

Distributed Version Control

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Version management

In any project, there are tedious bookkeeping tasks that need to be done:

- * Backup of consistent project snapshots
- * Documentation of changes
- * Sharing of changes
- * Distributed development by multiple people and/or in multiple locations
- * Bug tracing through development history

Task automation

The bookkeeping can be done

- * by hand: copy things into renamed files
- * locally: keep versions in a DB of some form
- * centrally: a server keeps the DB, clients do the work
- * distributed: each client holds a full copy of the DB

Tool history

Only showing commonly used free/OSS tools:

- * local:
RCS (1982)
- * central:
CVS (1990), SVN (2000)
- * distributed:
Darcs (2002), Bazaar, Git, Mercurial (all 2005)

Frontends and visualization

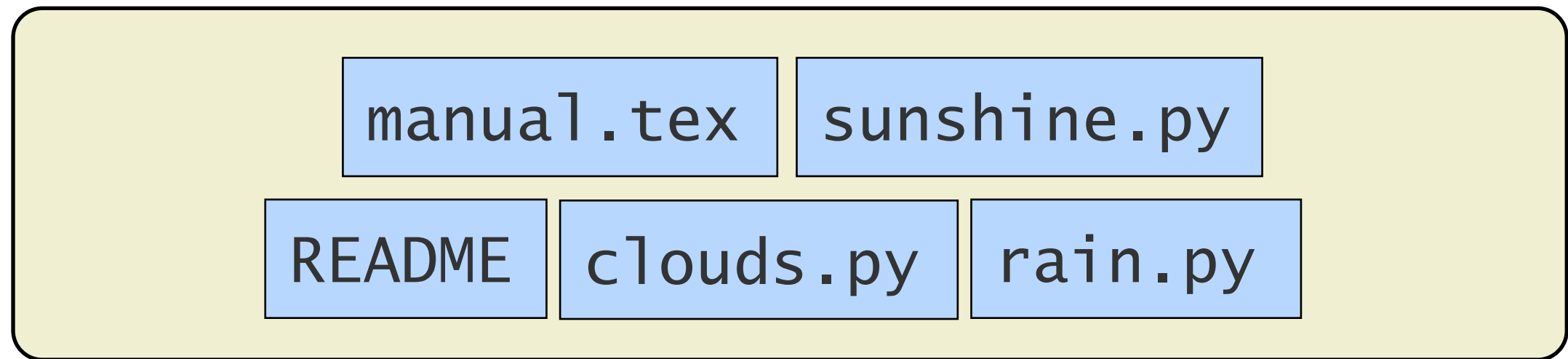
- * Mercurial has built-in hg serve
- * Many other GUI frontends available, try a few to find something you like
- * Github / Bitbucket additionally give full project management tools, but keep a second repo elsewhere!

Terminology

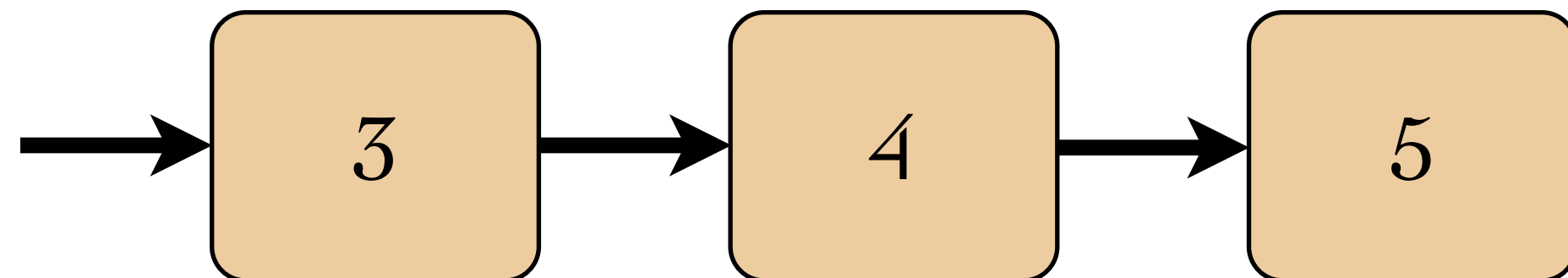
- * Working copy
- * Repository (local, remote)
- * checkout, checkin — update, commit
- * pull, push
- * branch, merge

Working directory

one version of the project, visible to be edited

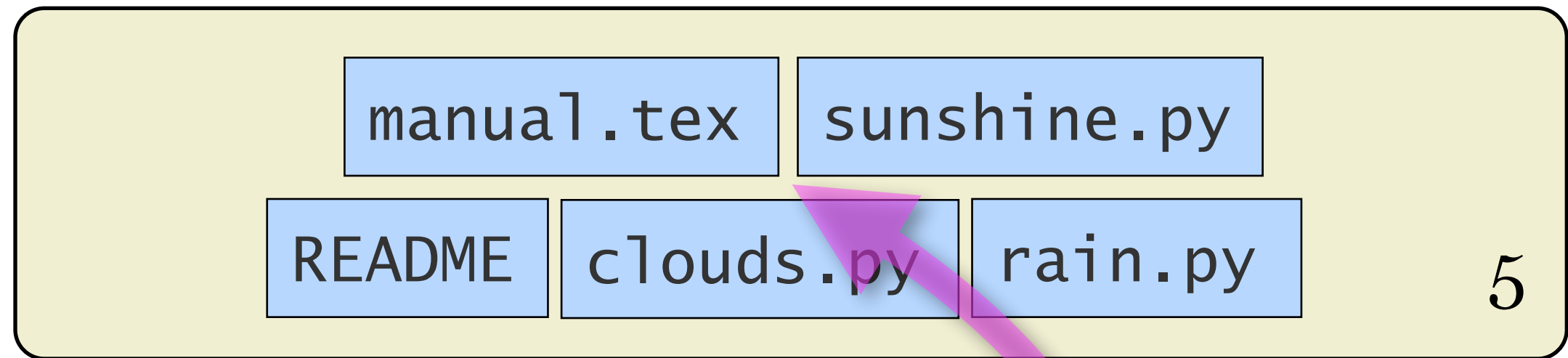


is based on **one** version in the repository,
usually the last one

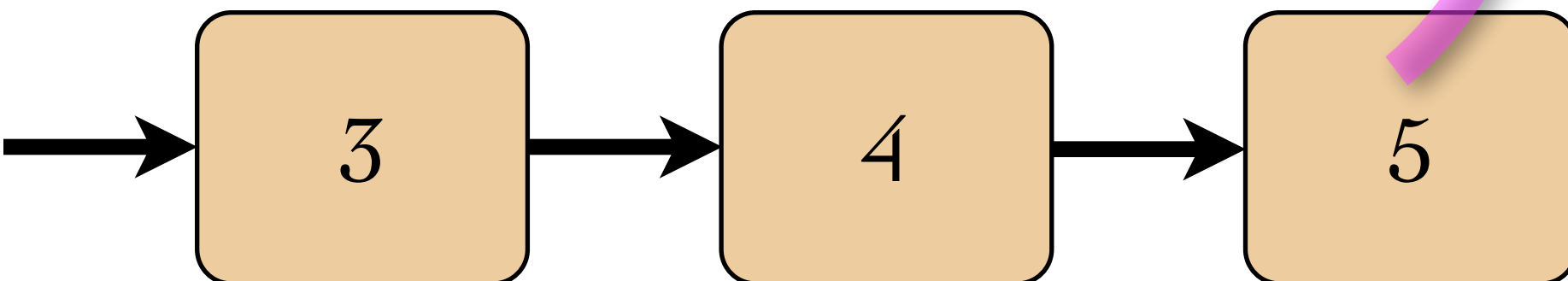


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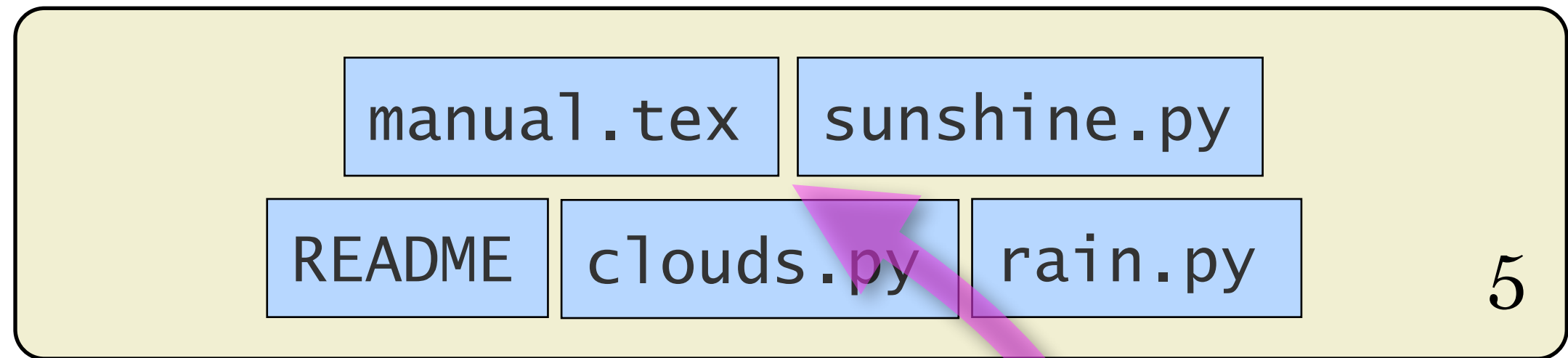


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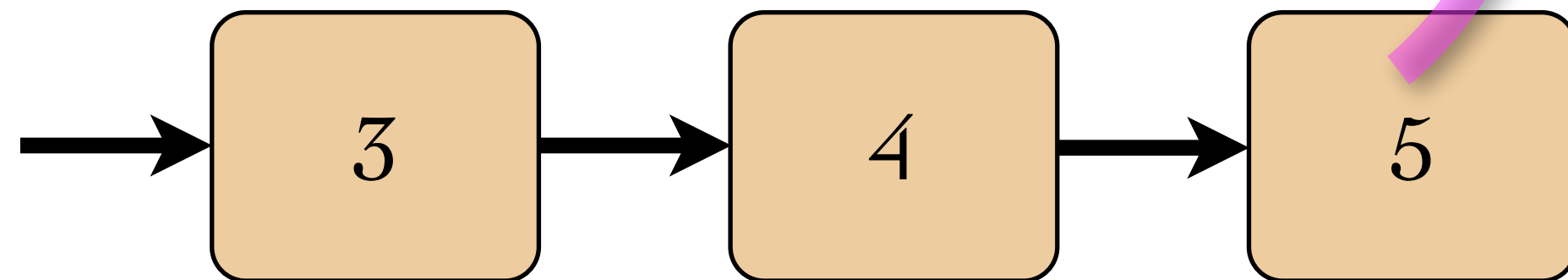


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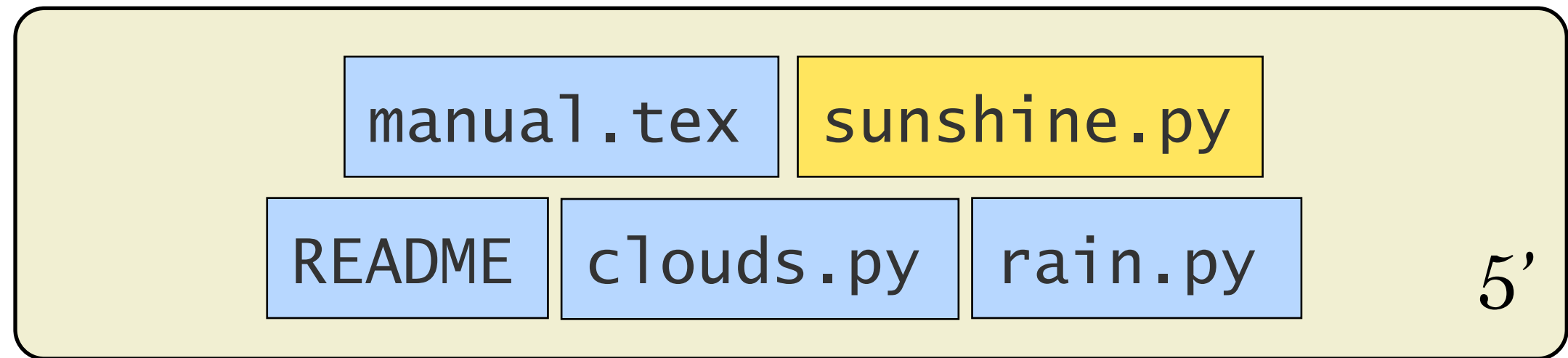
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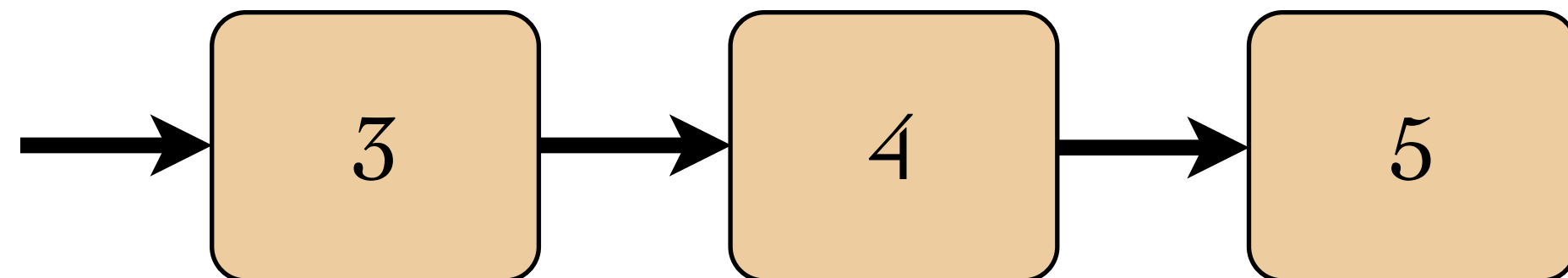
each WD has its
own copy of the
full repository!

Changes

working copy can be changed as usual

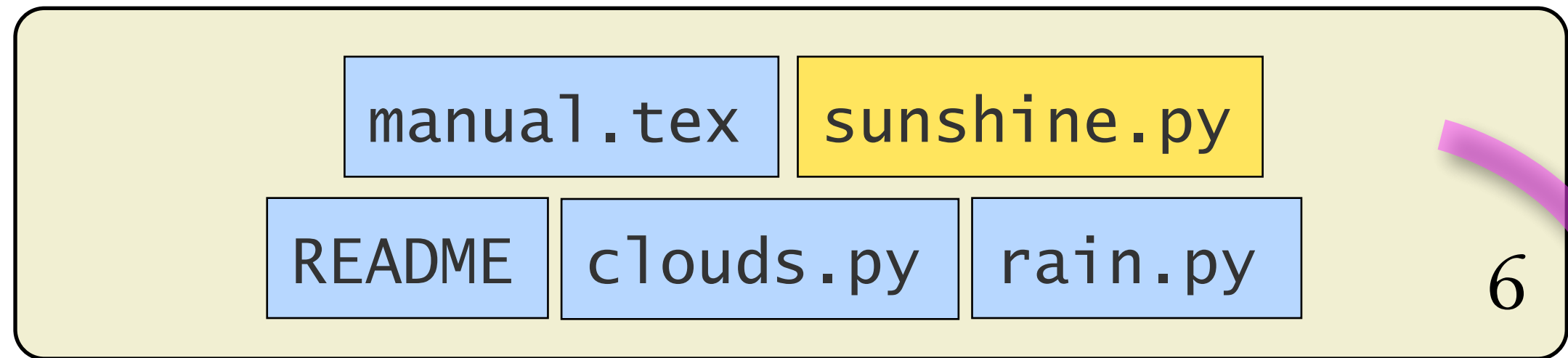


changes are then checked in / committed
as a new version

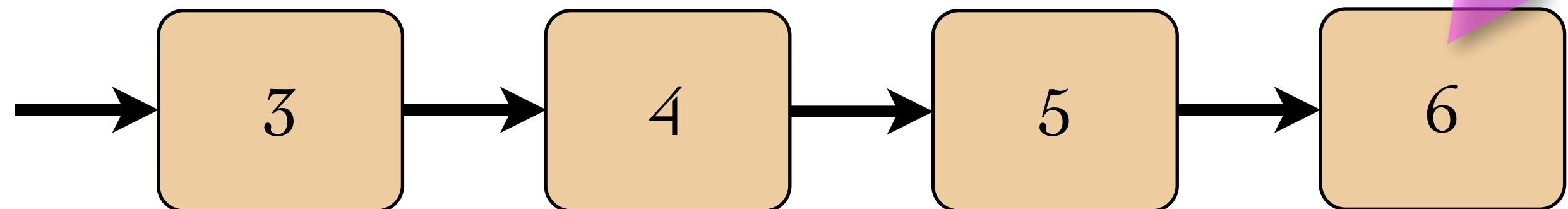


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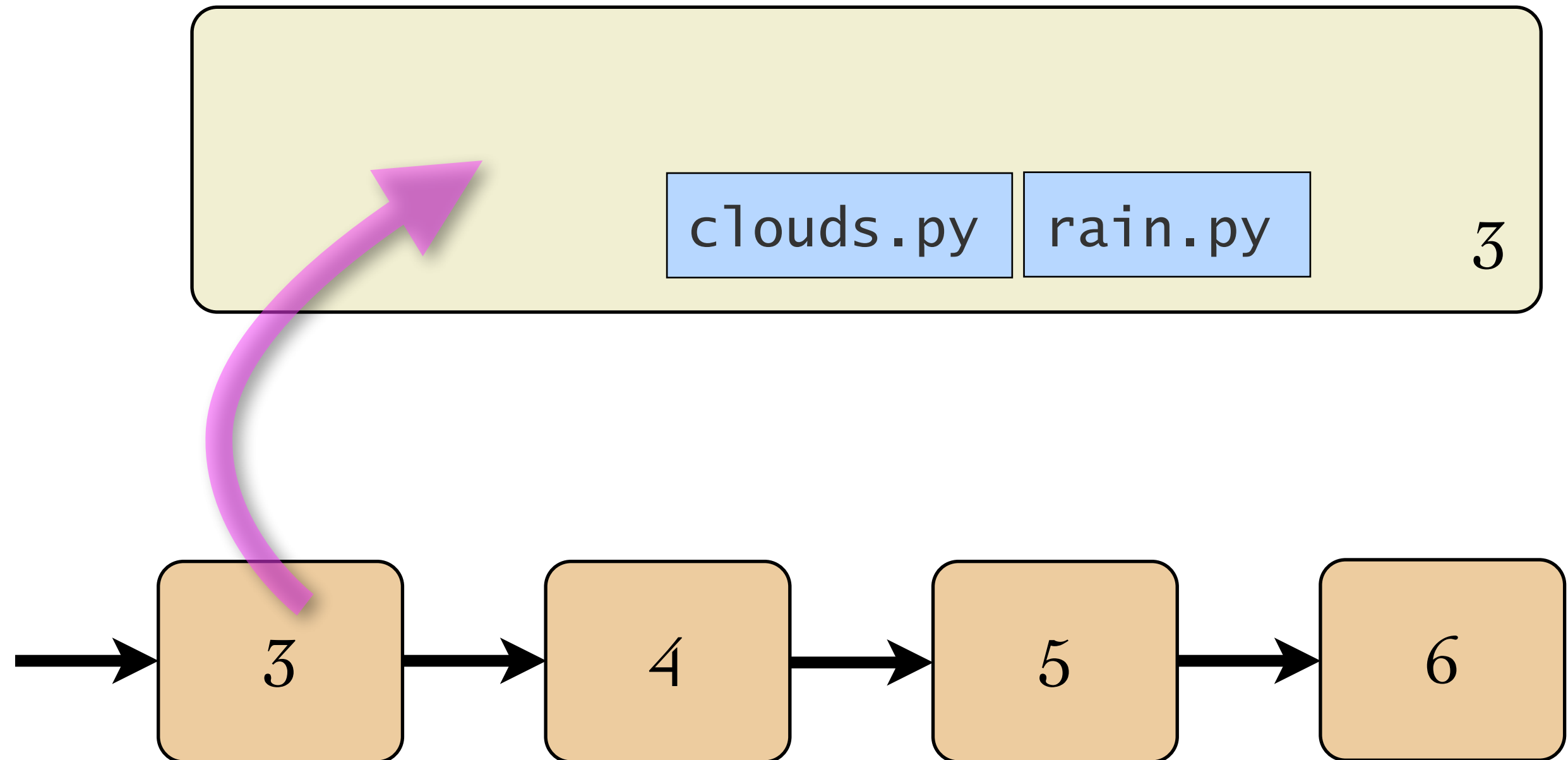
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changeset

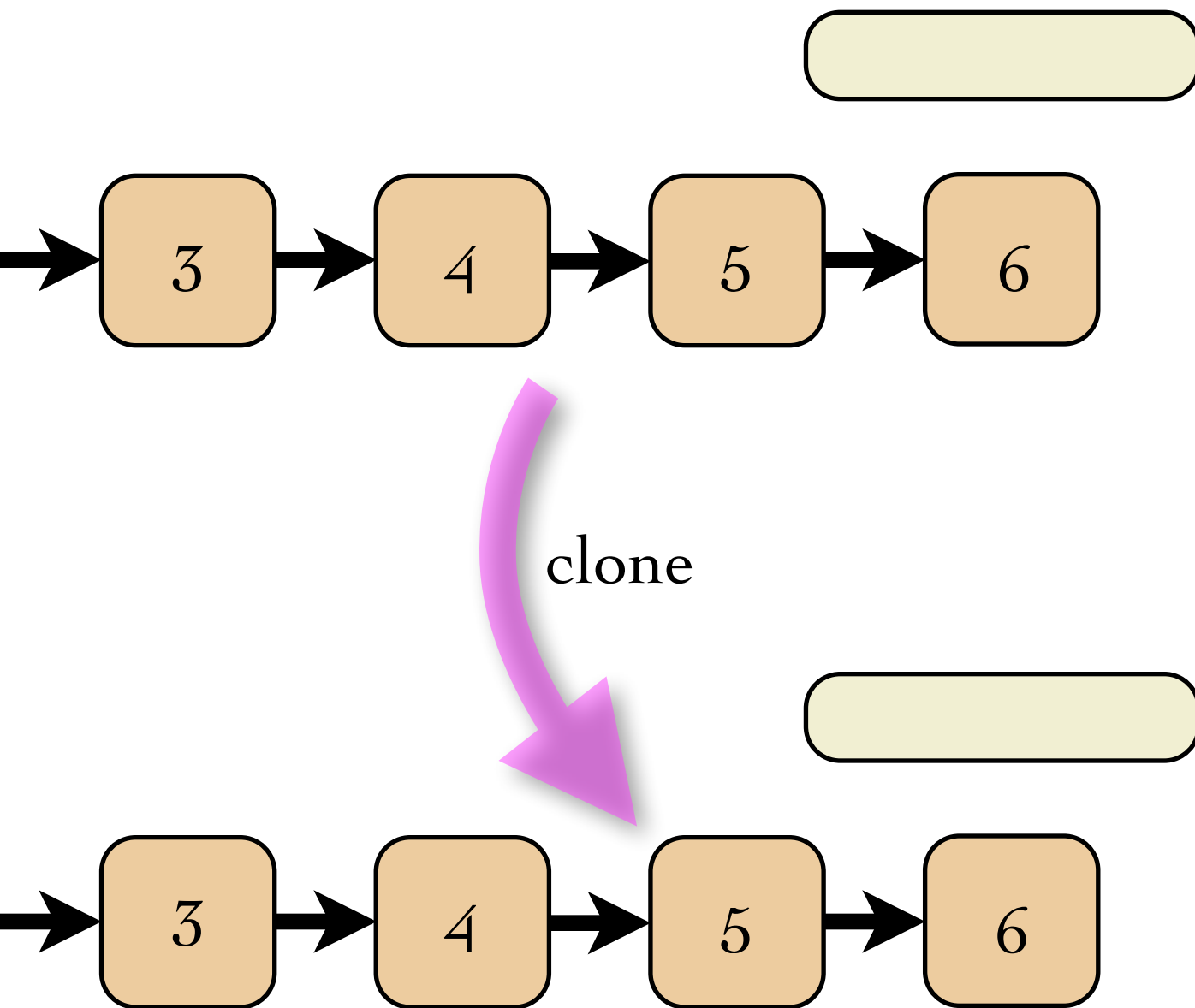
Backtracking

older versions can be looked at at any time



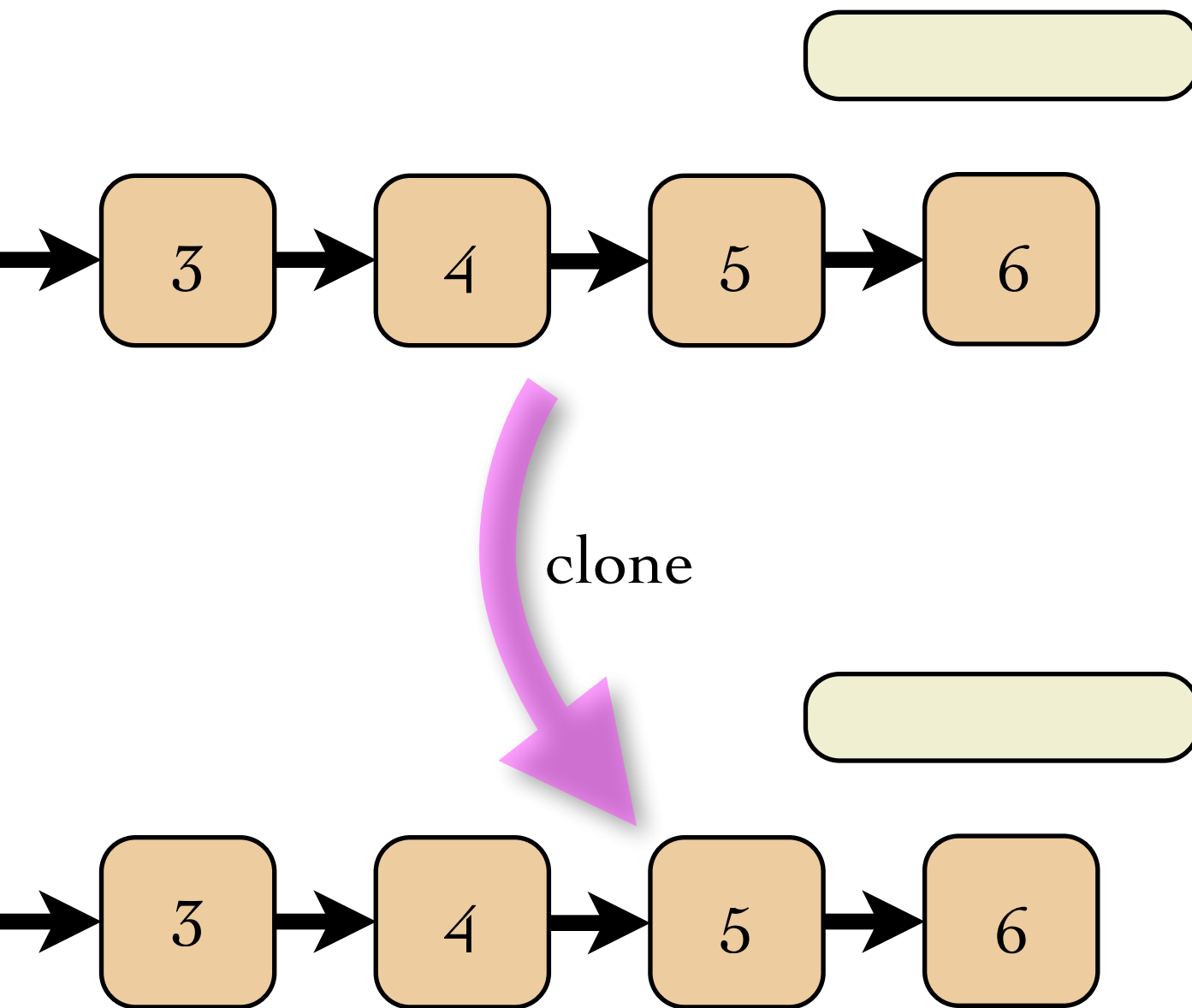
Remote work

clone repositories to other locations / devices / people



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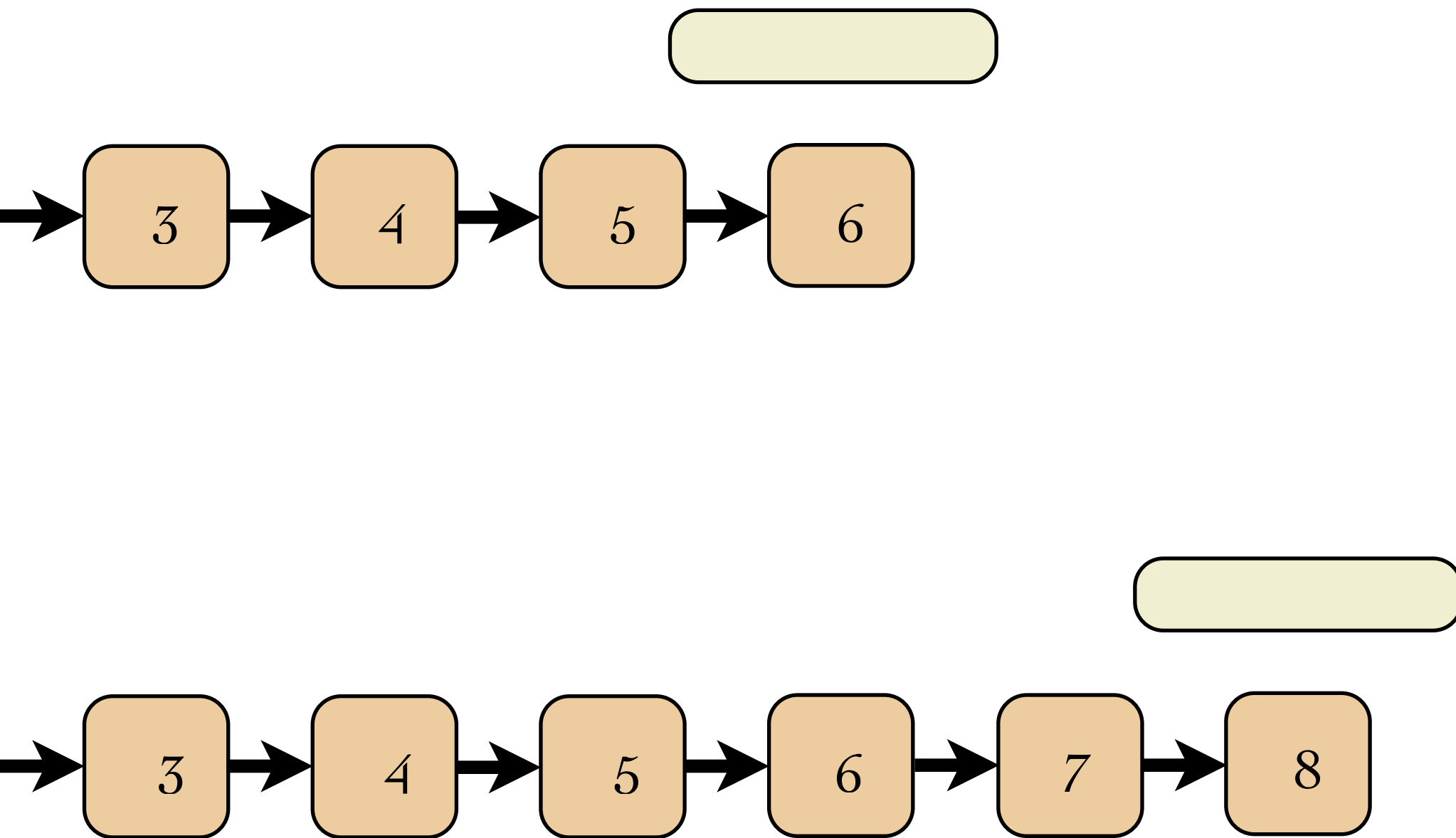
clone repositories to other locations / devices / people



each clone has all features,
not distinguishable

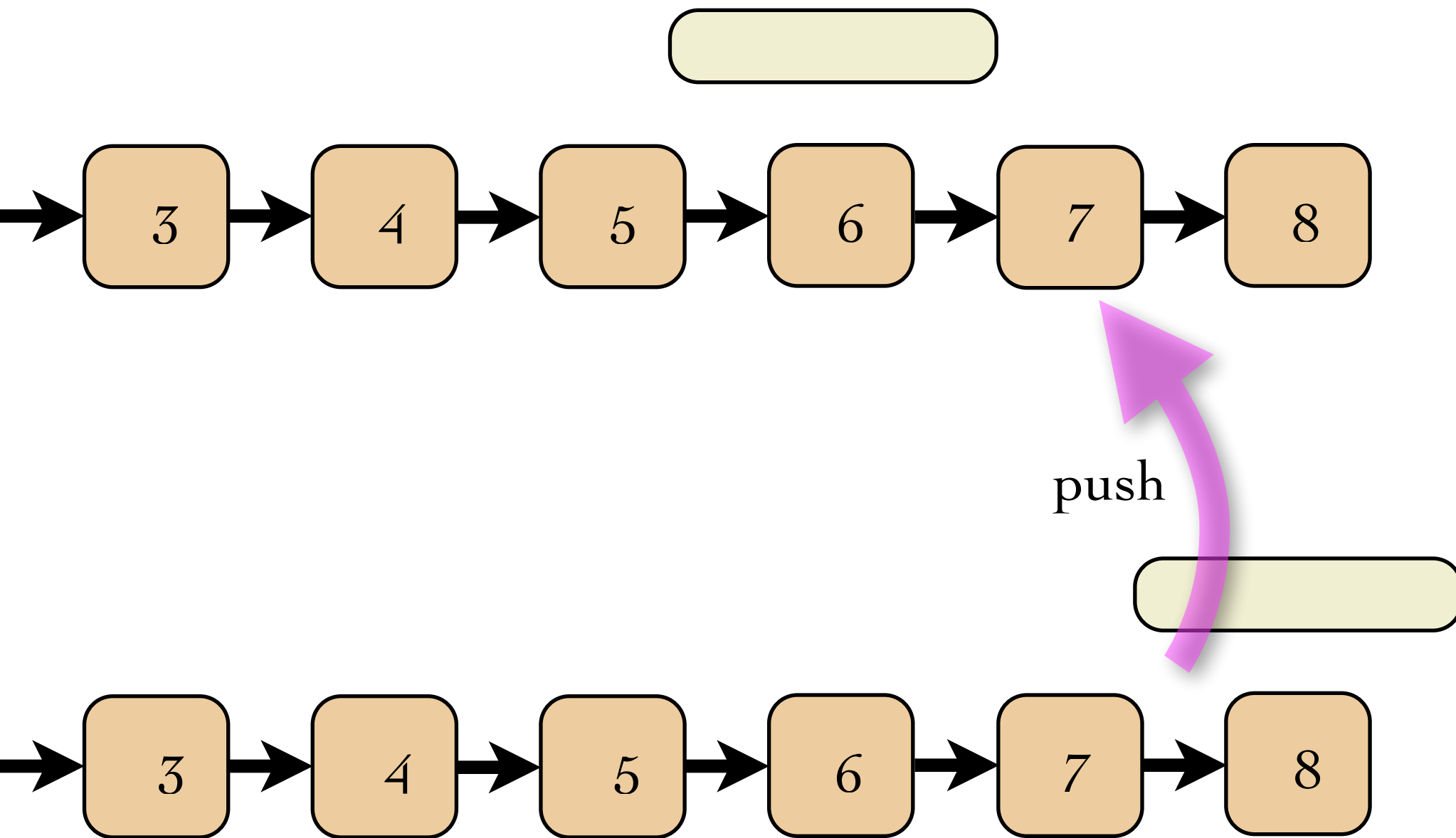
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development can happen anywhere



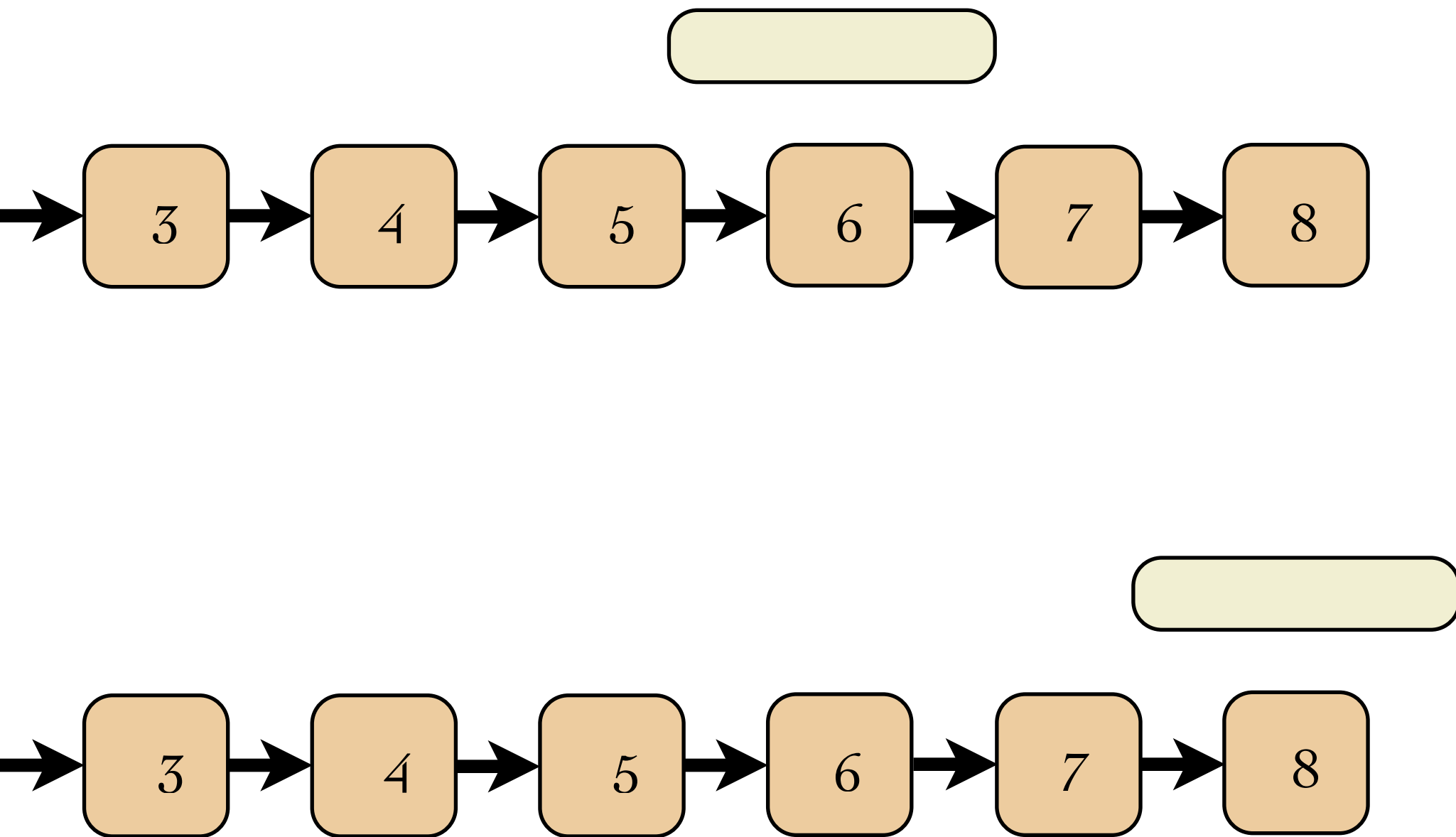
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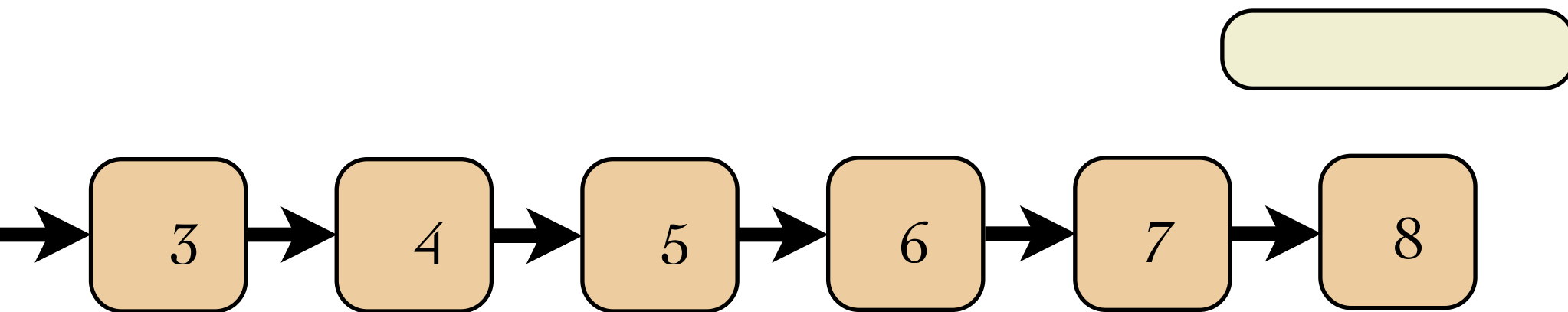
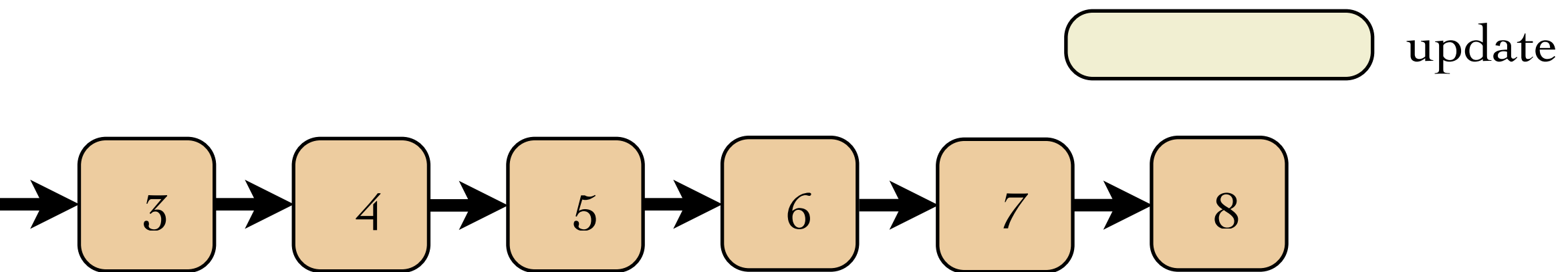
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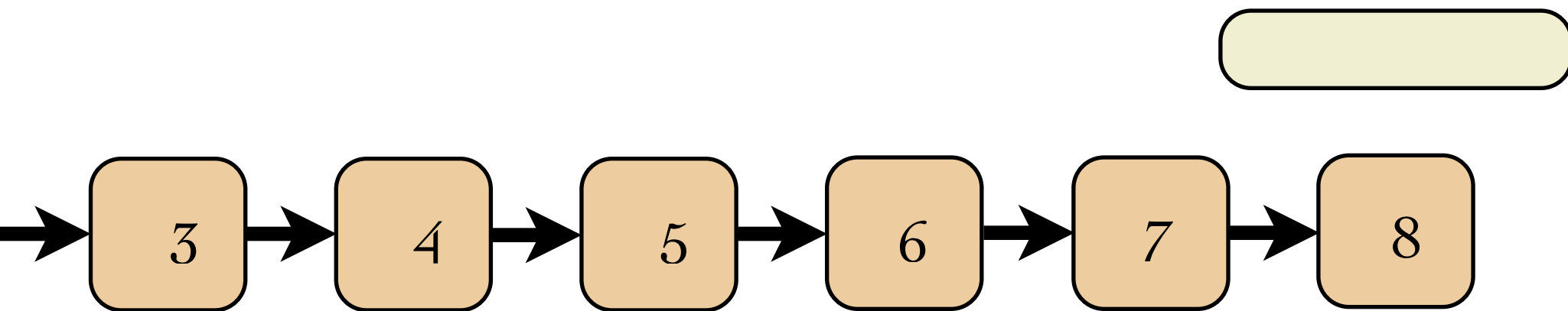
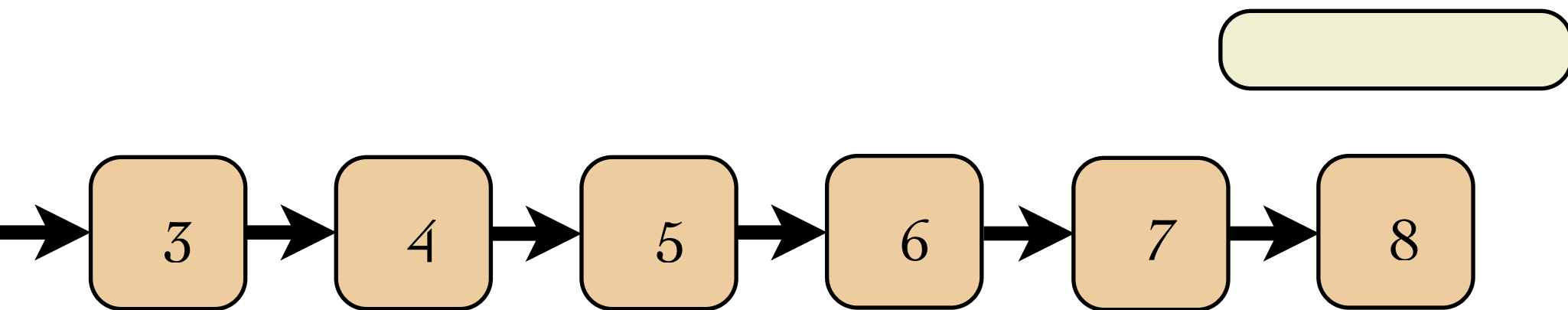
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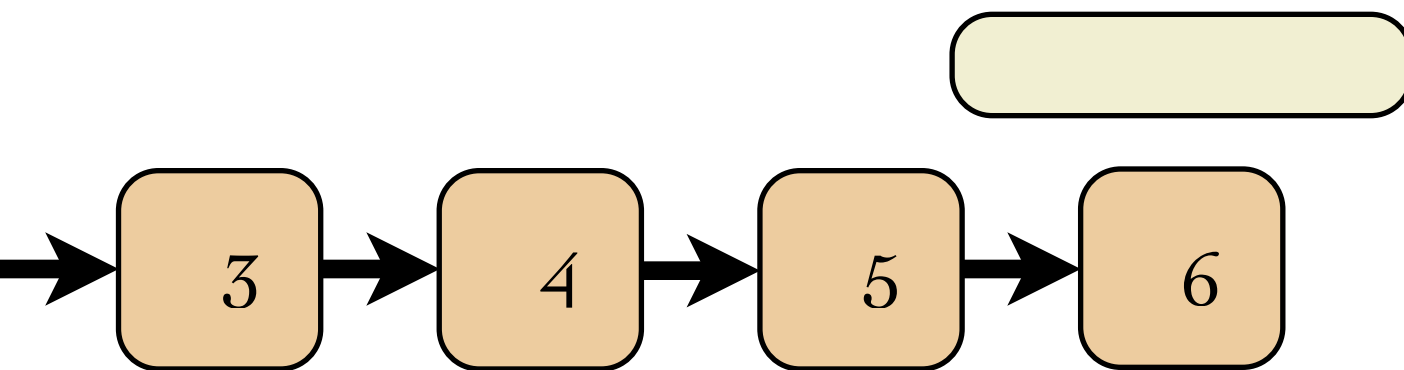
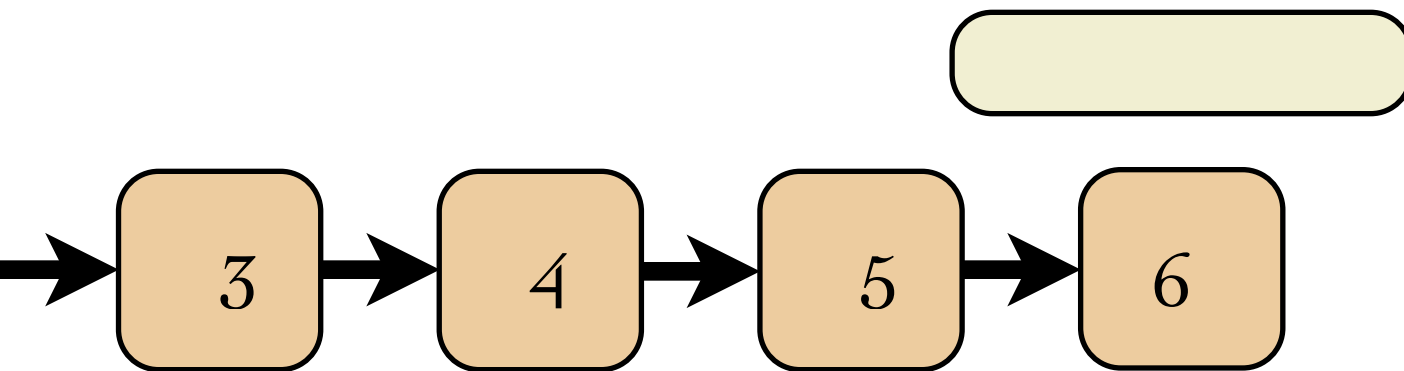
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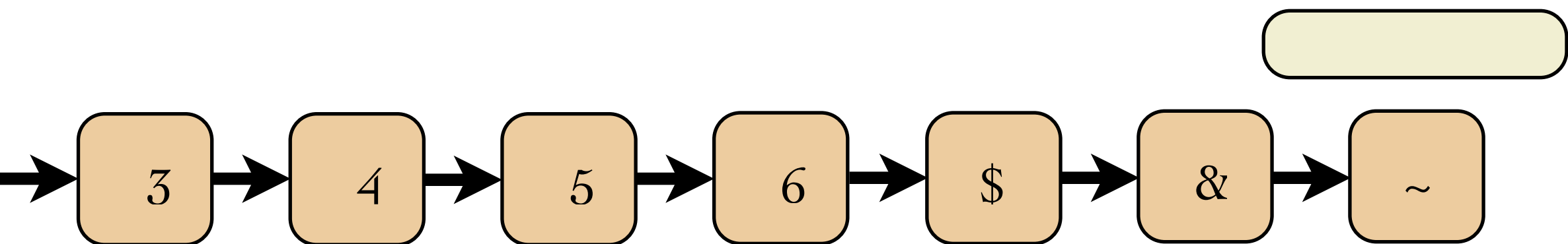
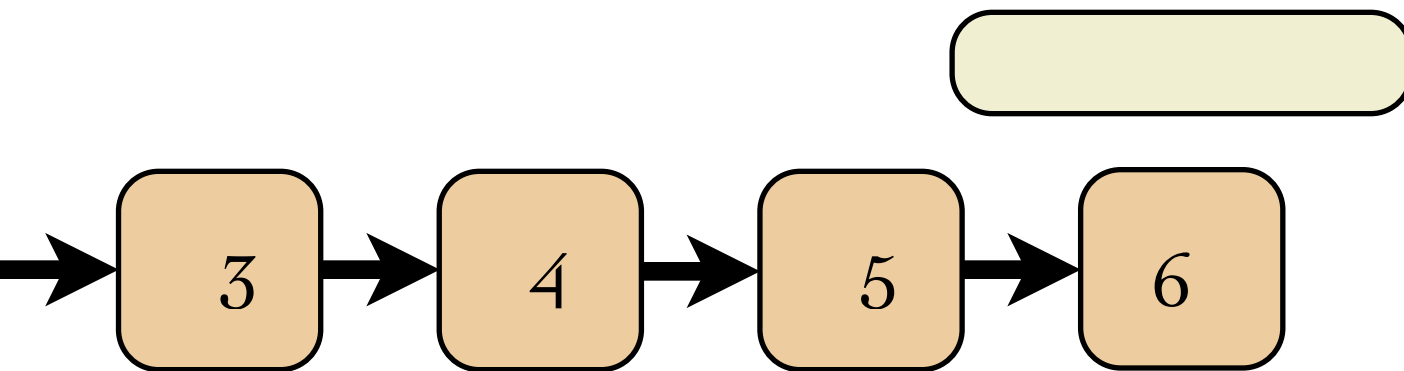
Branches

unlike in SVN, branches are a natural feature



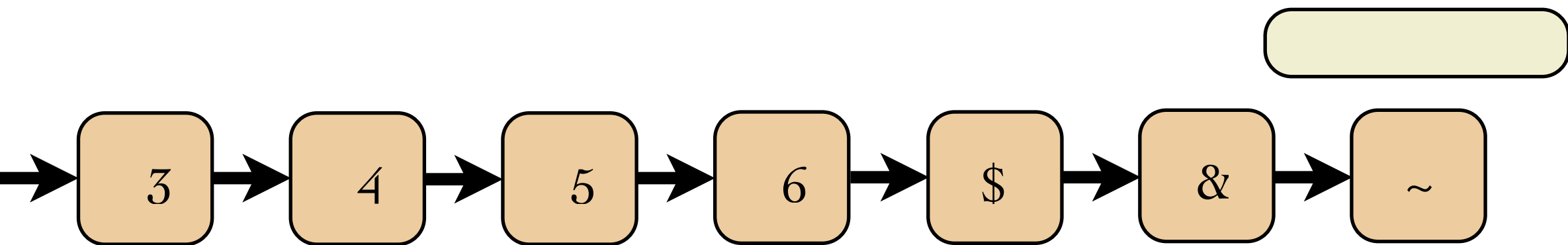
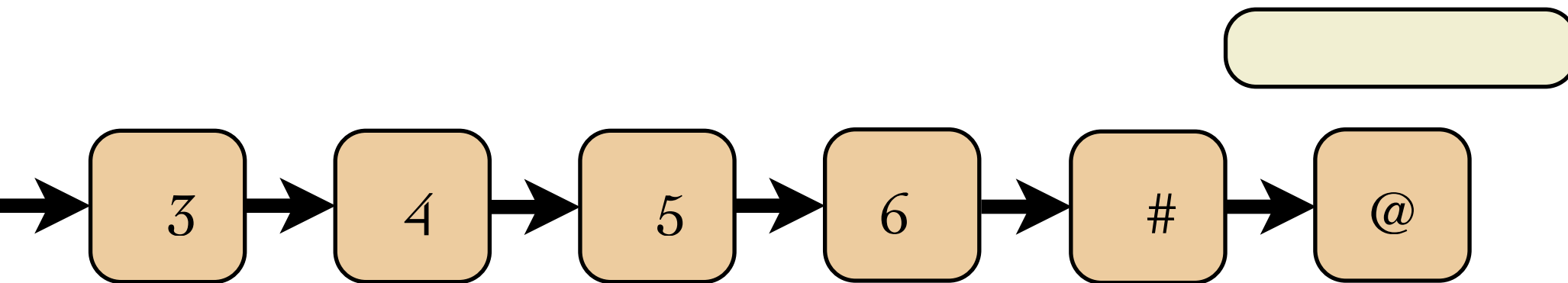
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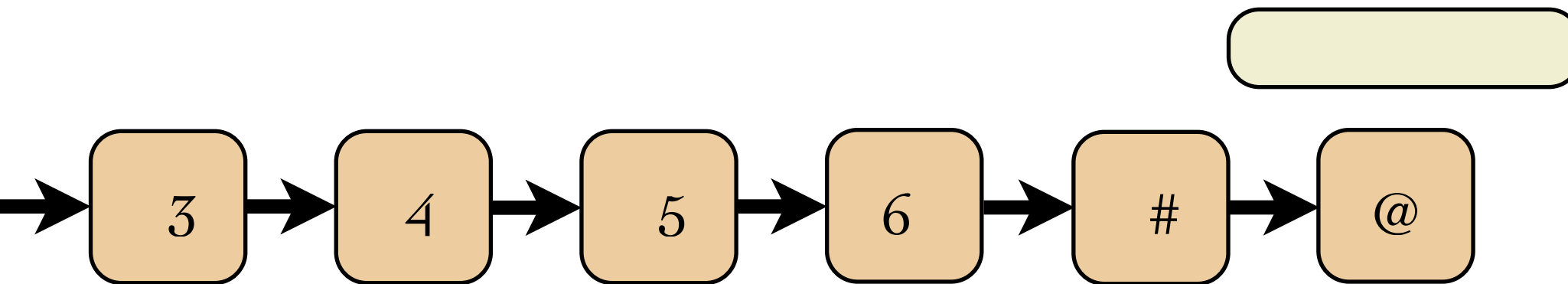
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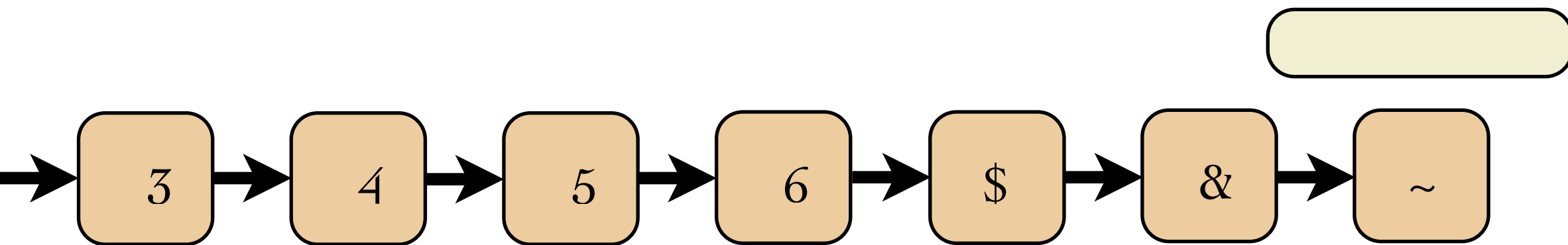


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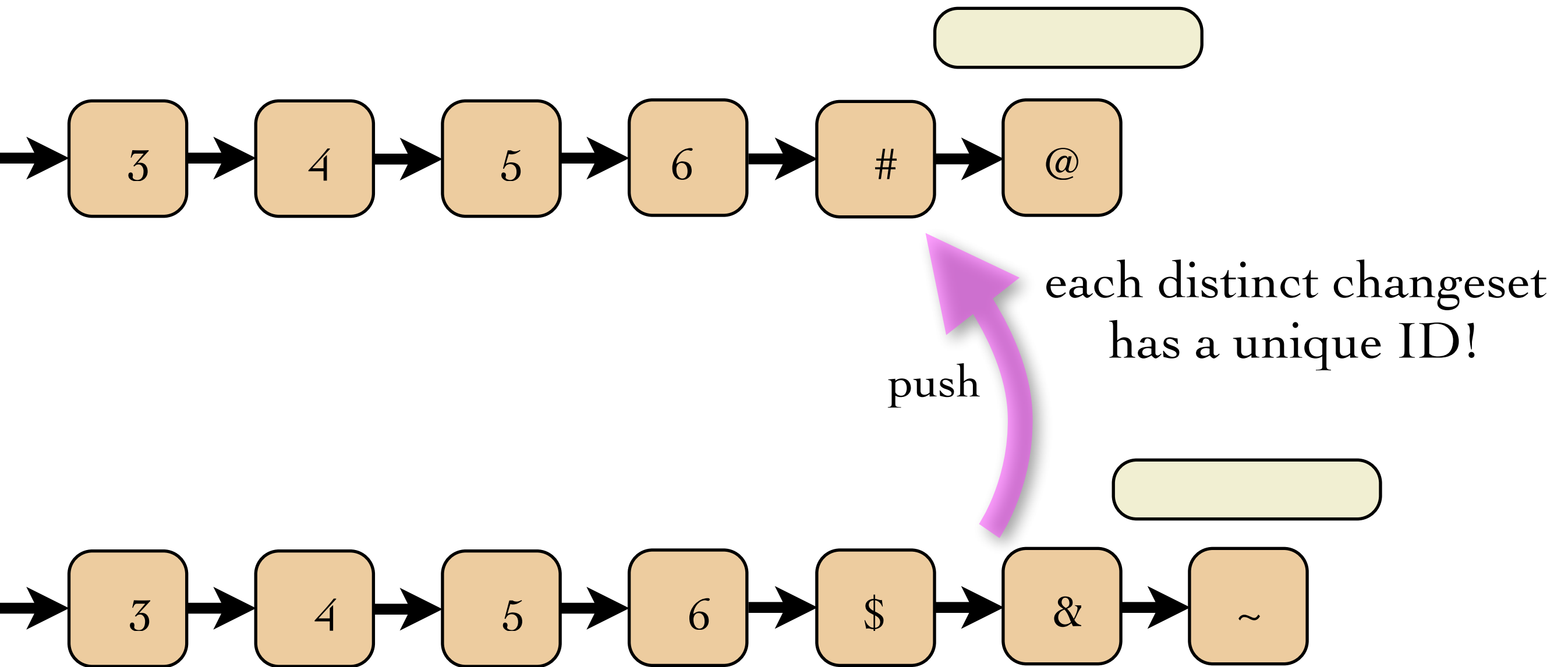


each distinct changeset
has a unique ID!



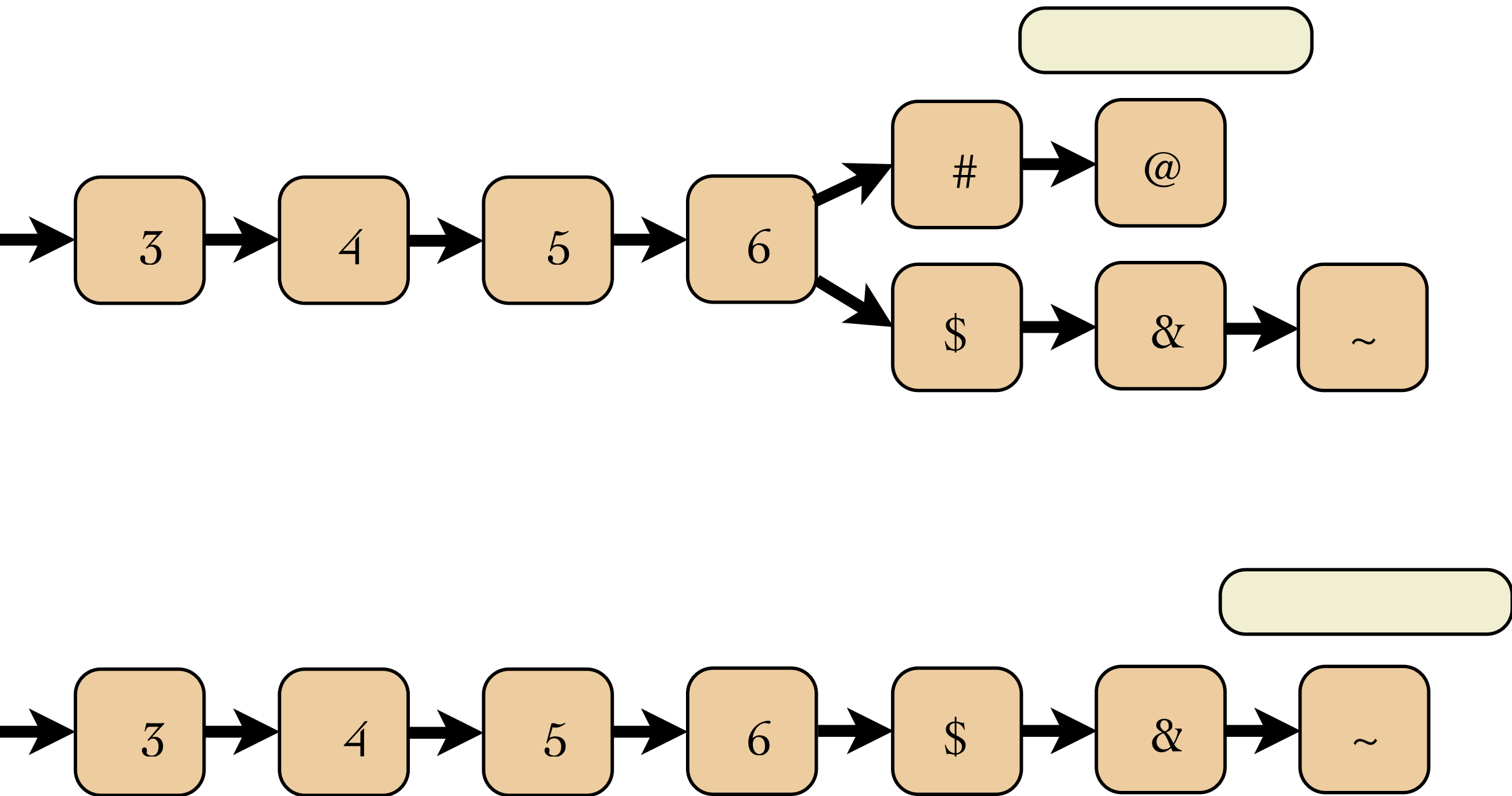
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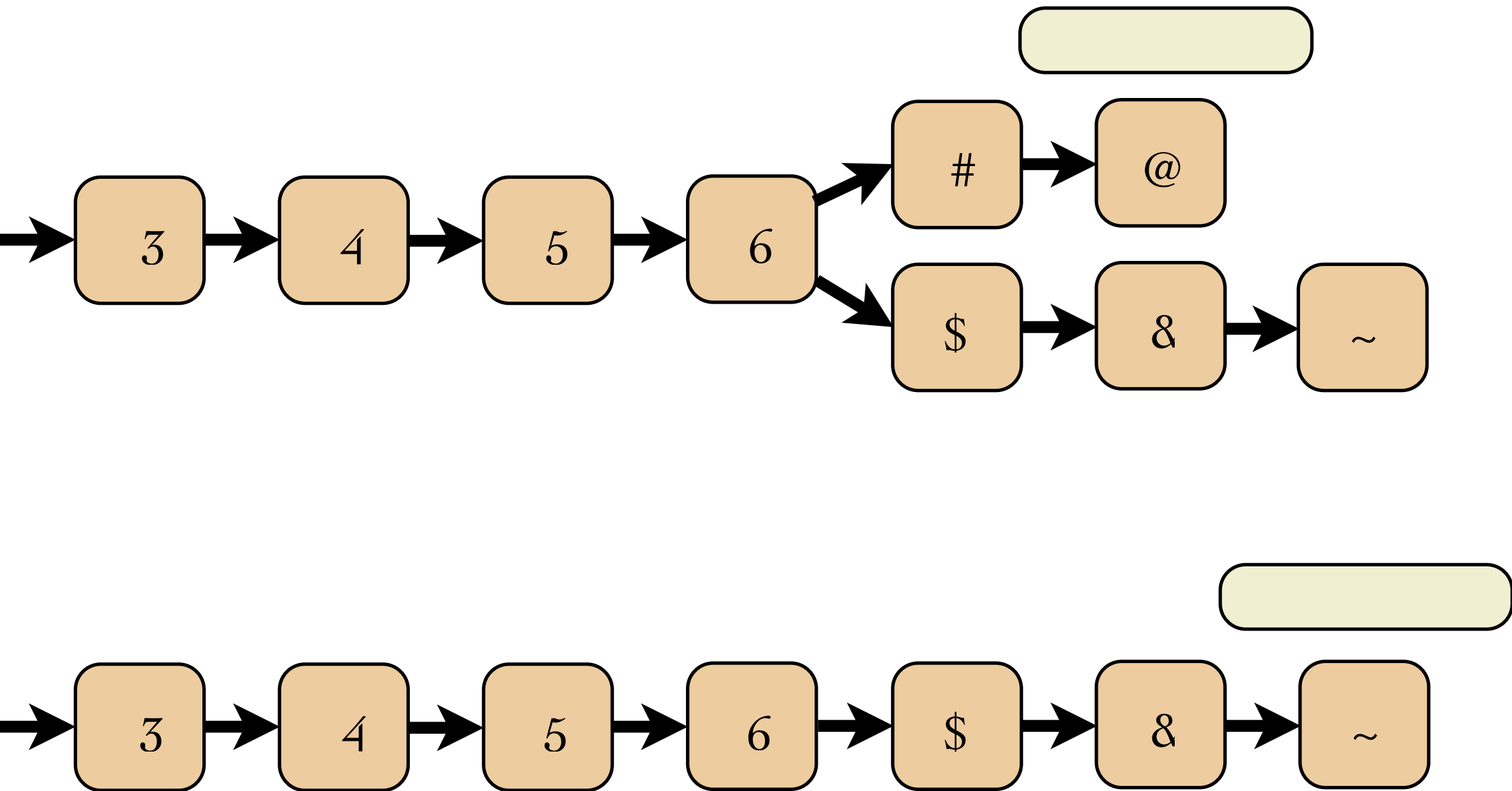
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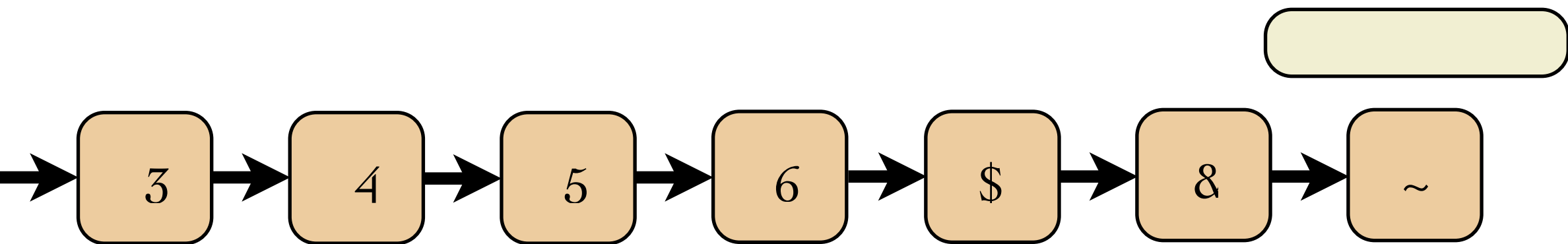
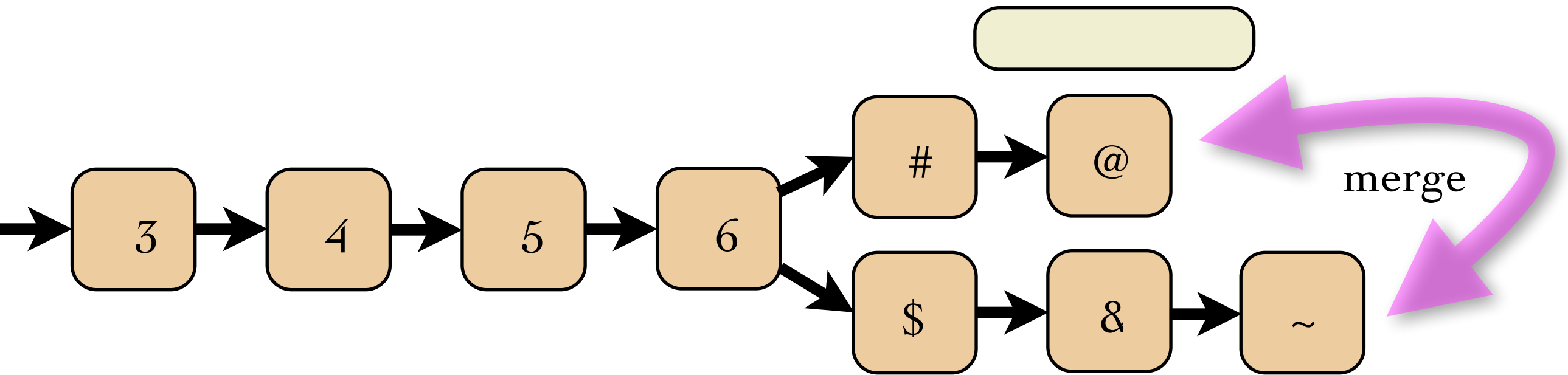
Merging

merging is automatic as far as possible



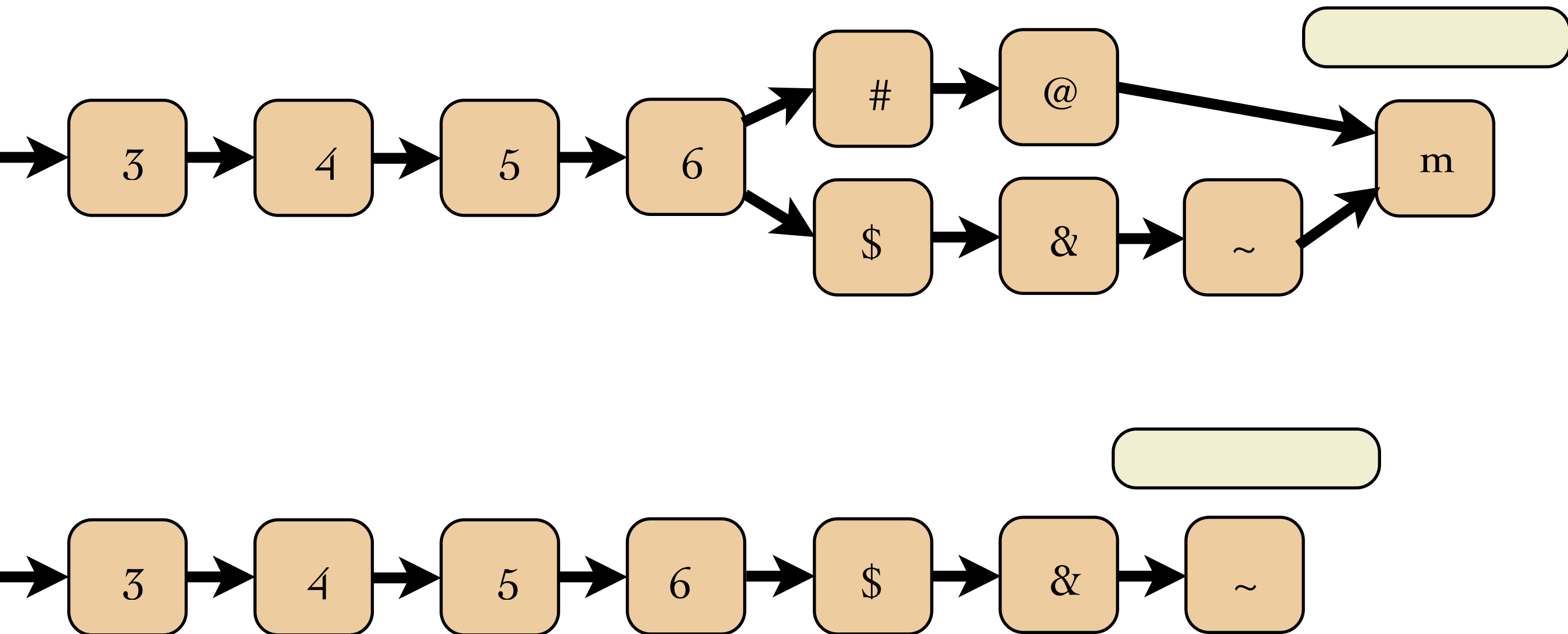
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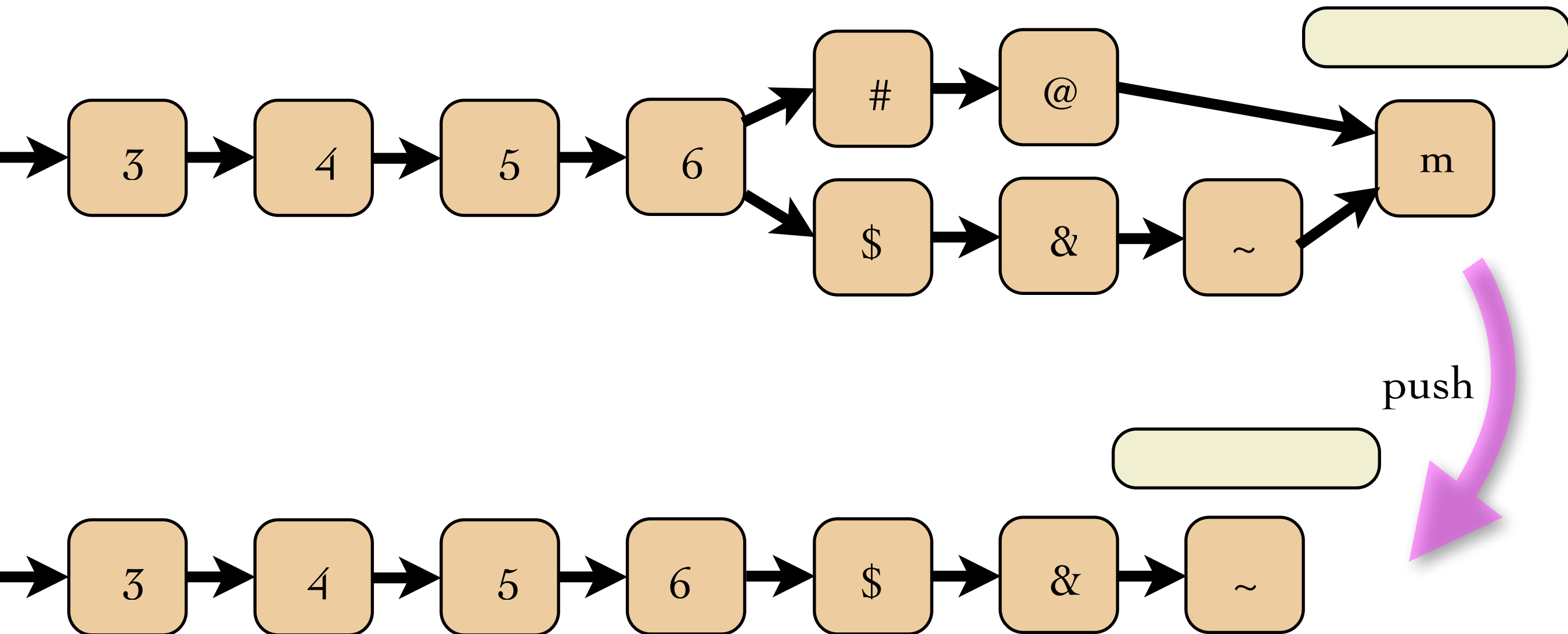
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only need to fix some conflicts by hand



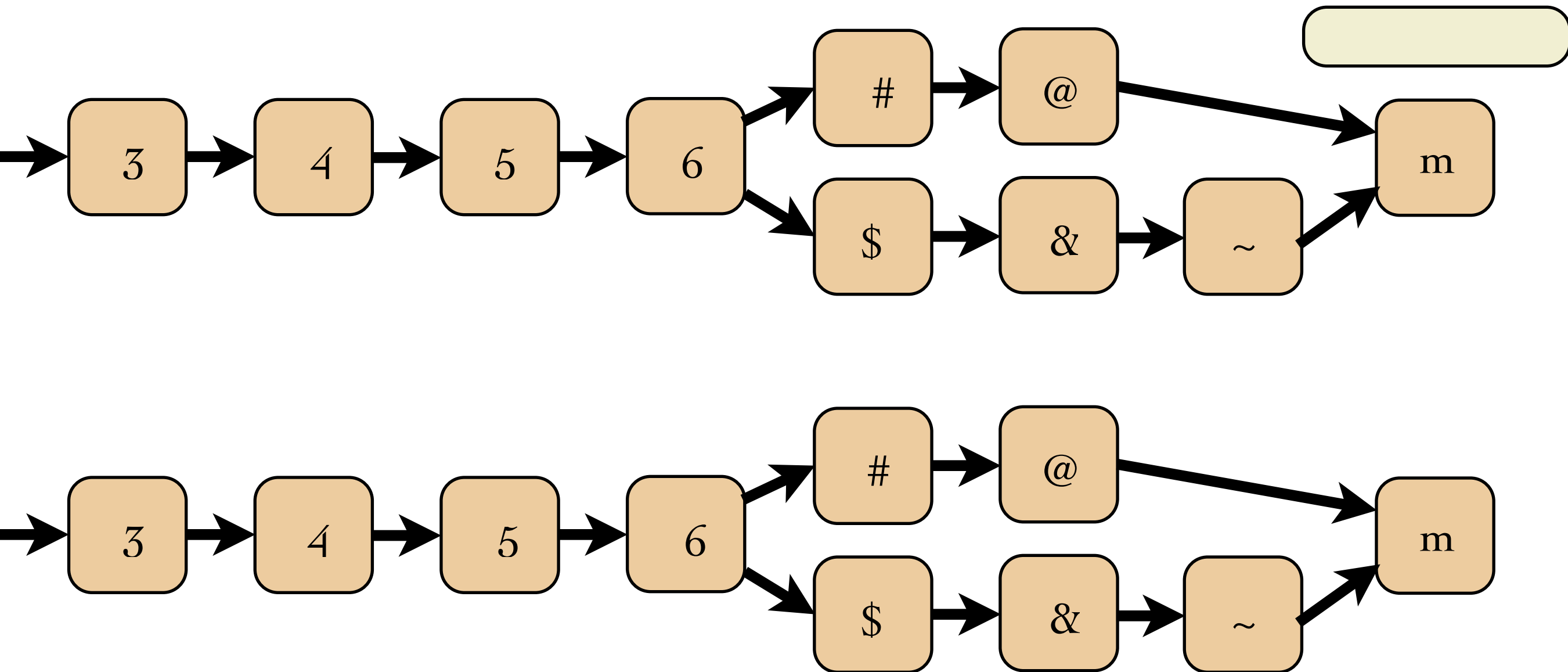
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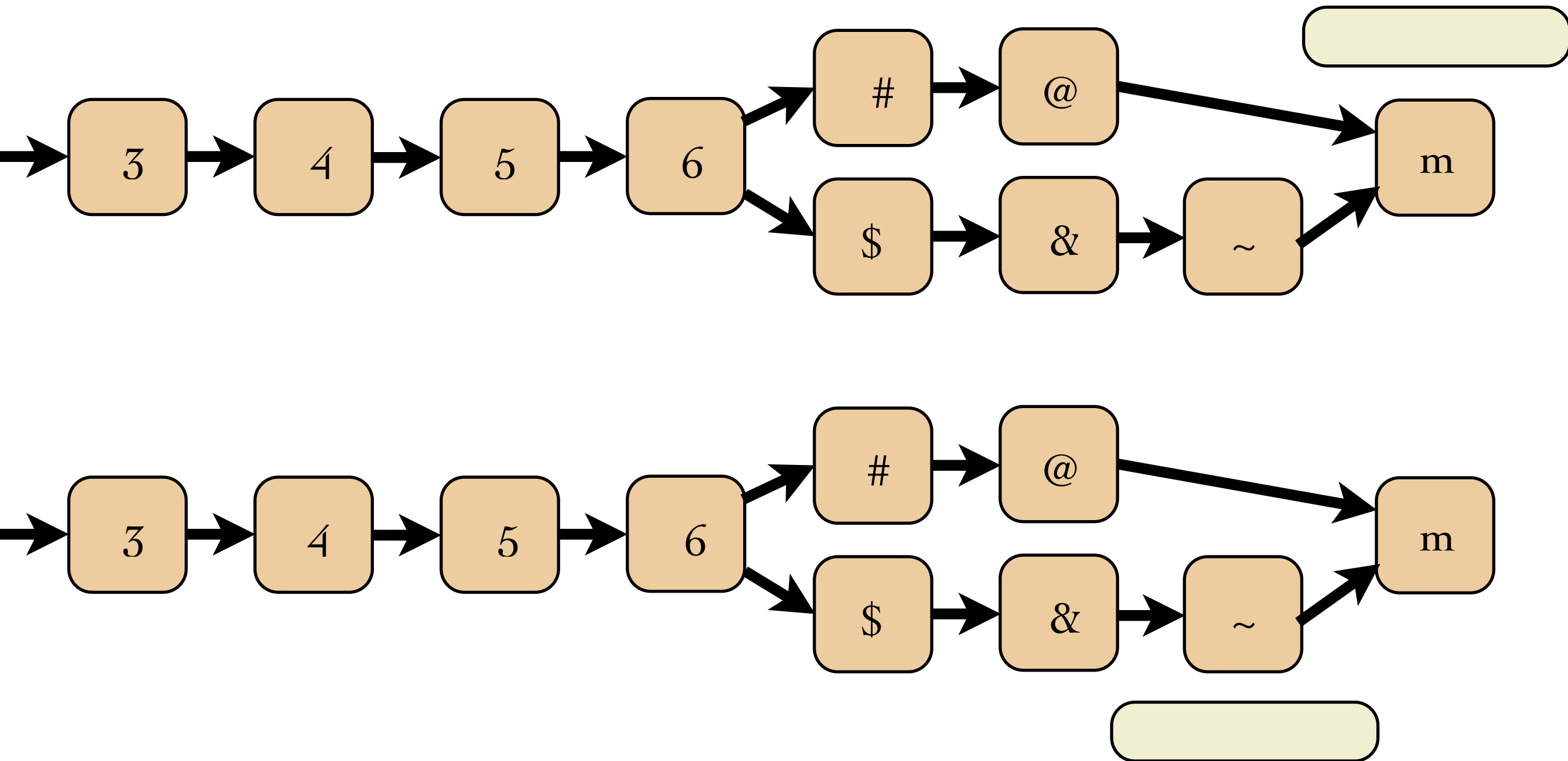
Merging

consistent state after push



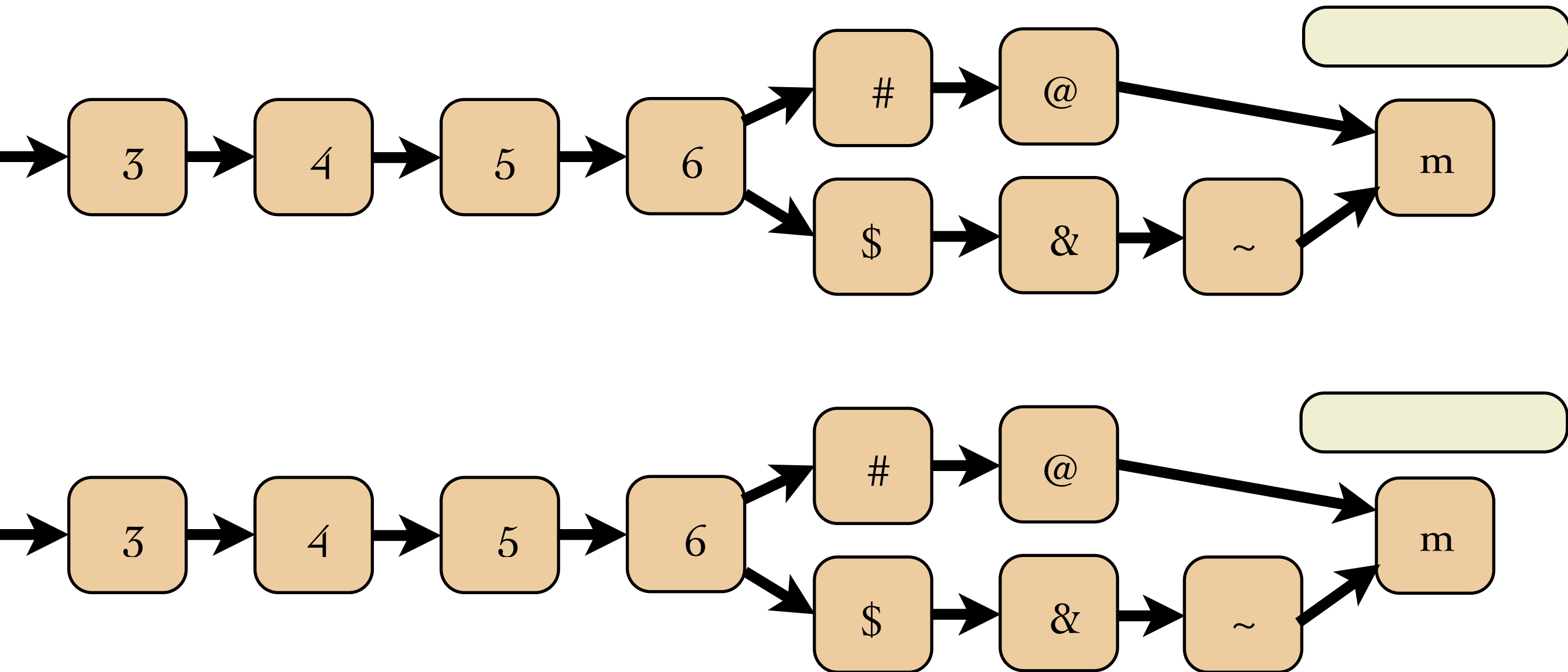
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	COMMENT	DATE
○	CREATED MAIN LOOP & TIMING CONTROL	14 HOURS AGO
○	ENABLED CONFIG FILE PARSING	9 HOURS AGO
○	MISC BUGFIXES	5 HOURS AGO
○	CODE ADDITIONS/EDITS	4 HOURS AGO
○	MORE CODE	4 HOURS AGO
○	HERE HAVE CODE	4 HOURS AGO
○	AAAAAAAAA	3 HOURS AGO
○	ADKFJSLKDFJSDKLFJ	3 HOURS AGO
○	MY HANDS ARE TYPING WORDS	2 HOURS AGO
○	HAAAAAAAAAANDS	2 HOURS AGO

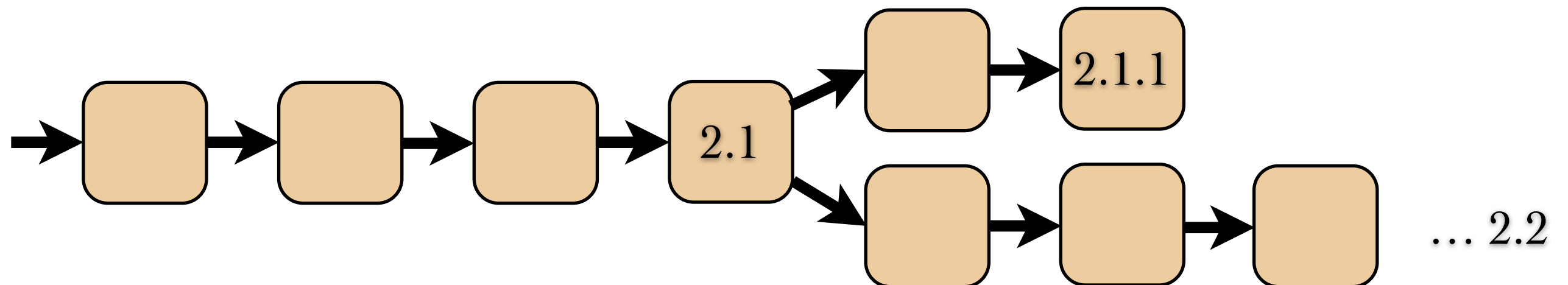
AS A PROJECT DRAGS ON, MY GIT COMMIT MESSAGES GET LESS AND LESS INFORMATIVE.

Typical usage patterns

- * Technically, every repo is the same
- * By agreement, designate one repo as “central”
- * Tarballs or other distributions are built *only* from there
- * Interaction with central repo: only push/pull from developers, no direct commits
- * Can pipeline even more: put code-review, tester, build manager repos in between

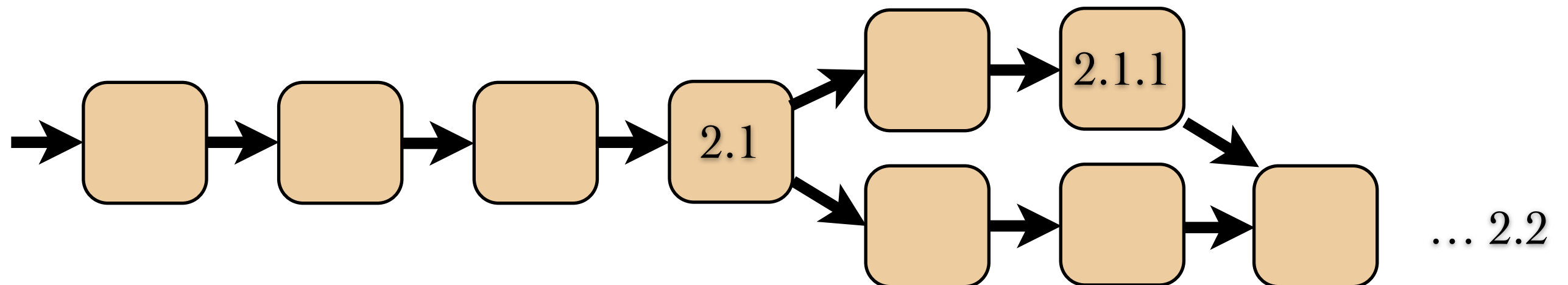
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- * Typically, separate release and feature branches
- * Carefully put checkins in the right place!



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Which branch for which checkin?

* Pick the innermost appropriate branch



Release branch 2.1.x

Main development for 2.2.0

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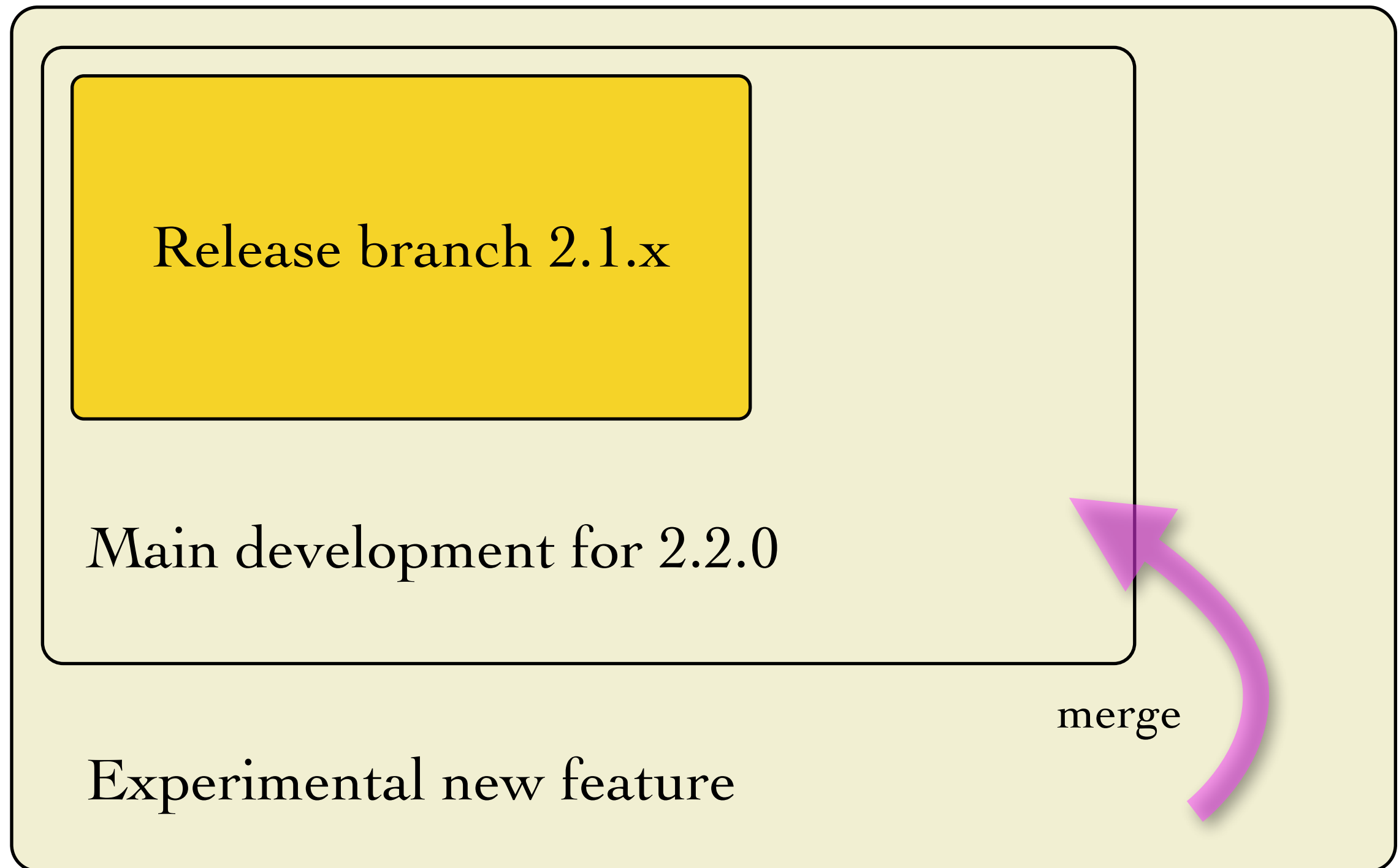
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Experimental new feature

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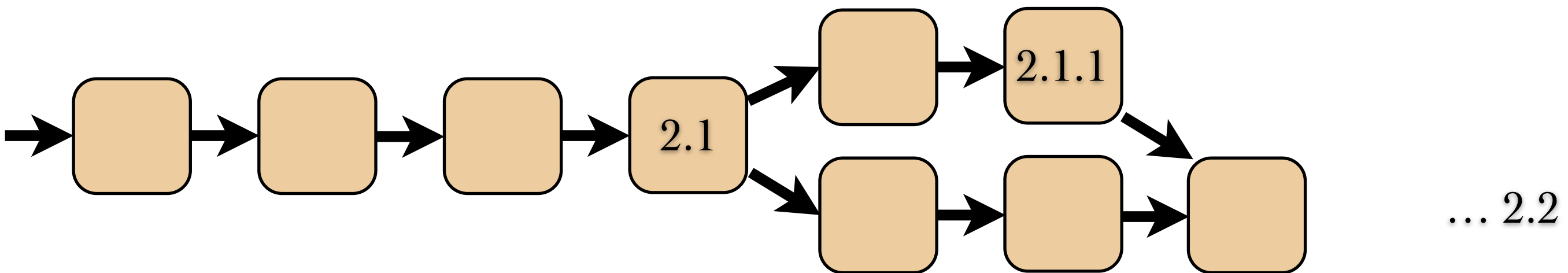


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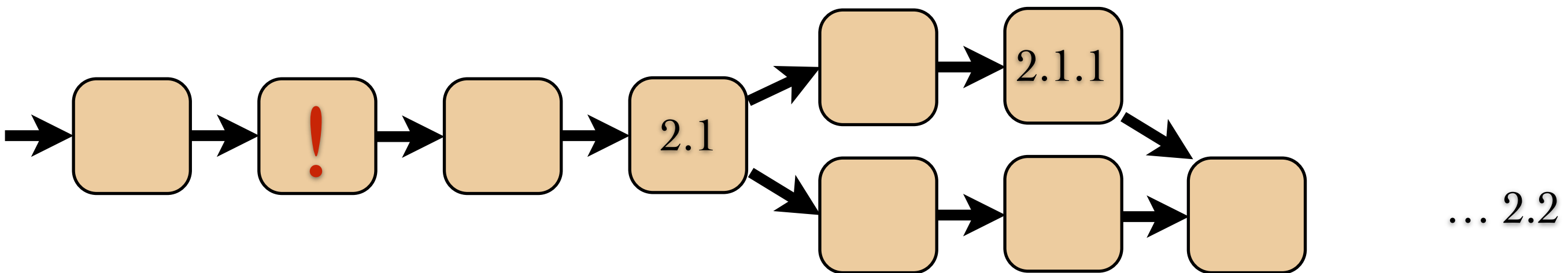
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If a bugfix is localizable, fix it **there!**



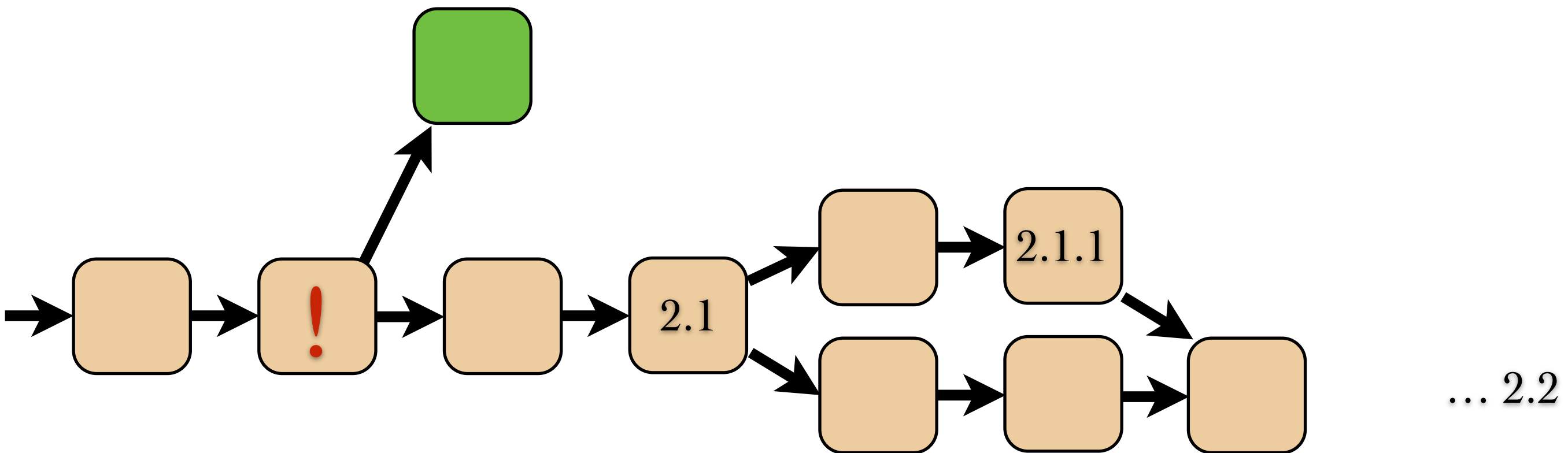
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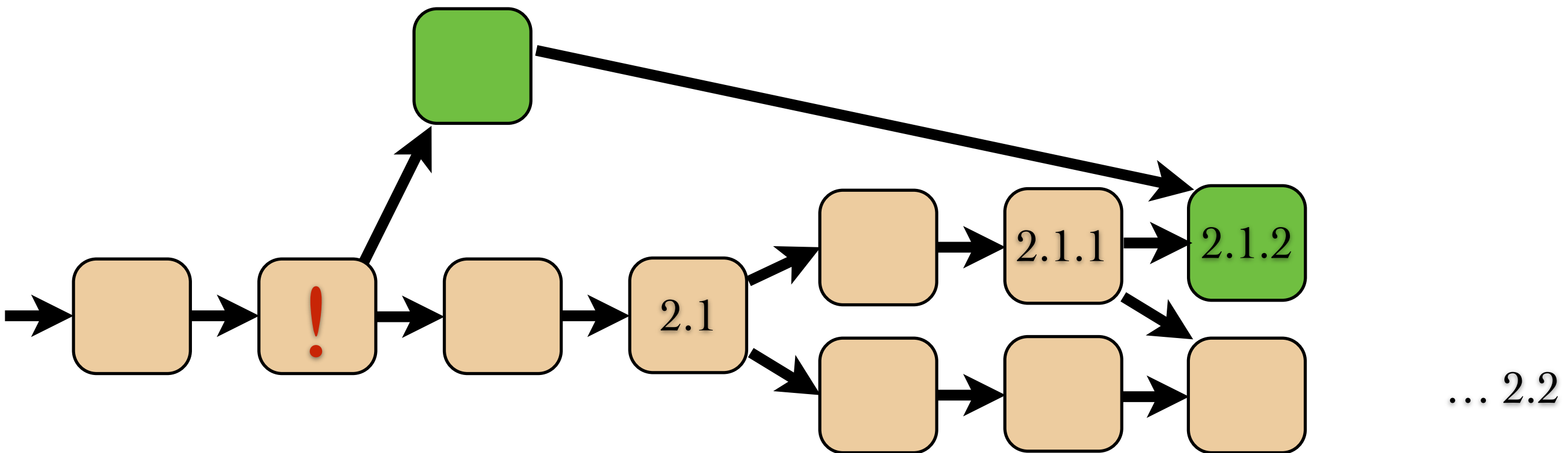
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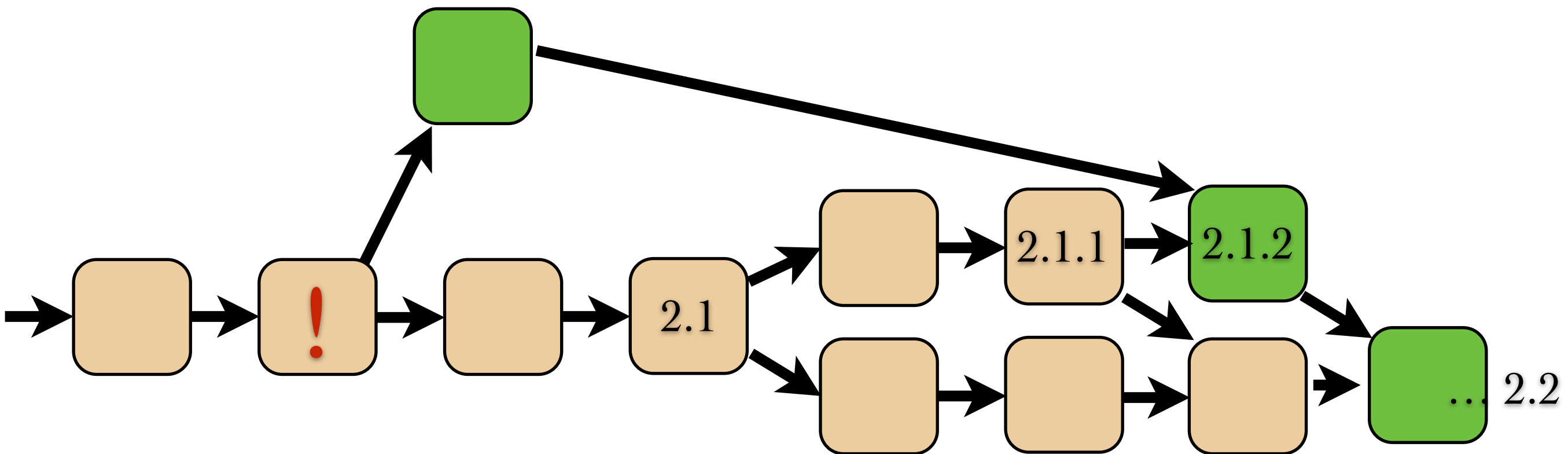
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**Don't even think of writing
outside version control!**