Project 1.1
Block 1.2

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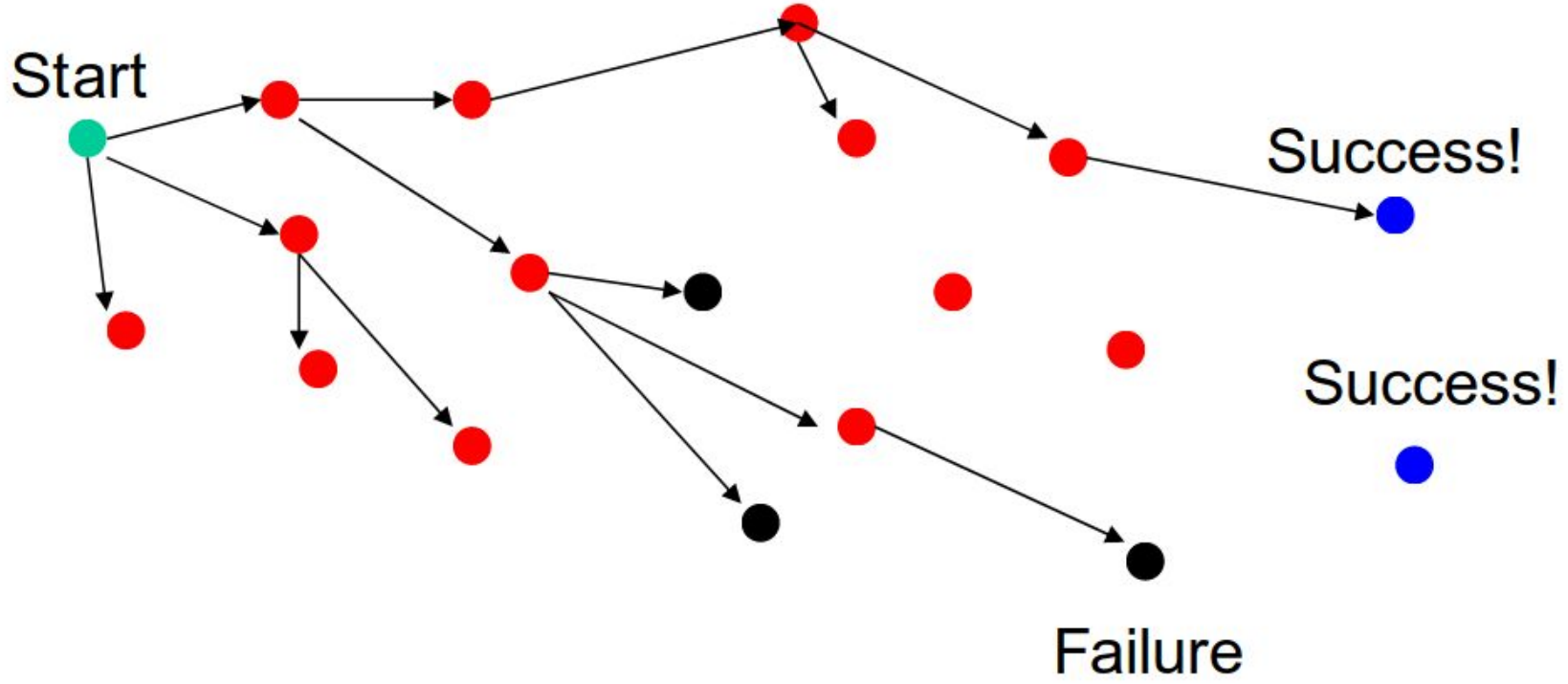
Contents

Problem statement

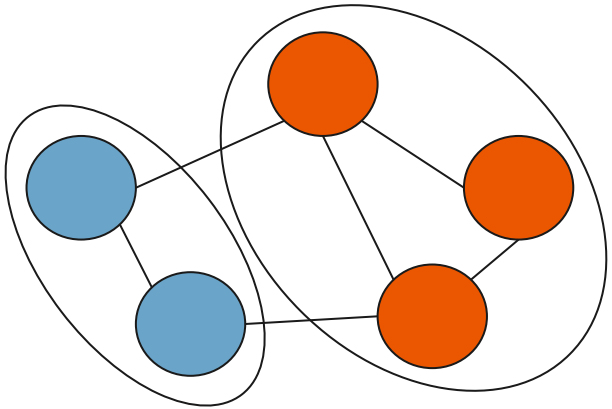
In Block 1.2 we're required to build a computer application with a user-friendly interface to play a simple game based on computation of chromatic number.

"Add interfaces screenshots"

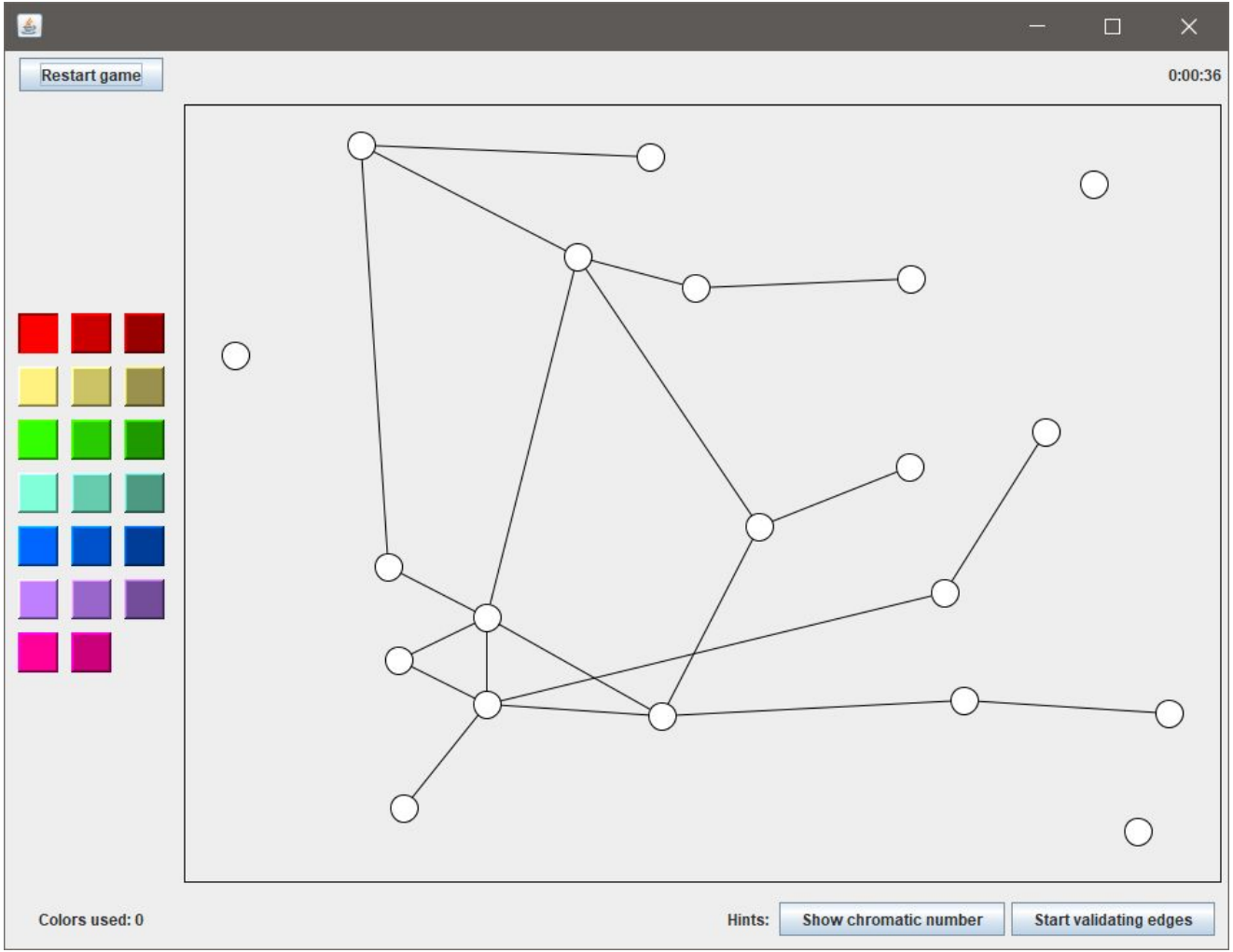
Exact algorithm - Backtracking

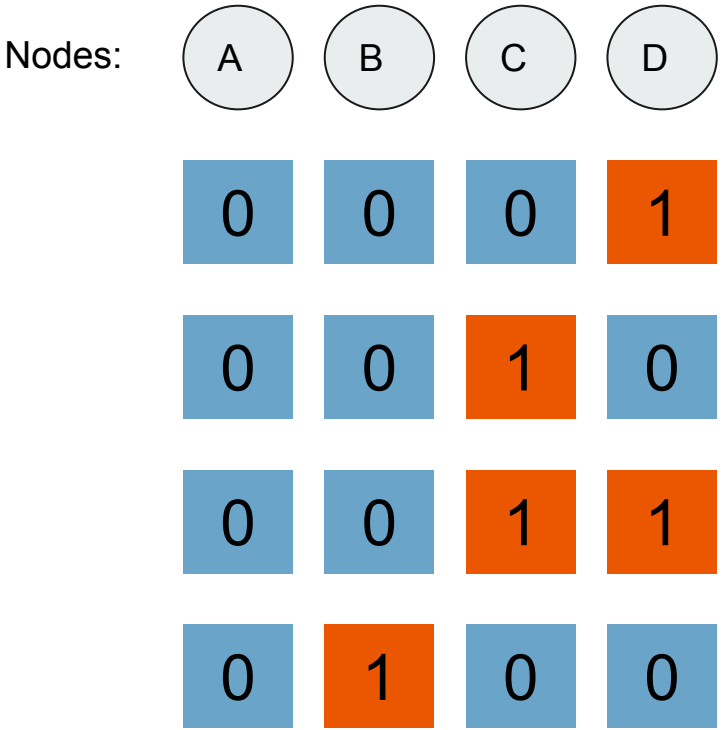


Graph Generation



Randomly Filling
Adjacency Matrix


Restart game
0:00:36
Colors used: 0
Hints:
Show chromatic number
Start validating edges



Counting in Binary as Set Partitioning

Graph visualisation

For any graph:
$\chi(G) \leq \Delta(G) + 1$

GRAPH NO	NODES NO	χ(G)	Δ(G) + 1
1	68	8	13
2	40	11	12
3	60	3	22
4	75	11	54
5	51	4	4
6	866	54	503
7	81	9	21
8	92	3	5
9	30	16	30
10	40	6	16
11	60	23	54
12	208	8	13
13	31	30	31
14	80	5	15
15	17	5	7
16	55	12	25
17	10	3	4
18	194	8	96
19	190	32	157
20	42	5	7

Game modes

1) To the bitter end:

- Chromatic number
- As quickly as possible
- No limit of time

Game modes

2) Best upper bound:

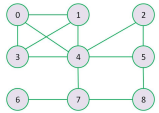
- As few colors as possible
- Limit of time
- Difficulty based on chromatic number and number of vertices

Game modes

2) :

- As few colors as possible
- Limit of time
- Difficulty based on chromatic number and number of vertices

Game modes

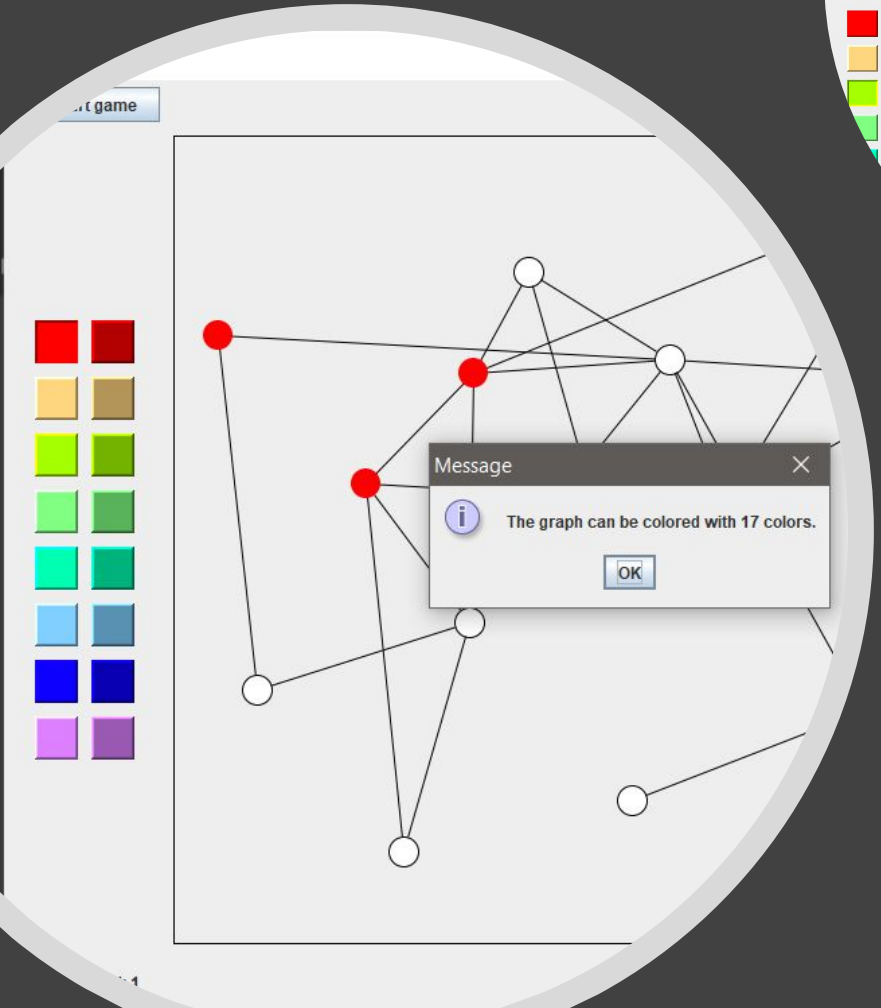


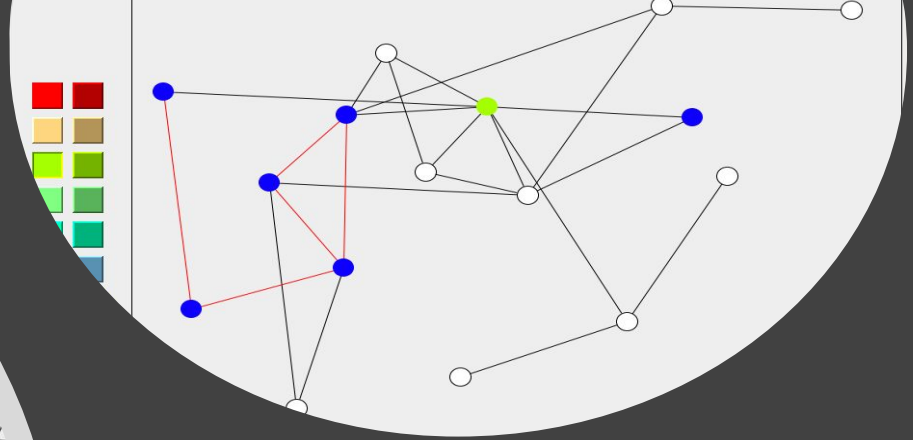
1) To the bitter end:

- Chromatic number
- As quickly as possible
- No limit of time

2) Best upper bound:

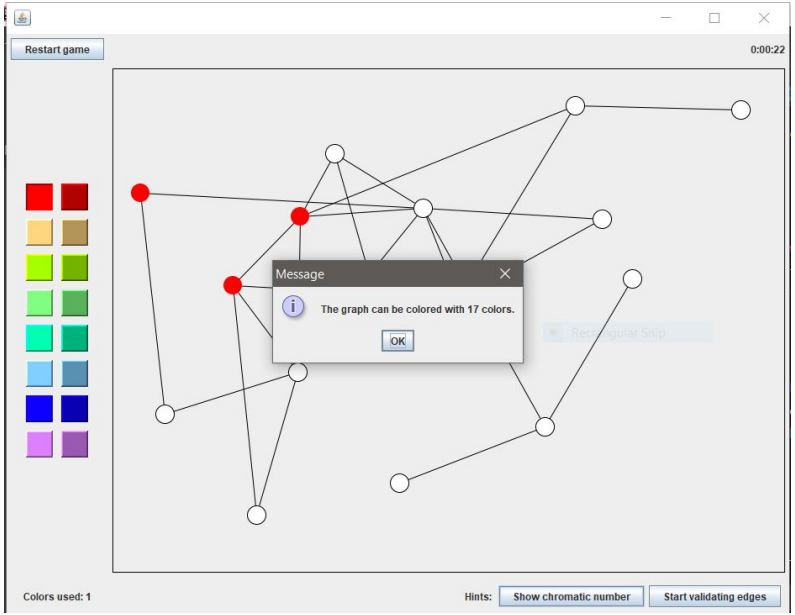
- As few colors as possible
- Limit of time



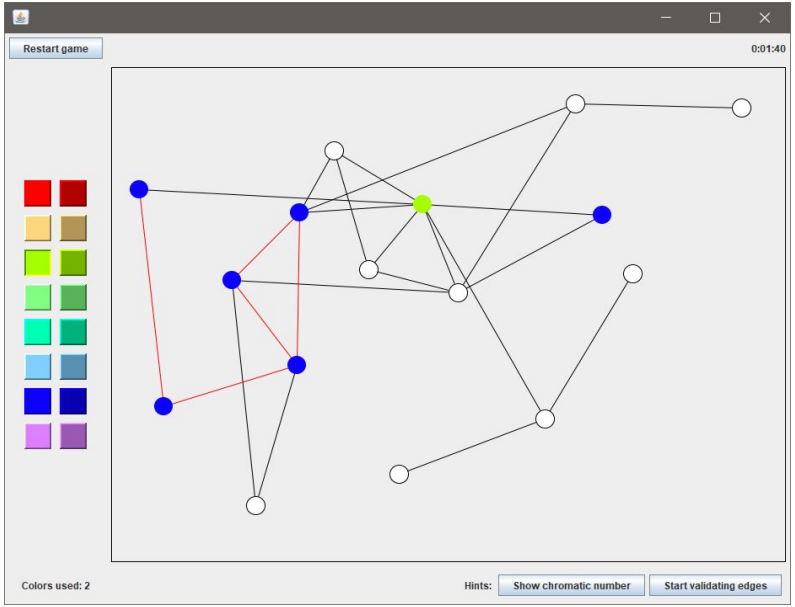


Hints-Function

Chromatic number

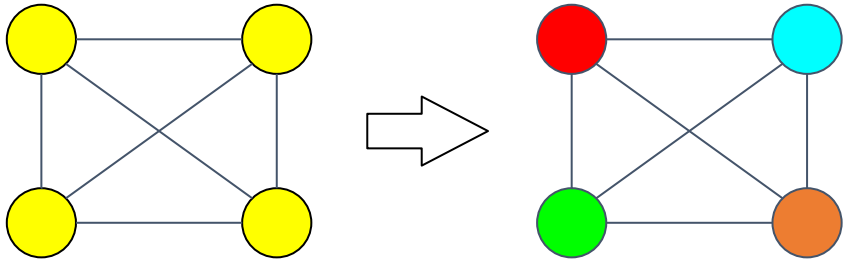


Validating edges

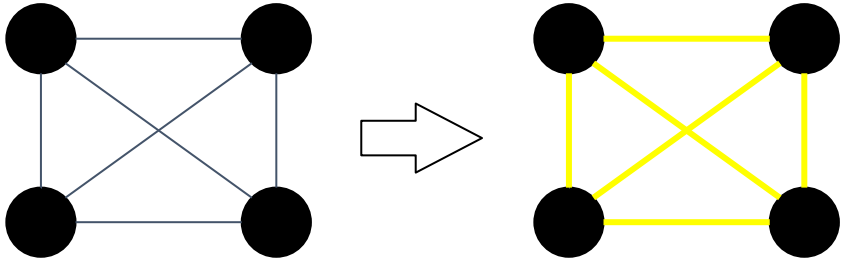


Yet to be implemented hints

- Maximum clique



- Highlight all connected edges



- Color random node

Demonstration of the game

Conclusion + Sources

1. Research :
    a.
2.
    a.

Any questions?