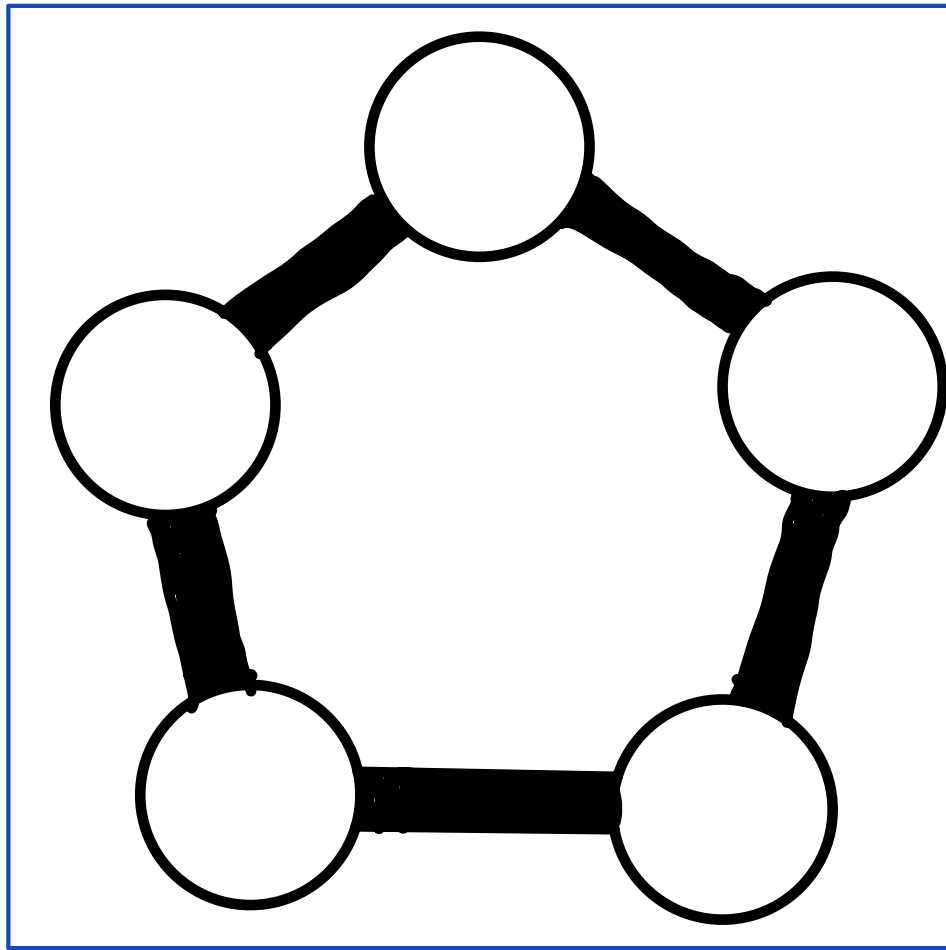
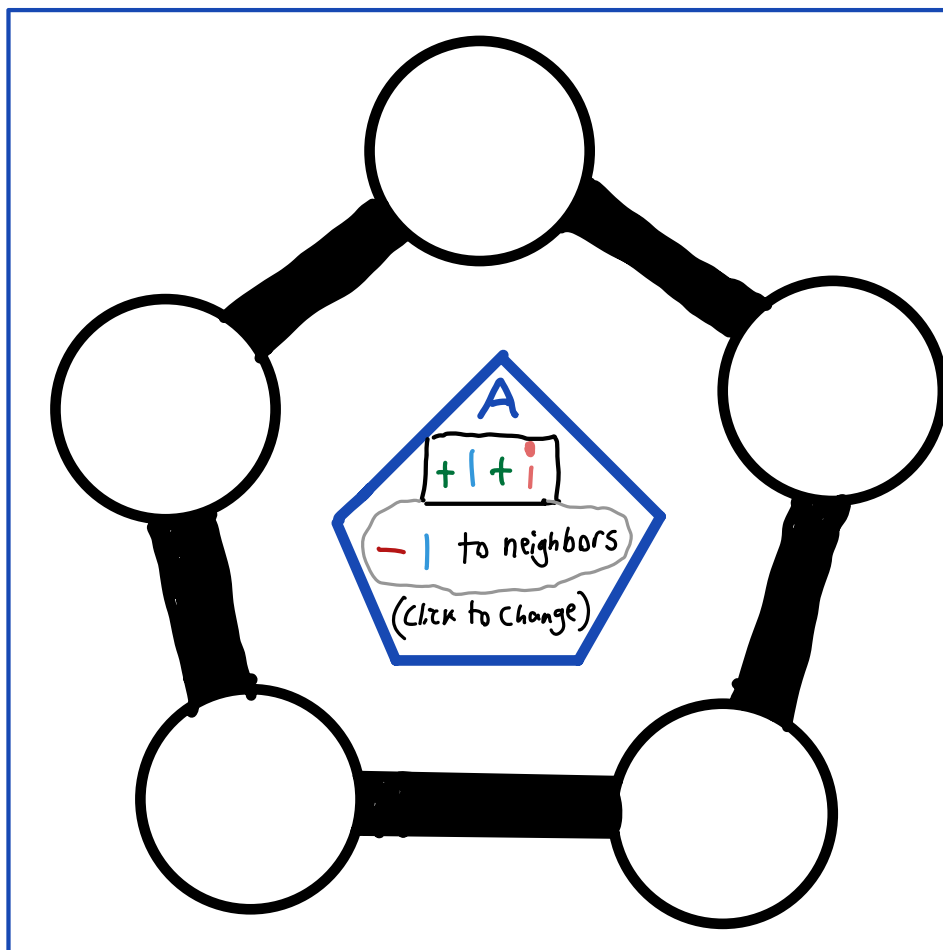


## Pentagon Should Fill Screen

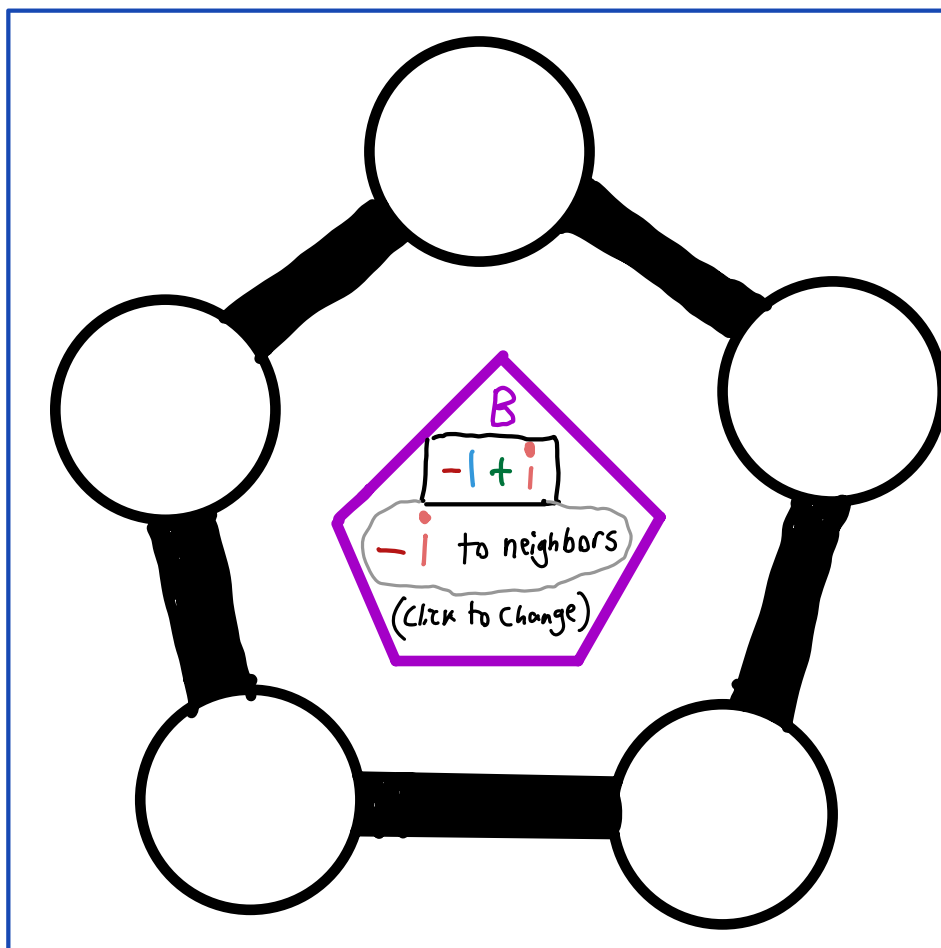
I think the Star in the middle is a bit misleading, since vertex firings only impact neighbors.

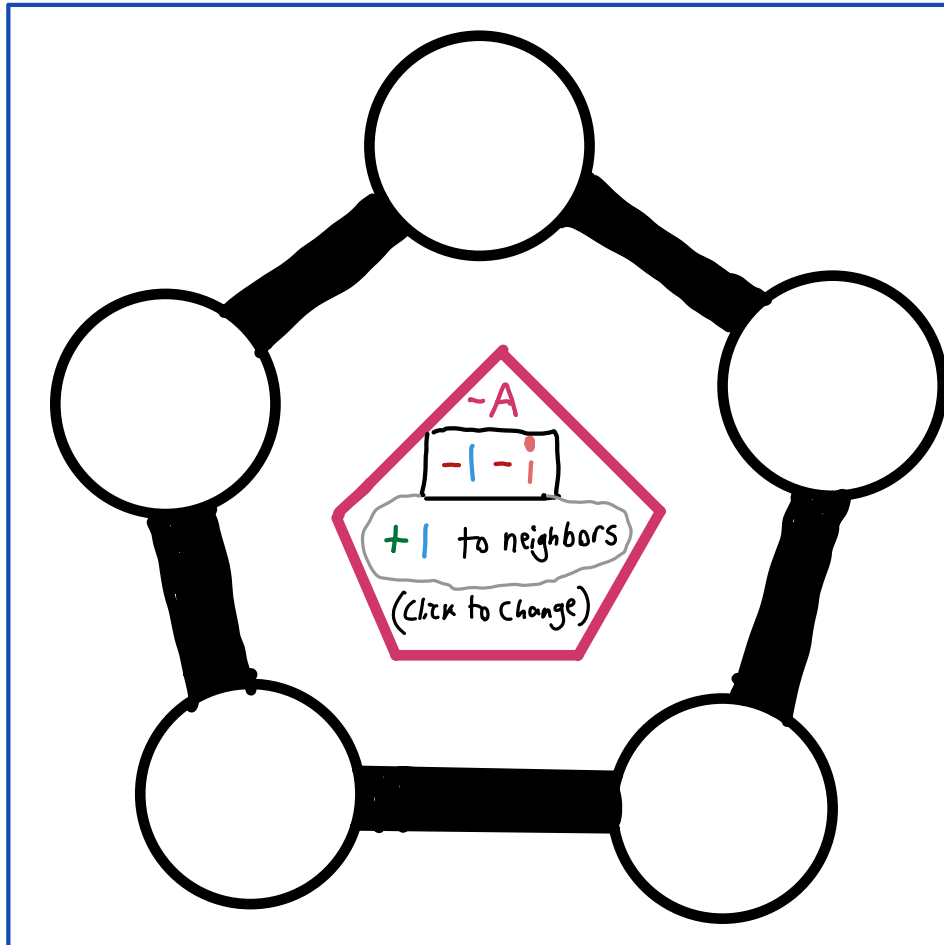


What if the rule was in the middle?

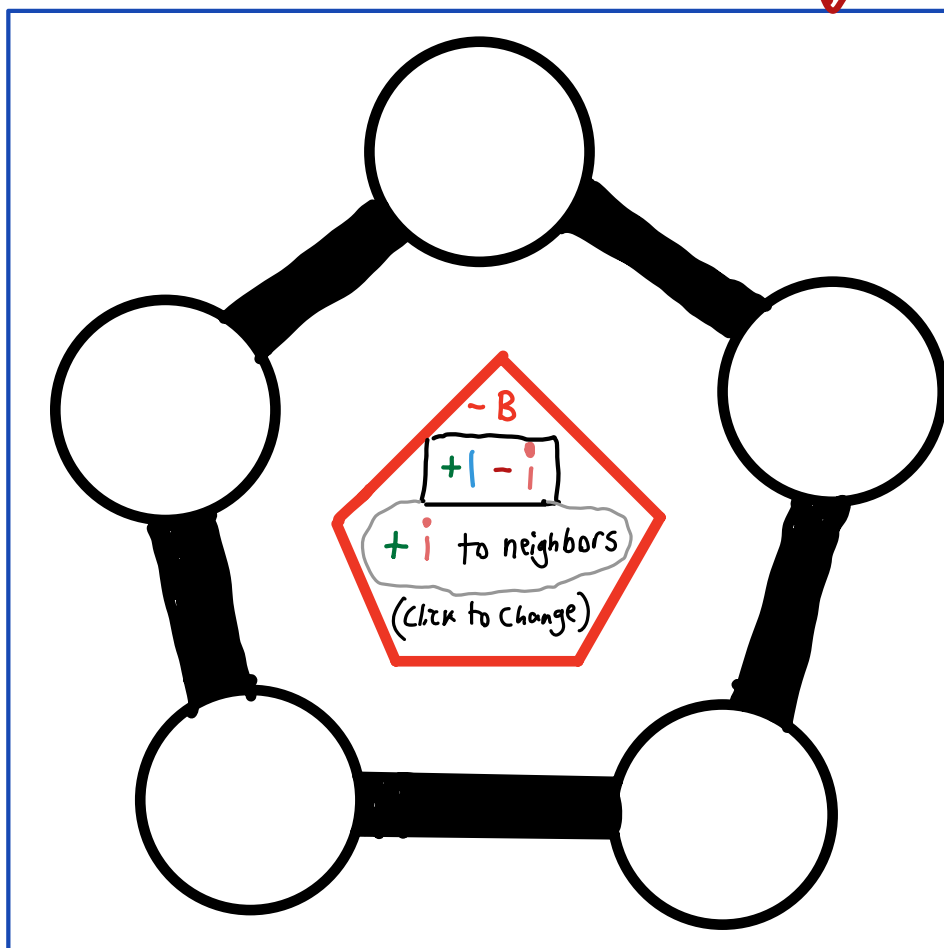


↓ After middle click ↓



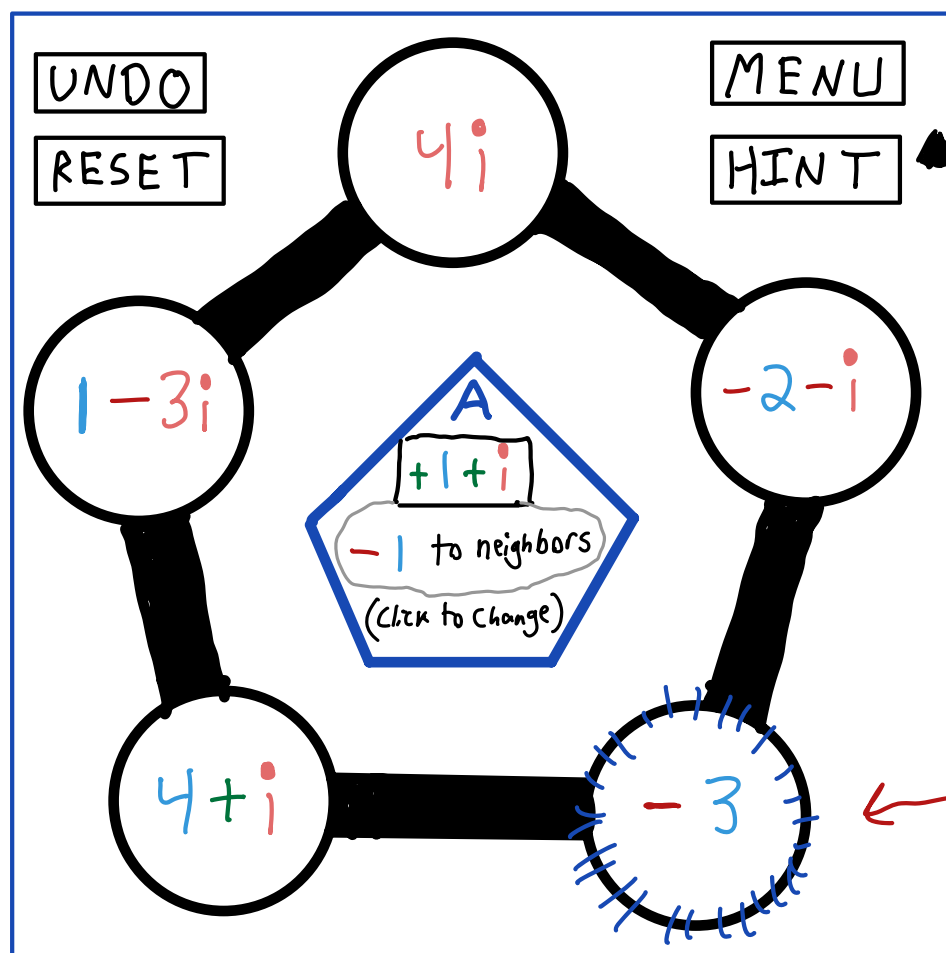


↓ After middle click ↓



we can use colors to make the difference between real and complex more evident.

I'm undecided whether 0 should be included or not (e.g.  $0+4i$  and  $-3+0i$  in this example)

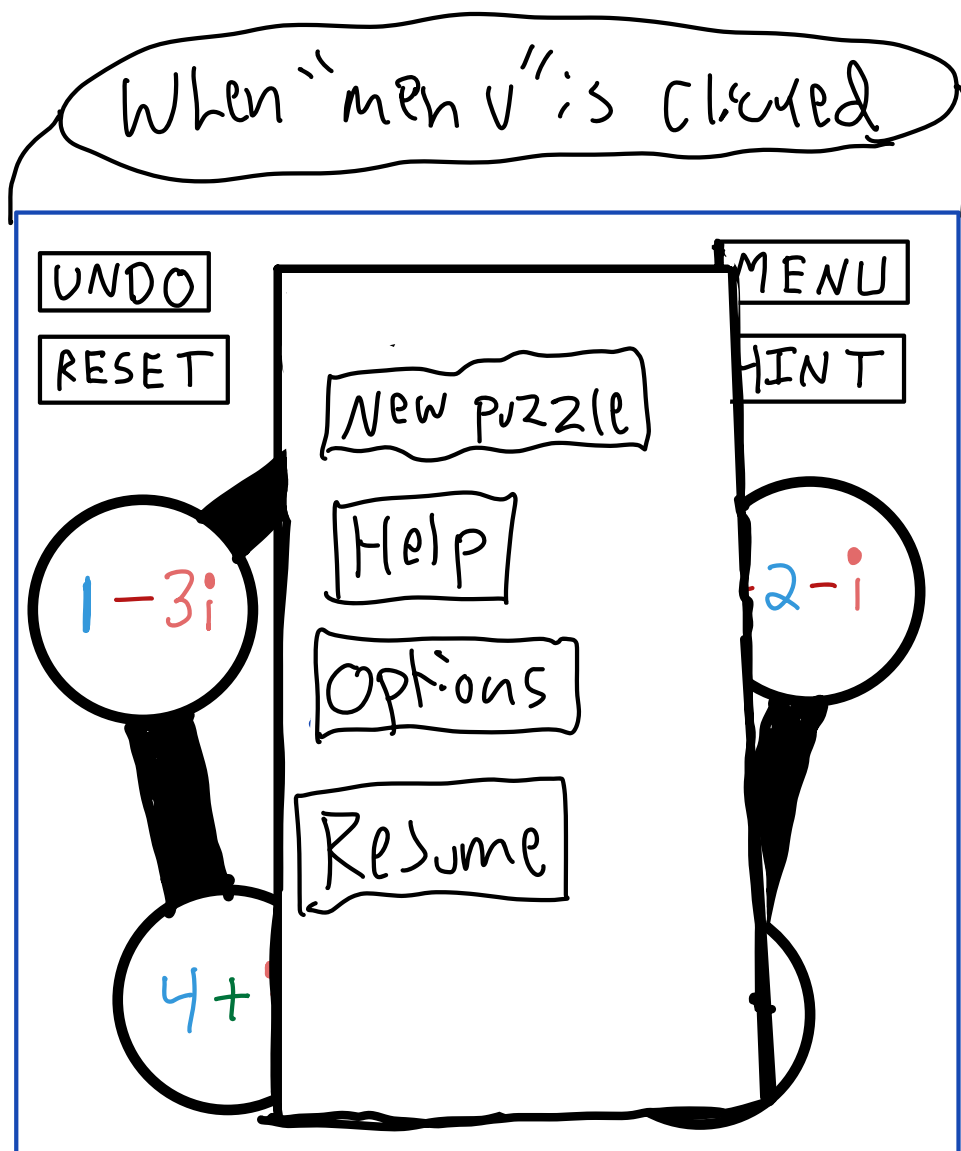


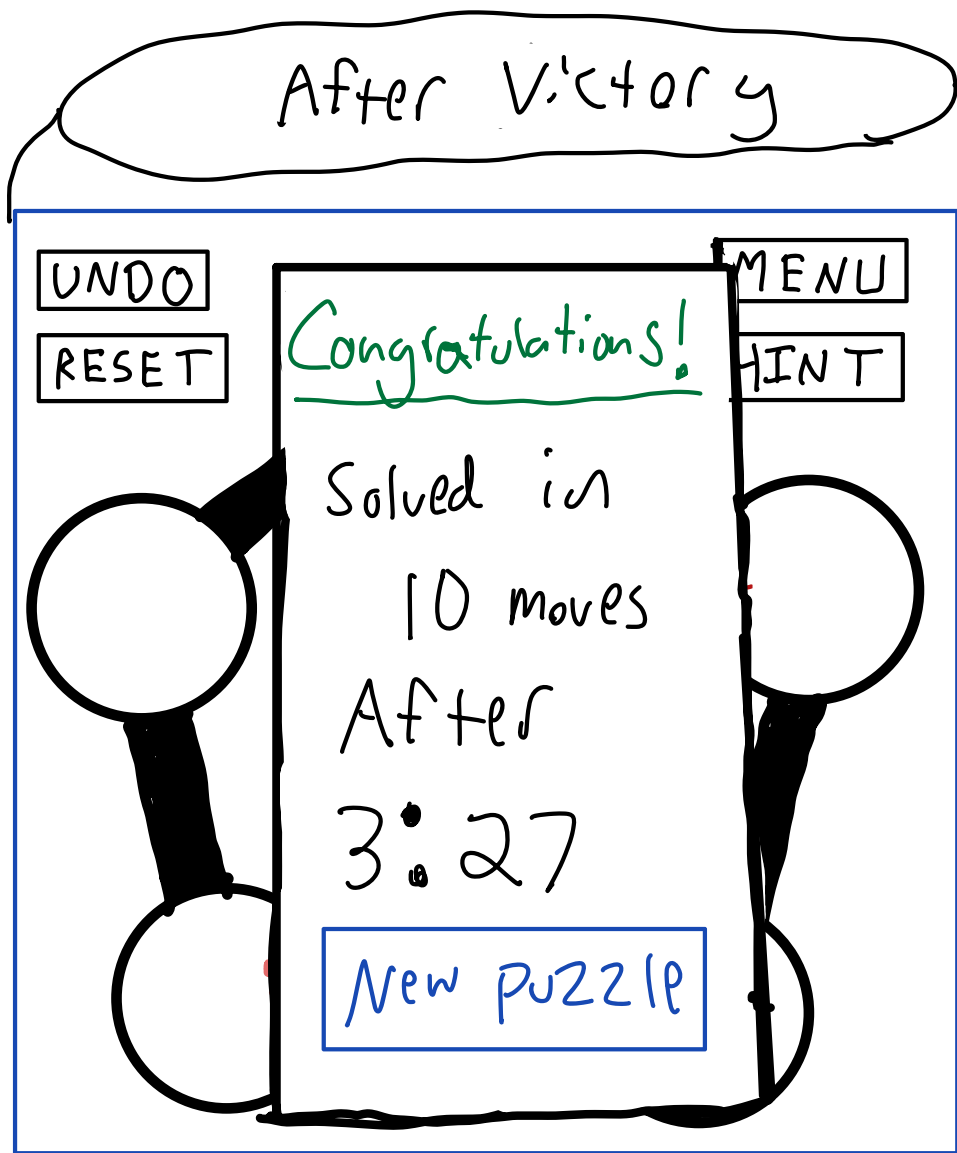
If clicked, highlights a node if clicking one with the current rule is useful. If not, highlights the center. No words necessary, just a little halo.

- Right clicking a vertex will still subtract instead of adding, and right clicking the center will negate the rule (same as 2 left clicks)
- There should also be a keyboard shortcut to left click the center

## How big can the numbers get?

- We can let them get arbitrarily large, but this could get ugly on UI
- We could work in  $\mathbb{Z}_6$  and say that  $0-1=5$ , but this could be confusing for the player.
- A medium solution would be to have some multiple of 6 loop back to 0 (like  $60=0=-60$ )





- All puzzles should take the same number of moves (a number that can be set in "options").
- This can be guaranteed by never applying both  $A$  and  $-A$  or both  $B$  and  $-B$  to the same vertex.

- One way to create a puzzle is to take

$$\begin{bmatrix} 1+i & -1 & 0 & 0 & -1 \\ -1 & 1+i & -1 & 0 & 0 \\ 0 & -1 & 1+i & -1 & 0 \\ 0 & 0 & -1 & 1+i & -1 \\ -1 & 0 & 0 & -1 & 1+i \end{bmatrix} \cdot \begin{bmatrix} a_1 + b_1 i \\ a_2 + b_2 i \\ a_3 + b_3 i \\ a_4 + b_4 i \\ a_5 + b_5 i \end{bmatrix}$$

where  $\sum_{k=1}^5 |a_k| + |b_k|$  is a fixed value

(this sum is the minimum moves to solve).