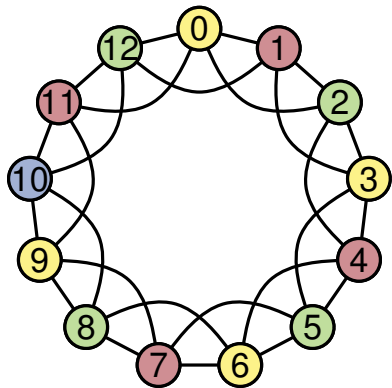
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

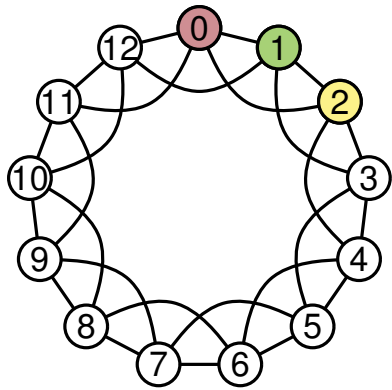
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0

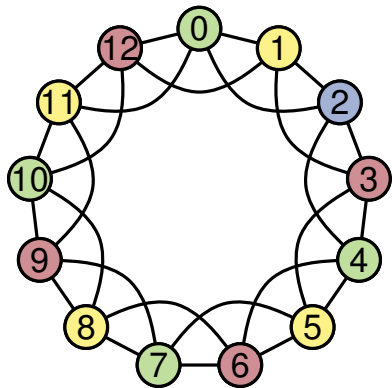
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

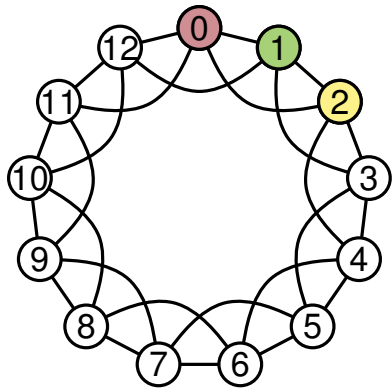
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0

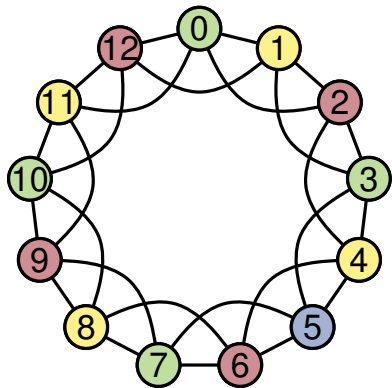
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

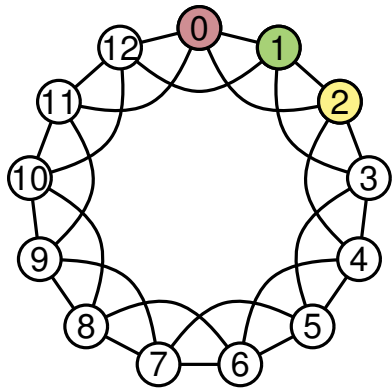
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0

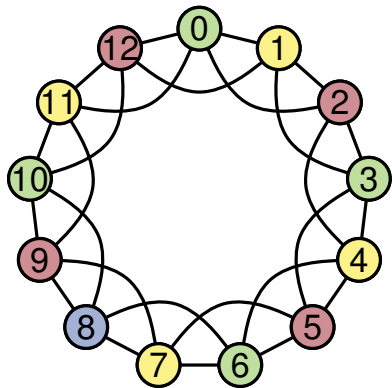
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

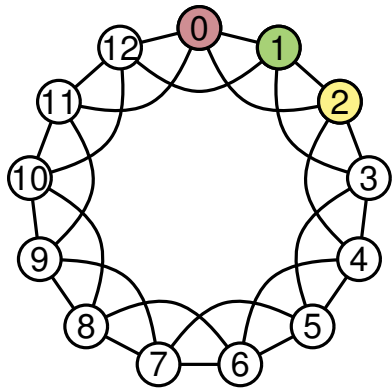
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	1	0

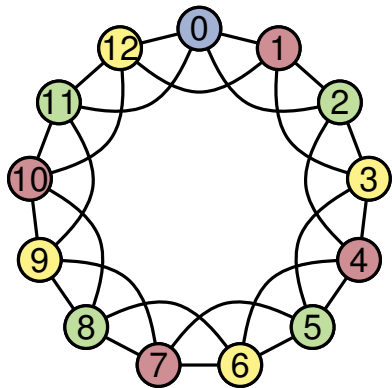
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

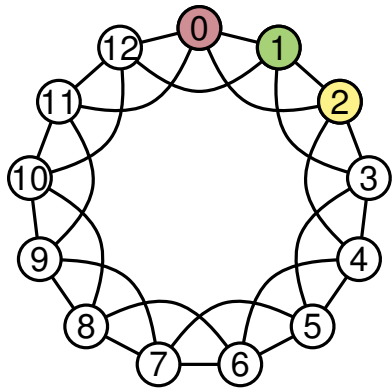
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	1	0
8	0	1	0	0	1	0	0	1	0	0	0	1	0
9	0	1	0	0	1	0	0	1	0	0	0	1	0
10	0	1	0	0	1	0	0	1	0	0	0	1	0
11	0	1	0	0	1	0	0	1	0	0	0	1	0
12	0	1	0	0	1	0	0	1	0	0	0	1	0

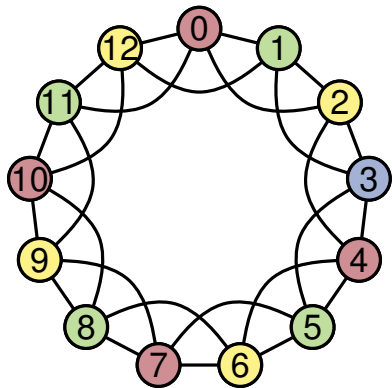
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

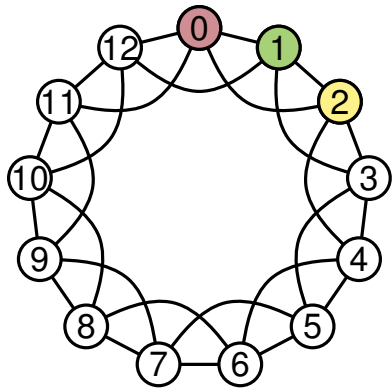
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	1	0
8	0	1	0	0	1	0	0	1	0	0	0	1	0
9	0	1	0	0	1	0	0	1	0	0	0	1	0
10	0	1	0	0	1	0	0	1	0	0	1	0	0
11	0	0	1	0	0	0	1	0	0	1	0	0	1
12	0	0	1	0	0	0	1	0	0	1	0	0	1

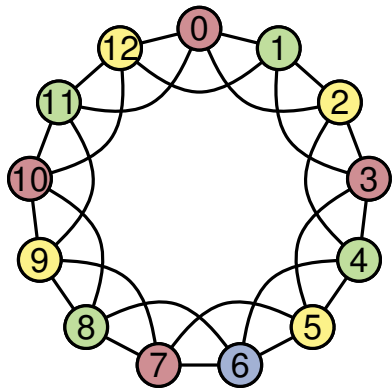
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

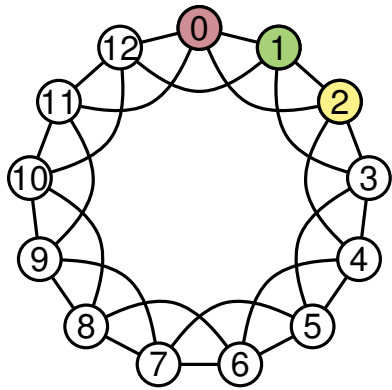
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	1	0
8	0	1	0	0	1	0	0	1	0	0	0	1	0
9	0	1	0	0	1	0	0	1	0	0	1	0	0
10	0	0	1	0	0	0	1	0	0	1	0	0	1
11	0	0	1	0	0	1	0	0	1	0	0	1	0
12	0	0	1	0	0	1	0	0	1	0	0	1	0

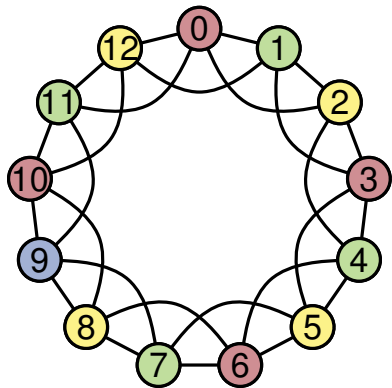
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

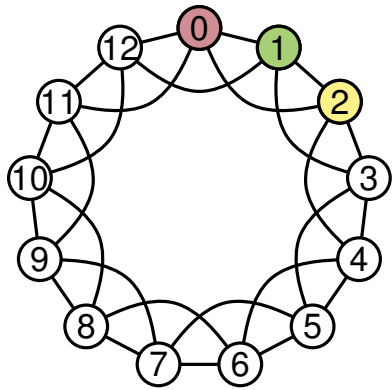
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	1	1	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	1
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	1	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	1	0	0	1	0	0	1	0	0	1	0
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	1	0
8	0	1	0	0	1	0	0	1	0	0	0	1	0
9	0	1	0	0	1	0	0	1	0	0	0	1	0
10	0	1	0	0	1	0	0	1	0	0	1	0	0
11	0	0	1	0	0	0	1	0	0	1	0	0	1
12	0	0	1	0	0	1	0	0	1	0	0	1	0

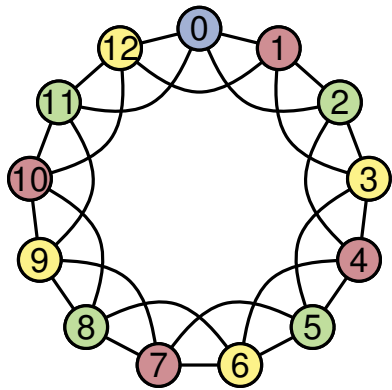
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

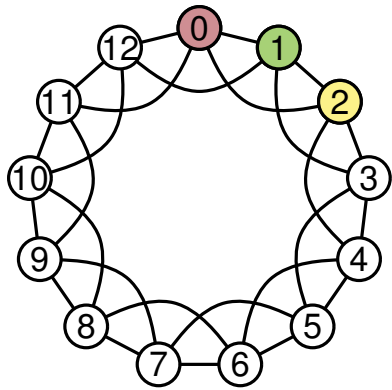
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	1	1	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	1	0
8	0	1	0	0	1	0	0	1	0	0	0	1	0
9	0	1	0	0	1	0	0	1	0	0	0	1	0
10	0	1	0	0	1	0	0	1	0	0	0	1	0
11	0	0	1	0	0	0	1	0	0	1	0	0	1
12	0	0	1	0	0	1	0	0	1	0	0	1	0

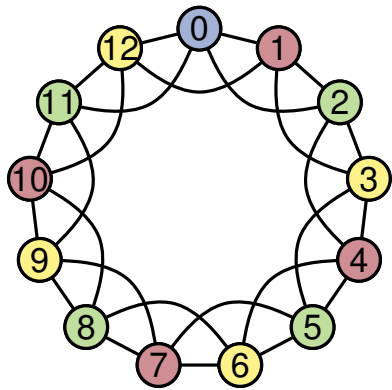
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1

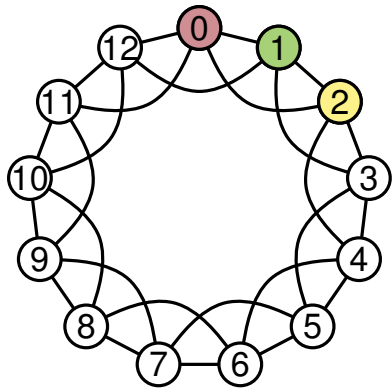


$B =$

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	1	0
8	0	1	0	0	1	0	0	1	0	0	0	1	0
9	0	1	0	0	1	0	0	1	0	0	1	0	0
10	0	1	0	0	1	0	0	1	0	0	1	0	0
11	0	0	1	0	0	0	1	0	0	1	0	0	1
12	0	0	1	0	0	1	0	0	1	0	0	1	0

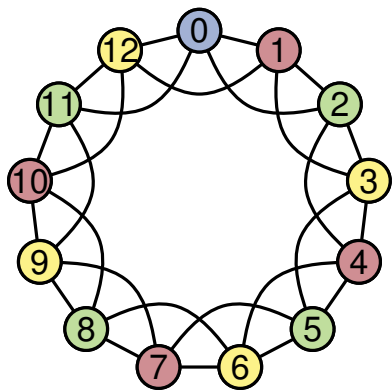
- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Partitionierbare Graphen – C_{13}^2



$A =$

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	0
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	0	1	1



$B =$

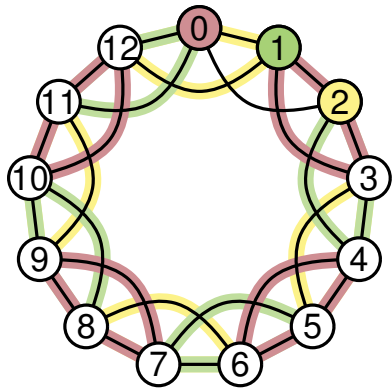
	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	1	0
8	0	1	0	0	1	0	0	1	0	0	1	0	0
9	0	1	0	0	1	0	0	1	0	0	1	0	0
10	0	0	1	0	0	0	1	0	0	1	0	0	1
11	0	0	1	0	0	1	0	0	0	1	0	0	1
12	0	0	1	0	0	1	0	0	1	0	0	1	0

- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Eigenschaften von A und B

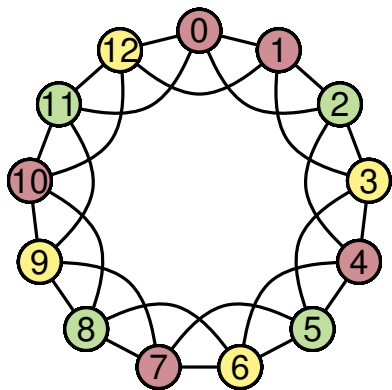
- Zeilen-/Spaltensumme von A ist $\omega (= 3)$
- Zeilen-/Spaltensumme von B ist $\alpha (= 4)$
- $AB^T = J - I = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

Partitionierbare Graphen – C_{13}^2



$A =$

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	1	1	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	1	1	1
5	0	0	1	1	1	0	0	0	0	0	0	0	0
6	0	0	0	0	0	1	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0	1	1	1	0	0	0
8	1	0	0	0	0	0	0	0	0	0	1	1	1
9	0	0	0	1	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	1	1	1	0	0
12	1	1	0	0	0	0	0	0	0	0	1	1	1



$B =$

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	1	0	0	1	0	0	1	0	0	1
1	1	0	0	0	1	0	0	1	0	0	1	0	0
2	1	0	0	1	0	0	0	1	0	0	1	0	0
3	1	0	0	1	0	0	1	0	0	0	1	0	0
4	1	0	0	1	0	0	1	0	0	1	0	0	0
5	0	1	0	0	0	1	0	0	1	0	0	1	0
6	0	1	0	0	1	0	0	0	1	0	0	1	0
7	0	1	0	0	1	0	0	1	0	0	0	1	0
8	0	1	0	0	1	0	0	1	0	0	0	1	0
9	0	1	0	0	1	0	0	1	0	0	1	0	0
10	0	0	1	0	0	0	1	0	0	1	0	0	1
11	0	0	1	0	0	1	0	0	0	1	0	0	1
12	0	0	1	0	0	1	0	0	1	0	0	1	0

- wähle maximale Clique $\{0, 1, 2\}$
- wähle minimales Clique-Cover ohne Knoten 0
- wähle minimales Clique-Cover ohne Knoten 1
- wähle minimales Clique-Cover ohne Knoten 2
- lösche einen Knoten v aus Clique K_i
- wähle minimale Färbung ohne Knoten v
- wähle unabhängige Menge die keinen Knoten aus K_i enthält

Eigenschaften von A und B

- Zeilen-/Spaltensumme von A ist ω ($= 3$)
- Zeilen-/Spaltensumme von B ist α ($= 4$)
- $AB^T = J - I = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$