Choosing the system model for your specific application

Presentation to ecoinvent user meeting

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ecoinvent Centre

Overview

- Choosing system model relative to application, with example
- Does it matter? (comparing consequential and attributional systems)
- In development: Additional system models

System models

- “Consequential, small-scale, long-term” (consequential)
- “Allocation, ecoinvent default” (attributional)

- The two system models are the ones recommended by ecoinvent for consequential and attributional applications

Application areas

- Decision support for environmental improvements
- Two ways to make improvements:
  - ⇨ through product-oriented policies
  - ⇨ through direct regulation of the individual activities
- Applications where attributional modelling is relevant:
  - ⇨ Hot-spot analysis to identify both kind of improvement options
- Applications where consequential modelling is relevant:
  - ⇨ For most other applications, where improvements are sought via affecting the demand for specific products, e.g. labelling, purchase decisions, product development, product regulations, …

Example for building materials

- A study of the entire domestic building stock with the aim of identifying areas for improvement → Attributional model
- A study of specific improvement options, where the aim is to inform the decision maker to prioritise between options based on their consequences → Consequential model
- A study to provide a label on a specific building product, where the aim is to inform the customer of the consequences of buying this product → Consequential model

Does it matter…

- …which system model I choose?

Comparing the two recommended system models with ReCiPe, total (H,A):

- 44% of LCI results deviate less than 10 %
- 88% of LCI results deviate less than a factor 2
- 97% of LCI results deviate less than one order of magnitude

Causes for large deviations

…between the two recommended system models:

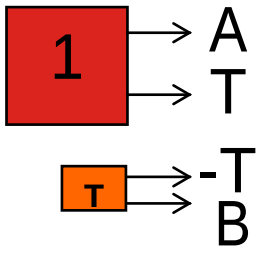
- Treatment activities have by-products that displace other activities in consequential model; In attributional model only the treatment activity is included
- Speciality products, like 100% recycled paper: Consequential model links to virgin production; attributional only to treatment activity
- Changes in consumption for constrained markets included in consequential model; not in attributional (example: krypton)
- Some unconstrained activities have much more/less impact than average (land tenure; Swiss electricity)
- By-products receive part of burden in attributional model; displace more polluting activities in consequential model

In progress: More system models

- Besides the two recommended system models, many more system models are possible, and some already are planned, based on customer demand:
  - (besides adding carbon corrections to the current attributional system model)
  - A system model for ILCD situation A (consequential, but without technology constraints)
  - An attributional system model with revenue allocation
  - A mass allocated system model for material flow accounting
  - A carbon allocated system model for carbon flow accounting
  - A new attributional system model with “true value” allocation, but re-introducing the cut-offs from ecoinvent v2 for some recycled materials (removing the supply of the reference product "treatment of X” from the treatment activities, adding instead an empty unit process "treatment of X, burden-free” to supply this input to the material supplier)

Planned system model with cut-offs

- Undefined:



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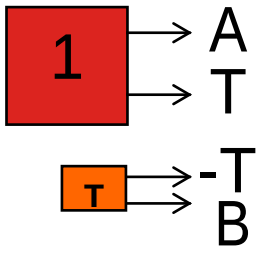

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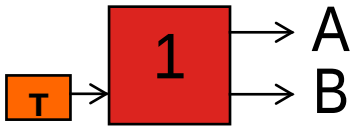

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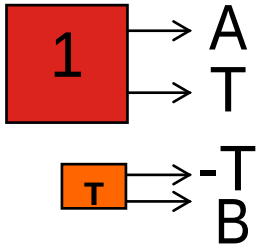

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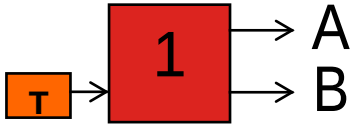

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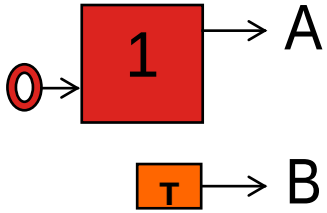

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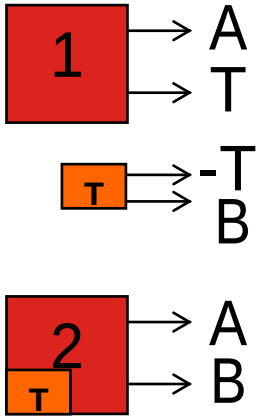

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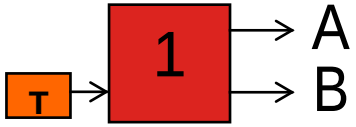

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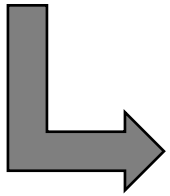

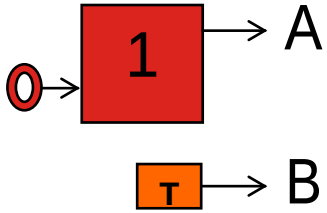

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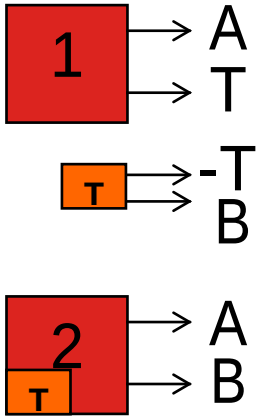

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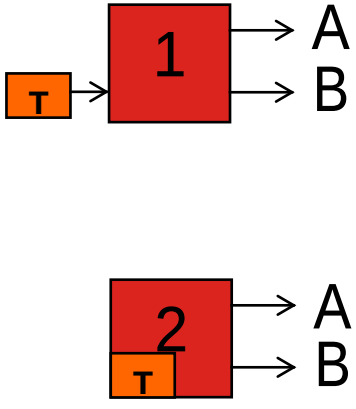

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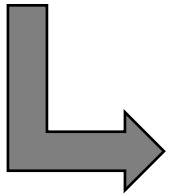

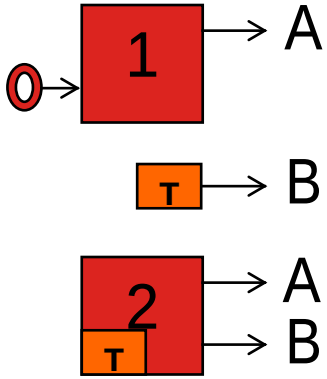

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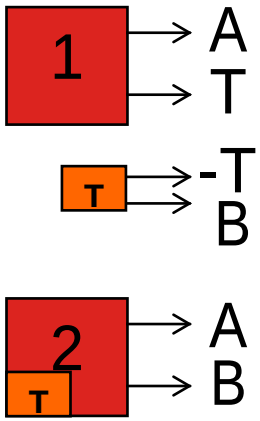

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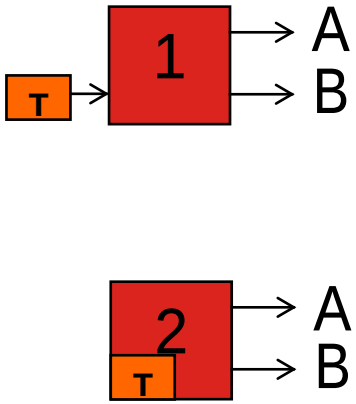

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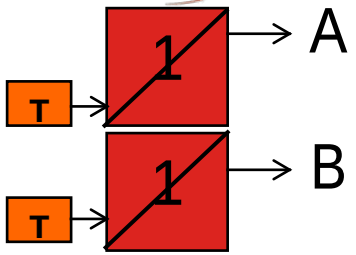

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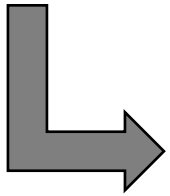

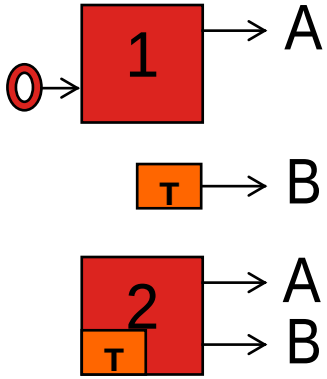

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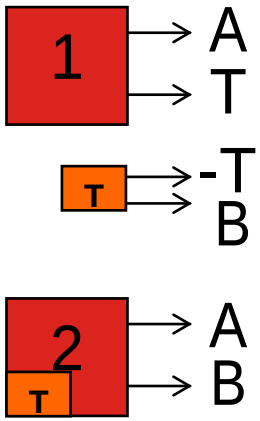

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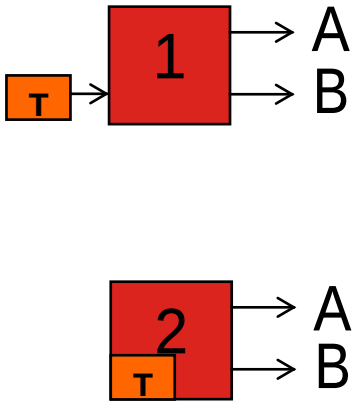

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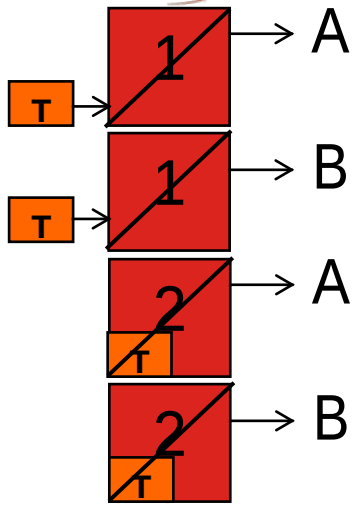

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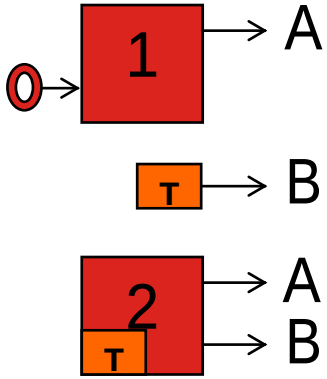

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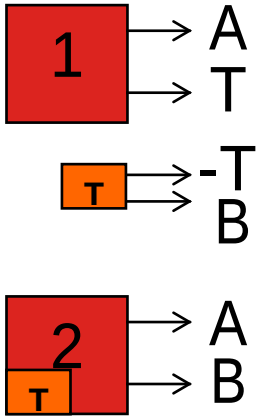

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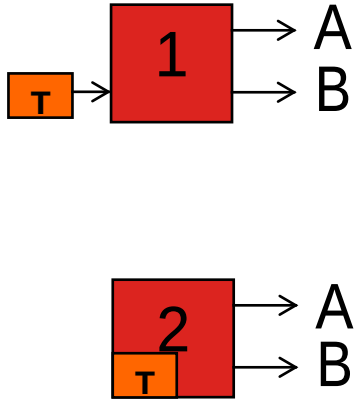

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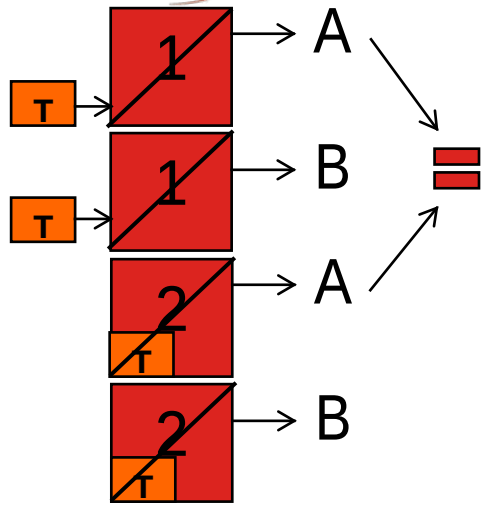

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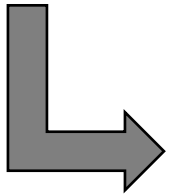

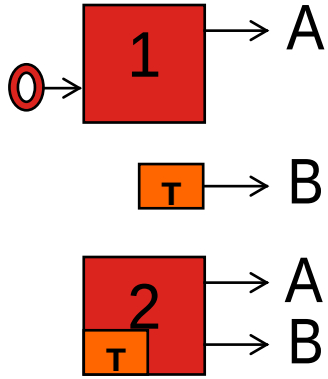

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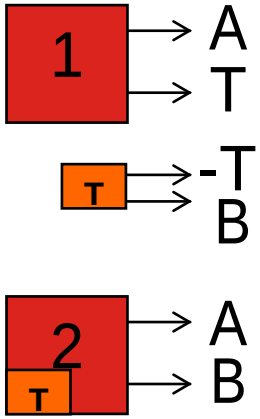

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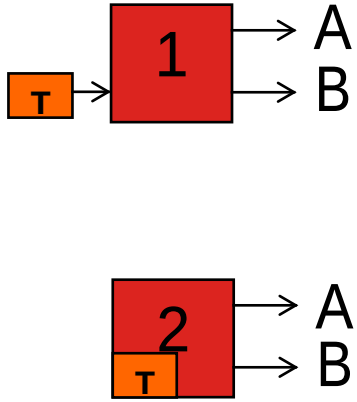

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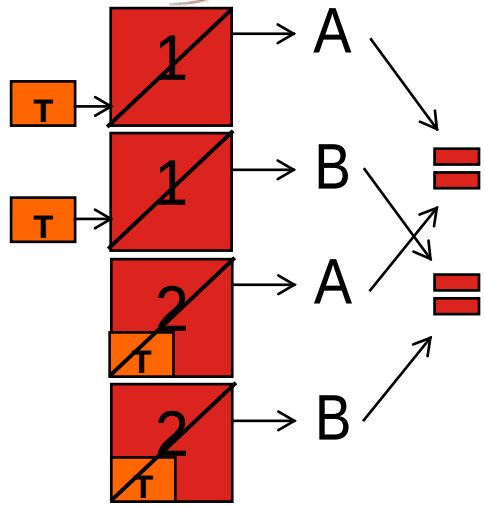

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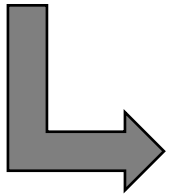

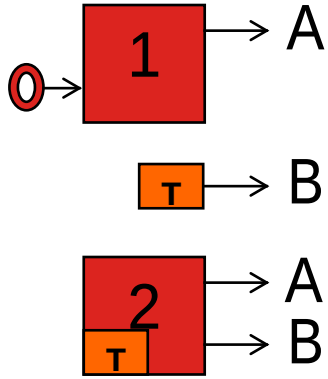

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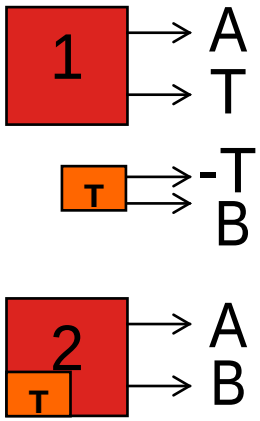

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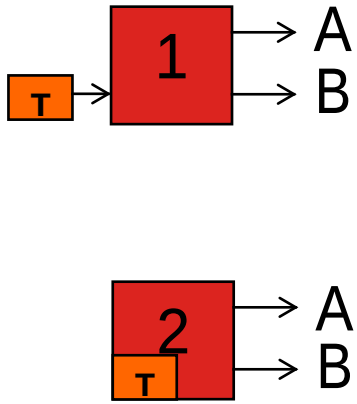

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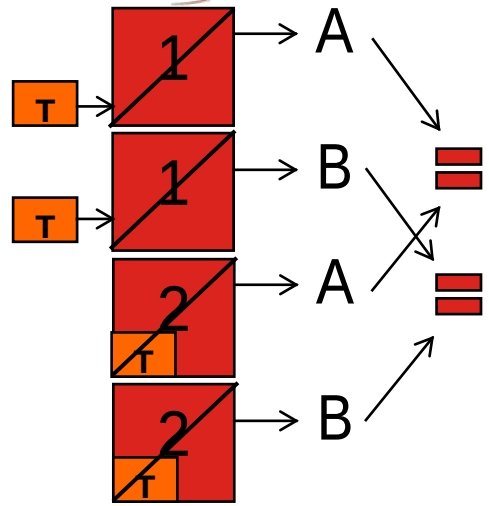

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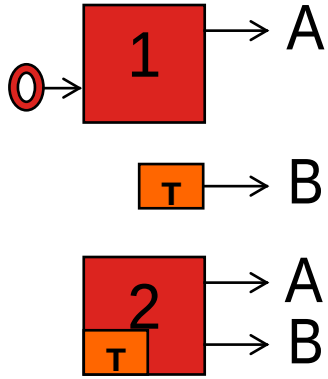

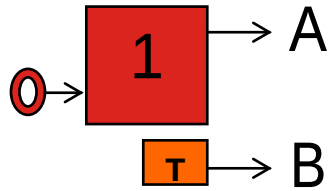

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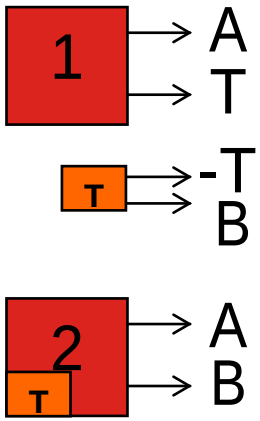

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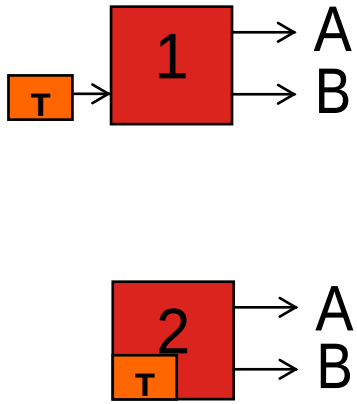

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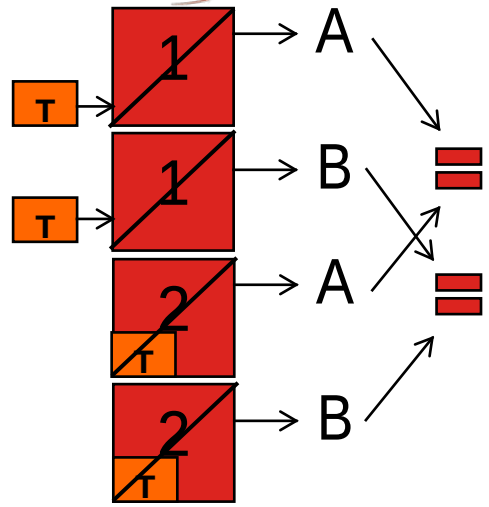

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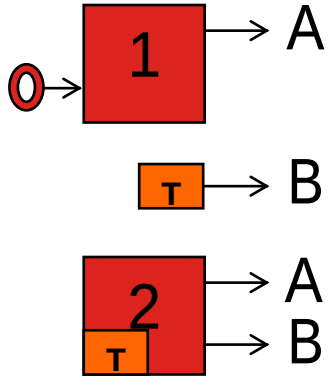

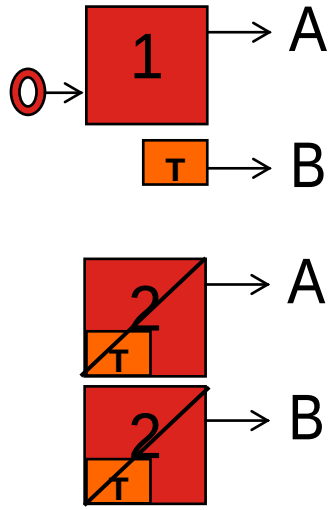

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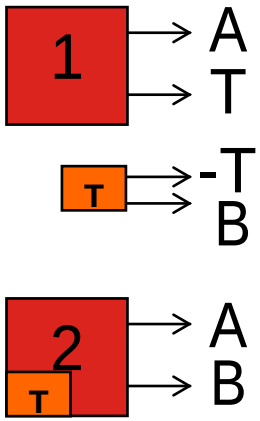

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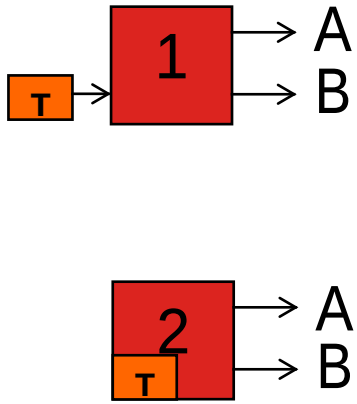

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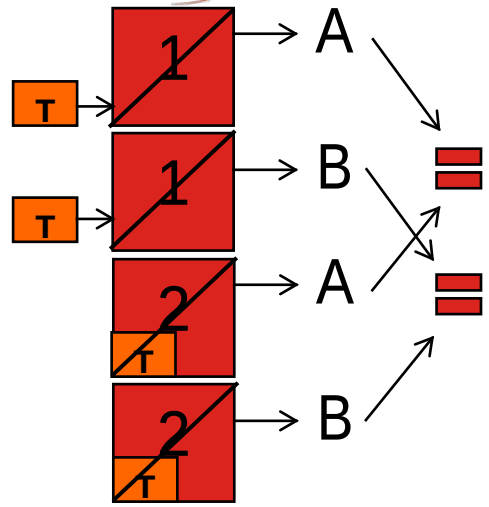

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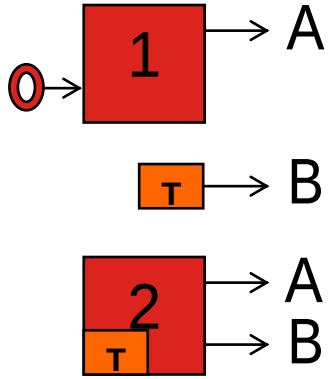

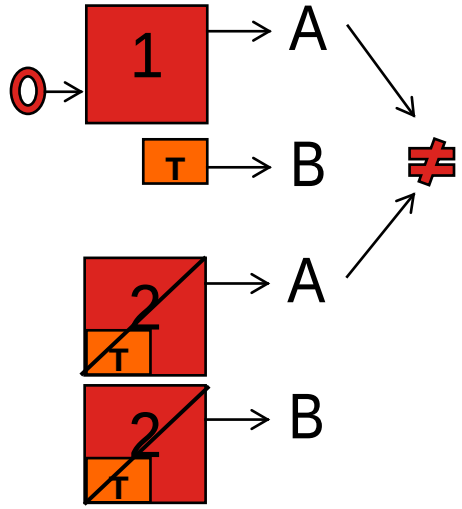

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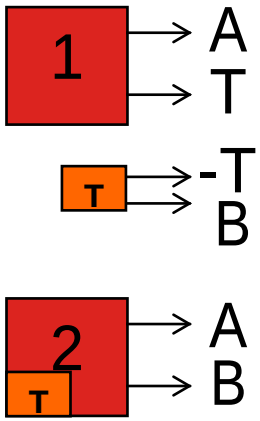

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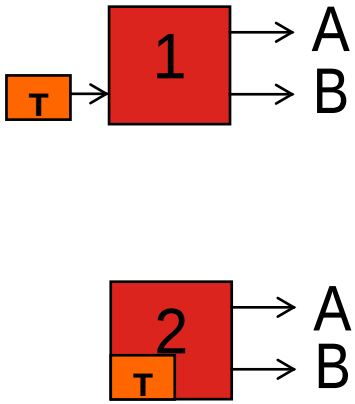

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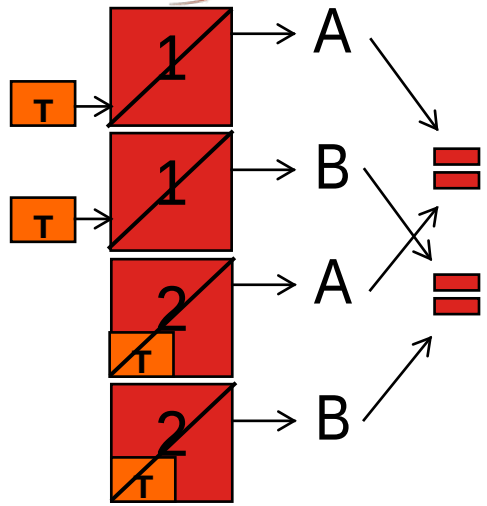

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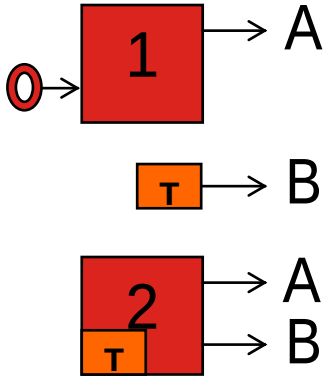

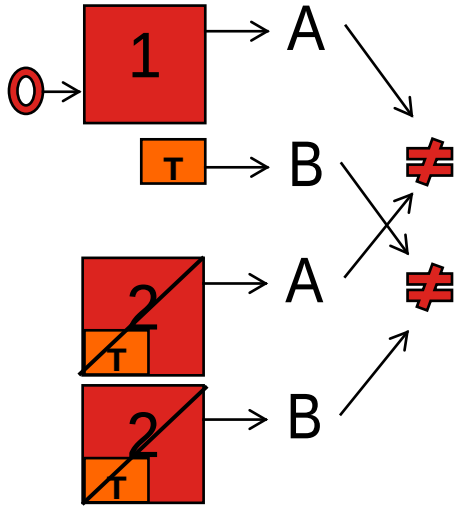

Questions?

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