Willkommen

Algorithmen I Tutorium 19

Wer? Florian Tobias Schandinat

Wo? 50.34, Raum -118

Wann? jeden Donnerstag 15:45-17:15

Material online

http://github.com/schandinat/algorithmen1_ss11

Graphenrepräsentation

Übung

$V = \{1, 2, 3, 4\}$
$E = \{(1, 2), (1, 3), (3, 1), (3, 2)\}$
Beschreiben Sie den Graphen $G = (V, E)$ mittels

- Adjazenzliste
- Adjazenzmatrix
- Adjazenzfeld

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Fügen Sie nun die Kante $(2, 4)$ ein

Graphenrepräsentation – Übersicht

Adjazenzliste

- schnelles Hinzufügen von Kanten
- Speicherverbrauch: $\theta(|V| + |E|)$

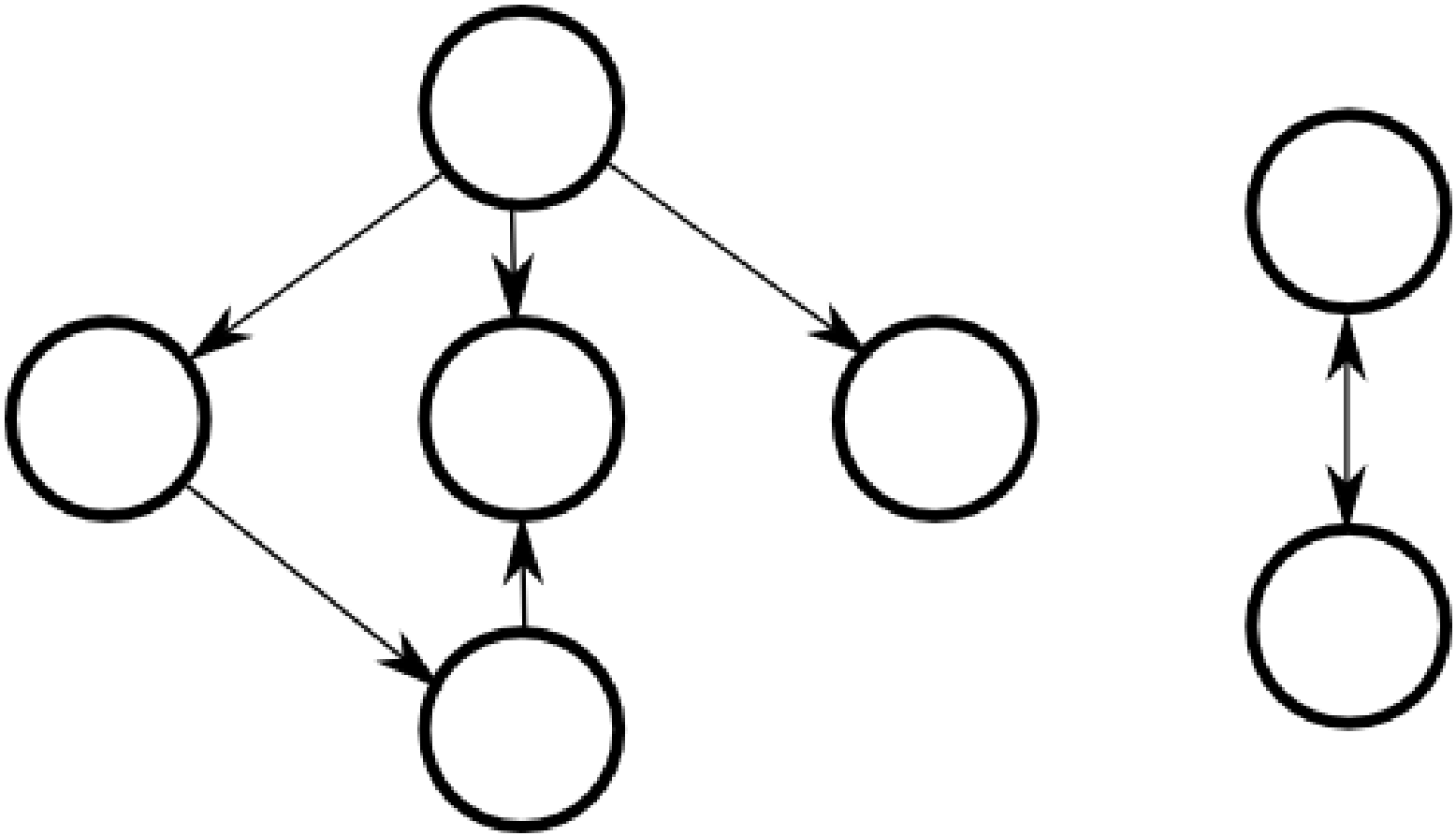
Adjazenzmatrix

- schnelle Kantenabfrage
- schnelles Hinzufügen/Löschen von Kanten
- Speicherverbrauch: $\theta(|V|^2)$

Adjazenzfeld

- etwas kompakter und etwas schnellere Kantenabfrage als Adjazenzliste
- Hinzufügen/Löschen von Kanten ist teuer
- Speicherverbrauch: $\theta(|V| + |E|)$

Tiefensuche (DFS)



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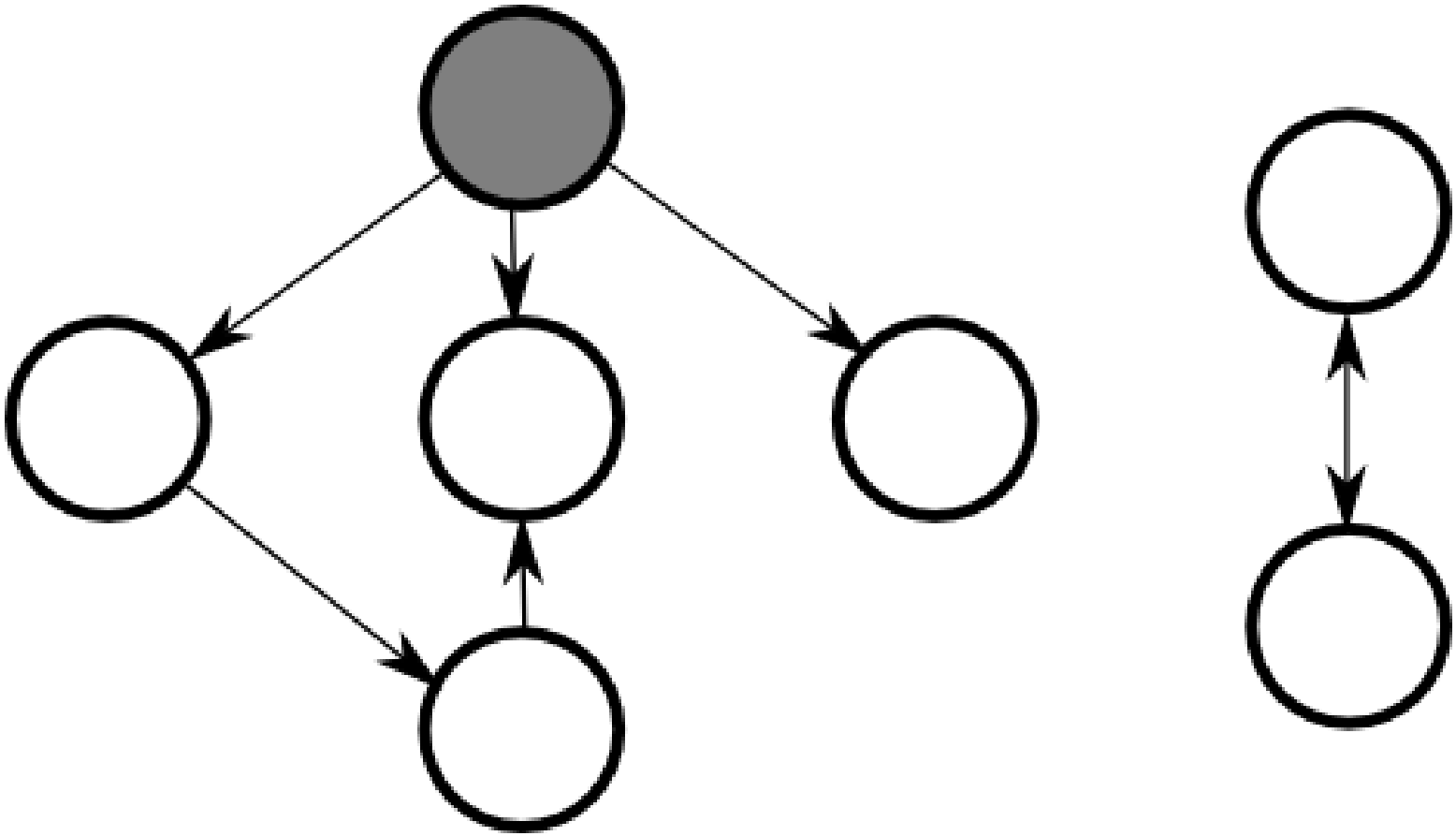

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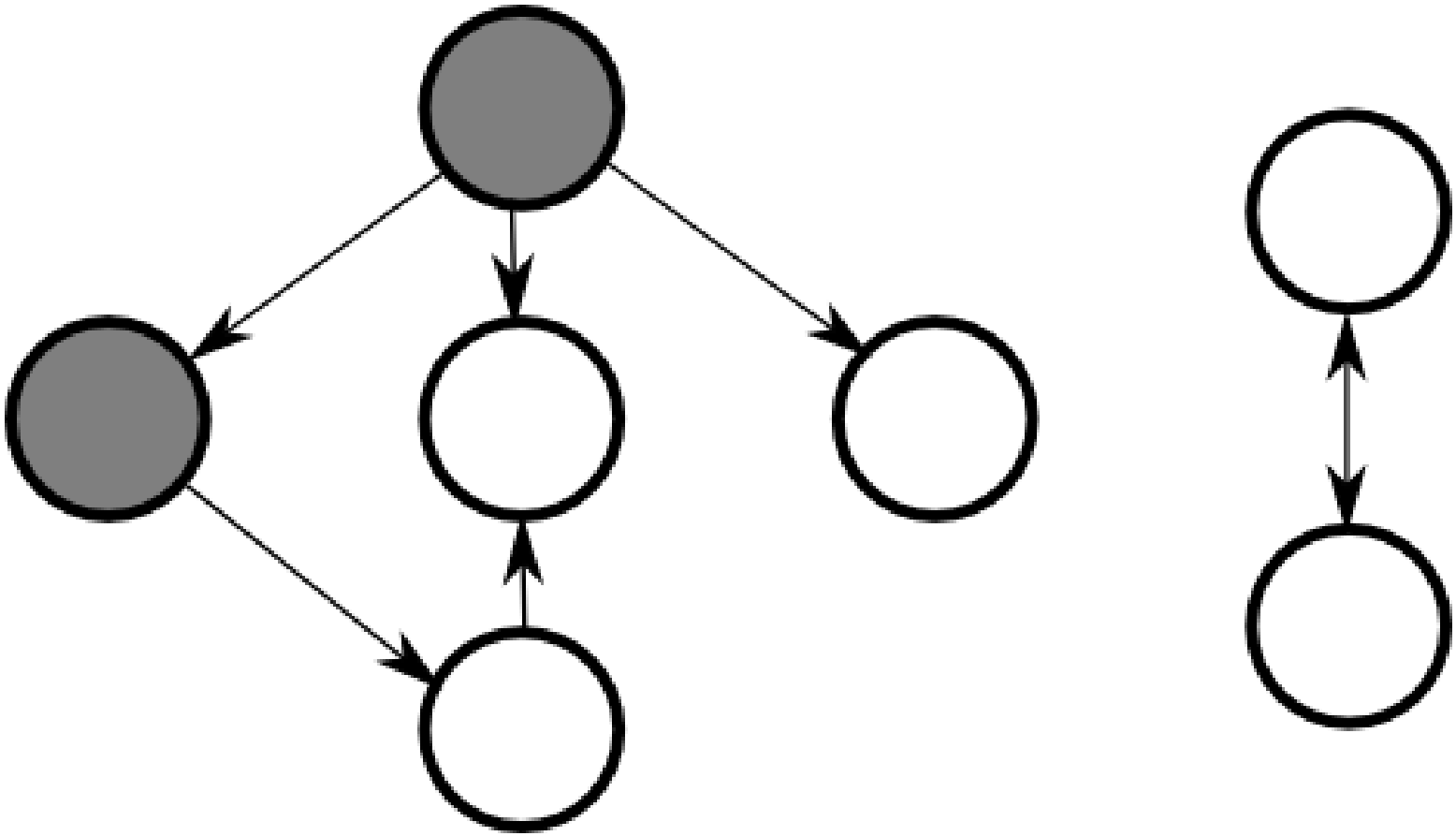

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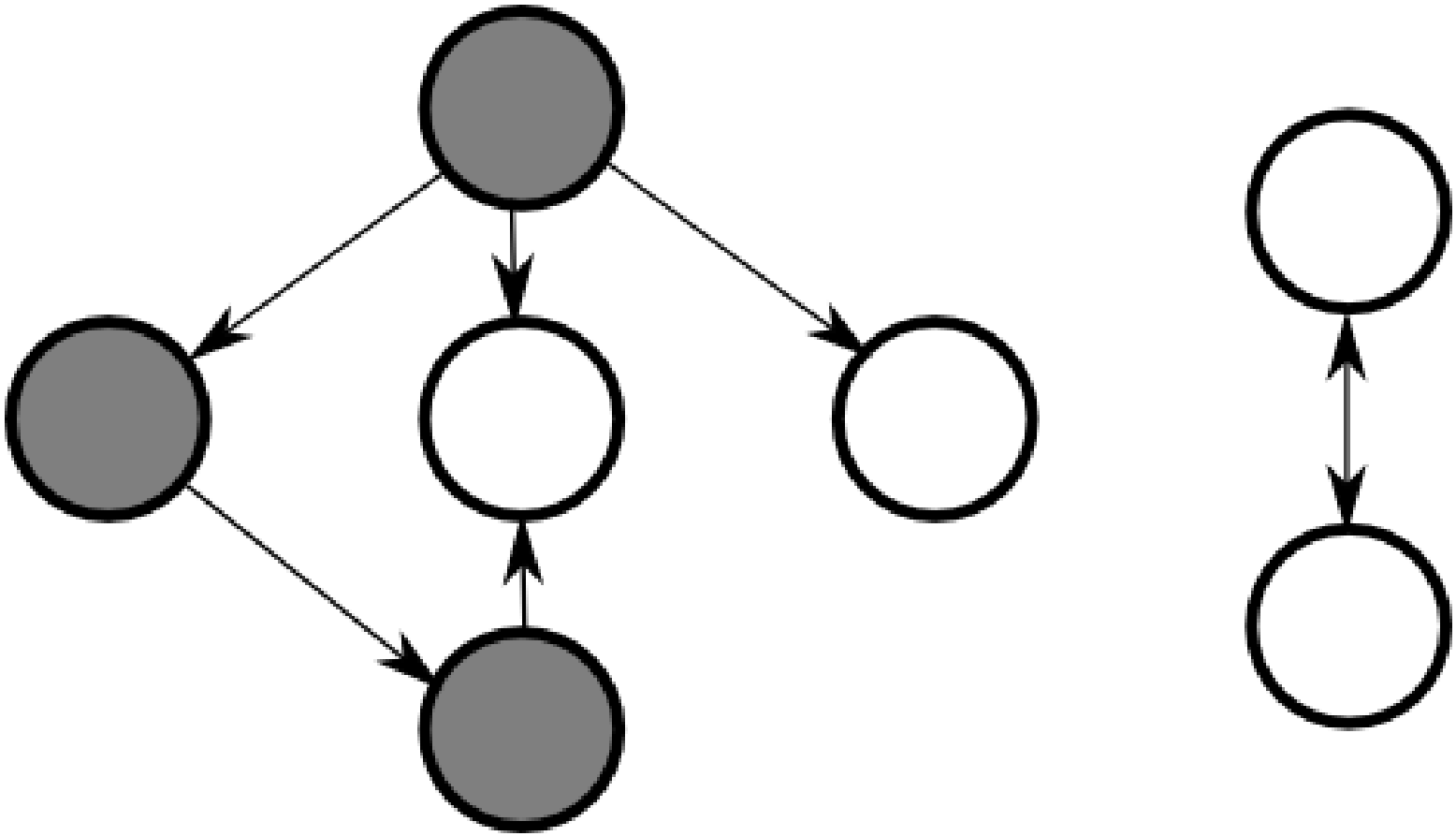

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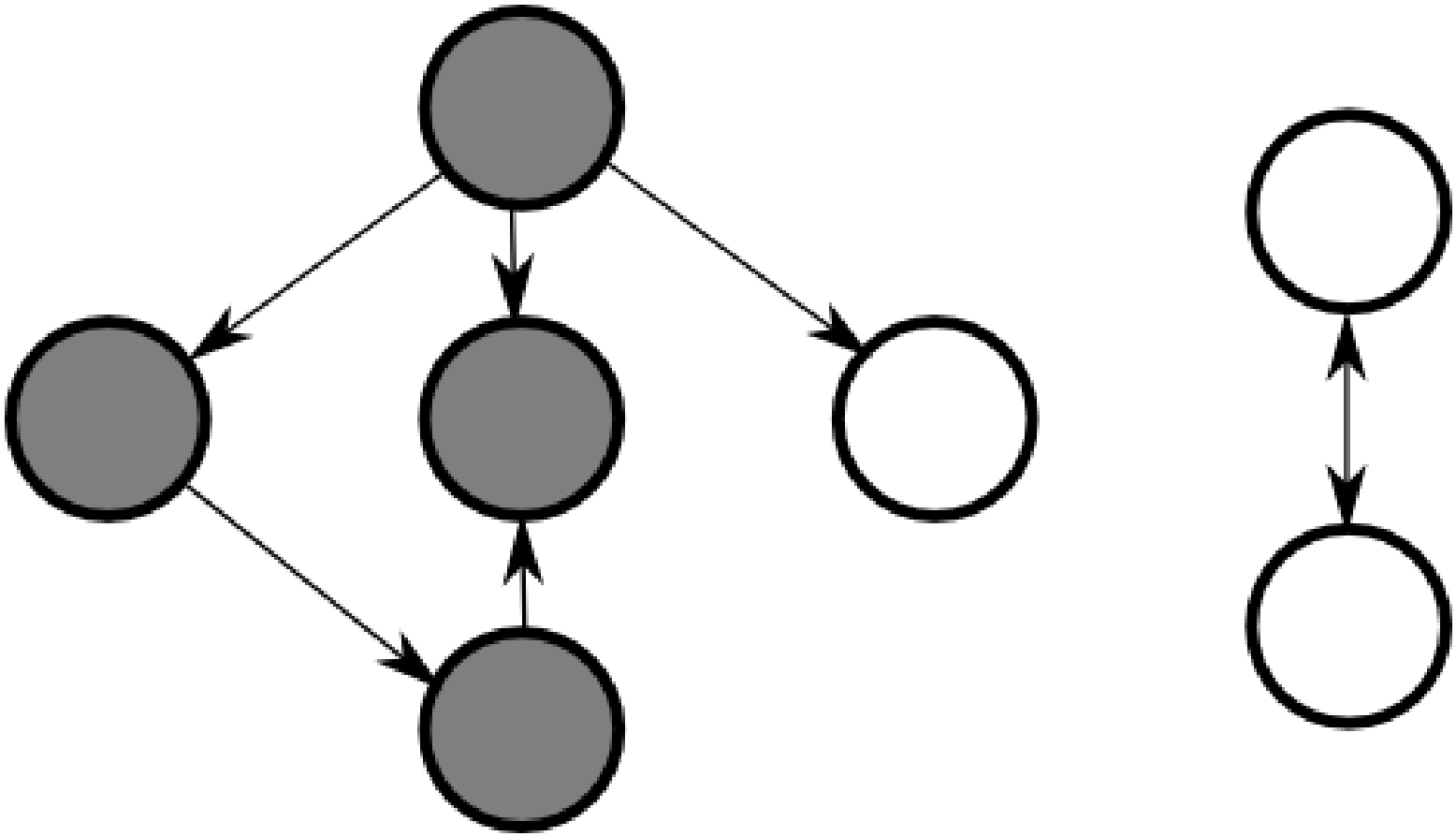

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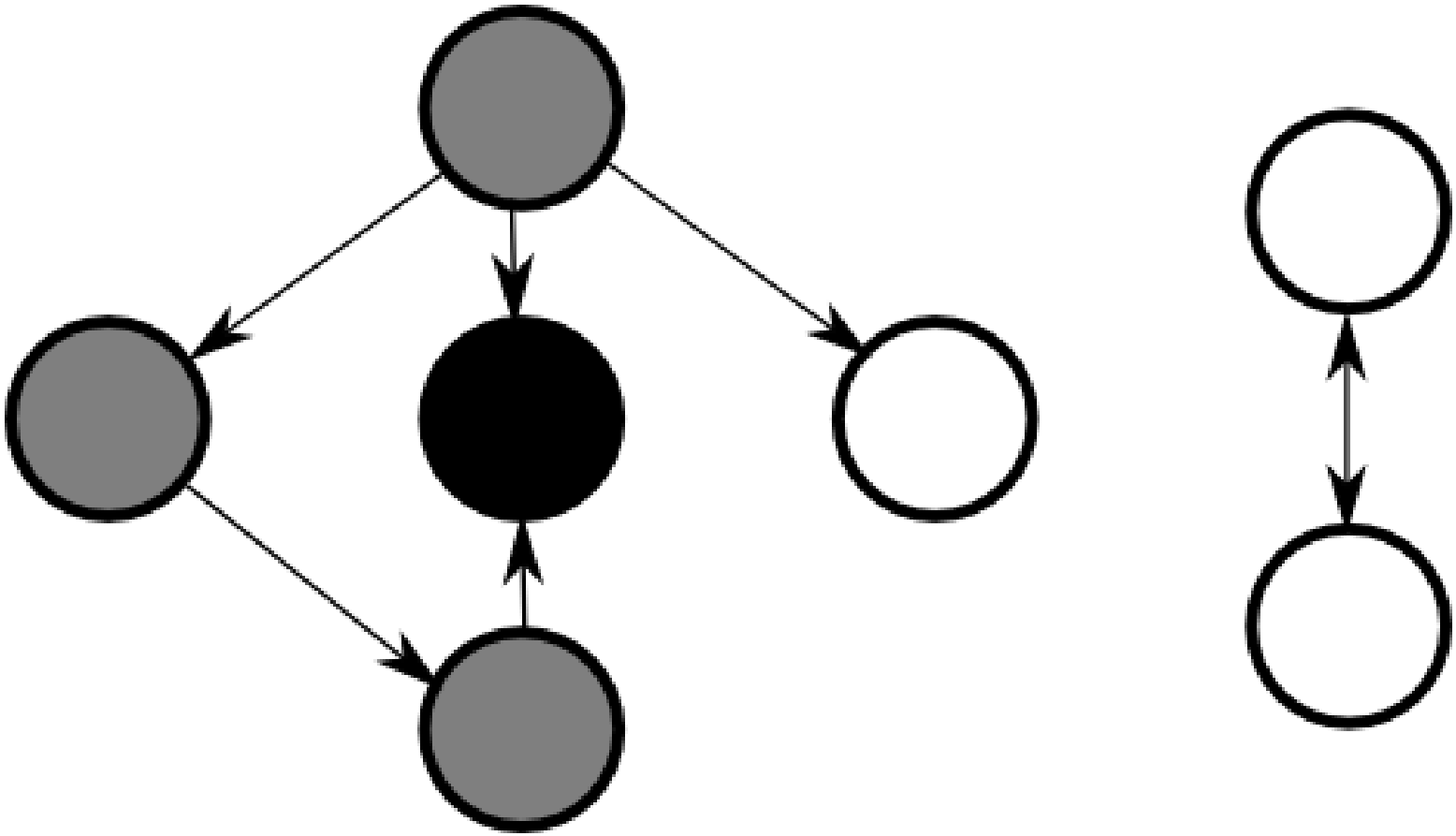

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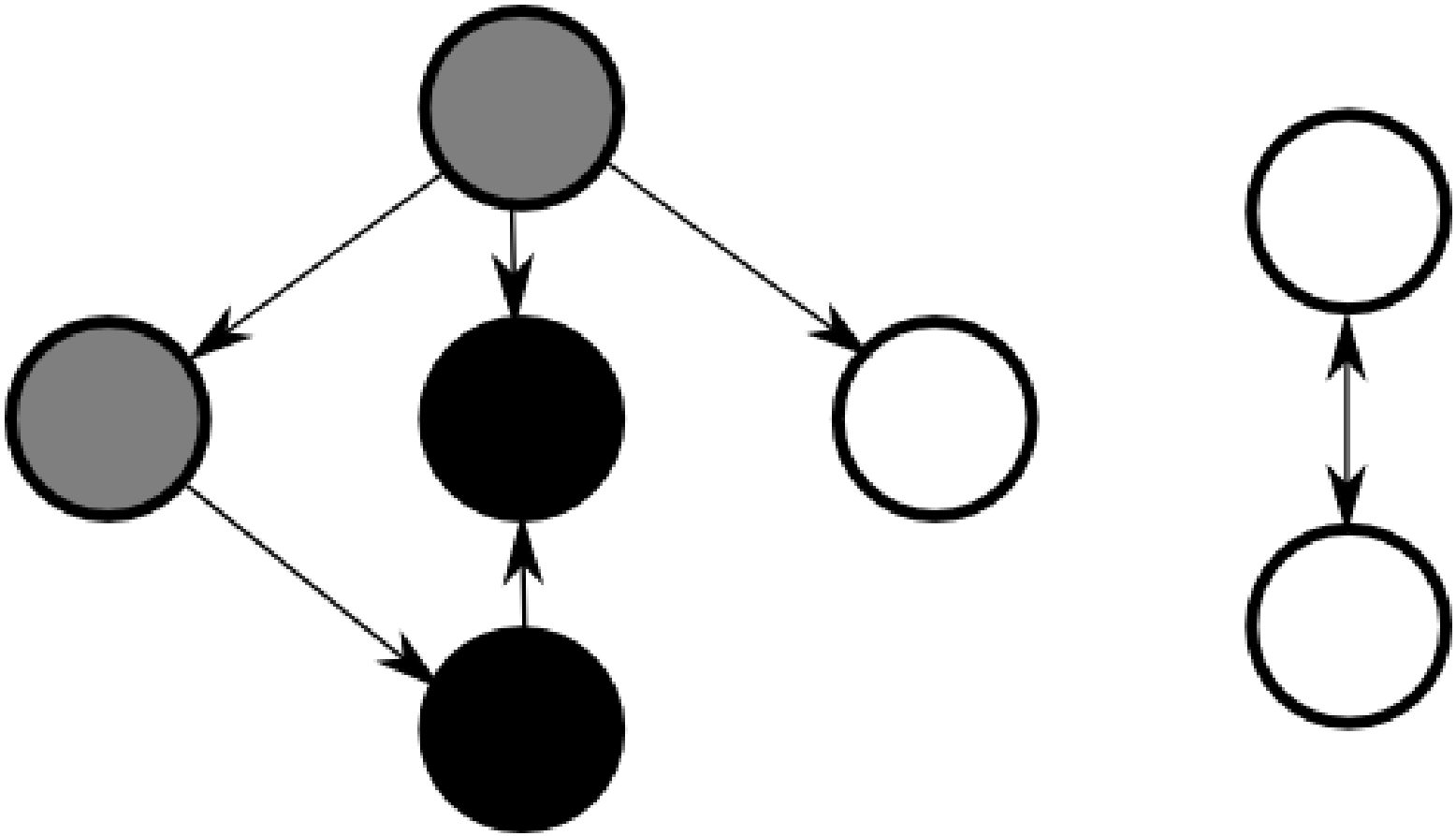

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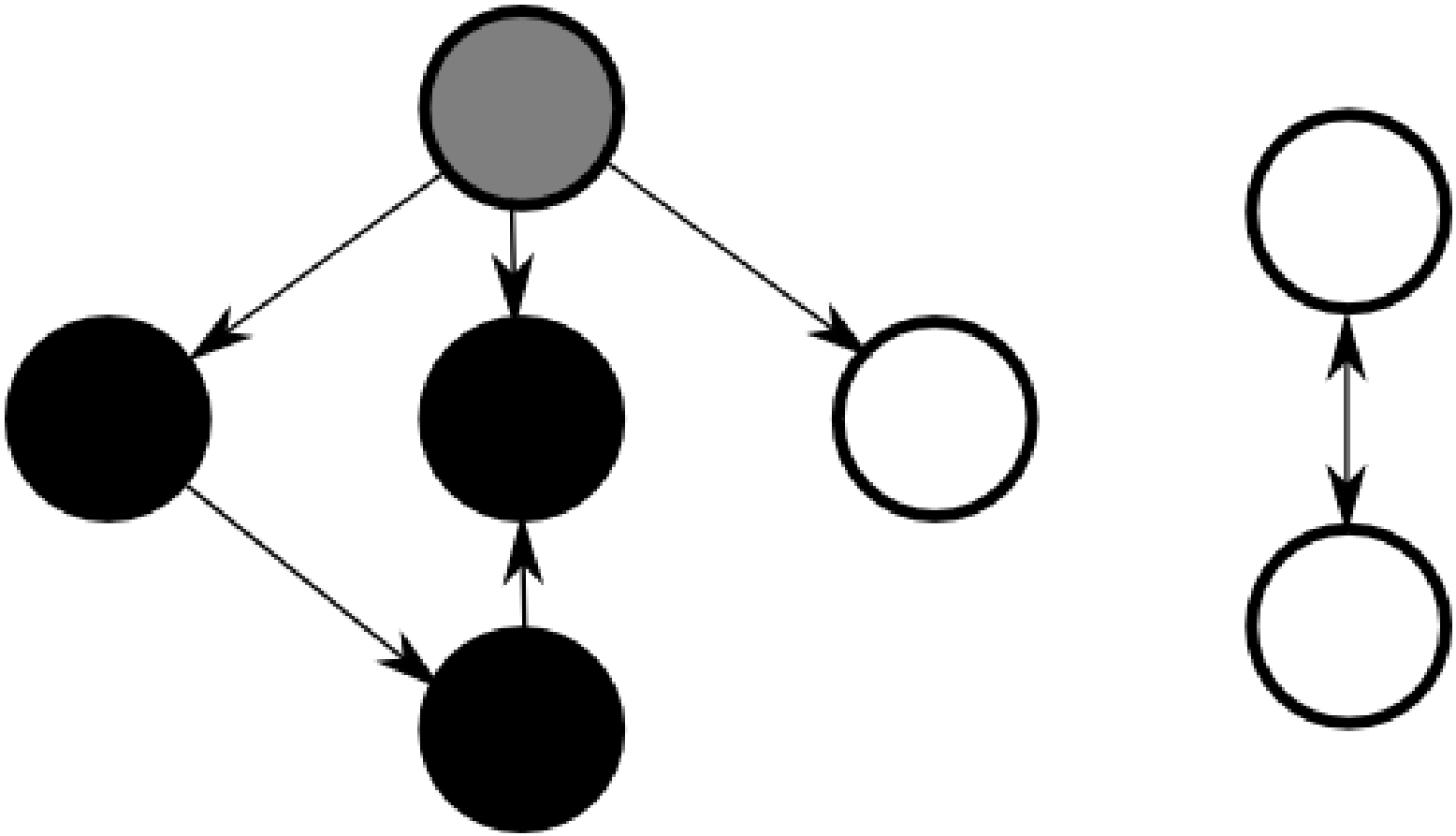

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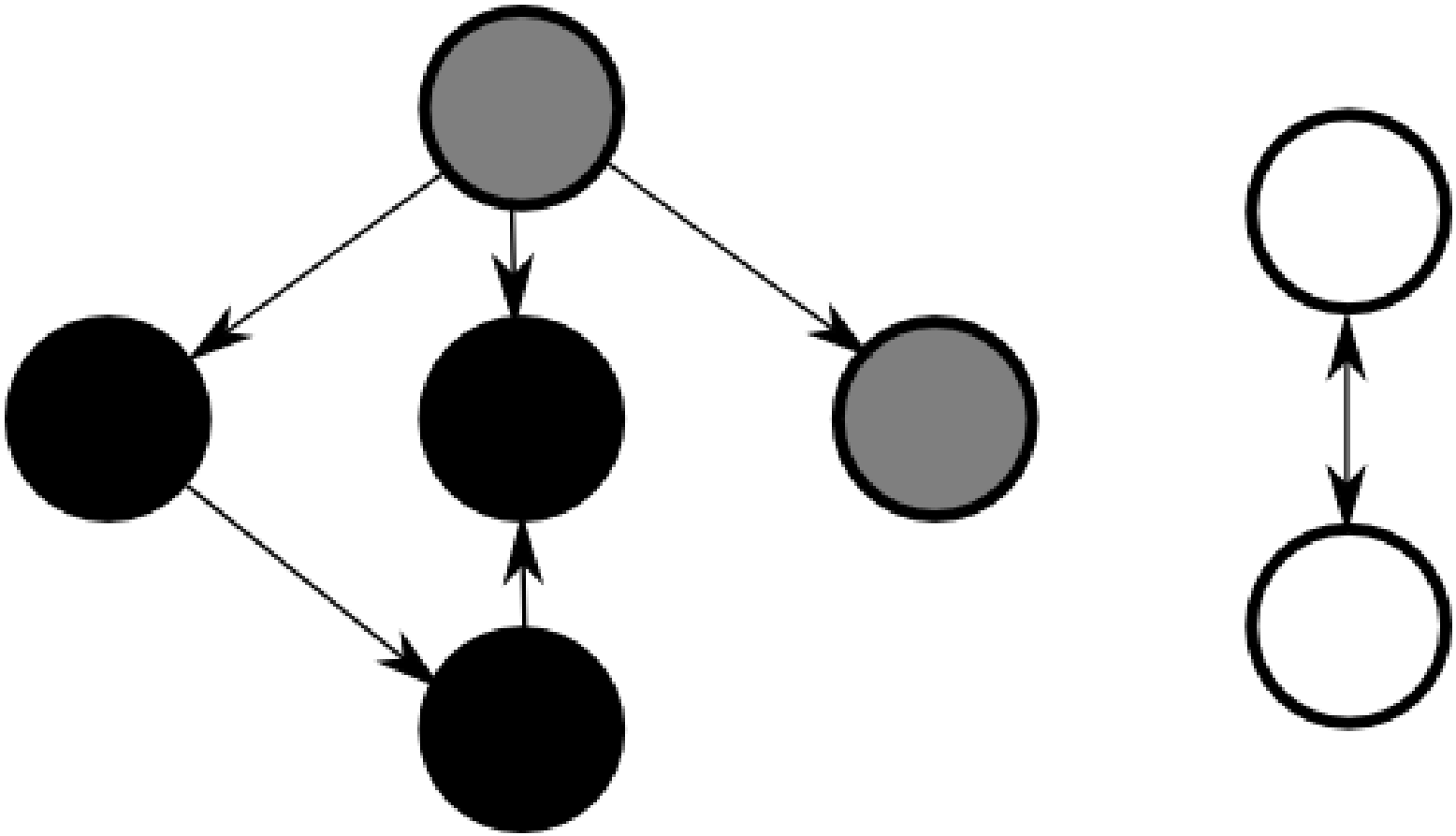

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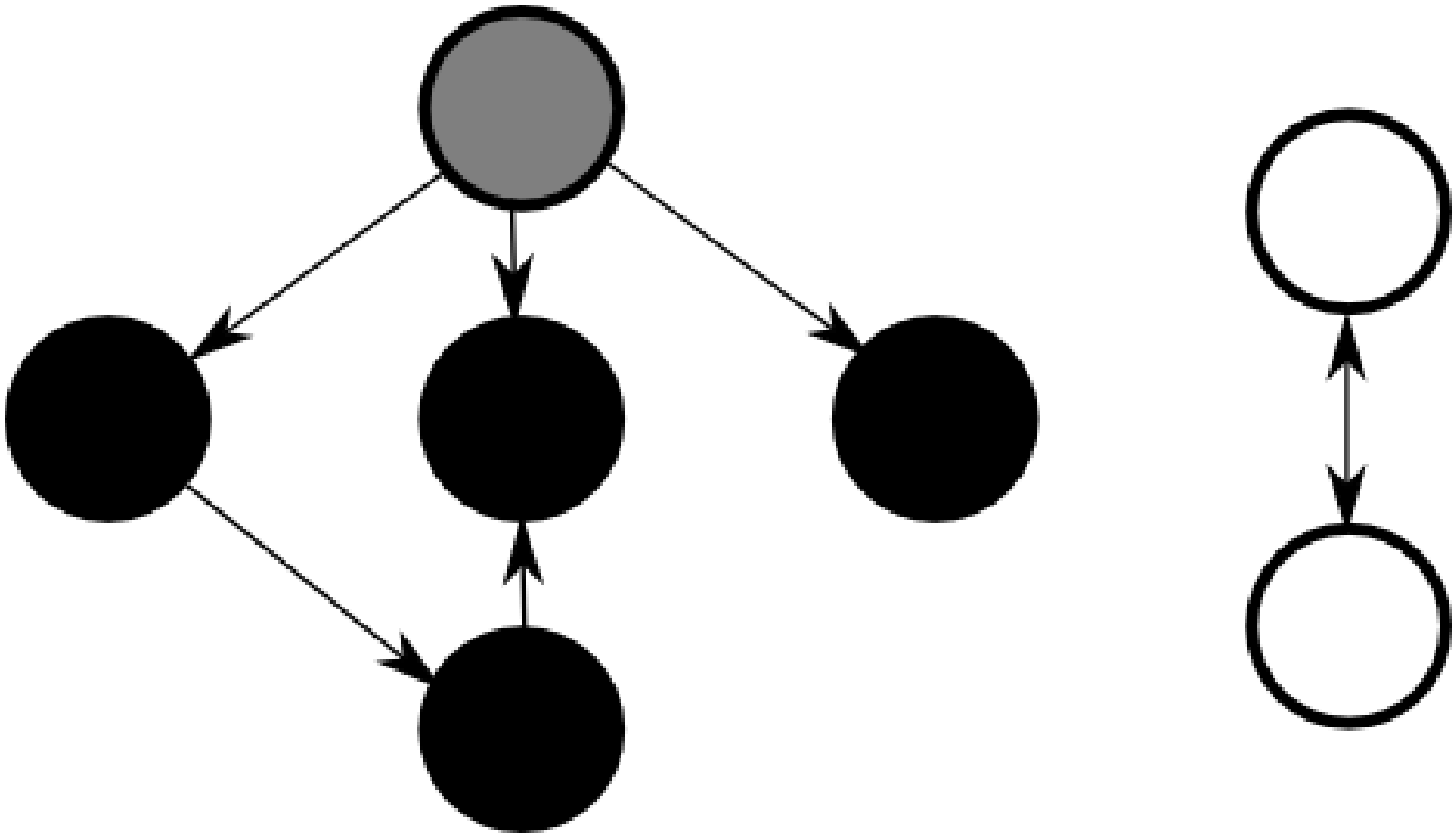

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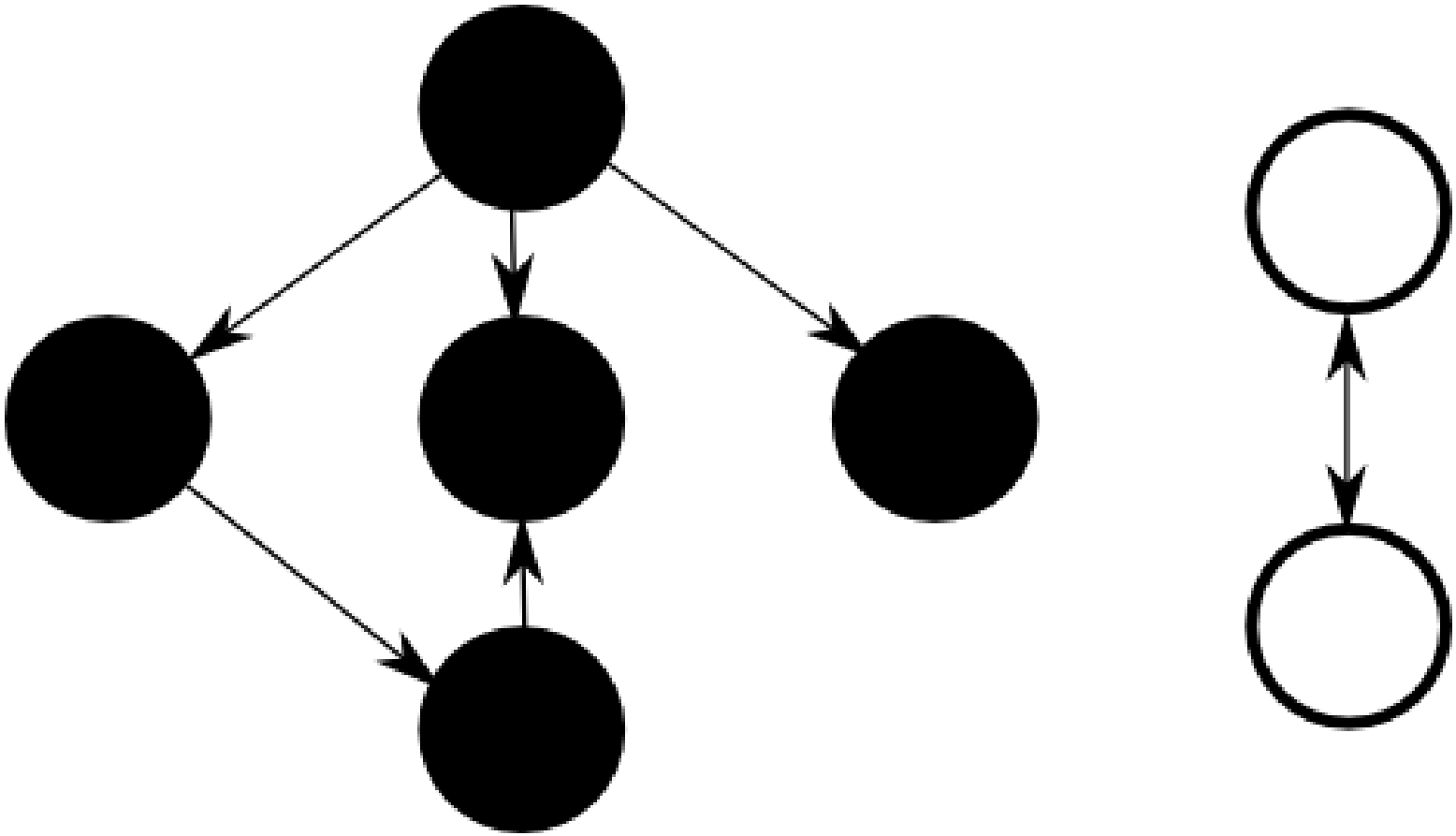

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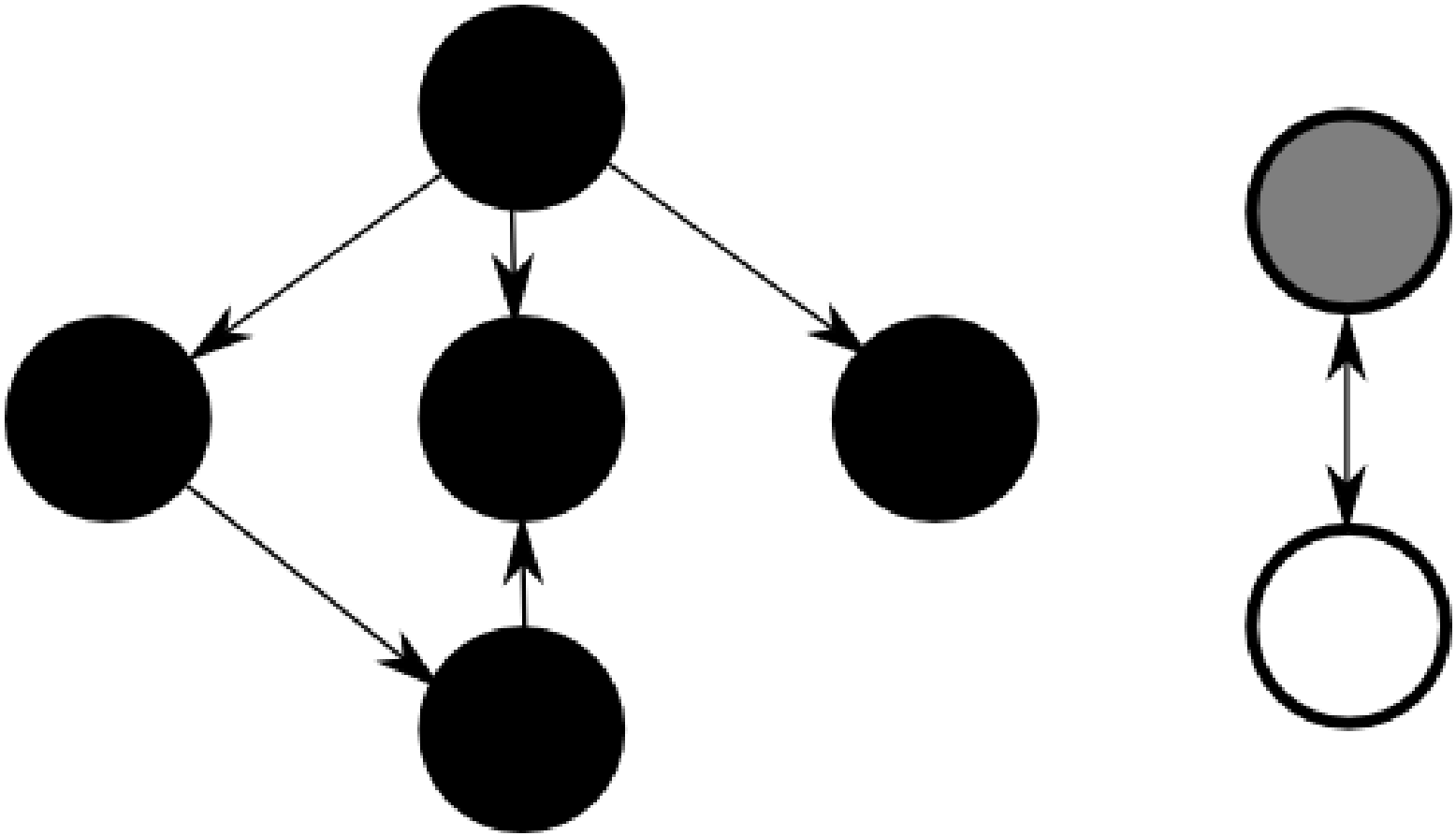

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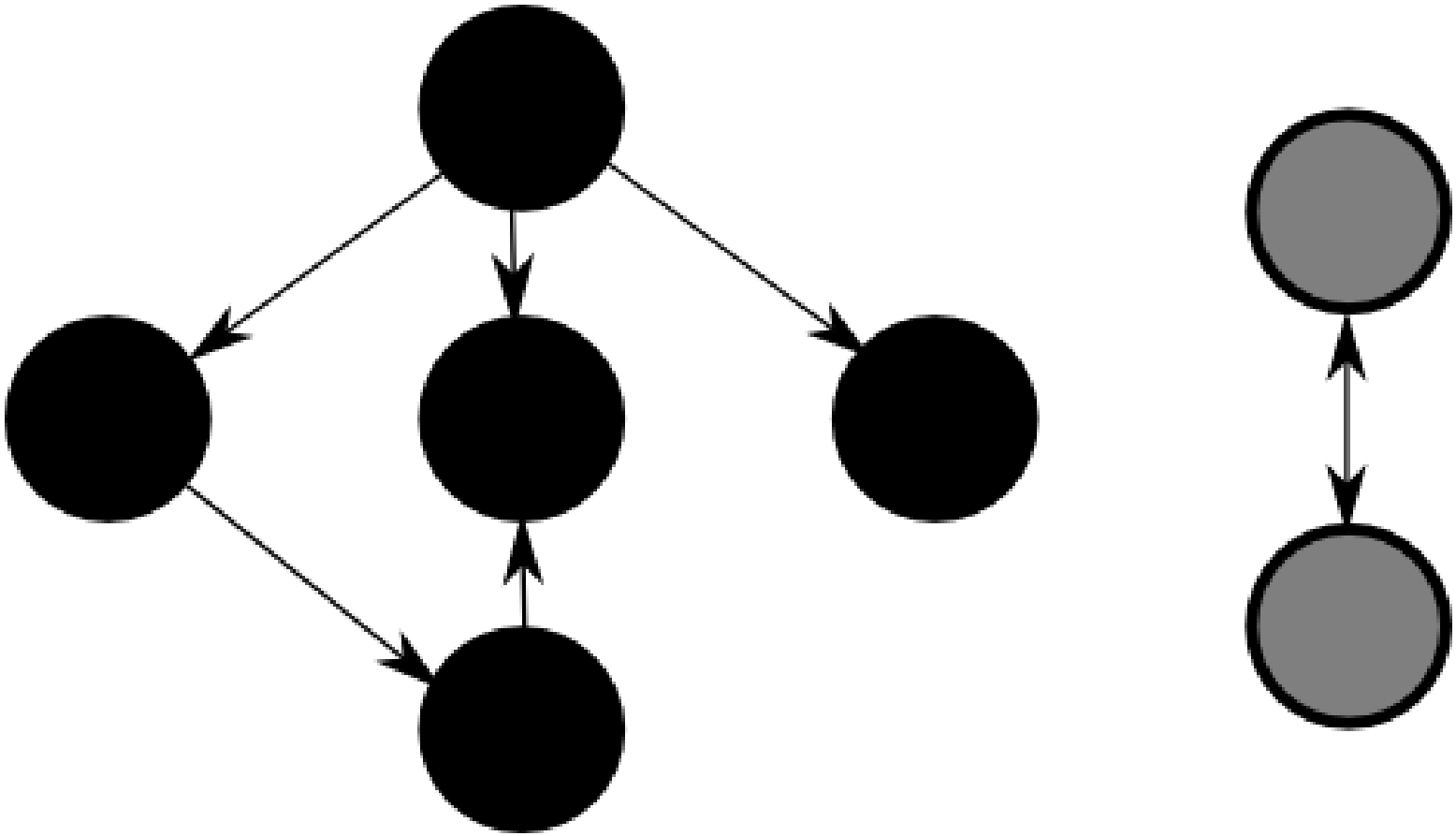

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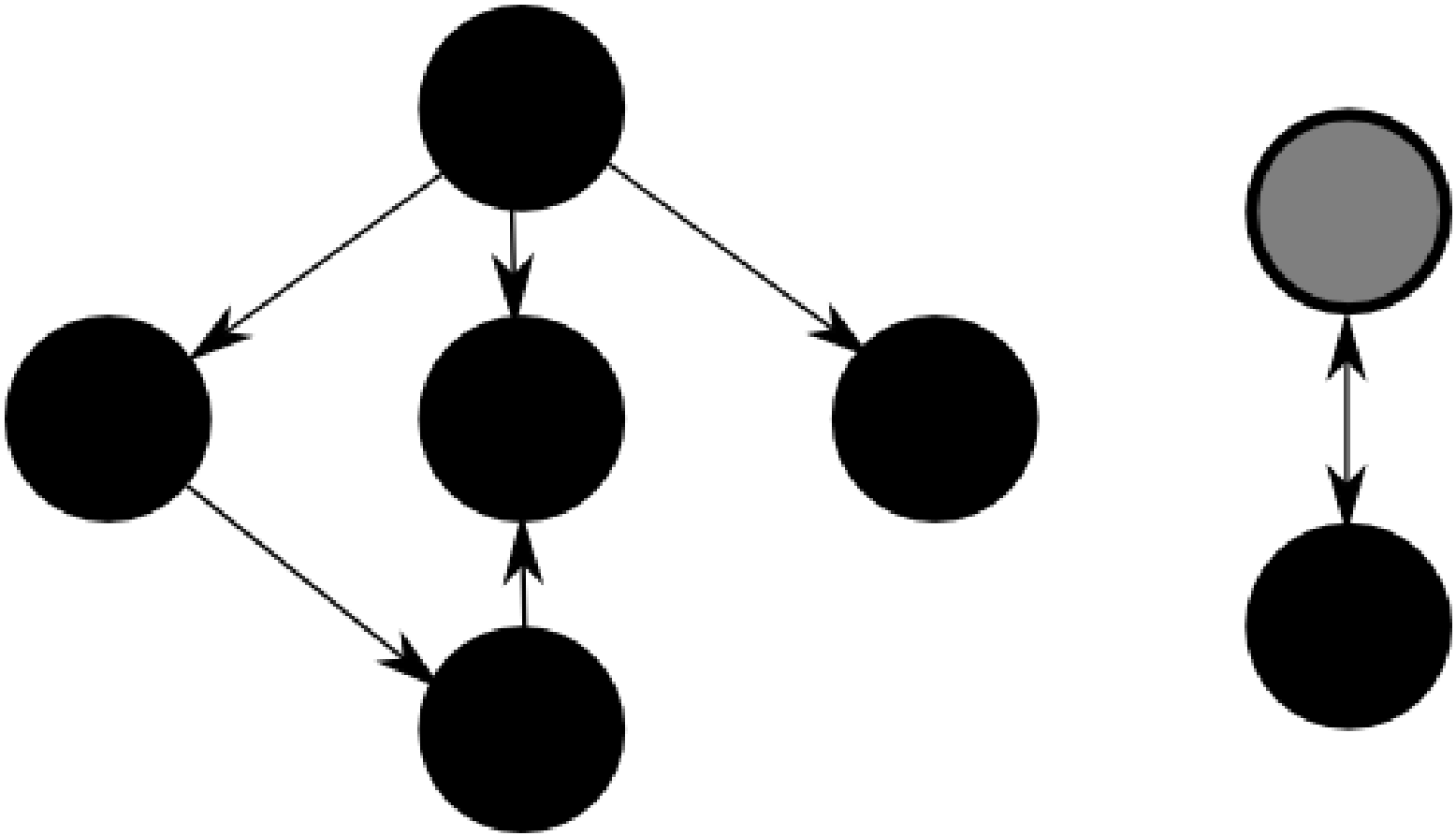

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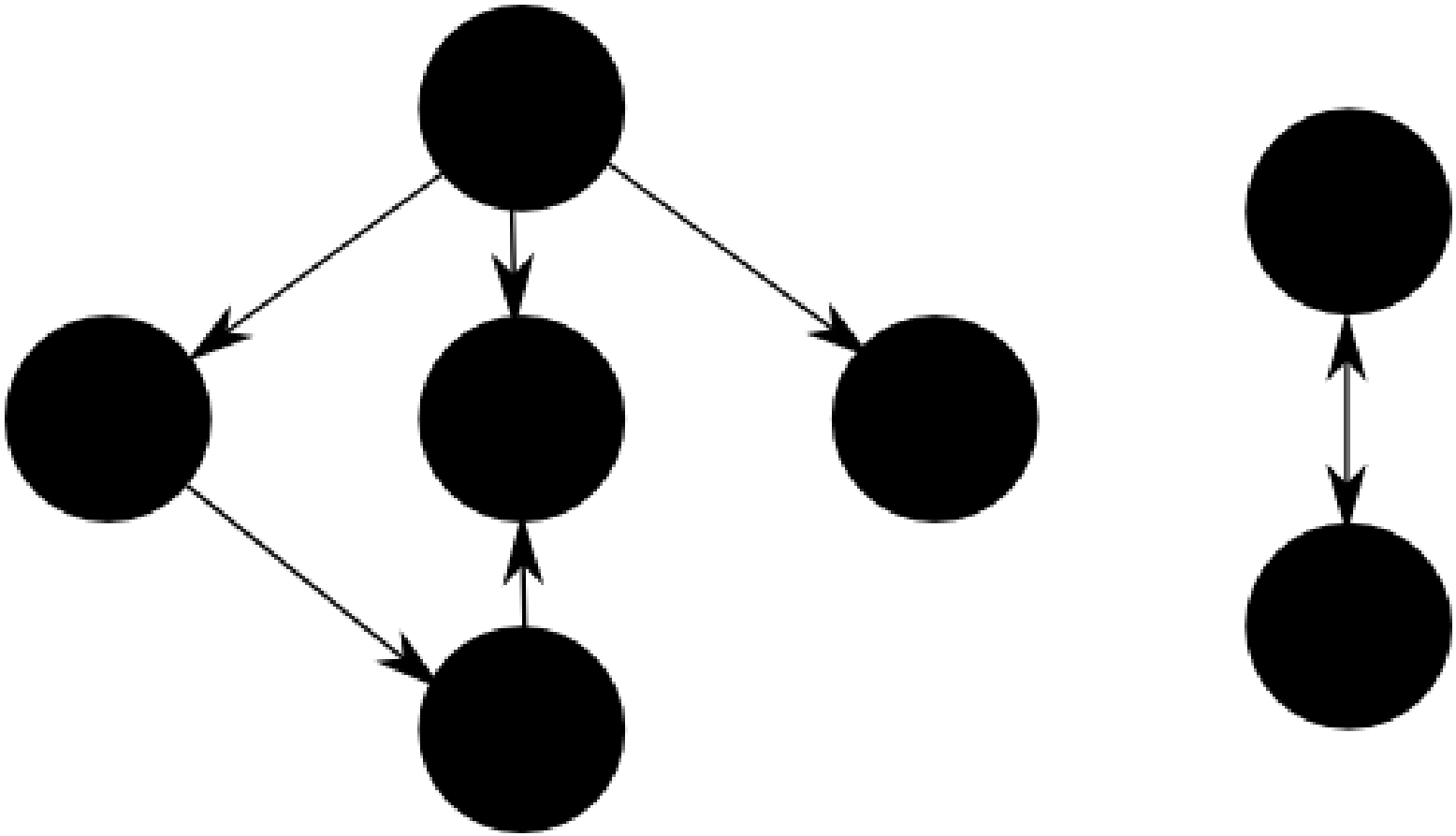

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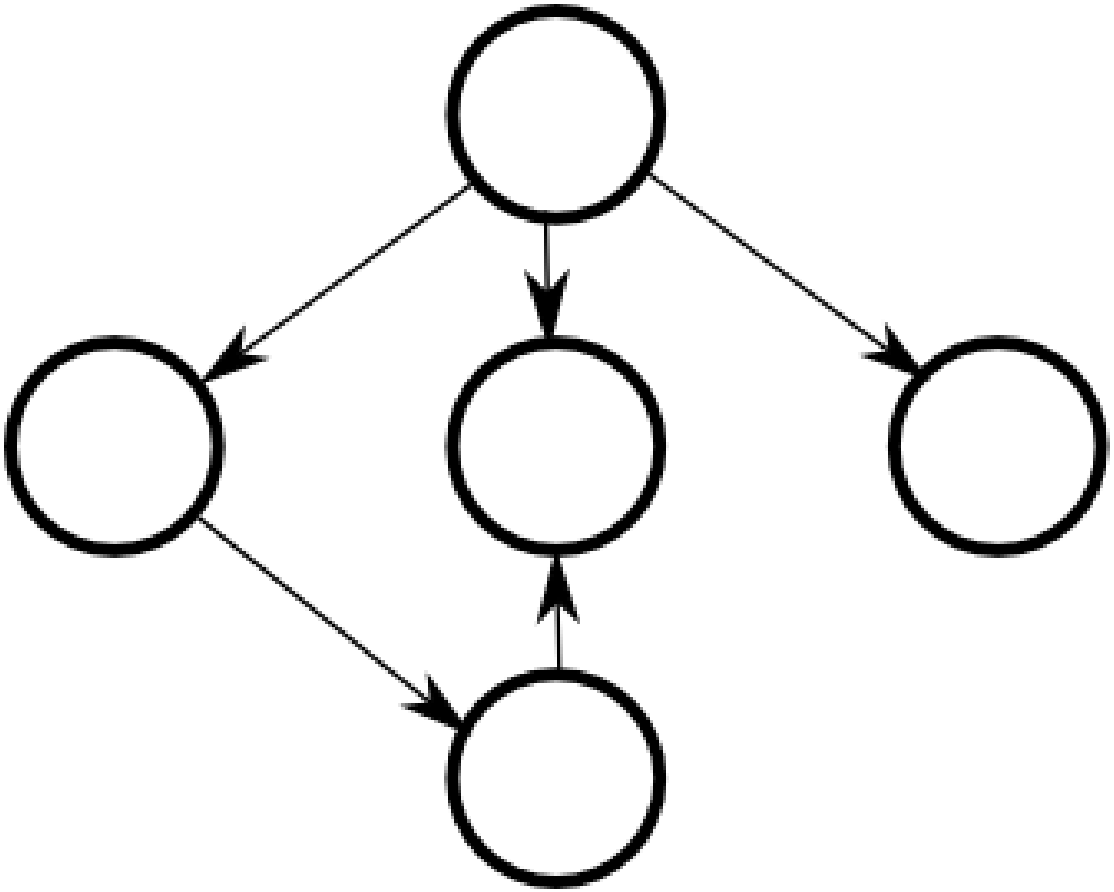

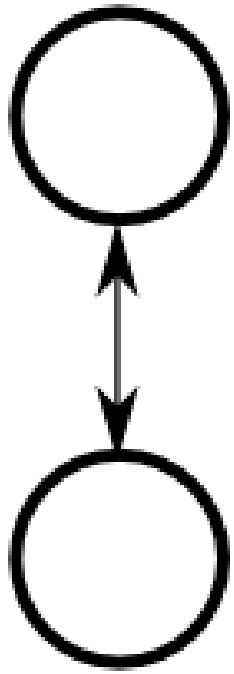

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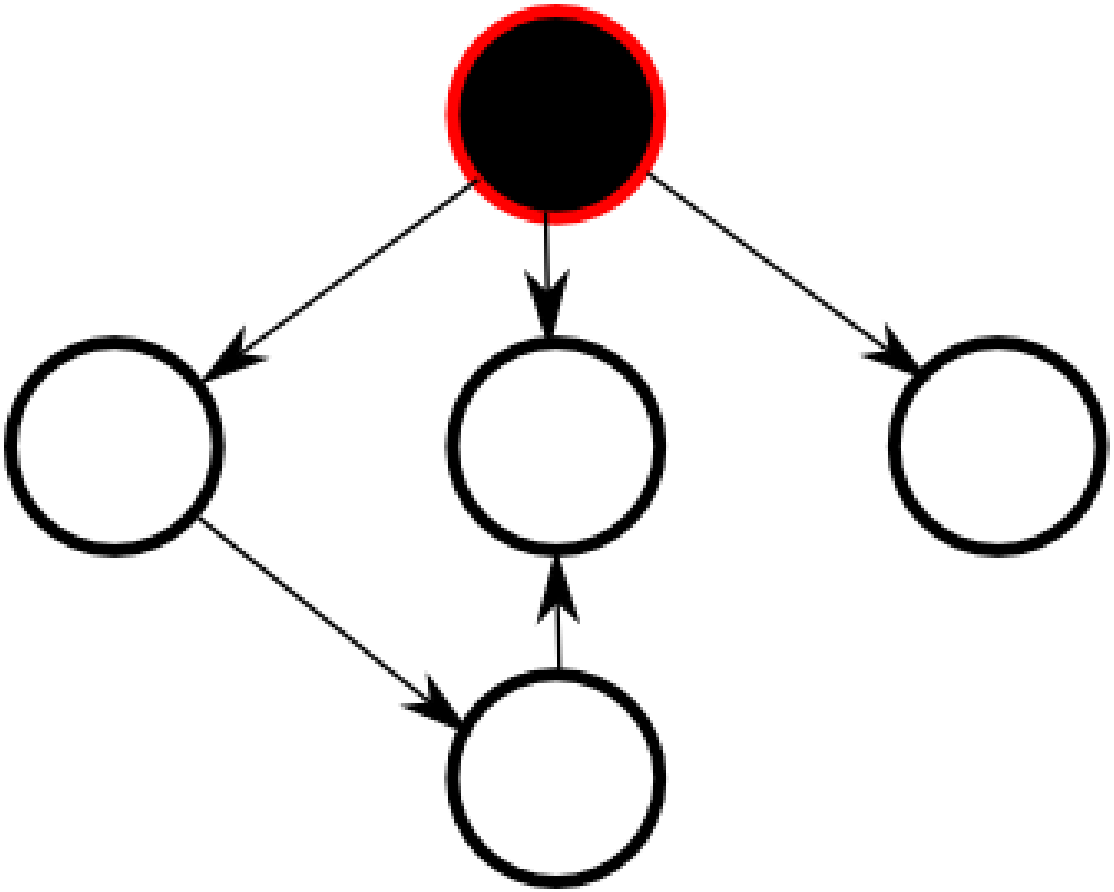

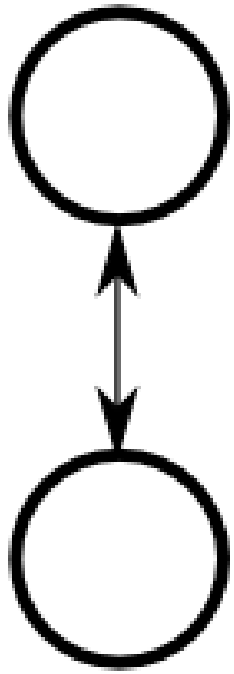

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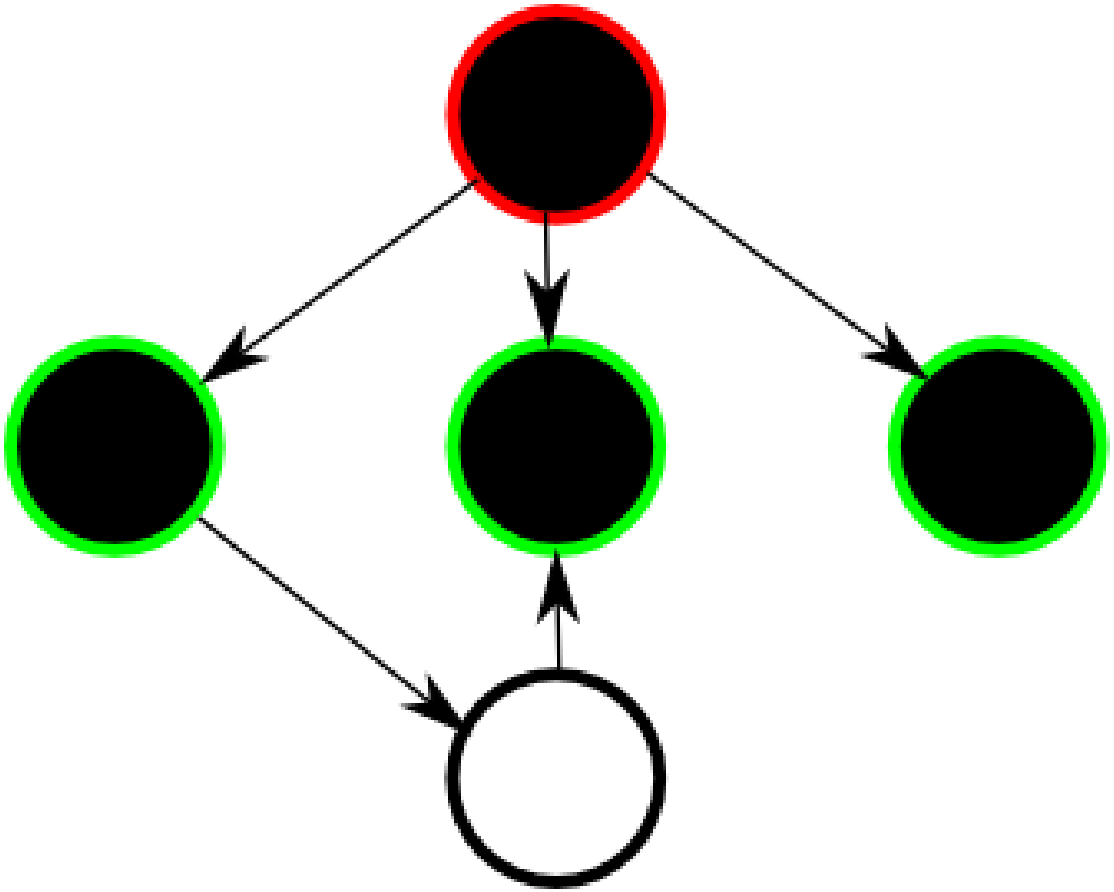

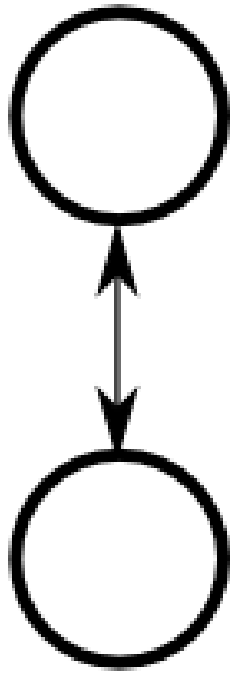

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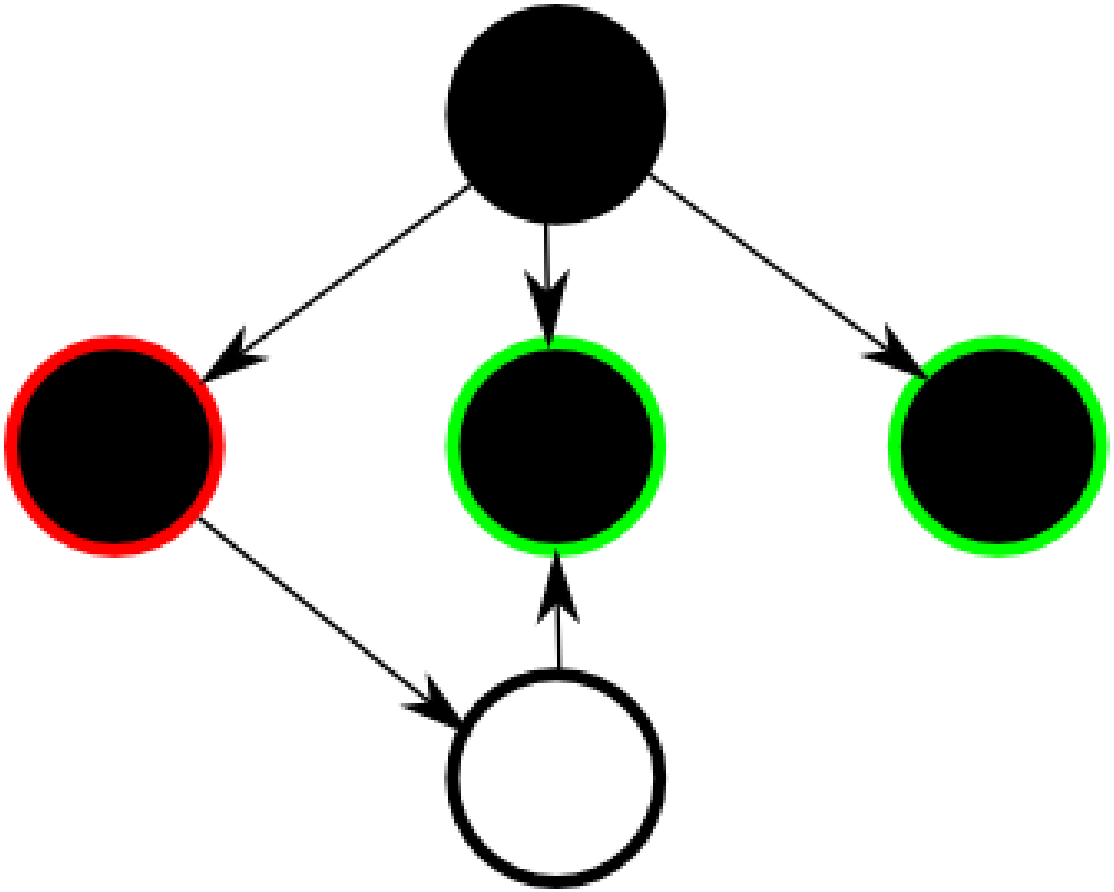

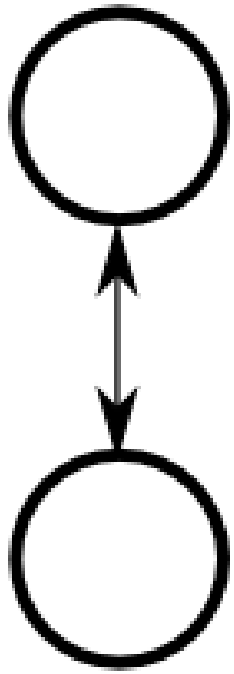

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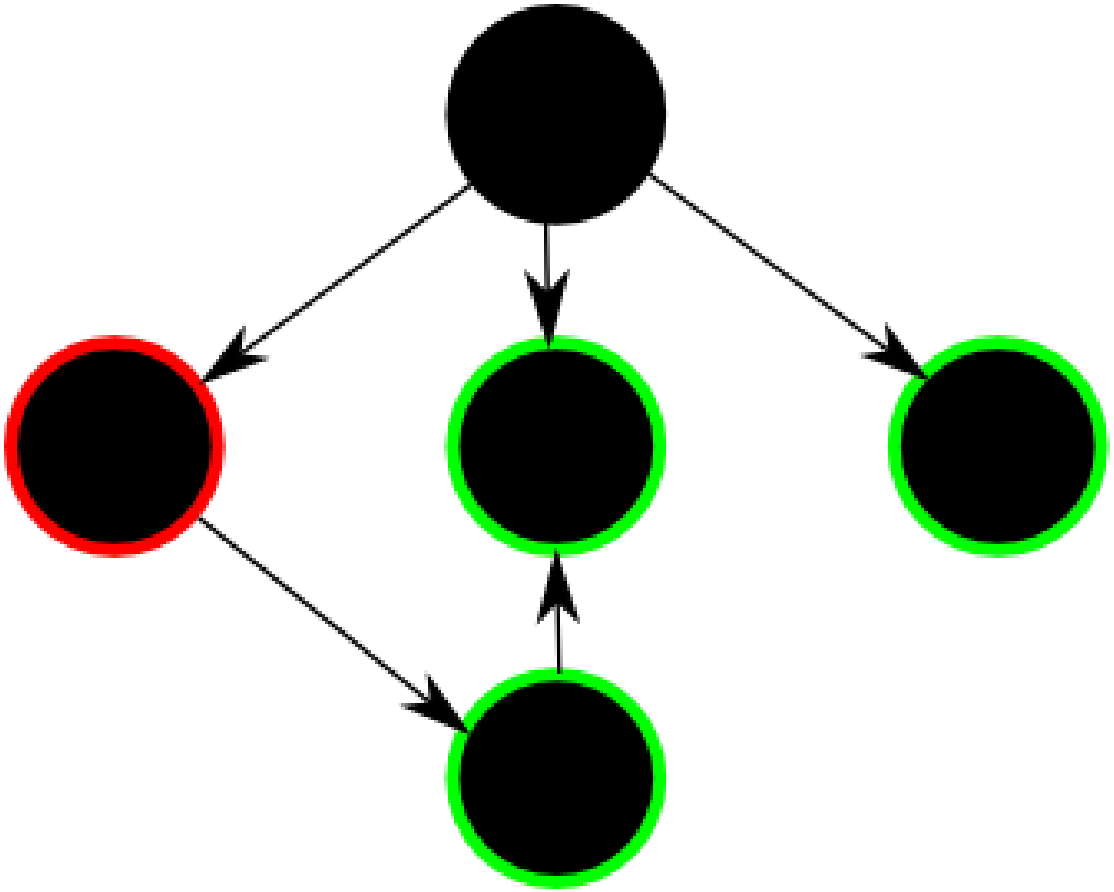

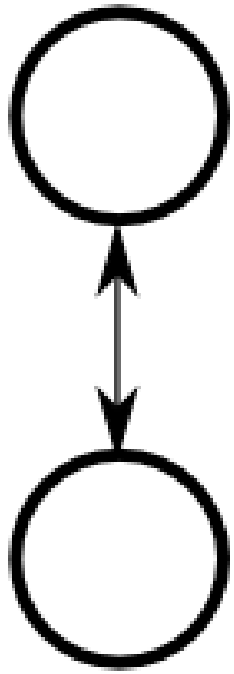

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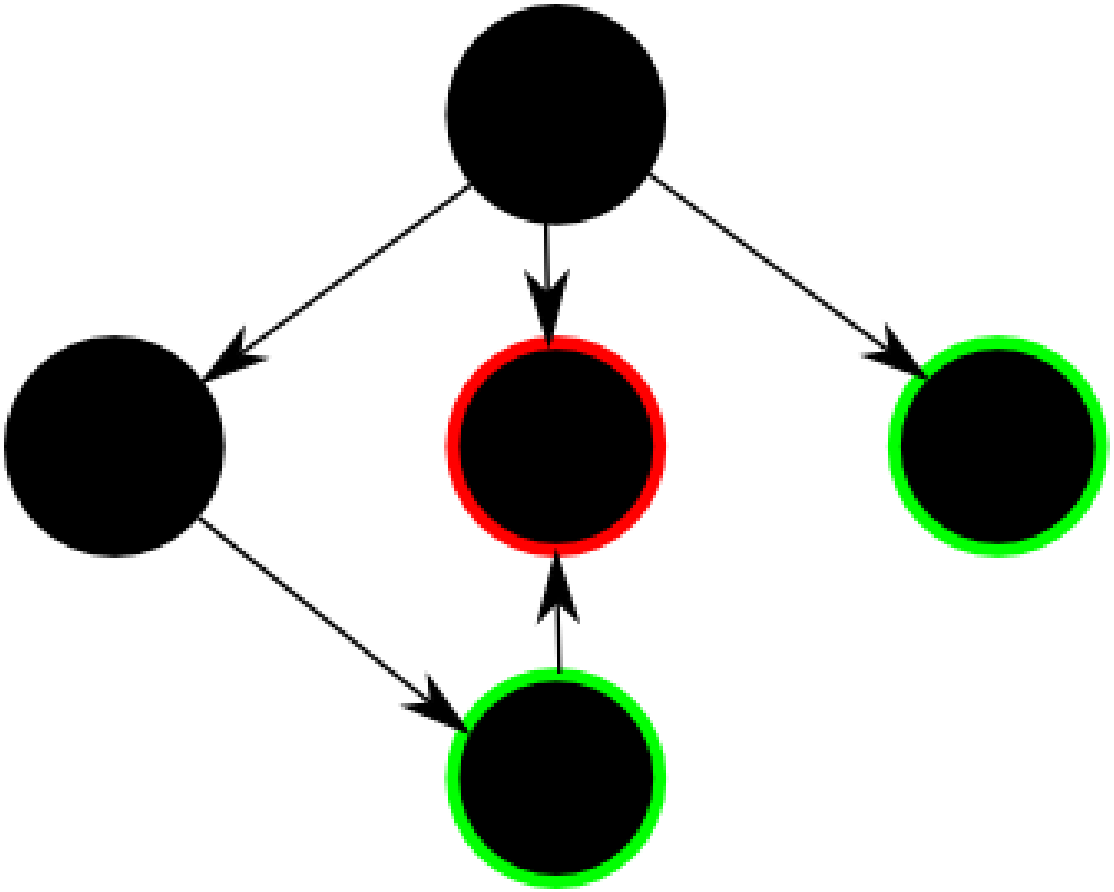

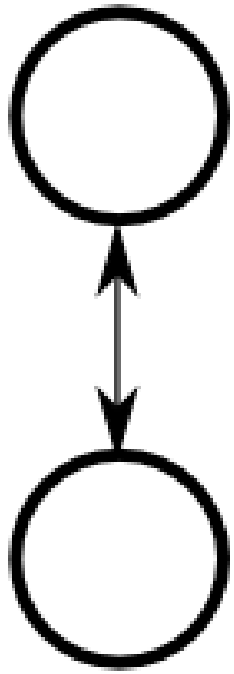

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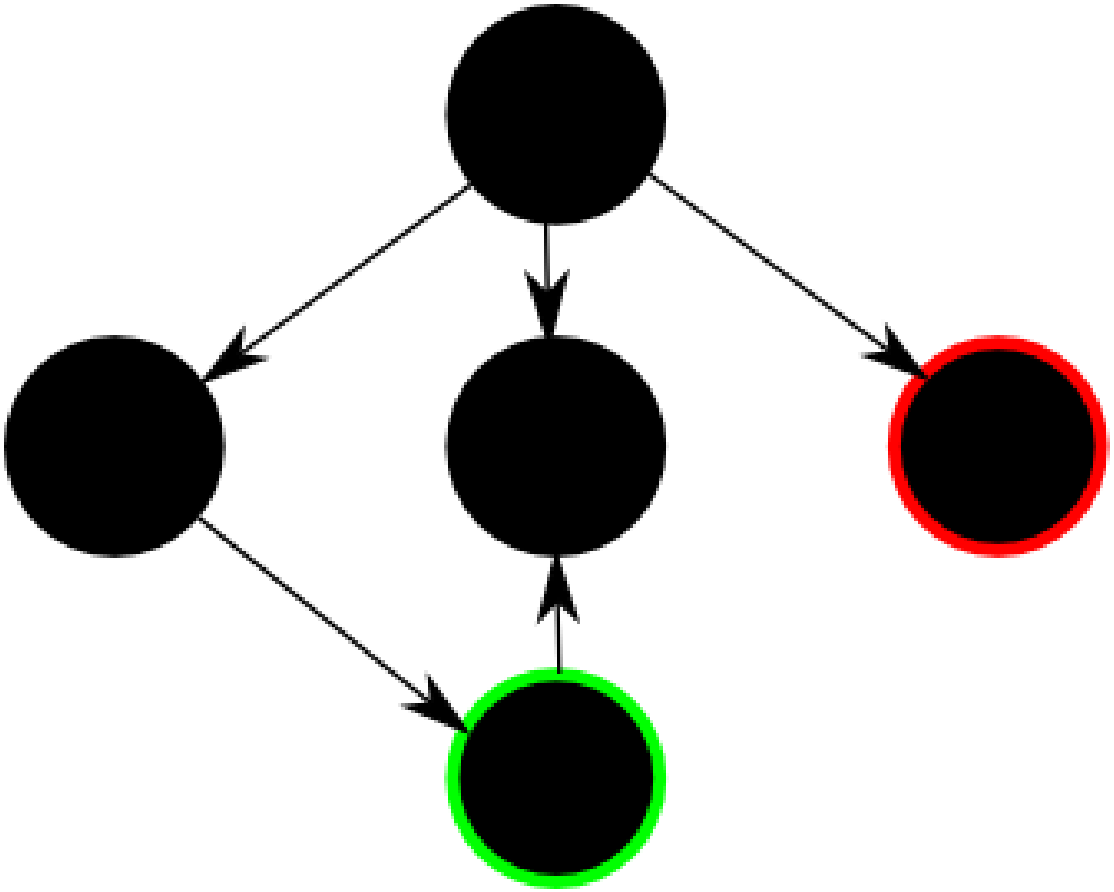

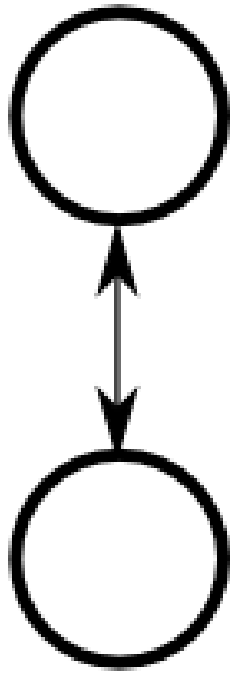

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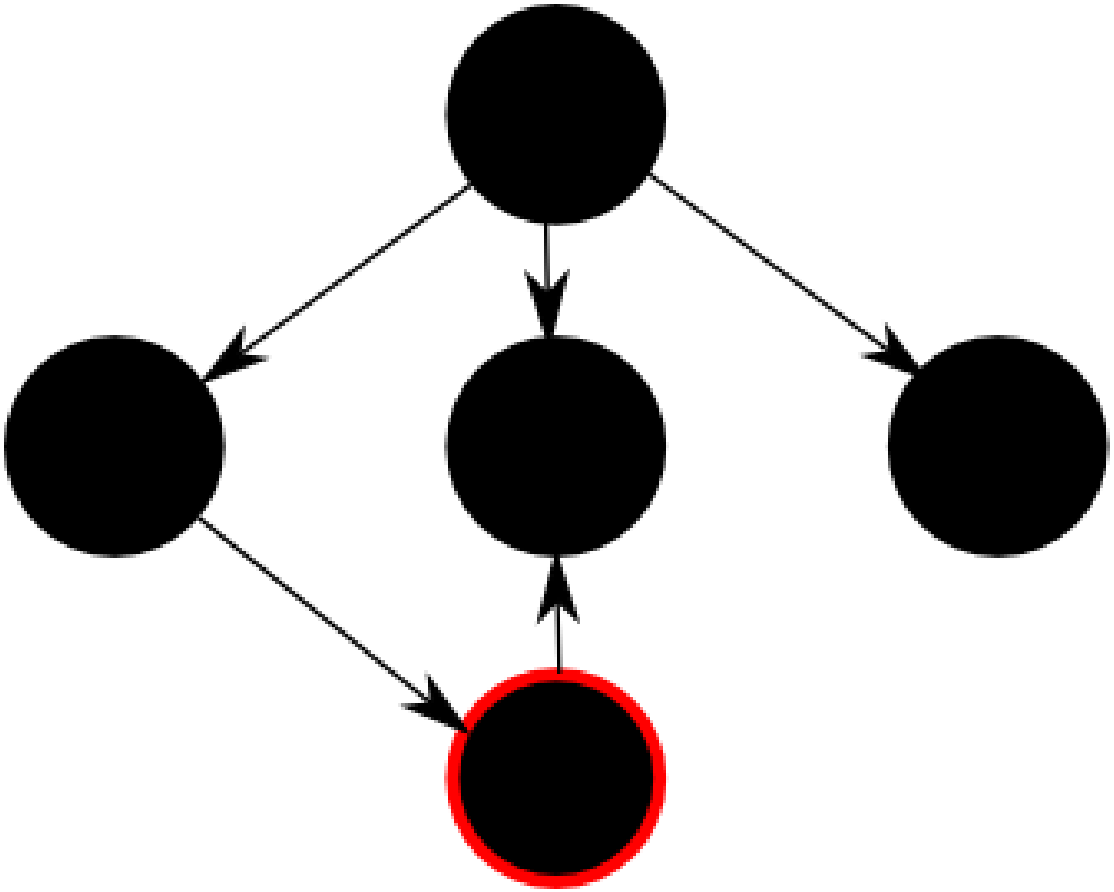

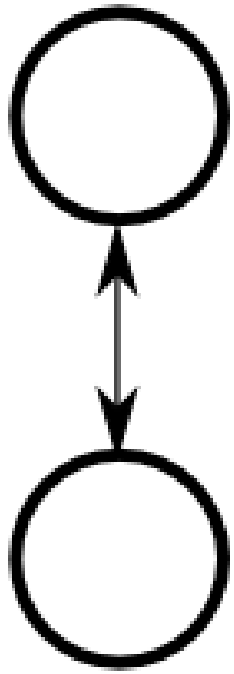

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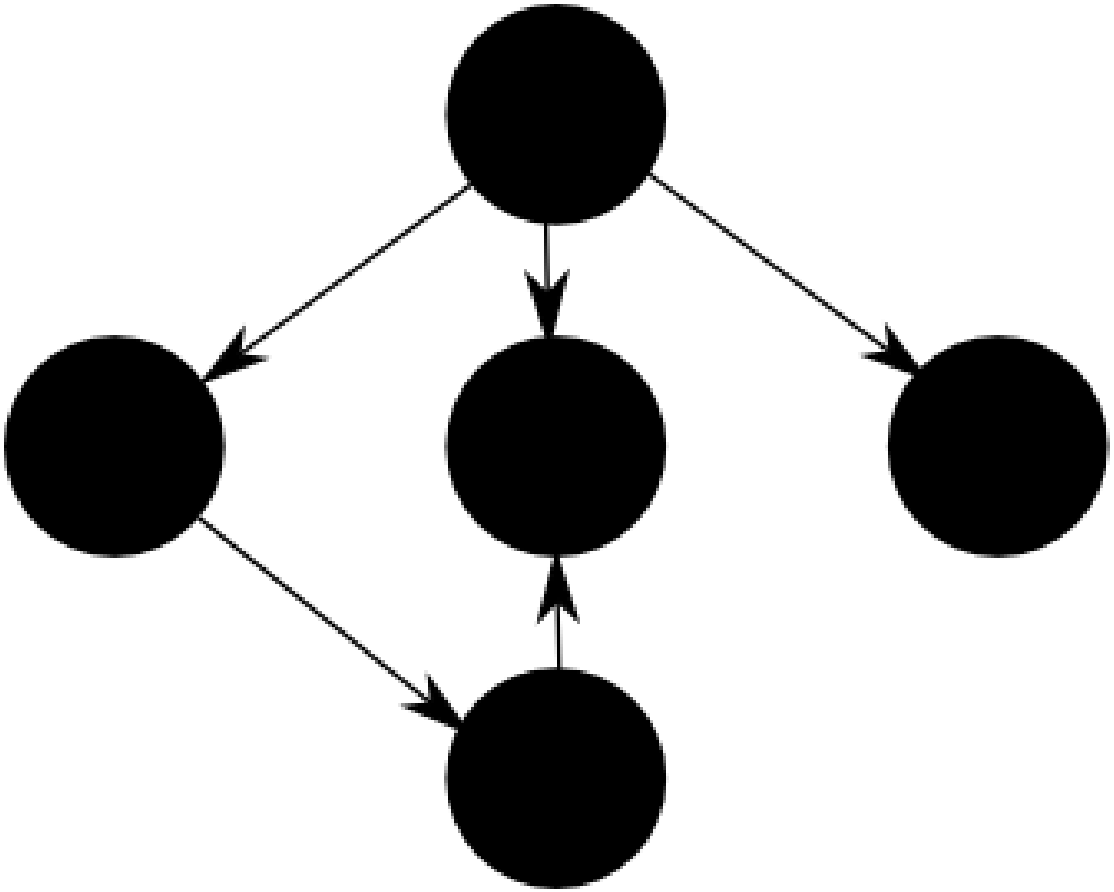

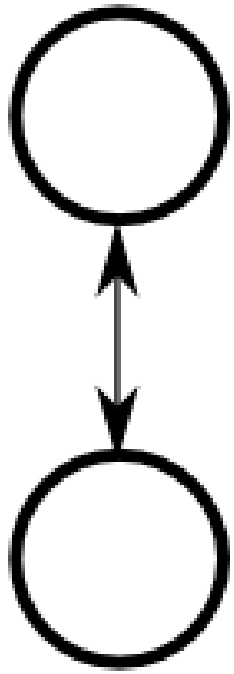

DFS & BFS

DFS

- kein ausgezeichneter Startknoten
- discovered, finalized
- Depth-First-Forest
- Laufzeit: $\theta(|V| + |E|)$

BFS

- ausgezeichneter Startknoten
- distance
- Breadth-First-Tree
- Laufzeit: $\theta(|V| + |E|)$

Sonstiges

- Baumkante
- Rückwärtskante
- Vorwärtskante
- Querkante
- Klammern-Theorem
- Starke Zusammenhangskomponenten
- Bipartite Graphen

Vielen Dank für die Aufmerksamkeit!