Knuth Morris Pratt (KMP)

http://bit.ly/VTProgKMP

What is the KMP algorithm?

The KMP algorithm is an algorithm used for searching for a target word in a larger text string.

Why not indexOf()?

Doesn’t String.indexOf() do the same thing? It does, however it is a $O(N^2)$ method. Let’s look at why that is.

Where are the inefficiencies?

The major inefficiency is that we don’t take into account how much we have matched in our target string already, or any information about the string we are searching through.

Remedying the issues

To remedy this issue we can look at this problem as a series of states of partial matches, which we traverse through.

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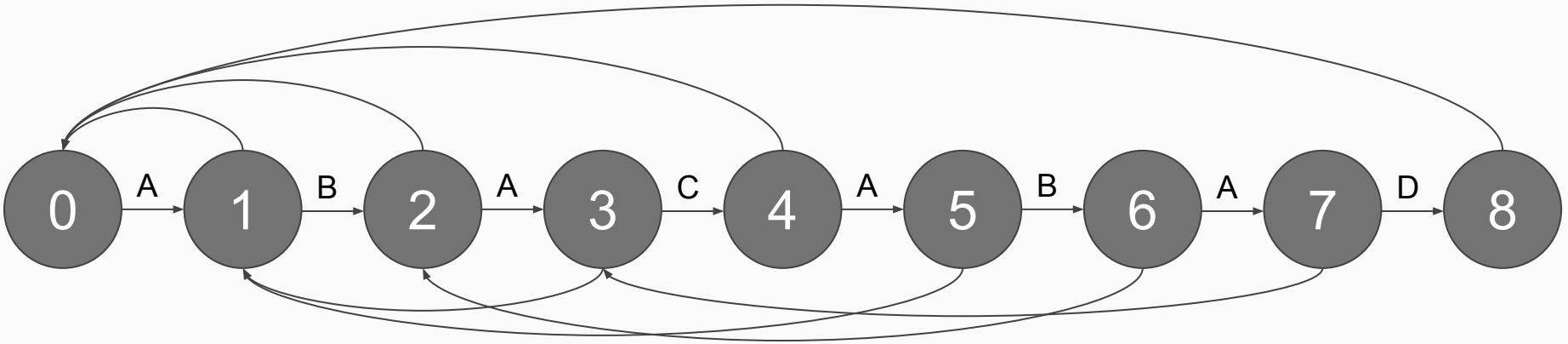

Target: ABACABAD

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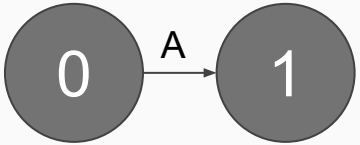

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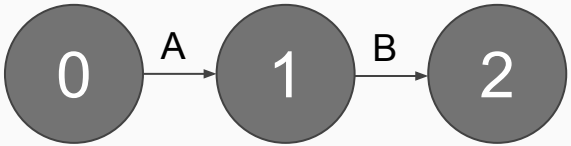

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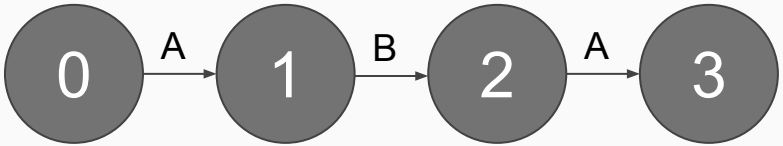

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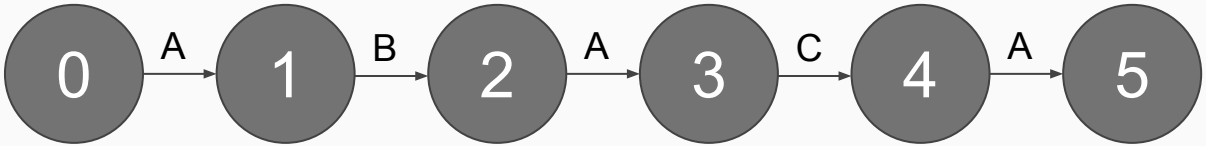

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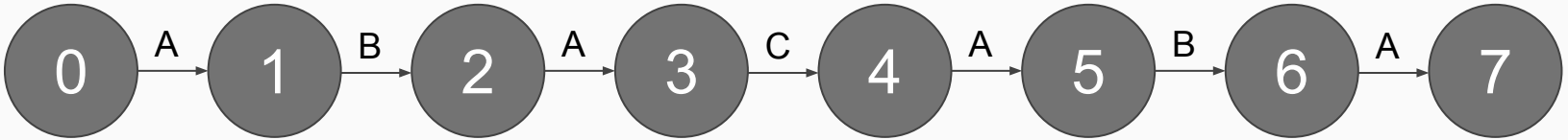

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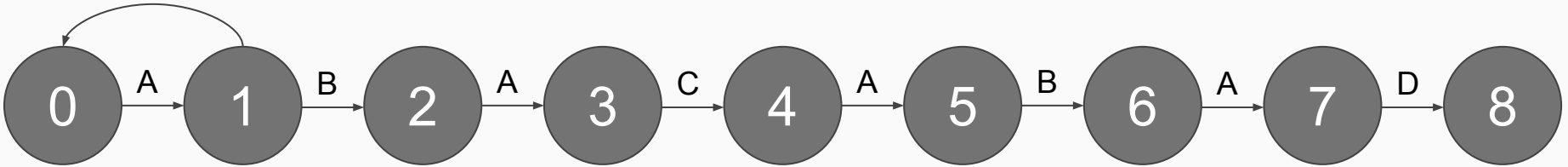

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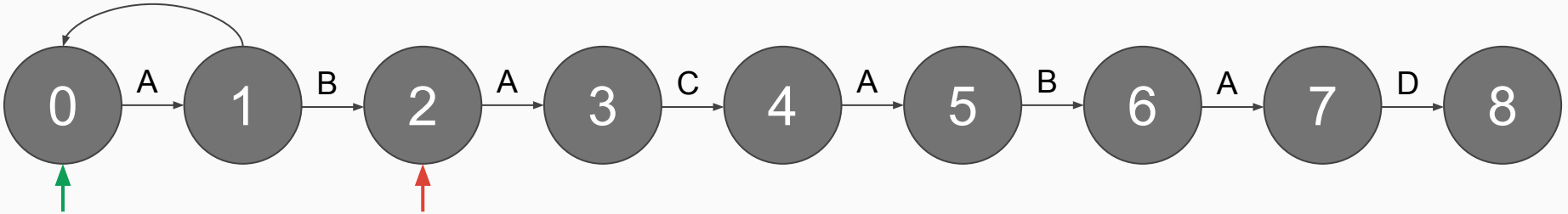

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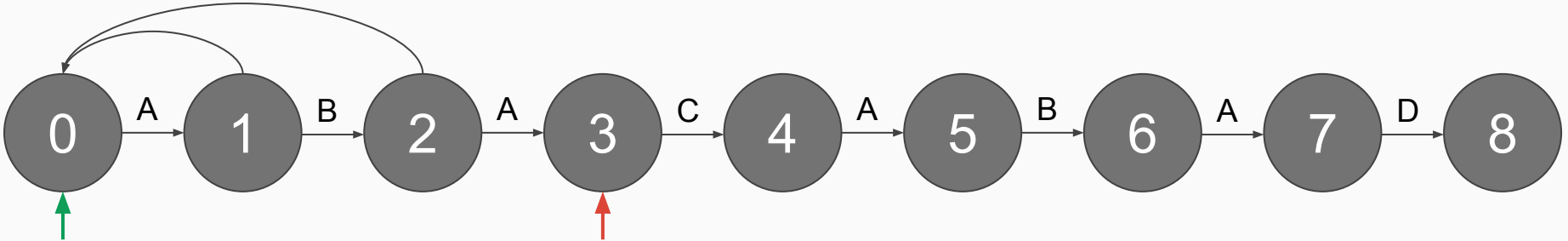

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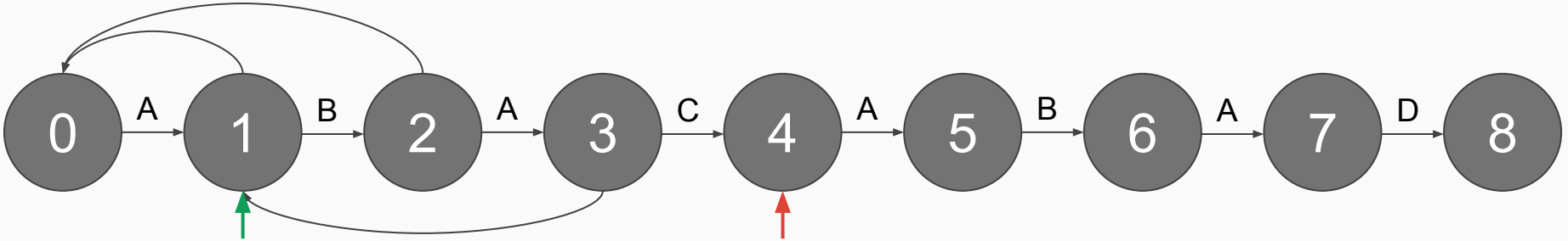

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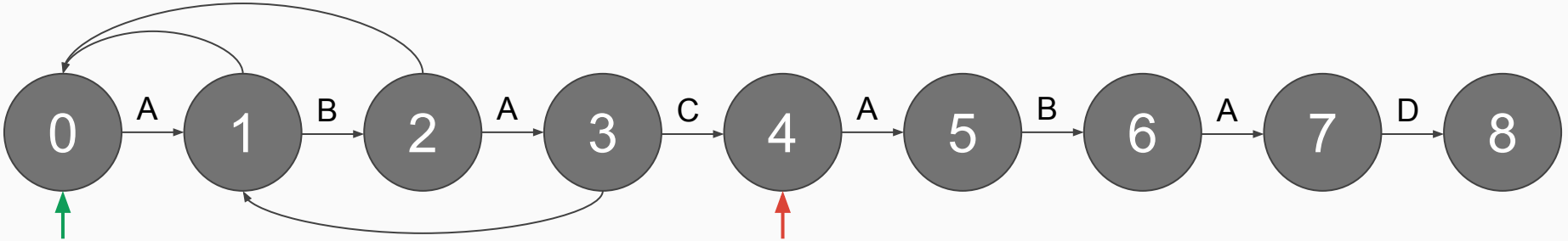

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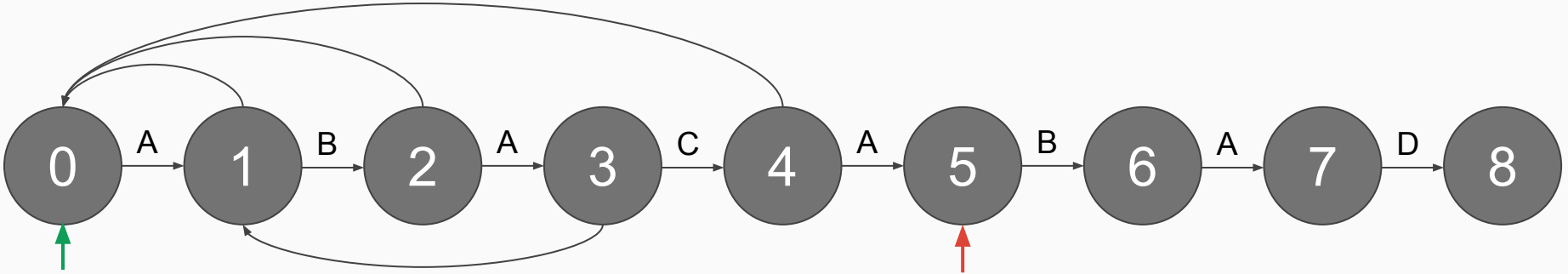

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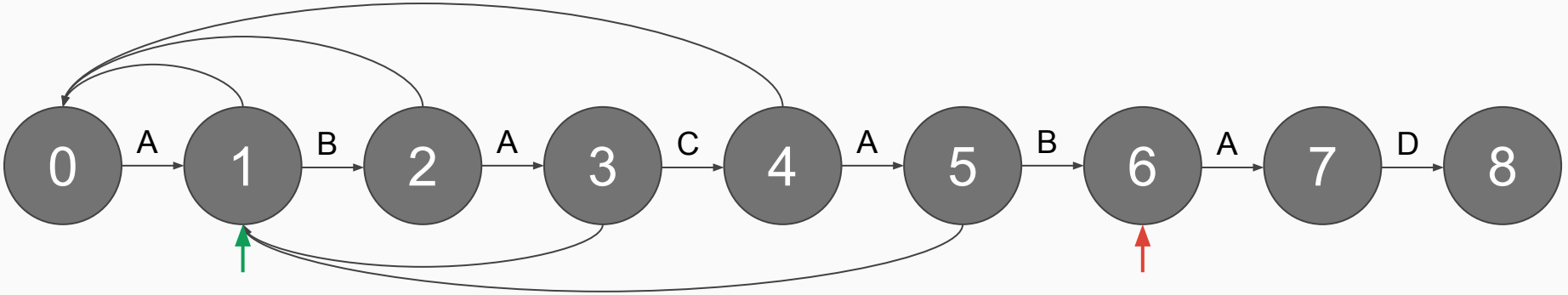

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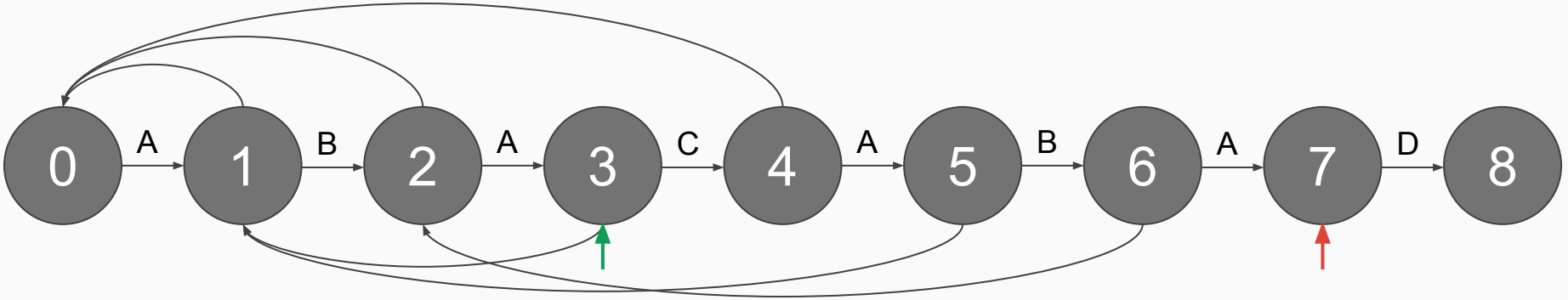

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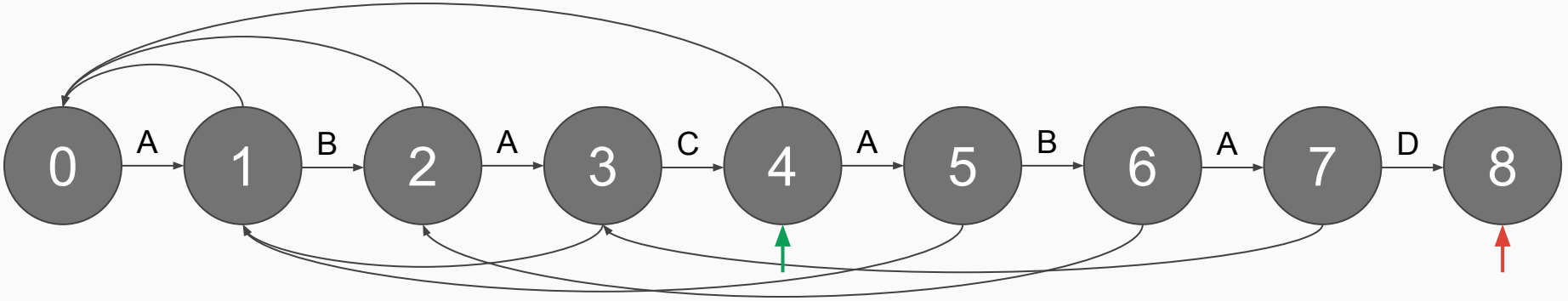

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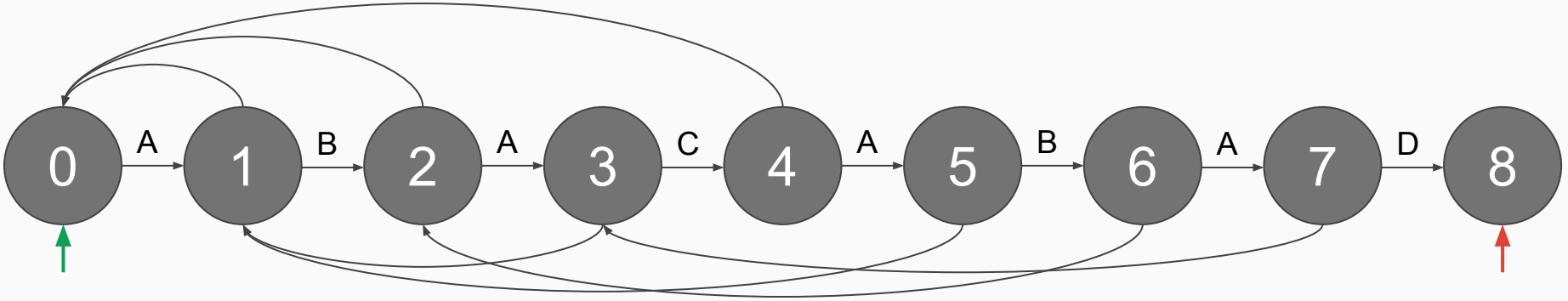

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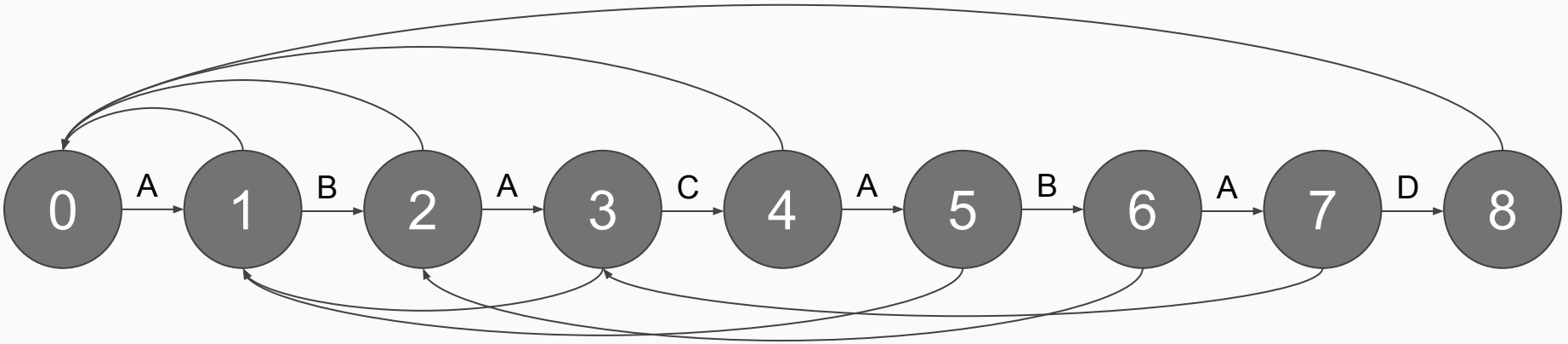

Search Method

Once we have this table built it is simply a matter of going through our search string and properly using the character to proceed through our state diagram.

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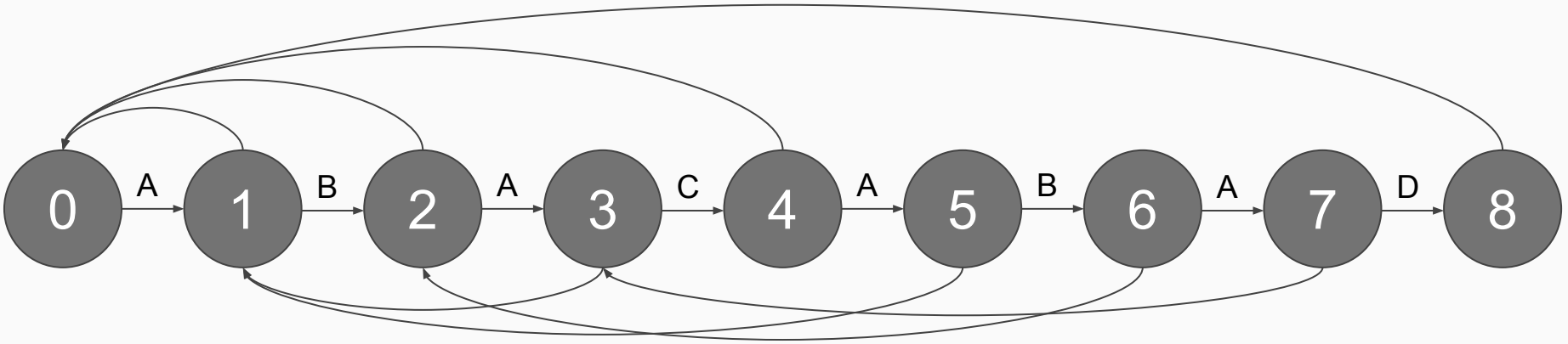

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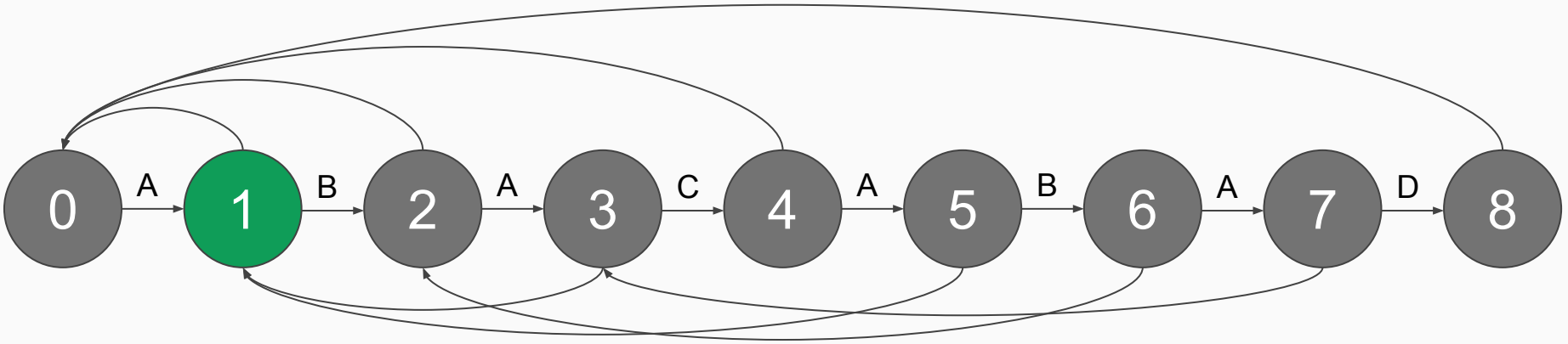

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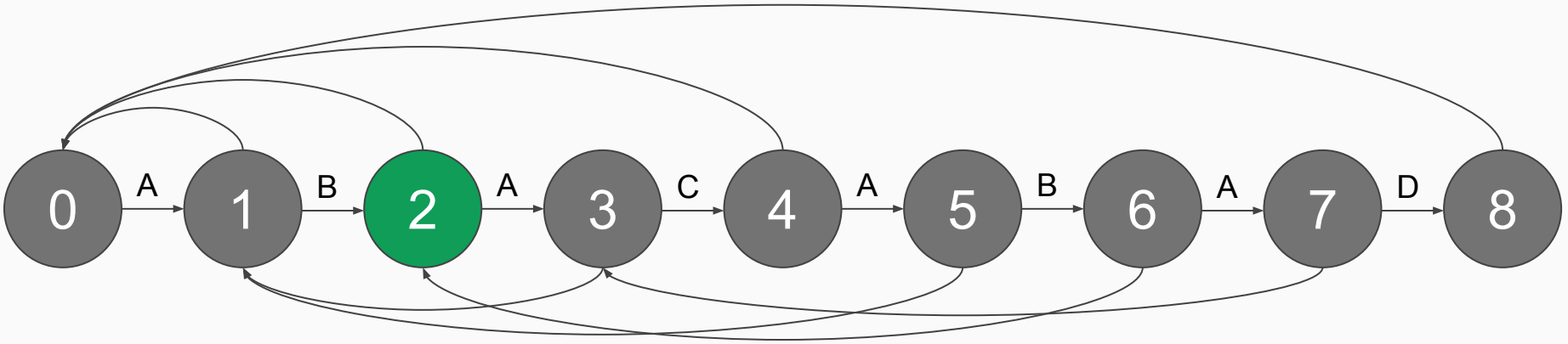

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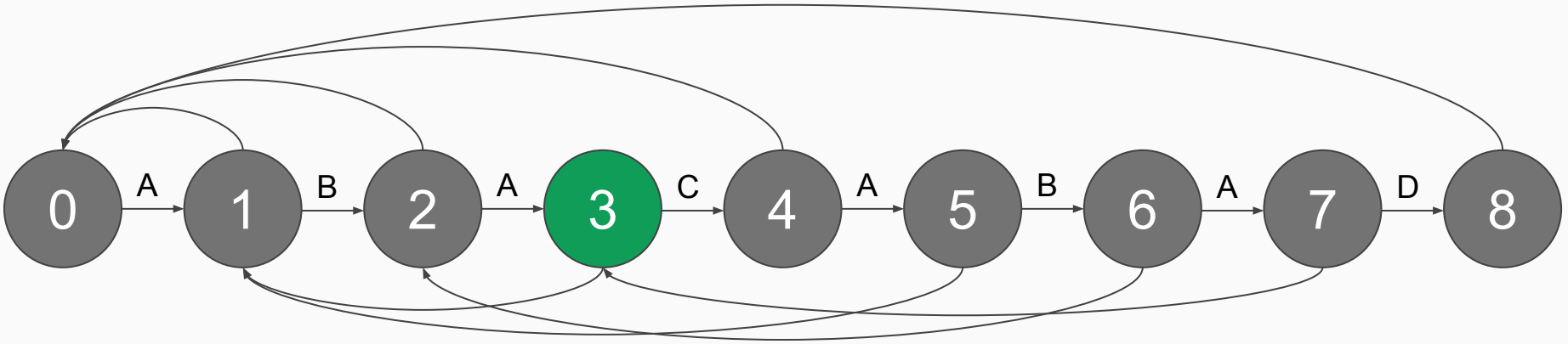

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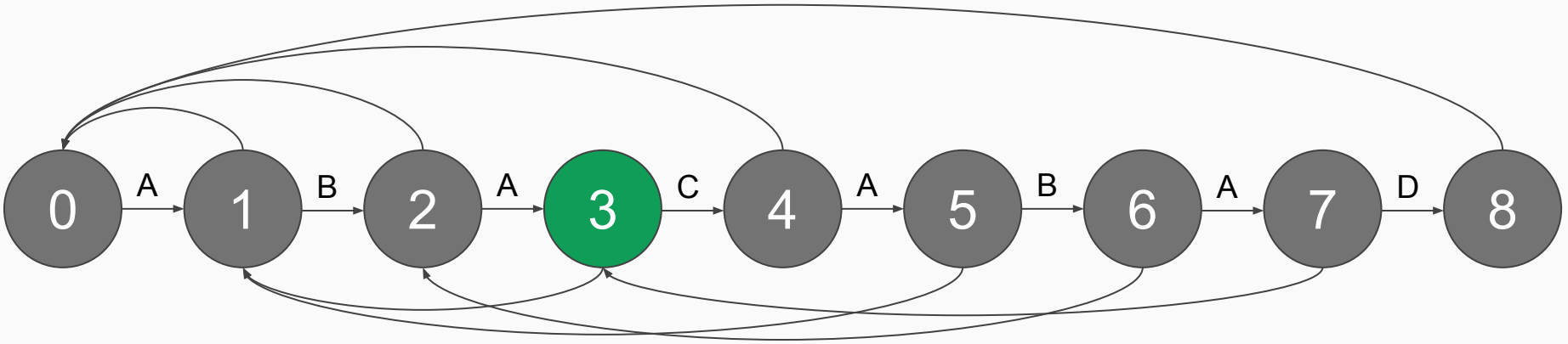

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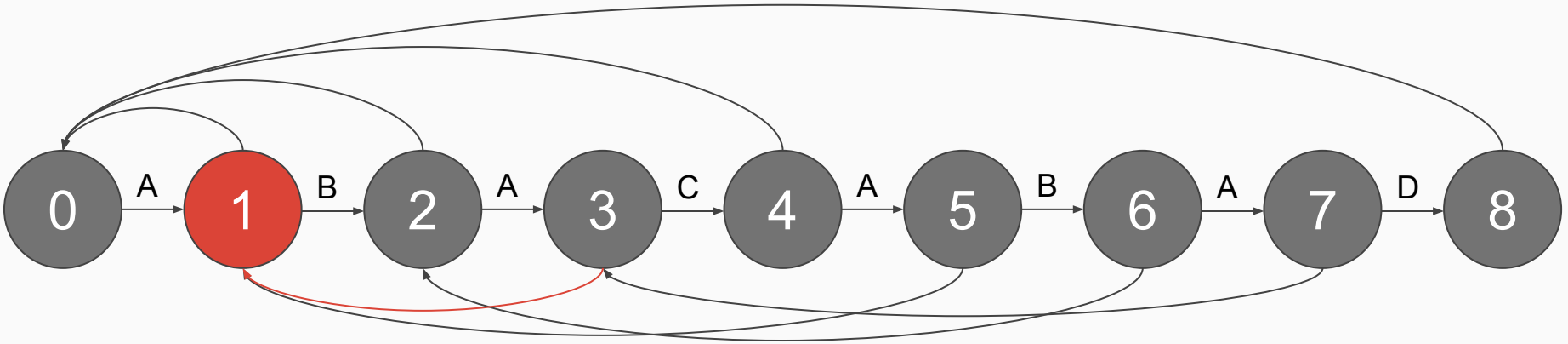

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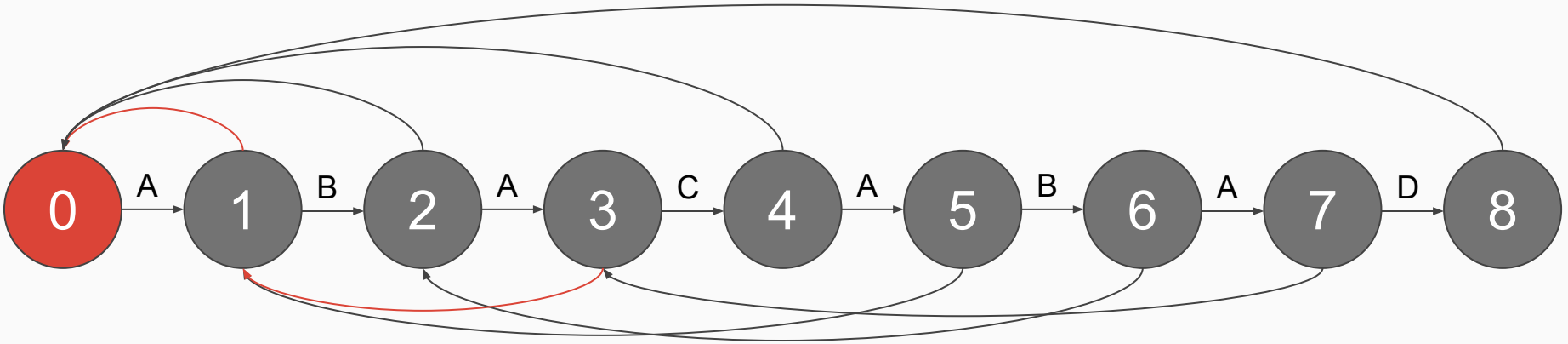

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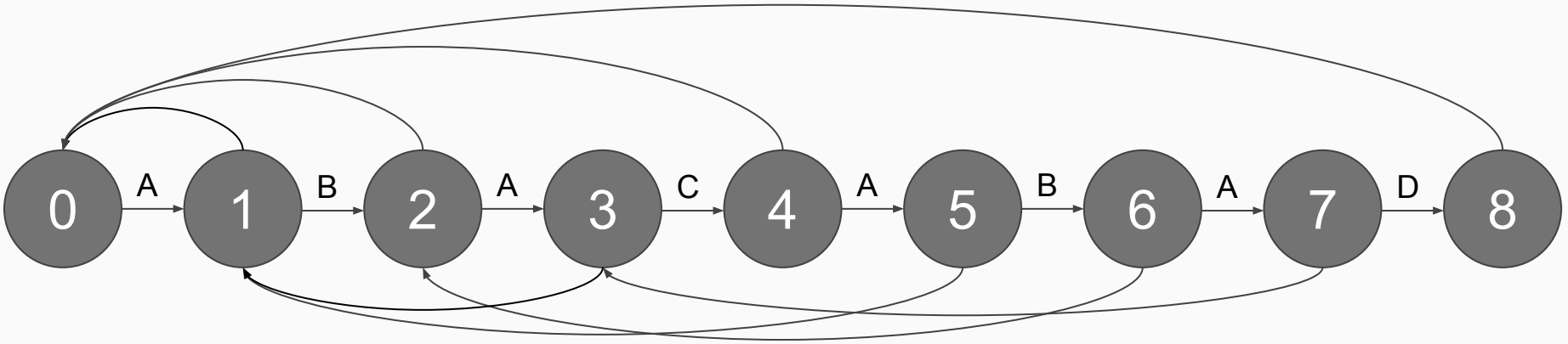

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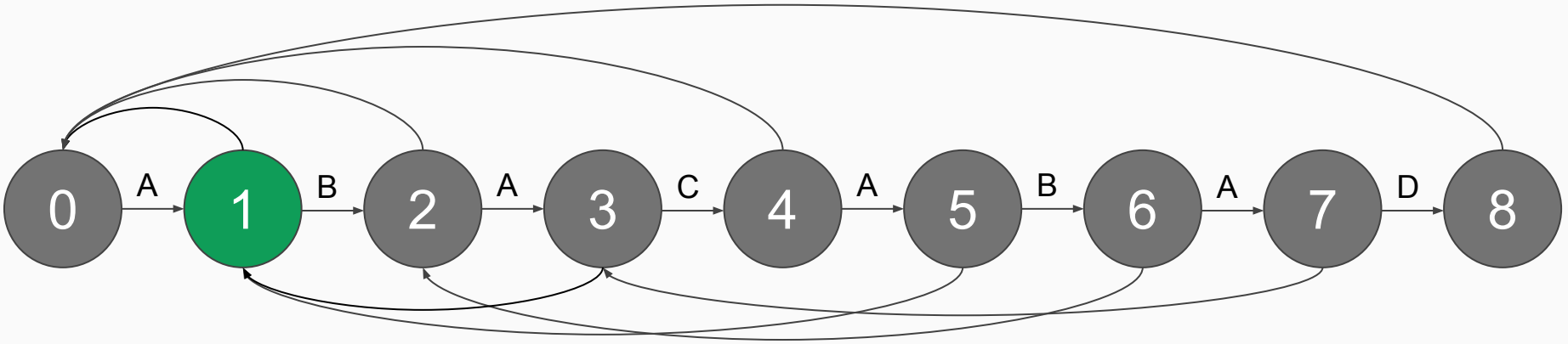

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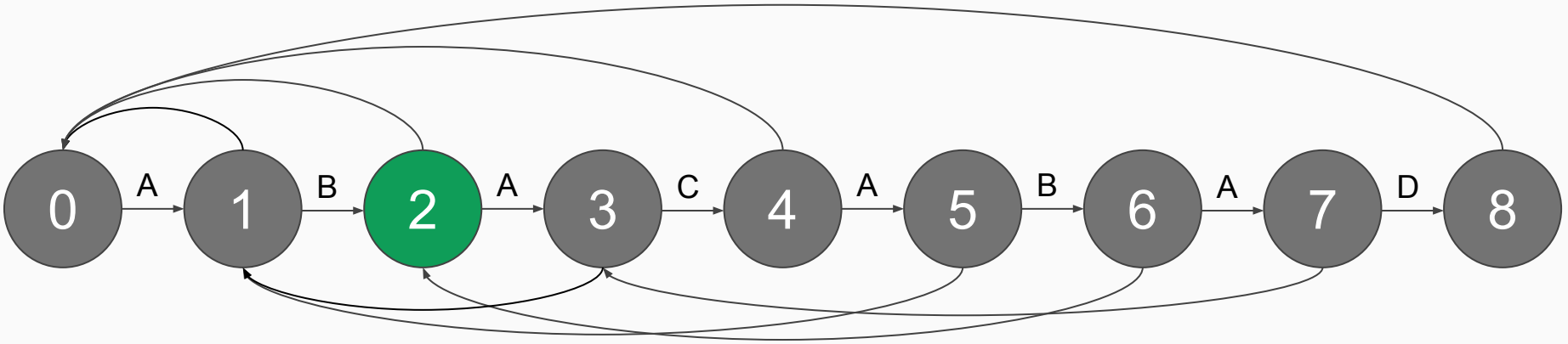

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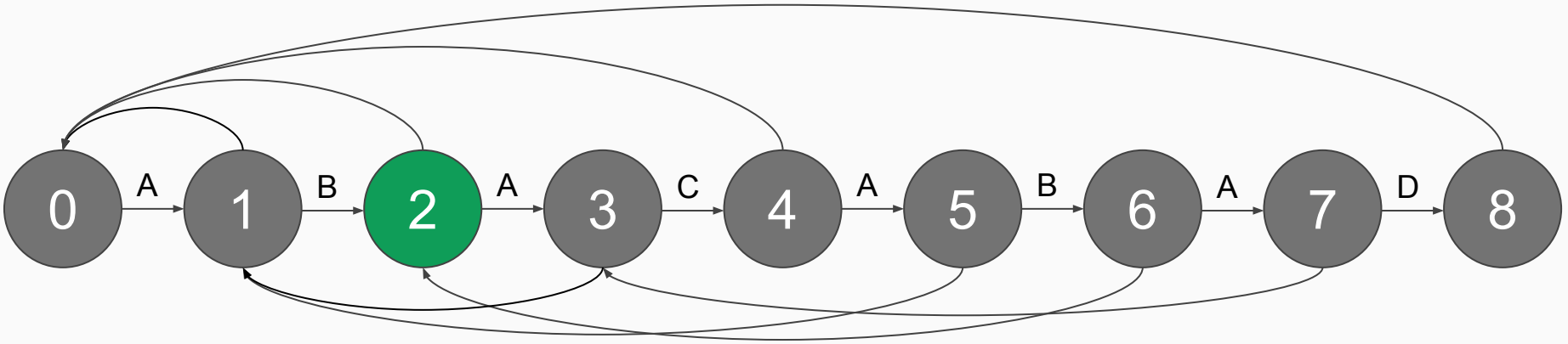

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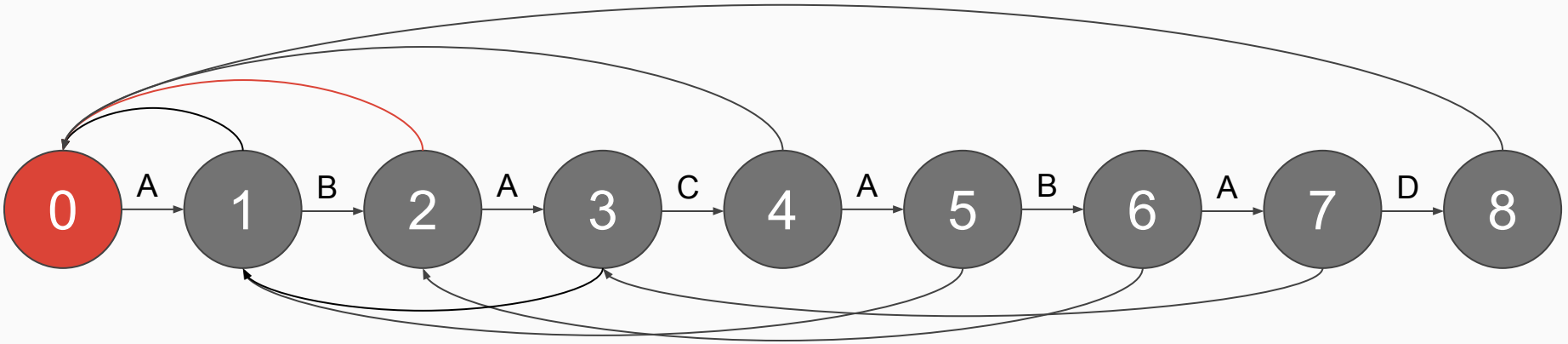

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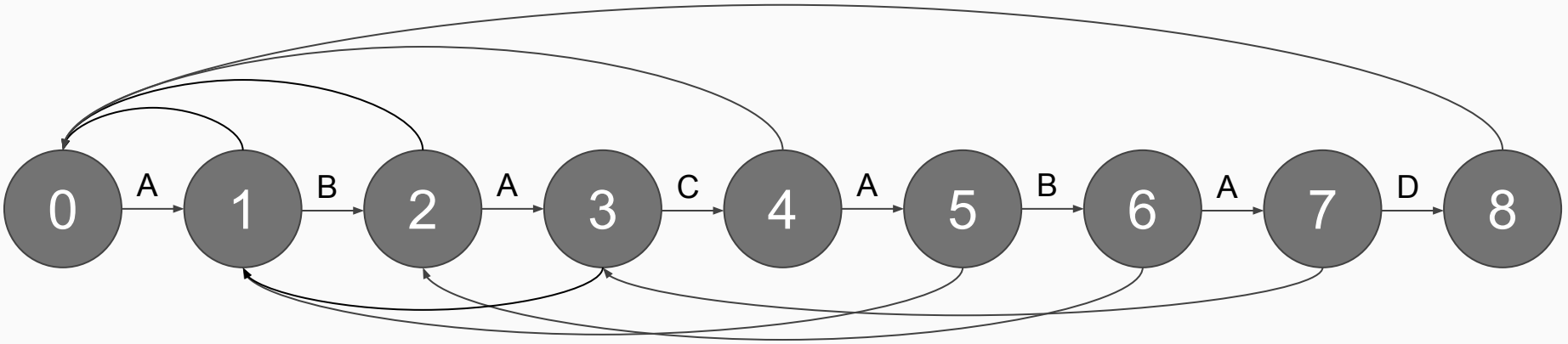

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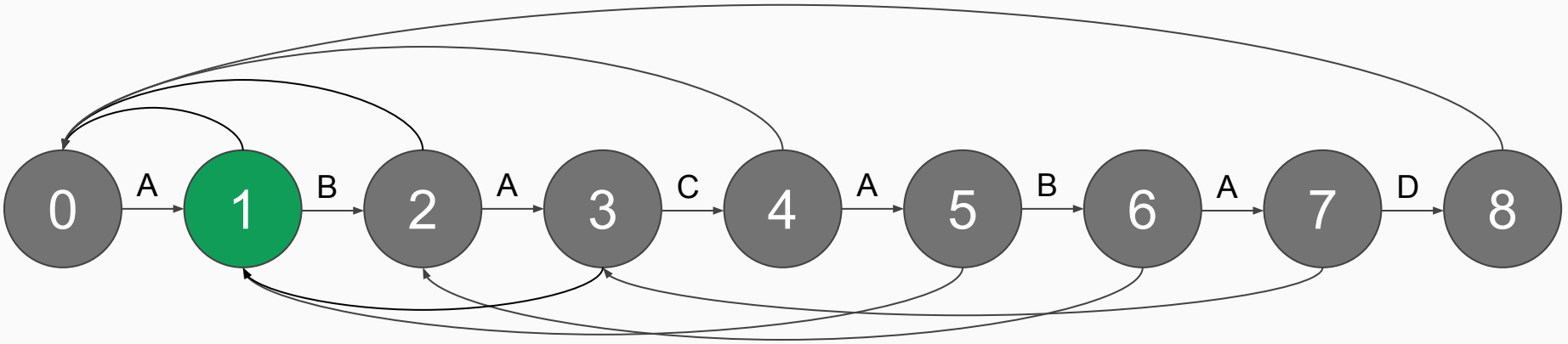

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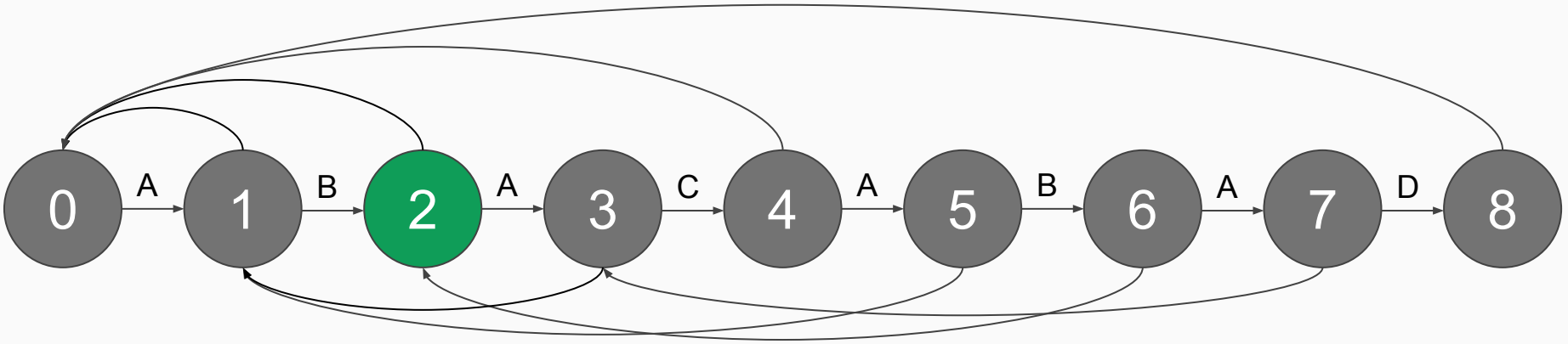

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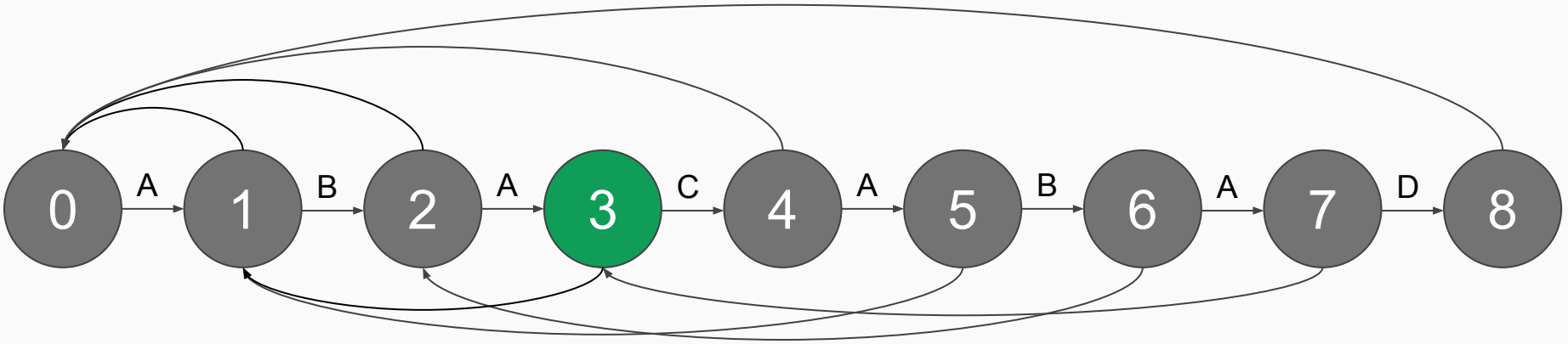

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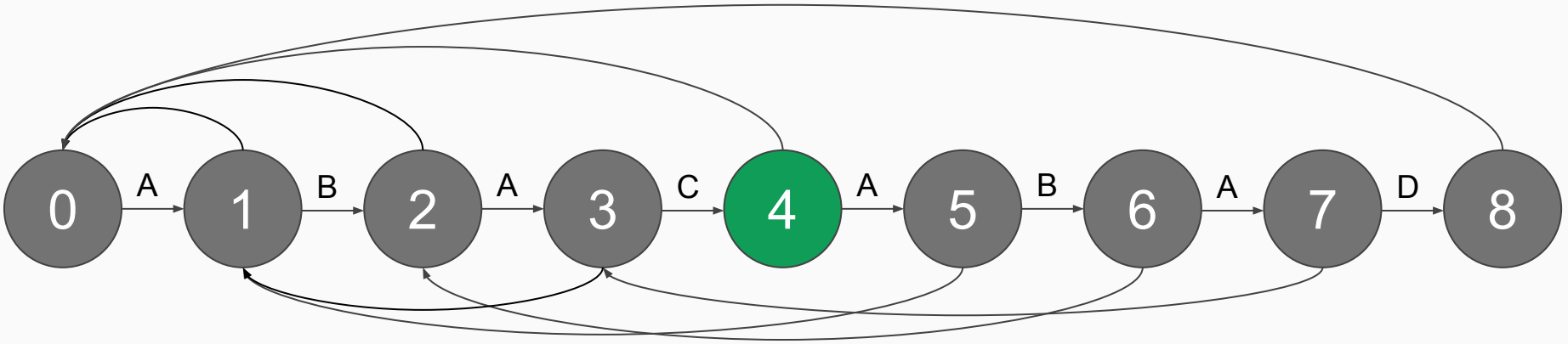

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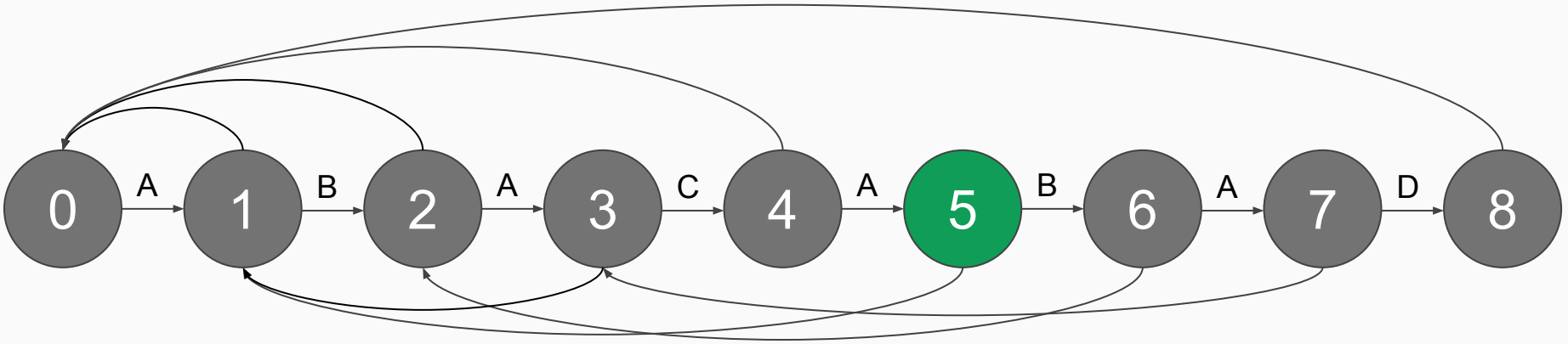

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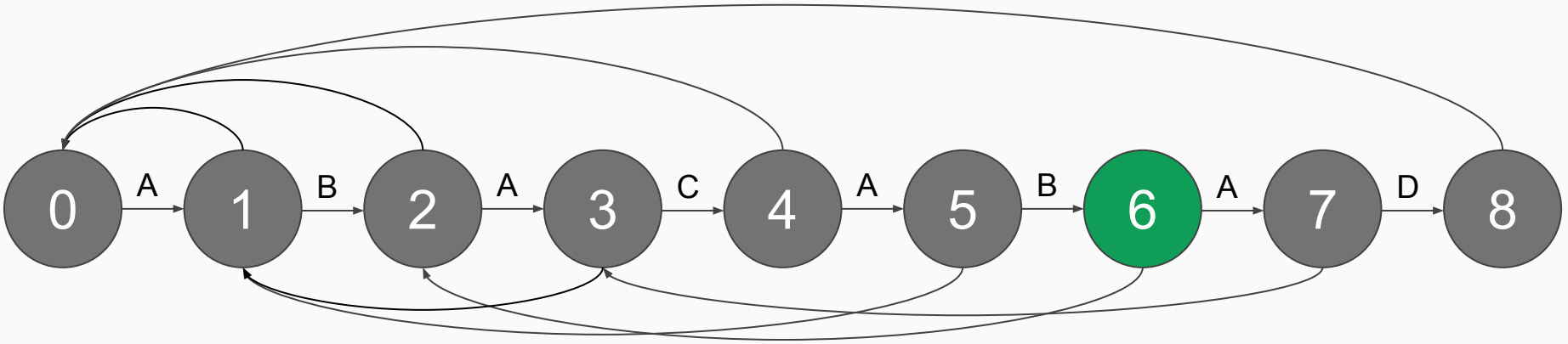

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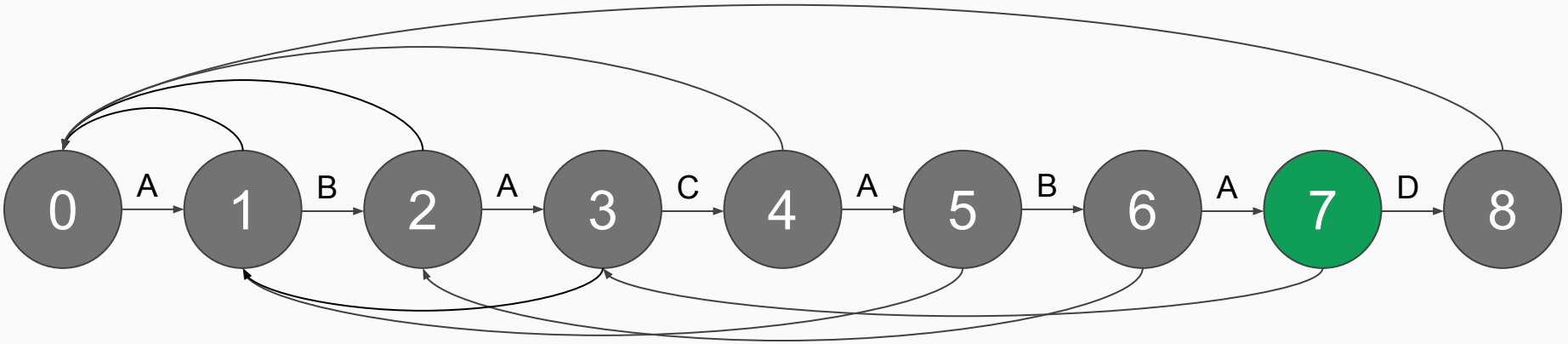

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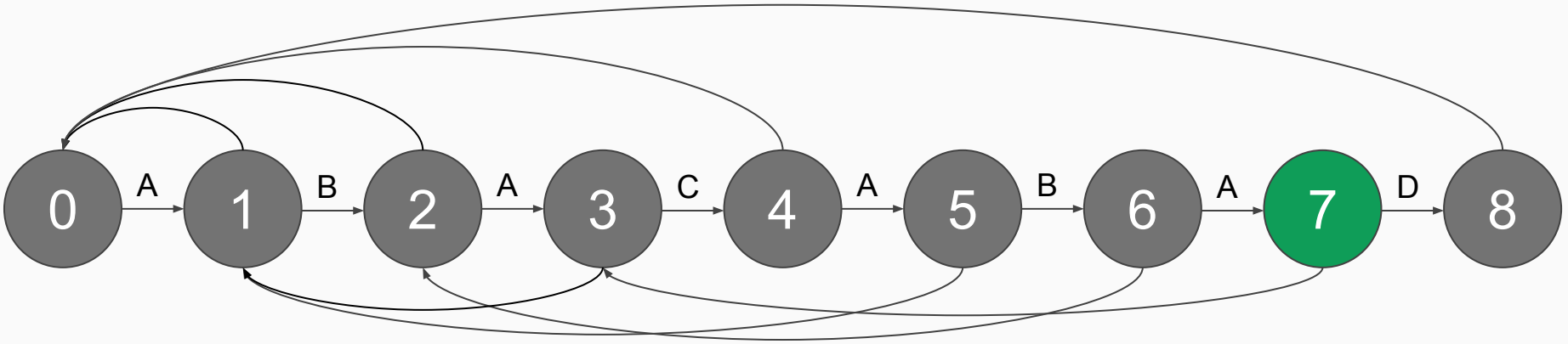

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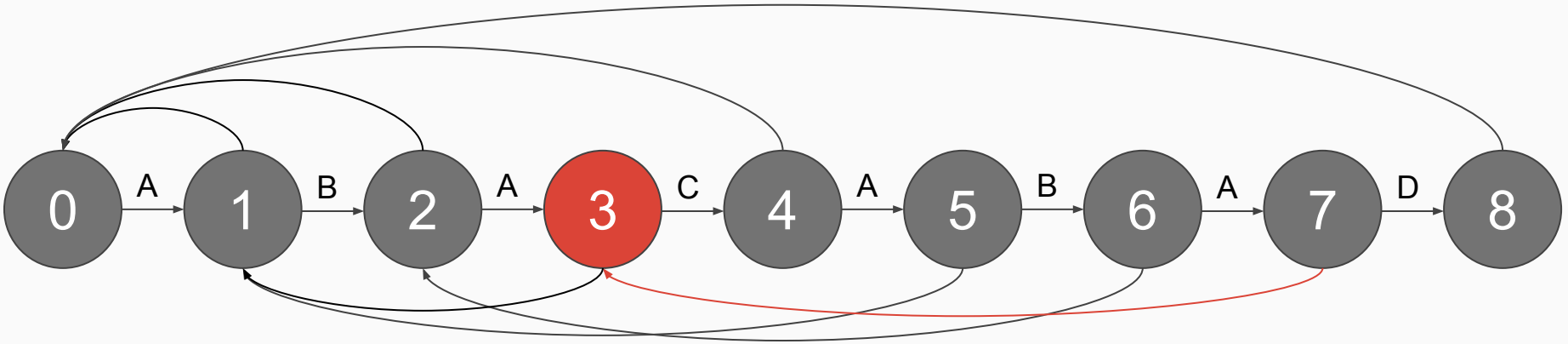

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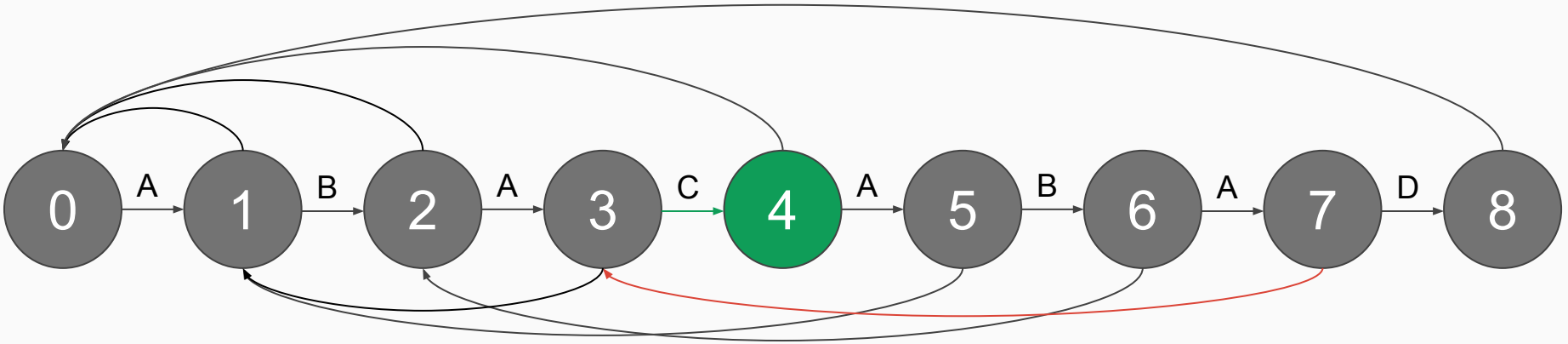

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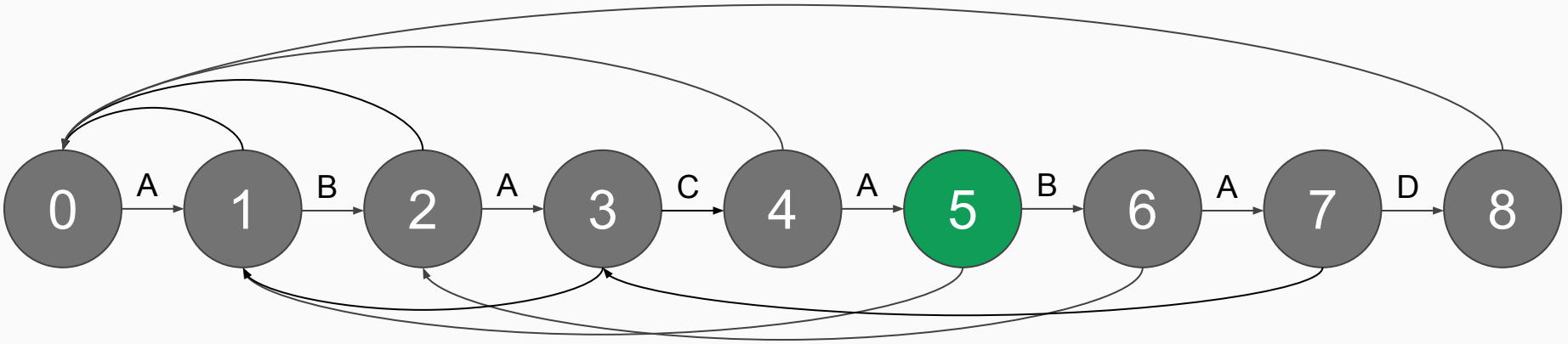

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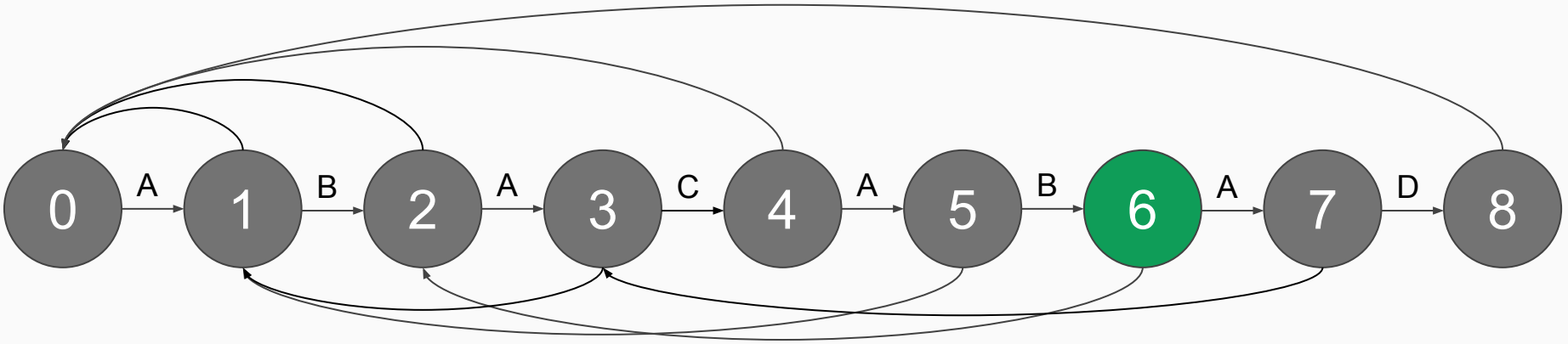

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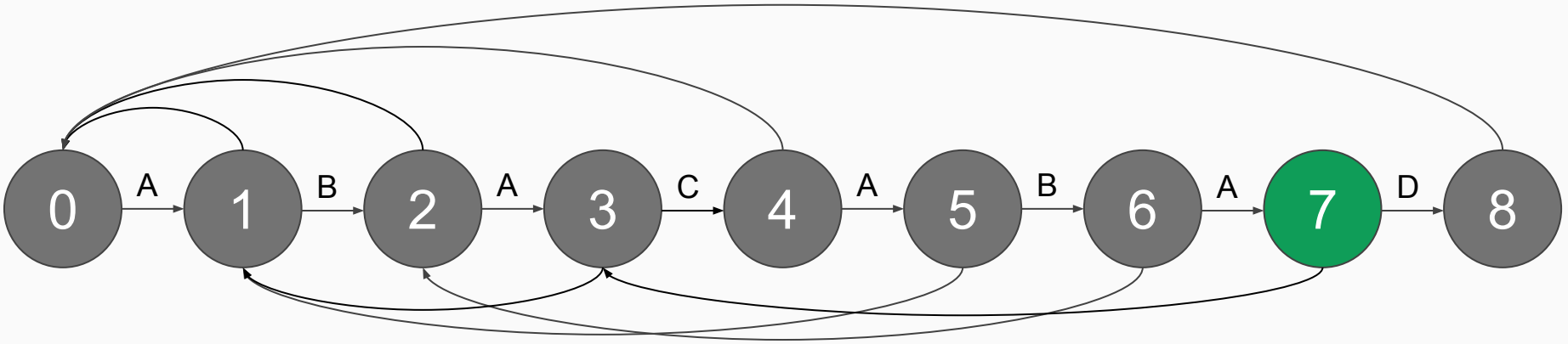

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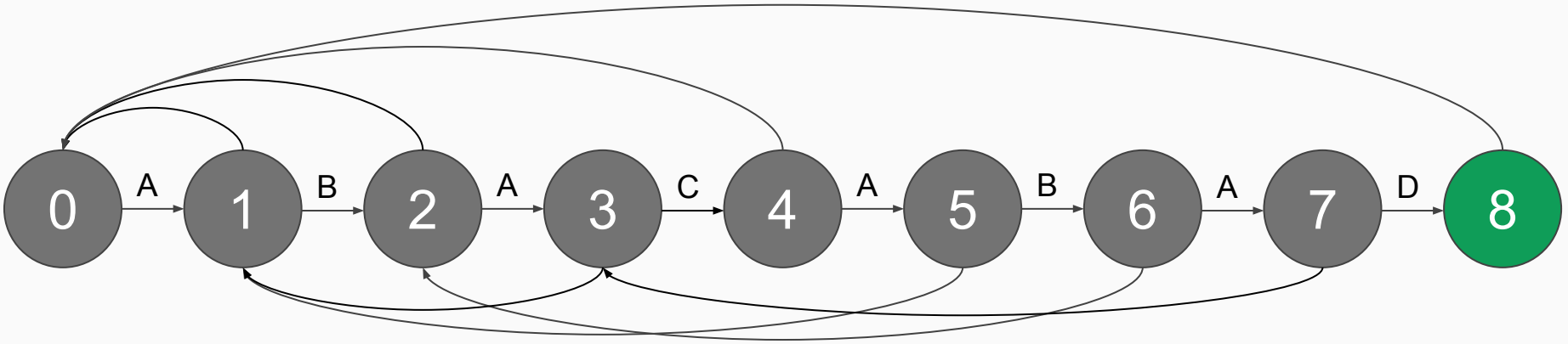

Problems

- http://codeforces.com/contest/432/problem/D