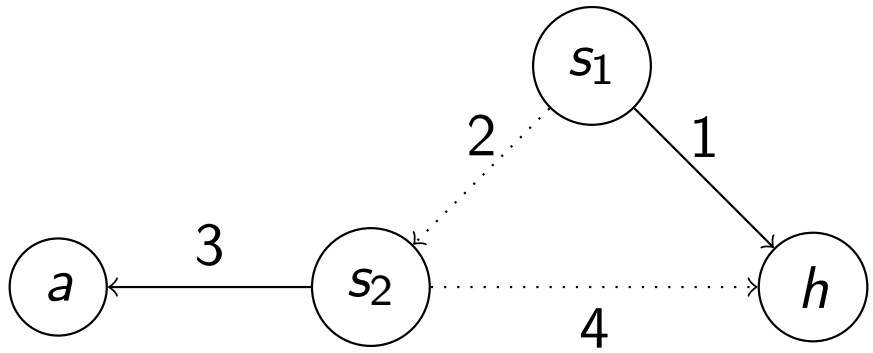
August 4, 2022

Outline

Examples
- blacklist
- loop freedom
- waypoint enforcement
- invalid drop
- congestion

Blacklist

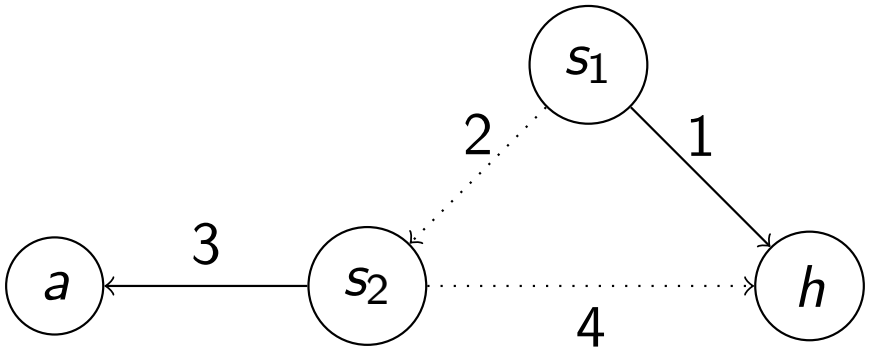


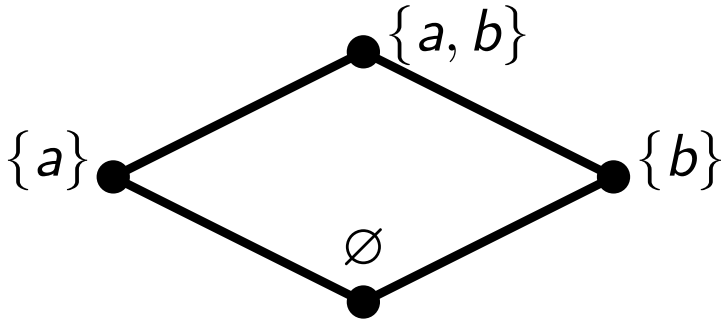
Property:

- Property: a not being reachable from s_1

Current Behavior:

1. Replace path 1 with 2

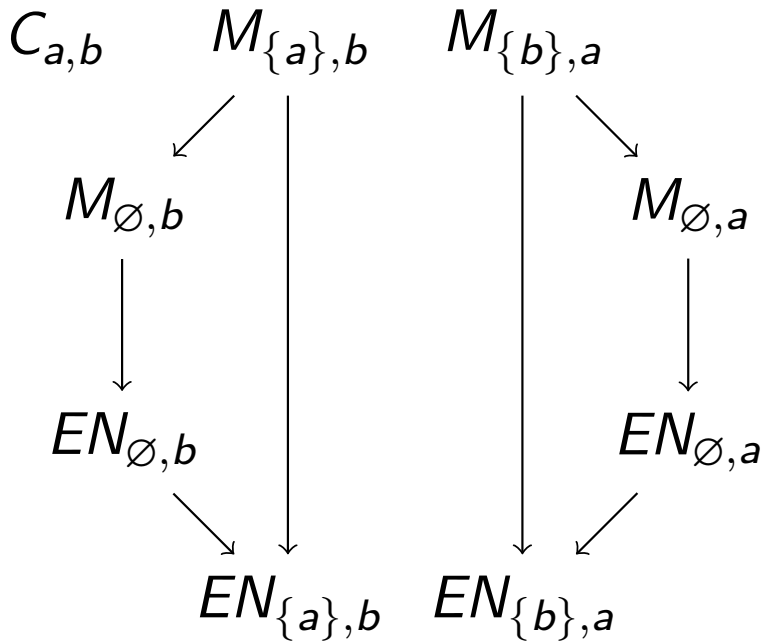


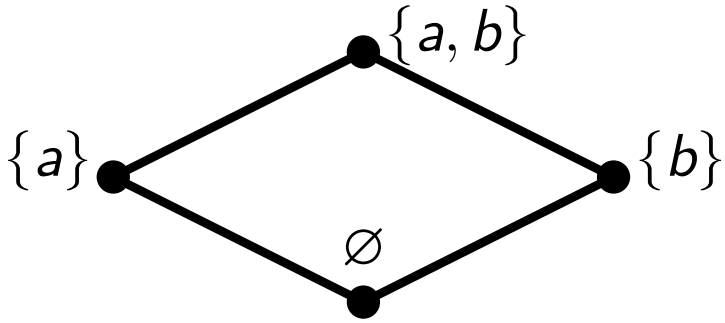


Events:

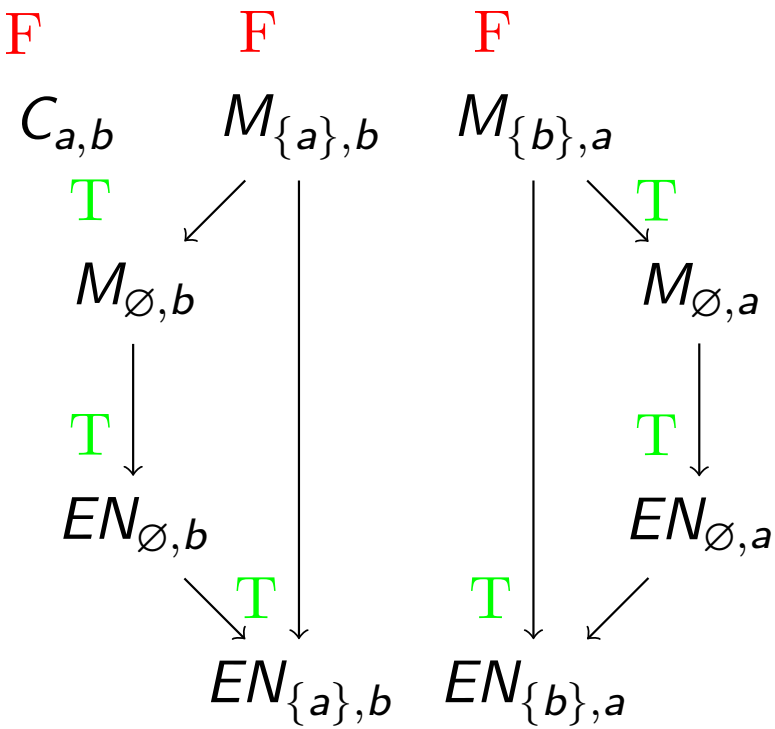
- a: Replace path 1 with 2
- b: Replace path 3 with 4

Counterexample: $\sigma = \{a\}$





- Counterexample: $\sigma = \{a\}$
- Cause: $M(\{b\}, a) = \mathrm{F}$
- Witness: $(\varnothing, \varnothing, \mathrm{T})$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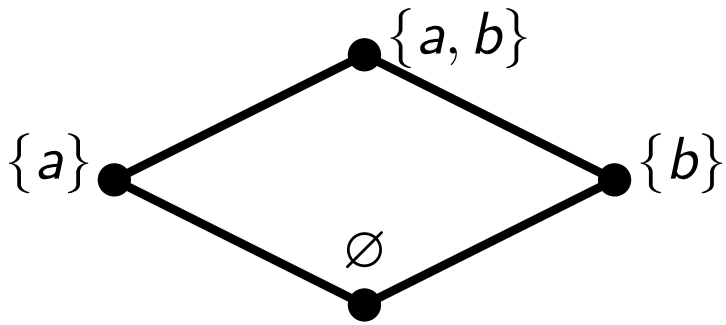
$\{a, b\}$
$\{a\}$
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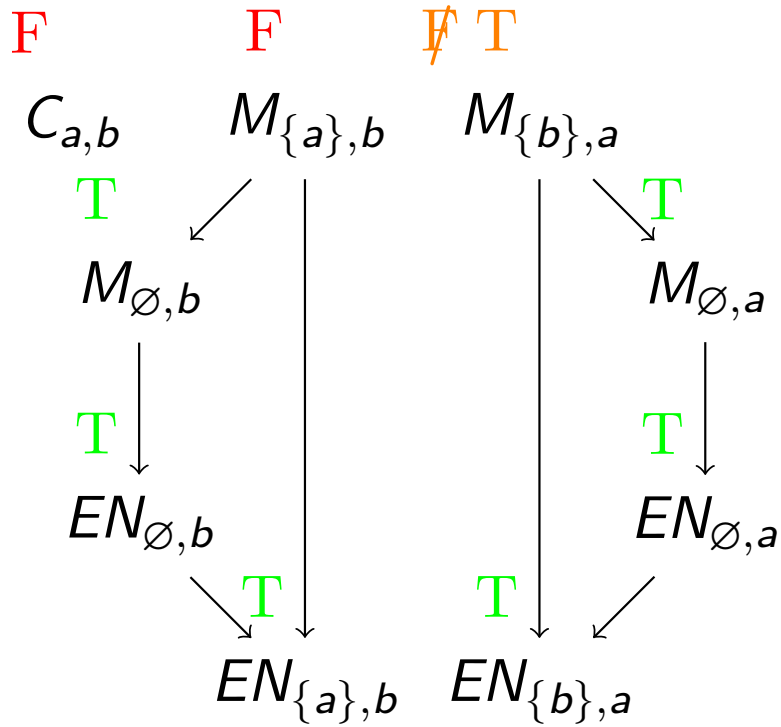
$\emptyset$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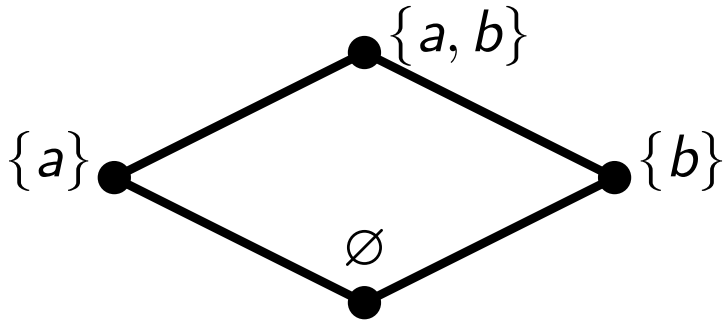
$\{a, b\}$
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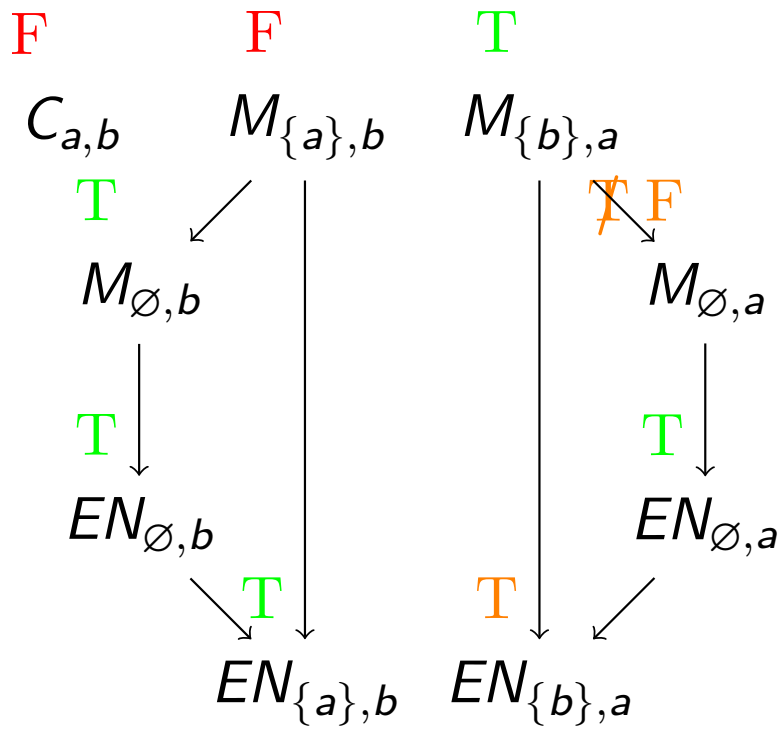
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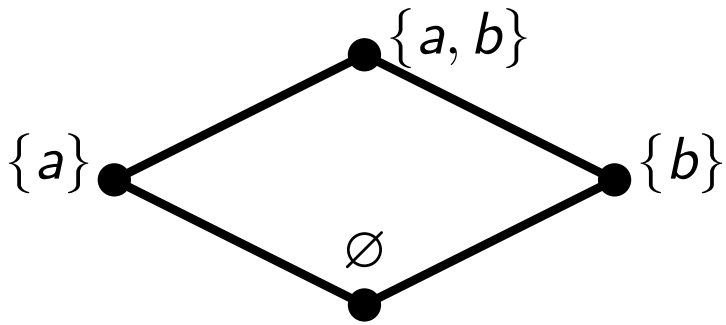
$\{a, b\}$
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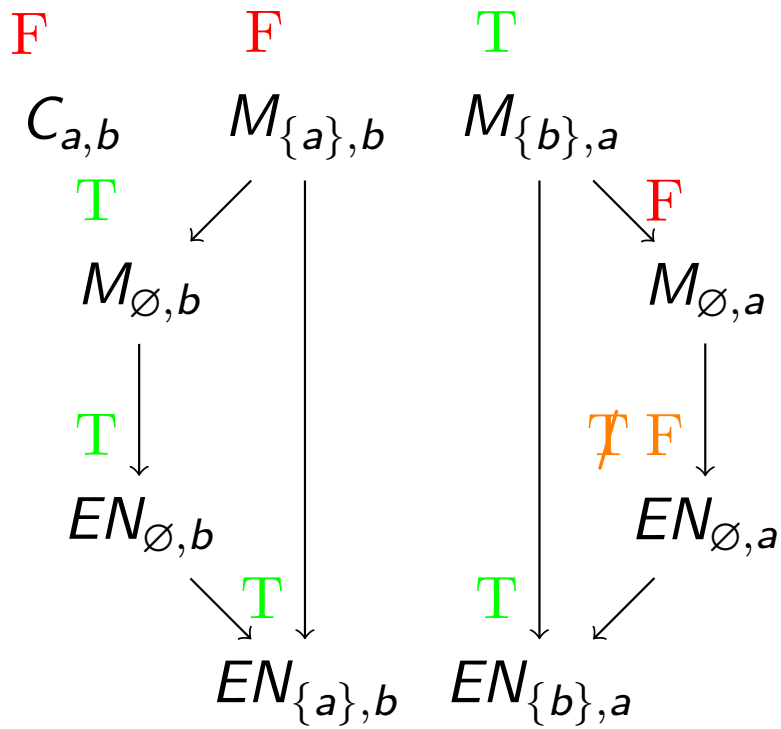
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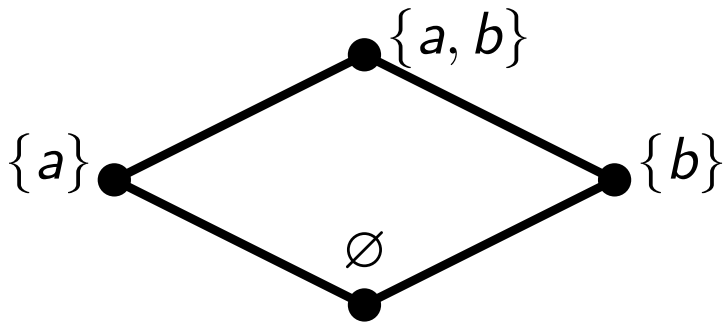
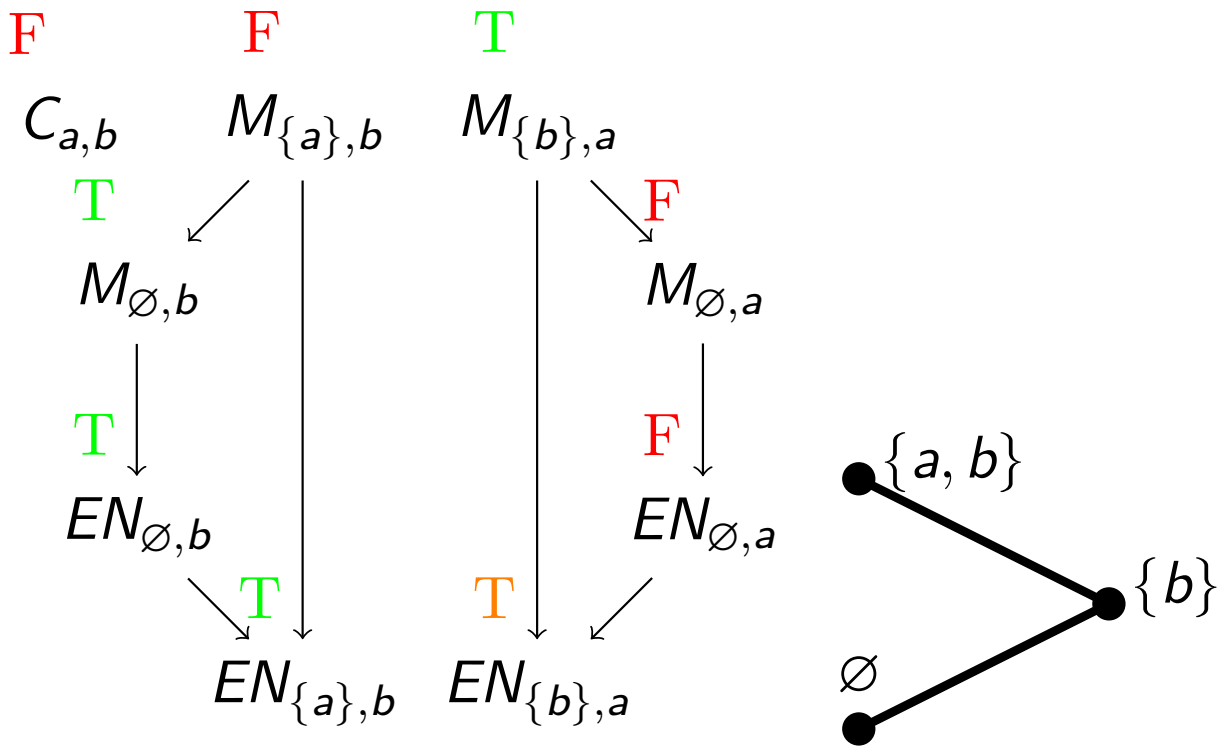

$\{a, b\}$
$\{a\}$
$\{b\}$
$\emptyset$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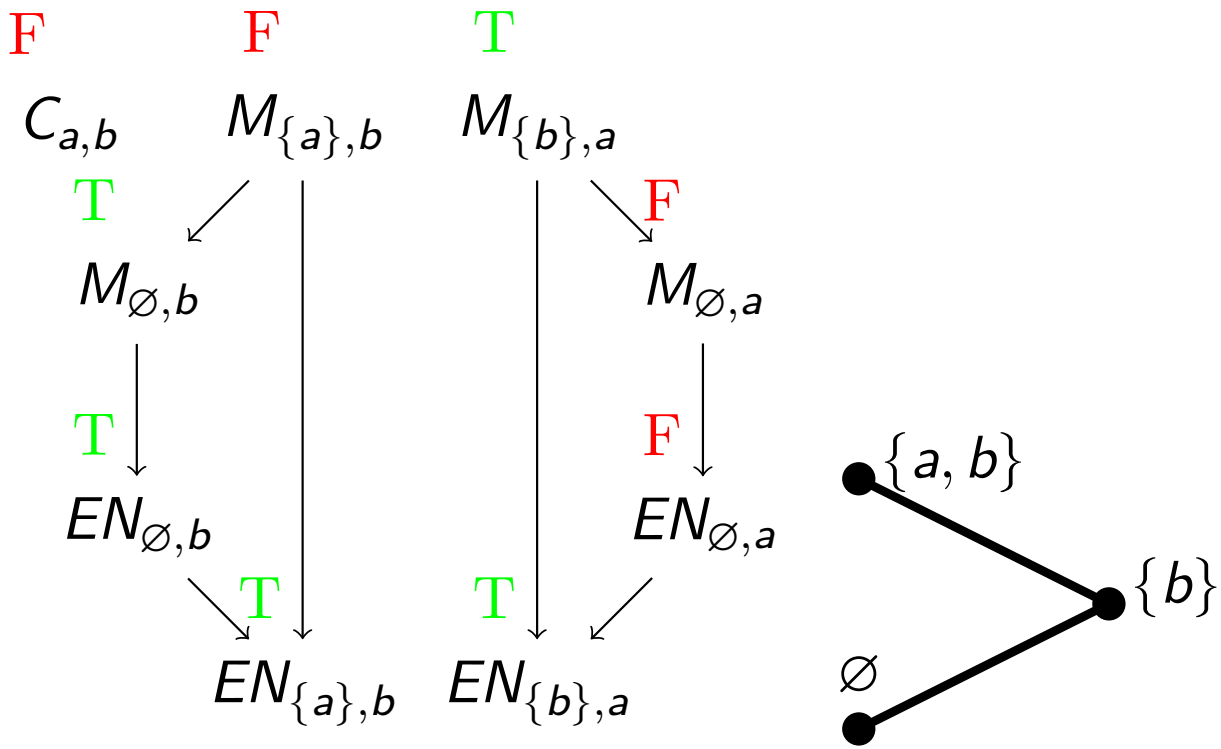
$\{a, b\}$
$\{b\}$
$\emptyset$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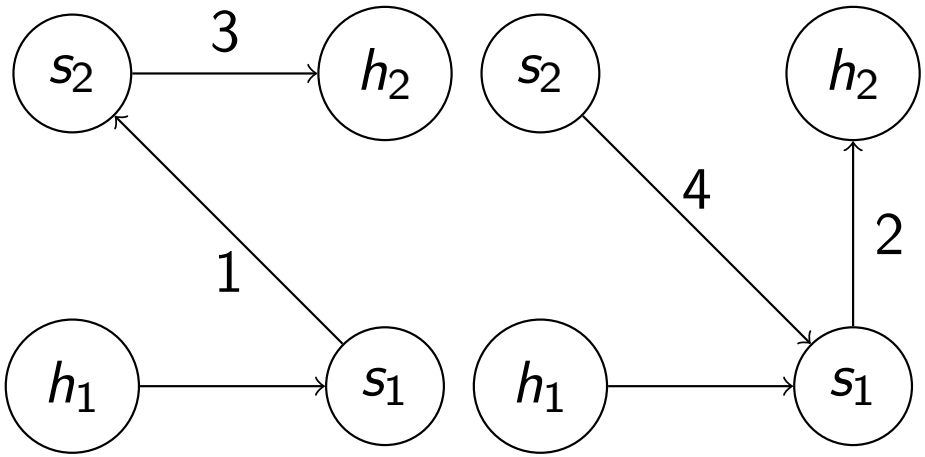
$EN_{\{b\},a}$
$\{a, b\}$
$\{b\}$
$\emptyset$

Loop Freedom

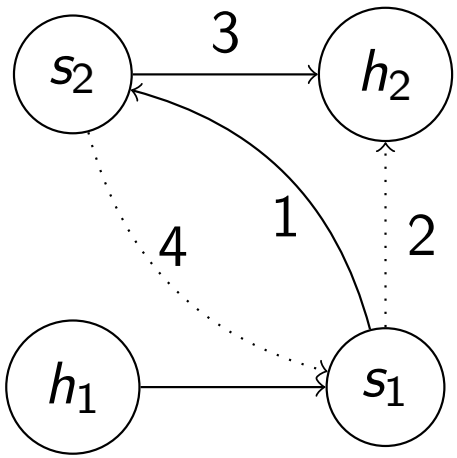


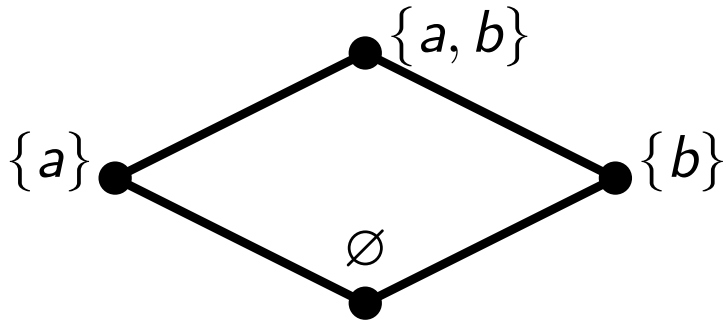
Property:

- Property: no forwarding loop

Current Behavior:

1. Replace path 3 with 4



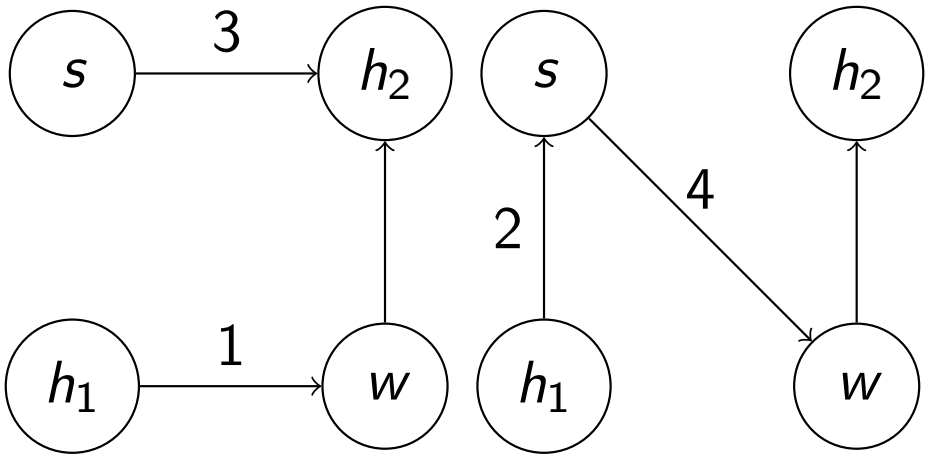


Events:

- a: Replace path 3 with 4
- b: Replace path 1 with 2

Counterexample: $\sigma = \{a\}$

Waypoint Enforcment

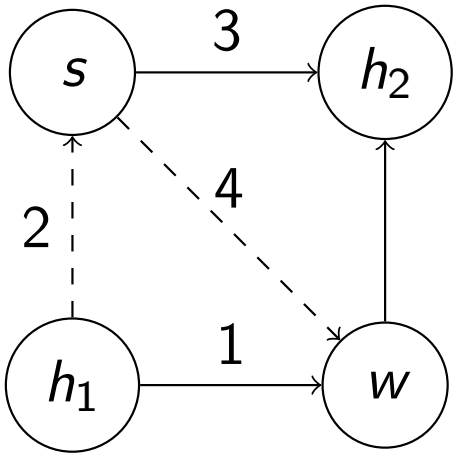


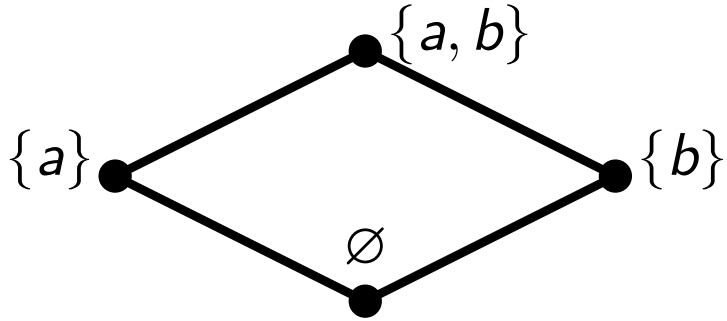
Property:

- Property: waypoint enforcement

Current Behavior:

1. Replace path 1 with 2



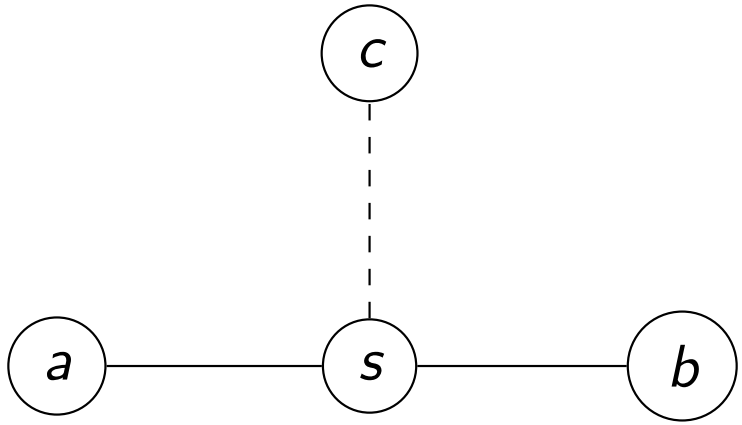


Events:

- a: Replace path 1 with 2
- b: Replace path 3 with 4

Counterexample: $\sigma = \{a\}$

Invalid Drop

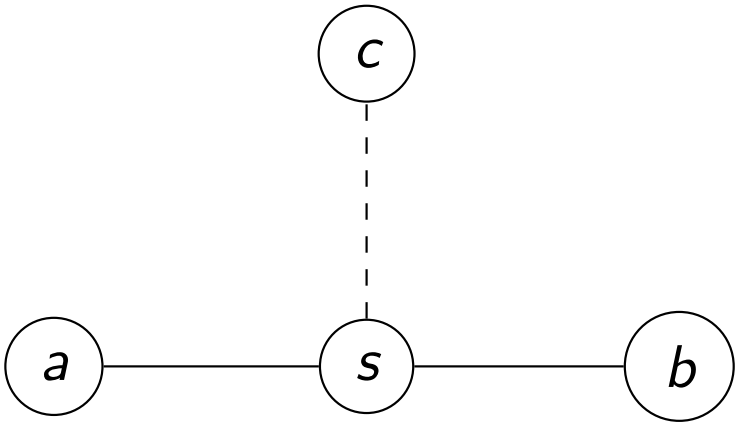


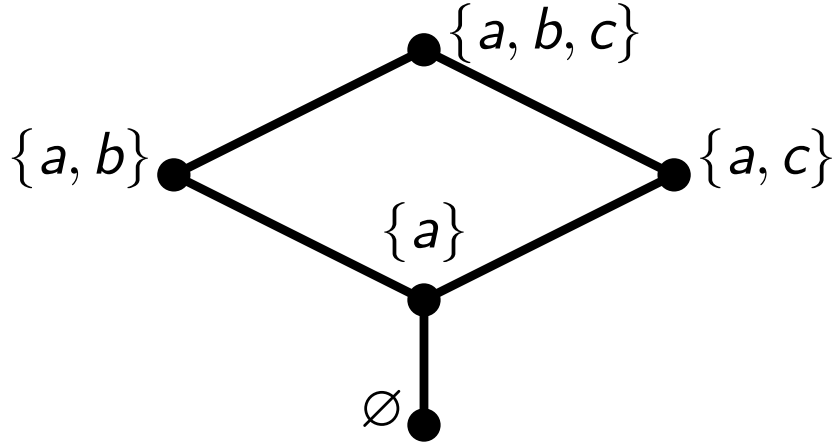
Property:

- Property: allow packets from b after a packet is sent toward it

Current Behavior:

1. a sends a packet to s
2. s sends an event to c
3. b sends a packet to s
4. s drops the b's packet
5. c sends a command to install a rule for allowing packets from b



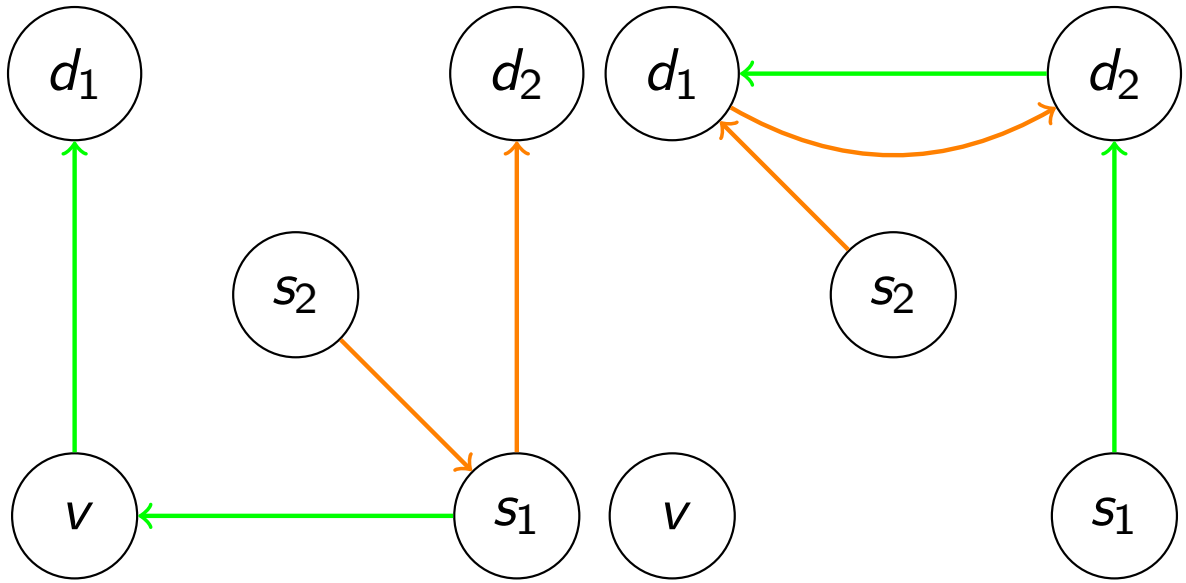


Events:

- a: the arrival of a packet from a at s and sending event to c
- b: the arrival of a packet from b at s
- c: the arrival of a command to allow packets from b

Enabling: $\varnothing \vdash a, \{a\} \vdash b, \{a\} \vdash c$
Counterexample: $\sigma = \{a\}$

Congestion

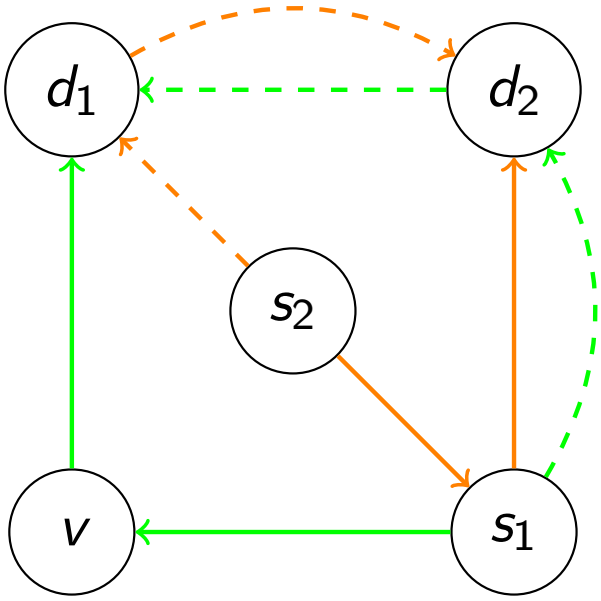


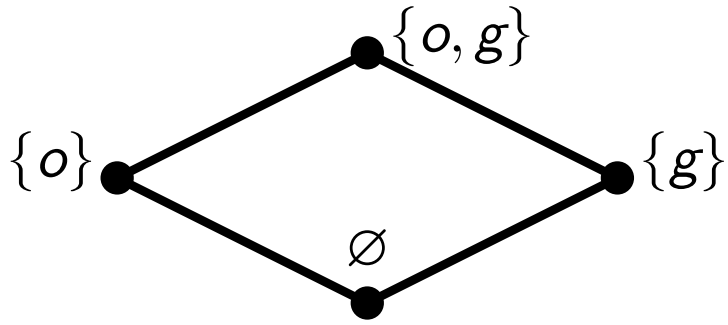
Property:

- Property: avoid congestion on the link $s_1 - d_2$

Current Behavior:

1. Migrate the green path



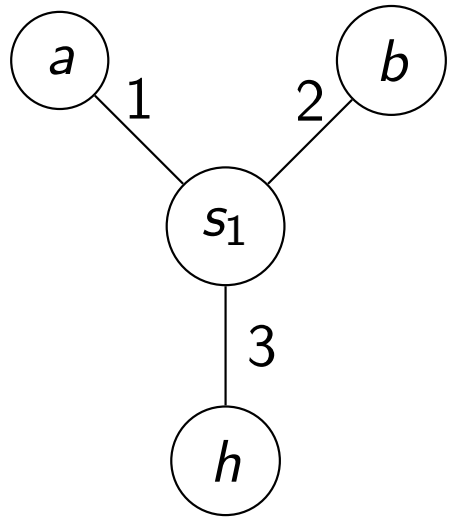


Events:

- g: migrating the green path
- o: migrating the orange path

Counterexample:

1. $\sigma = \{g\}$

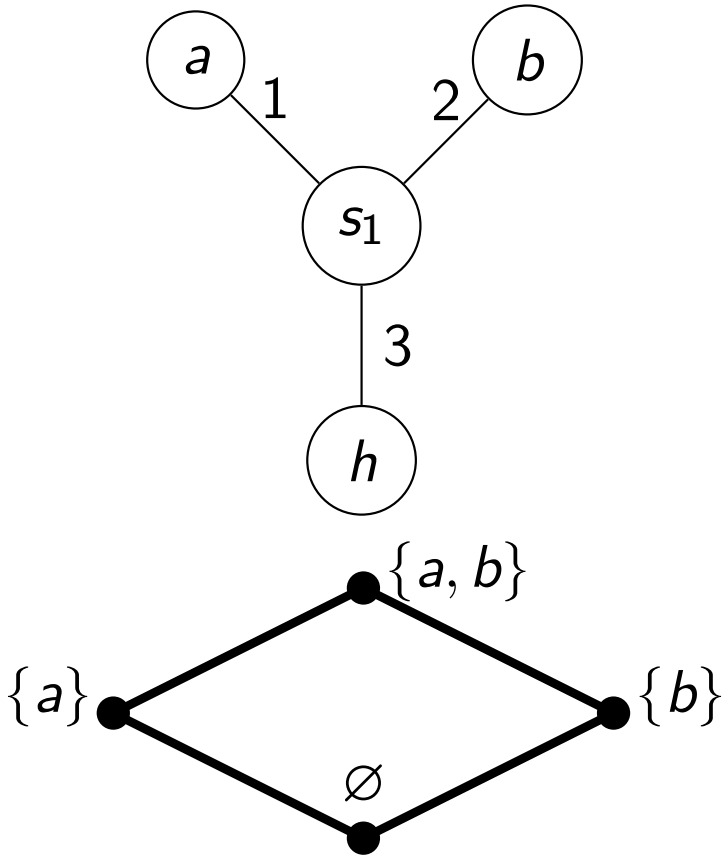


Property:

- at least two packets traversing link 3

Current Behavior:

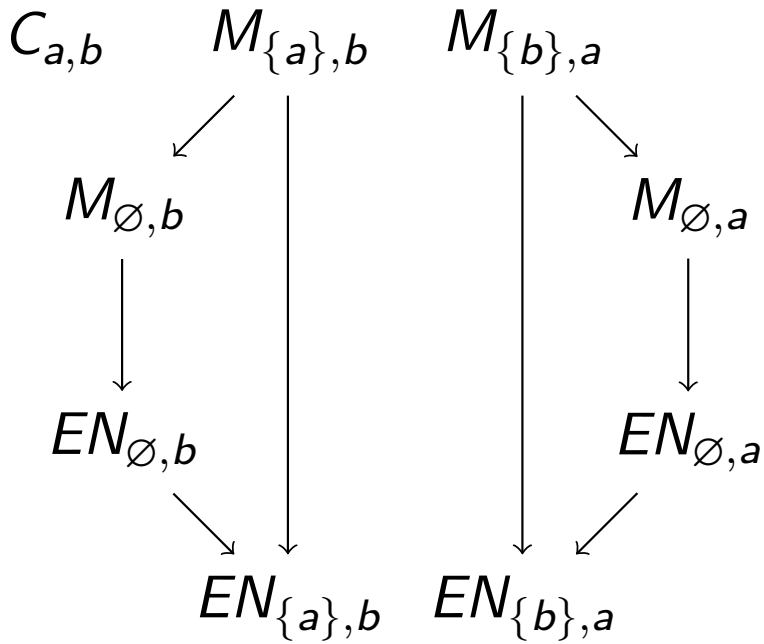
1. forwarding a packet from 1 to 3
2. forwarding a packet from 2 to 3

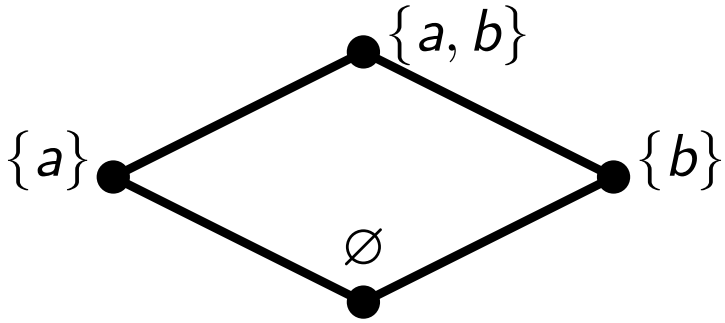


Events:

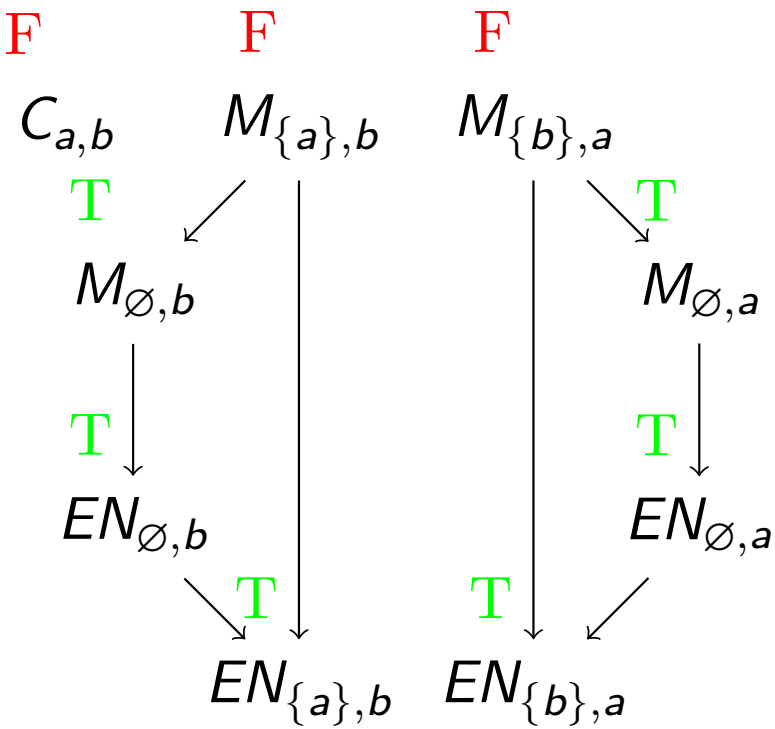
- a: Forwarding a packet from 1 to 3
- b: Forwarding a packet from 2 to 3

Counterexample: $\sigma = \{a, b\}$





- Counterexample: $\sigma = \{a, b\}$
- Cause: $C(a, b) = \mathrm{F}$
- Witness: $(\varnothing, \varnothing, \mathrm{T})$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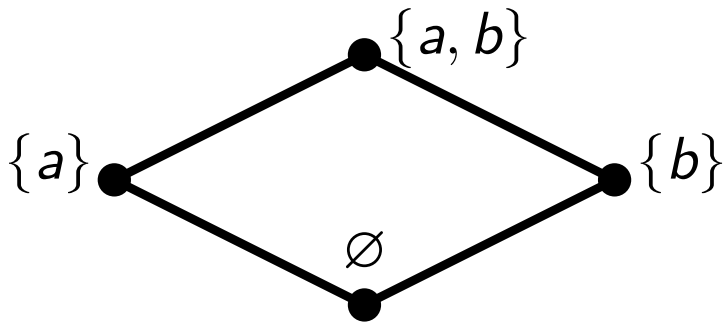
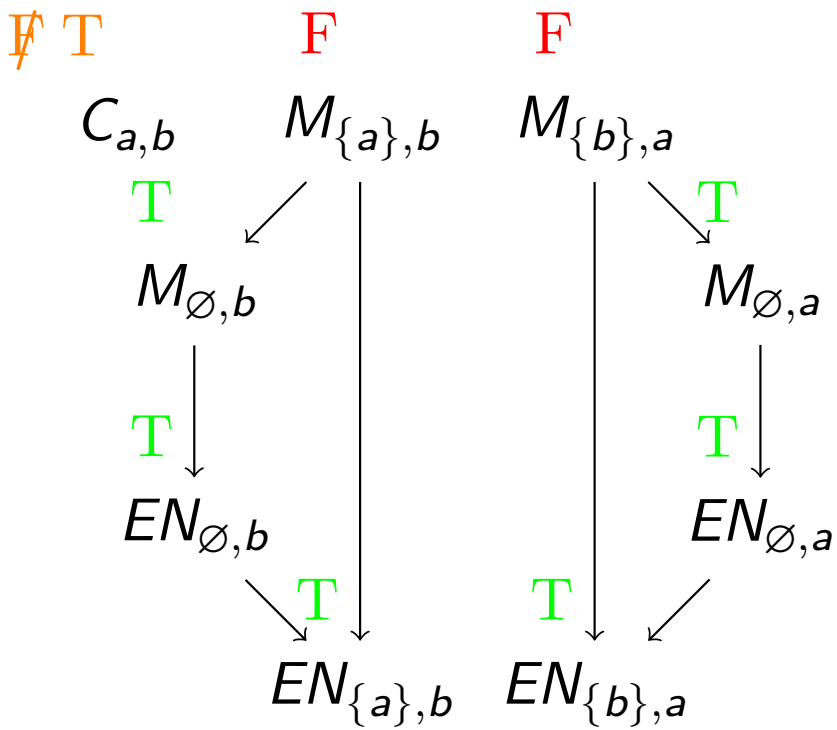

$\{a, b\}$
$\{a\}$
$\{b\}$
$\emptyset$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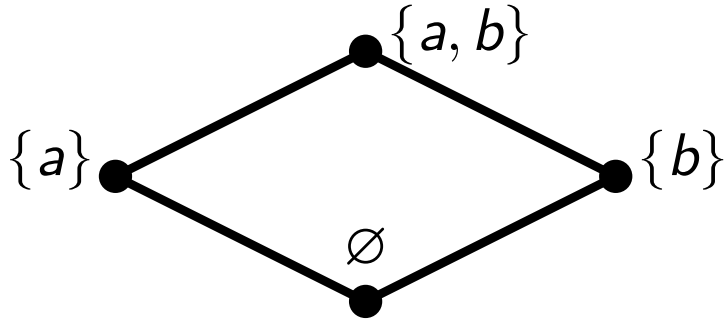
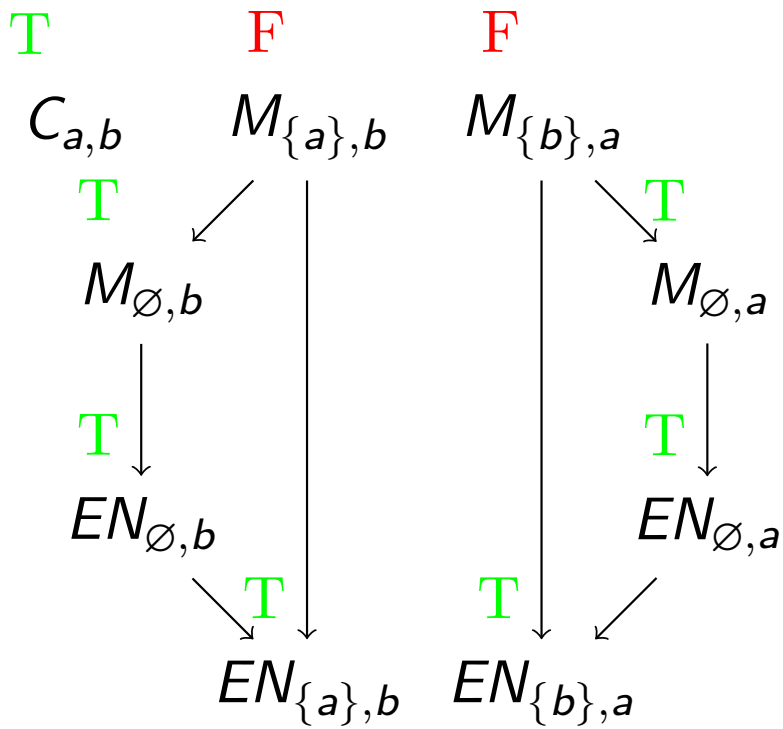

$\{a, b\}$
$\{a\}$
$\{b\}$
$\varnothing$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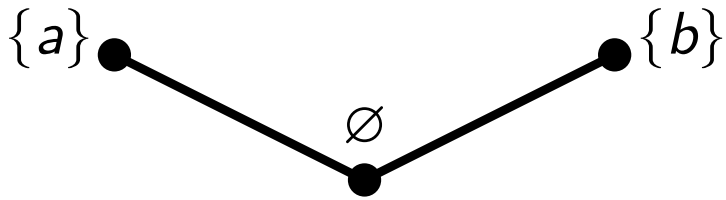
$\{a\}$
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