Every Reconfiguration Starts with a First Step

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1 Our instance for (graph#10) track

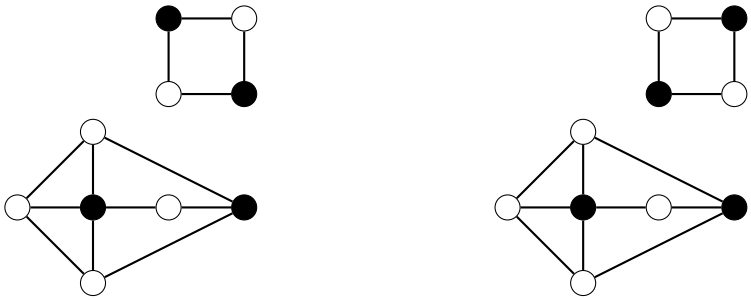
- A completely handcrafted instance, as shown in Figure 1. Our graph has two parts: the C_4 part above and the "kite" part below.
- The only difference between the initial and the target solutions is the two tokens on the C_4. However, these tokens interfere with each other, so they cannot be changed directly on the C_4 alone. Therefore, first, we need to move one of these tokens onto the kite, using four steps. (See Figure 2.)
- After reconfiguring the tokens on the C_4, we need to replay the previous step in reverse to restore the tokens on the kite, so the reconfiguration takes a total of nine steps.

2 Our instance for (graph#50) track

- Our instance is shown in Figure 3. It contains 50 vertices and 263 edges.
- We use the same idea as in our previous paper: Akira Suzuki, Amer E. Mouawad and Naomi Nishimura, Reconfiguration of dominating sets, Journal of Combinatorial Optimization 32(4), pp. 1182–1195, 2016.
- The only difference between the initial and the target solutions is the top right two tokens of Figure 3.
- However, 643 steps are required before and after reconfiguring these two tokens. Then the total reconfiguration takes 1,289 steps.

3 Our instance for (graph#100) track

- Our instance is shown in Figure 4. It contains 100 vertices and 637 edges.
- The idea is the same as (graph#50): While the only difference between the initial and the target solutions is the top left two tokens of Figure 4, the total reconfiguration takes 288,677 steps.



(a) (b)

Figure 1: Our instance for (graph#10) track, (a) the initial independent set, and (b) the target independent set.

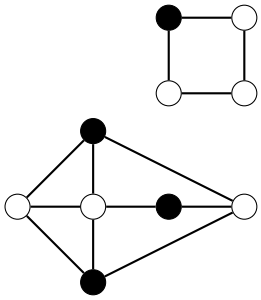
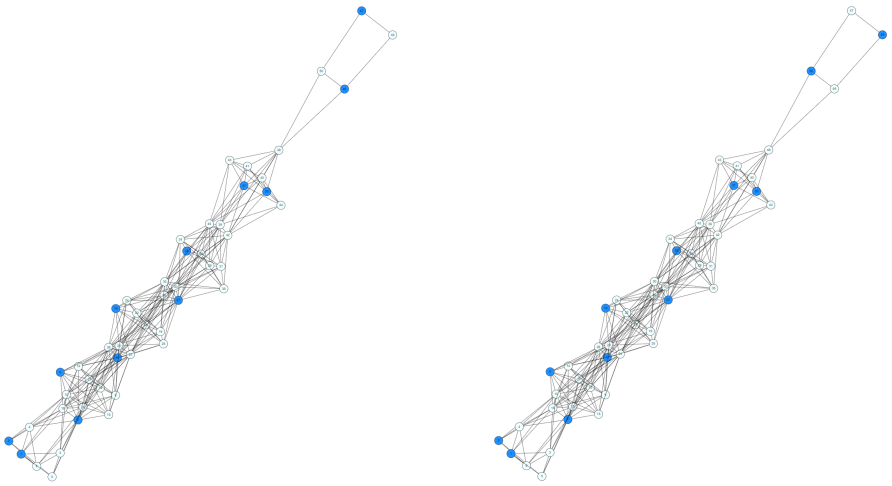
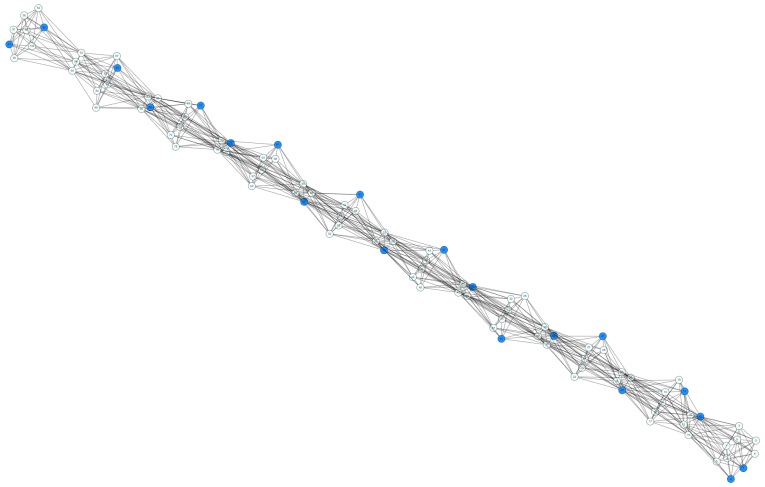


Figure 2: The independent set of four steps after the initial solution. Since there are three tokens on the kite, we can move the token on the C_4.

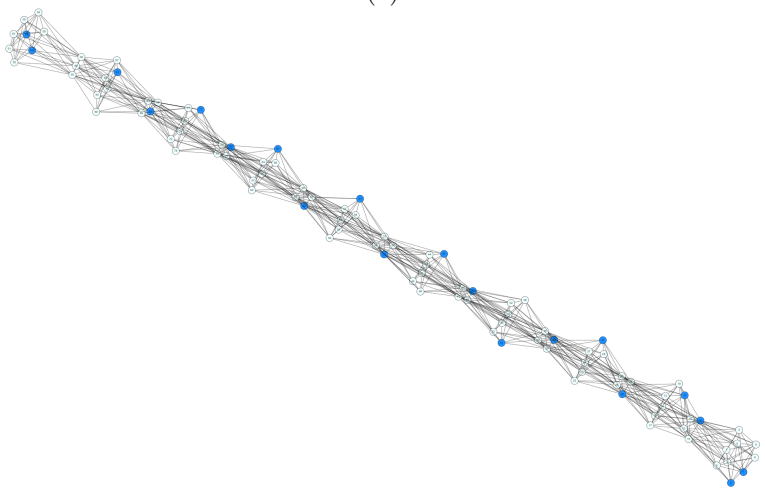


(a) (b)

Figure 3: Our instance for (graph#50) track, (a) the initial independent set, and (b) the target independent set.



(a)



(b)

Figure 4: Our instance for (graph#100) track, (a) the initial independent set, and (b) the target independent set.