Azrieli College of Engineering Jerusalem

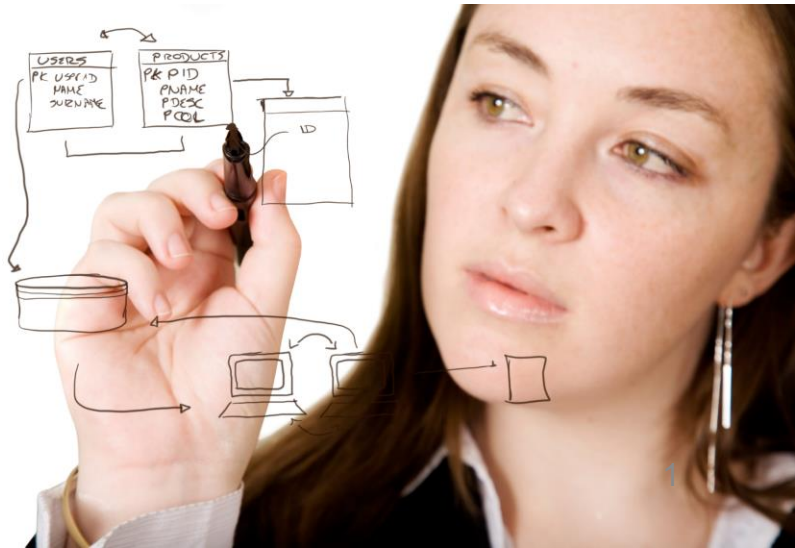
עזריאלי מכללה אקדמית להנדסה ירושלים

מודלים לפיתוח מערכות תוכנה
Software Systems Modeling

קורס 12003

סמסטר ב' תשע"ה

9. מודל קונספטואלי לבקרת קוד מבוזרת



ד"ר ראובן יגל
robi@post.jce.ac.il

הפעם

- מידול תהליכי פיתוח תוכנה
  - עבודת צוות ומחזור חיים
  - תיכון וארכיטקטורה -> High Level Models
  - בדיקות
    - ריבוע הבדיקות
    - תיעוד חי? (BDD)
  - מימוש : גיט
- המשך מצגות פרויקט
- סיכום הקורס והצגת הסקר

בקרת תצורה (SCM)

- לפרויקט תוכנה תוצרים שונים:
- מסמכי דרישות ותיכון, קוד, executables, מדריכי שימוש, בדיקות,...
- פרויקט תוכנה משתמש בכלים שונים:
- מהדרים, עורכים, צד ג', שת"פ, (מ"ה), ...

בקרת תצורה

- מבחינת תהליך זה אלו נקראים CI – Configuration Items
- לכל אחד יכולים להיות גרסאות ועותקים שונים
- אנו צריכים יכולת לזהות, לעקוב ולאחסן אותם
- נתמקד בנושא של גרסאות

בקרת גרסאות – Version Control

- איך (האם?) אתם שומרים את תוצרי העבודה שלכם?
- האם אפשר לשפר?
- האם יש הבדל בין מפתח בודד לחברה גדולה?
- שמות שונים:
  - בקרת תצורה
  - Revision Control
  - Software Configuration Management
  - Source-Code/Version Control System

בקרת גרסאות – בשביל מה? יעדים

- איסוף כל הגרסאות ומעקב אחרי שינויים
  - חזרה לגרסה מסוימת, השוואה
  - מאפשר מחיקת קוד
- ניהול מספר גרסאות במקביל
- גיבוי והצלה
- שיתוף מספר מפתחים (מרוחקים) בו זמנית
  - טיפול בסתירות
- מאגר מעודכן של תוצרי הפרויקט
  - במיוחד עם daily build\

בפרויקט תדרשו להדגים את בקרת התצורה שלכם

פעולות נדרשות

- בקרת שינויים
  - זיהוי ותיעוד (למשל מי משנה, הסיבה, זמן וכדו')
  - ניתוח והערכה (של שינוי)
  - אישור \ דחיה
  - אימות, מימש ושחרור
- בקרת גרסאות
  - מאגר
  - הכנסה והוצאה
  - ענפים ומיזוגים
  - תיוג

כלים: היסטוריה (השוואה)

Generation	Networking	Operations	Concurrency	Examples
1	None	One file at a time	Locks	RCS, SCCS
2	Centralized	Multi-file	Merge before commit	CVS, SourceSafe, Subversion, Team Foundation Server, IBM Rational ClearCase
3	Distributed	Changesets	Commit before merge	Bazaar, Git, Mercurial

40 Years of Version Control

SCCS & RCS (1970s)

CVS (1986)

Subversion (2001)

Git (2005)

Image © TheSun.au

Git

- Successful open source project
  https://git.wiki.kernel.org/index.php/GitProjects
  https://github.com/google, microsoft, facebook, twitter…
  http://stackoverflow.com/research/developer-survey-2015#tech-sourcecontrol
- Problems / Issues:
  - Usability!
  - Mainly a scripted / toolset (by now IDE integration and GUIs)
  - Binary/big file
  - Enterprise (e.g. locking)

משל גיט

- Tom Preston-Werner http://tom.preston-werner.com/2009/05/19/the-git-parable.html
- Herland, http://www.infoq.com/presentations/git-details, slides: https://github.com/jherland/git_parable

The Git Parable

Johan Herland

johan@herland.net

The Git Parable

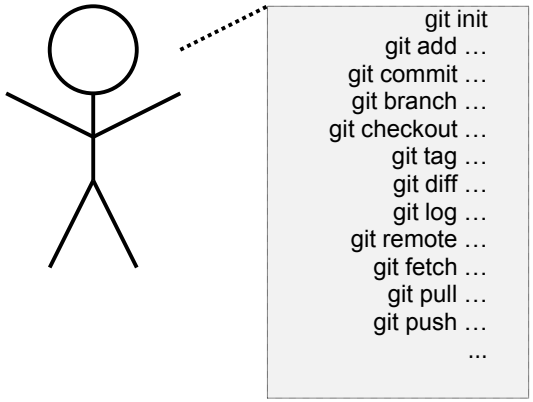
- Shamelessly stolen from Tom Preston-Werner
  http://tom.preston-werner.com/2009/05/19/the-git-parable.html
- I'm lazy...
- Also: Best introduction to Git I've found so far

The Git Parable

- Git - simple & powerful .

The Git Parable

Git - simple & powerful .



The Git Parable

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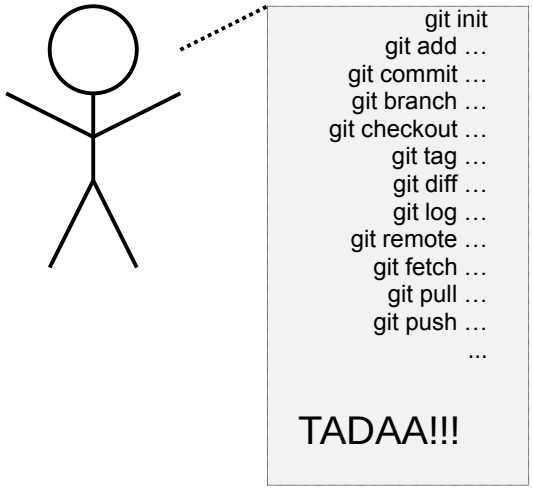

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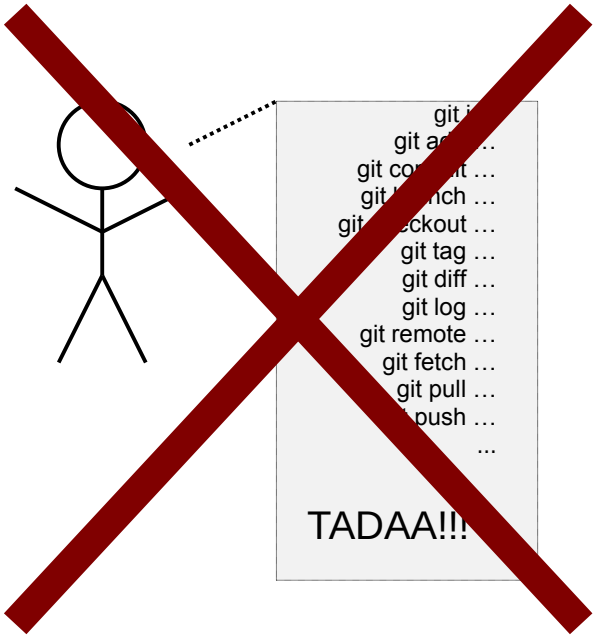

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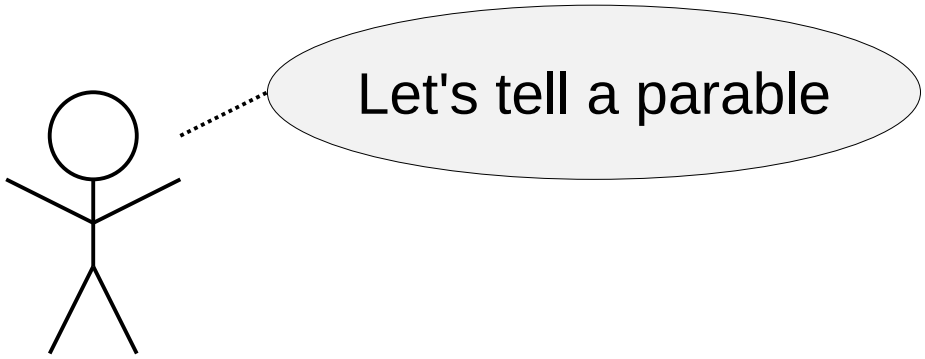

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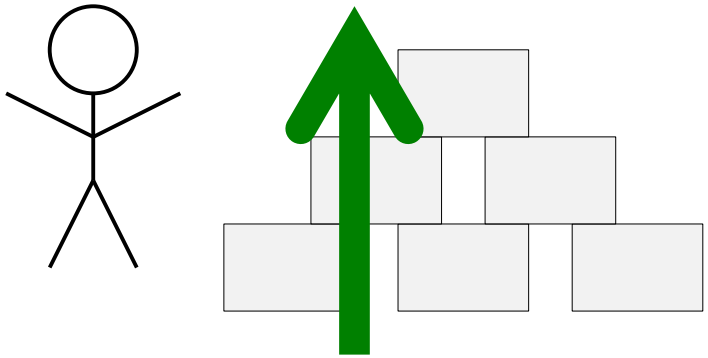

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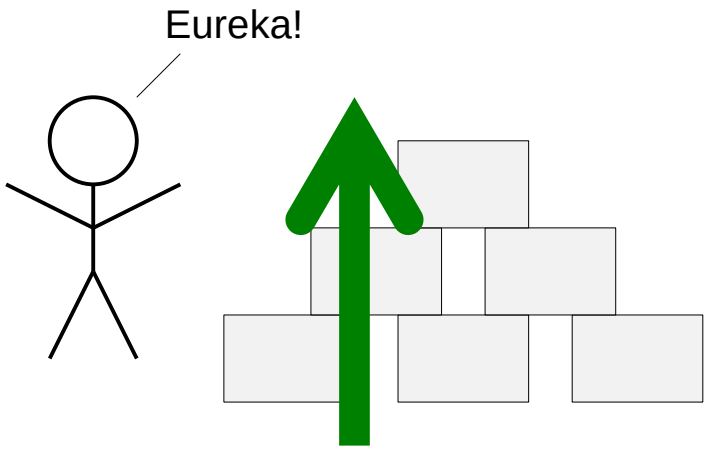
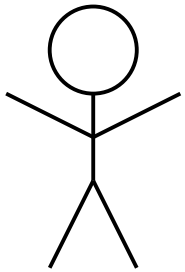


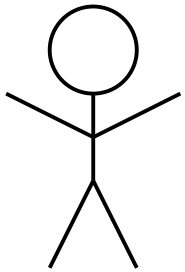
The Parable

- A simple computer
  - A text editor
  - A few filesystem commands



The Parable

Write a large software program .

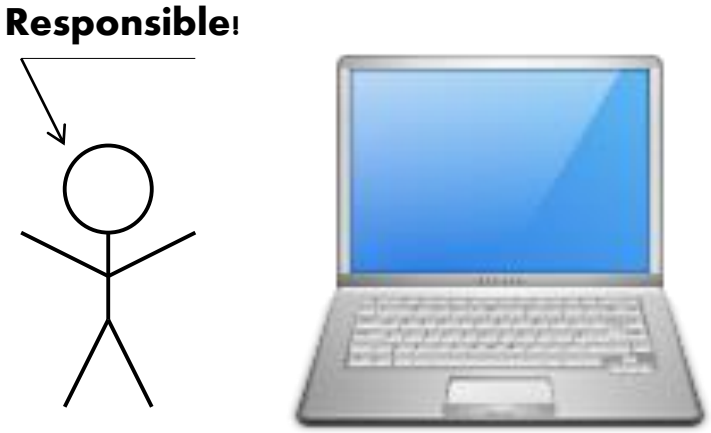


The Parable

Write a large software program .

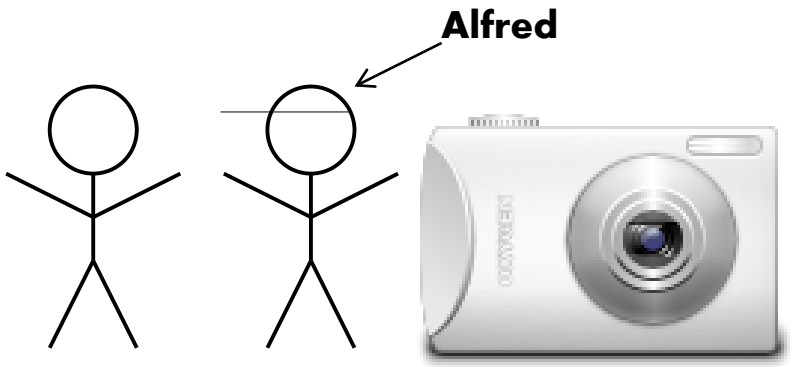
Invent some method to keep track of versions .

- **retrieve code that you changed/deleted**



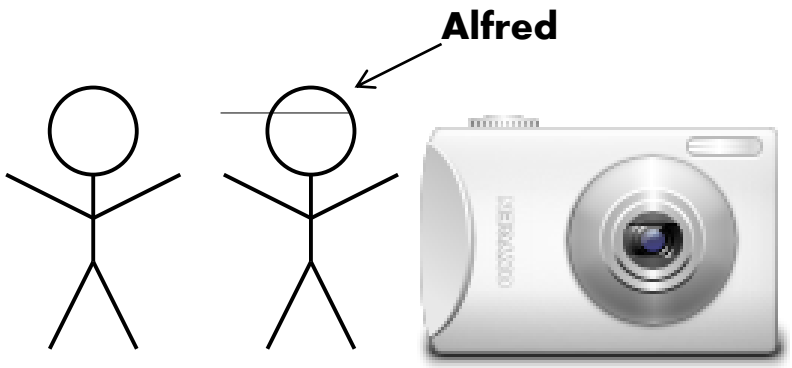
Snapshots

Alfred, the photographer .



Snapshots

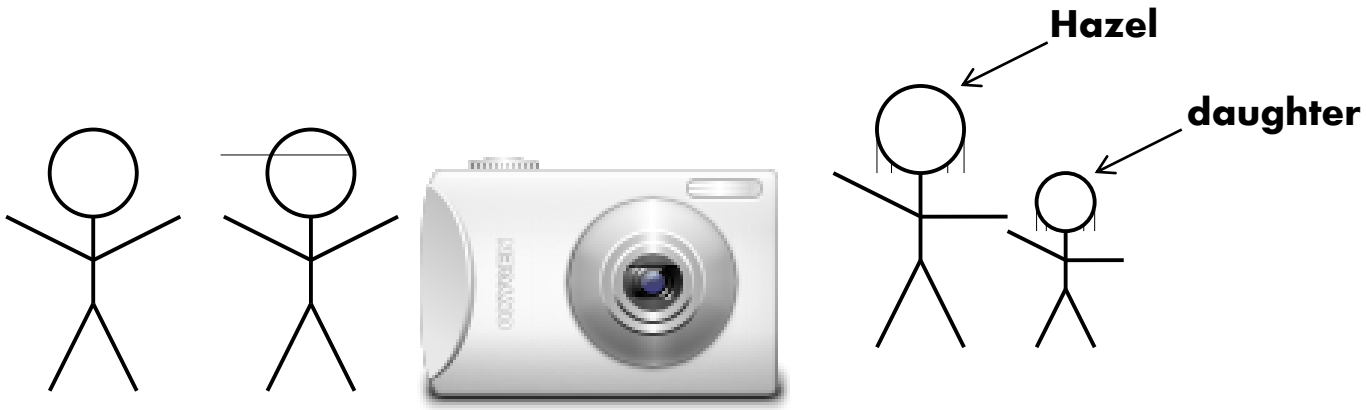
Alfred,



Snapshots

Alfred, the photographer .

Hazel and her daughter .

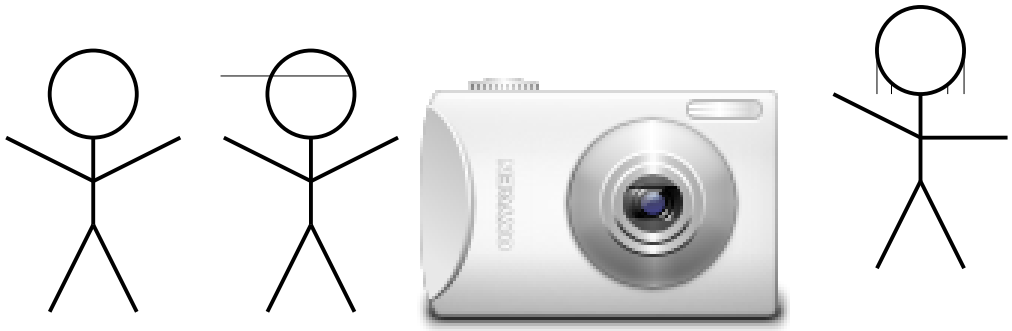


Snapshots

Alfred, the photo r .

Hazel and h r .

– Remer r the daught like at each different stage

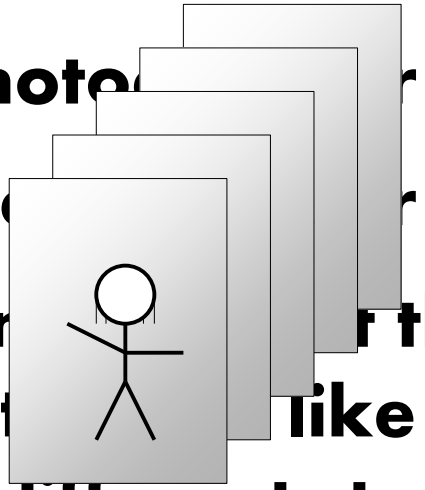


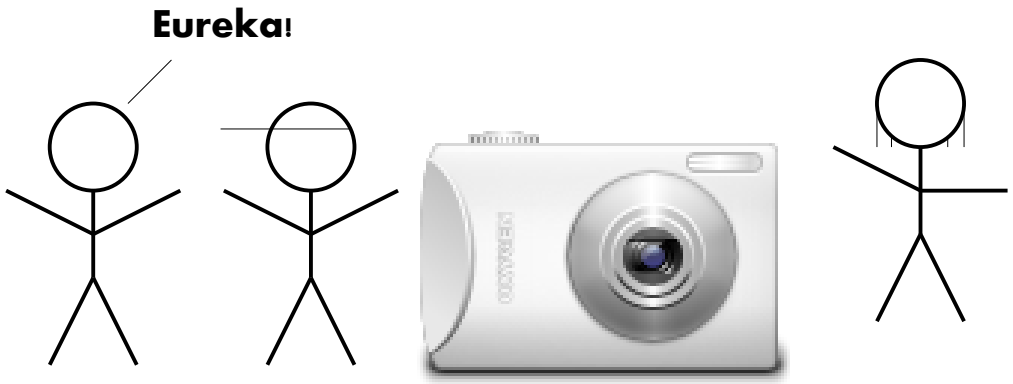
Snapshots

Alfred, the photo[illegible]r .

Hazel and h[illegible]r .

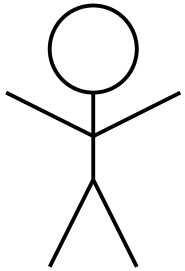
– Remem[illegible]r the daught[illegible]like at each different stage



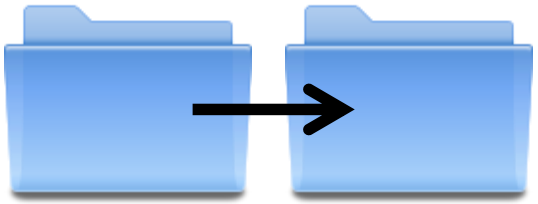


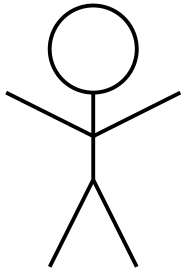
Snapshots

working

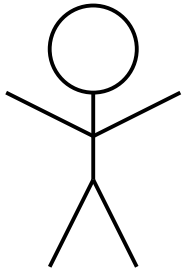


Snapshots

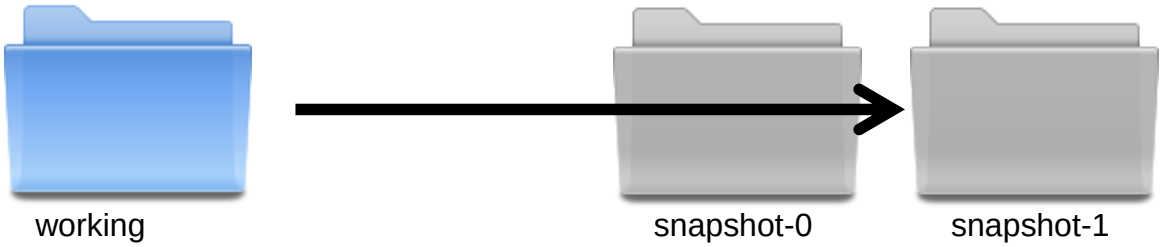


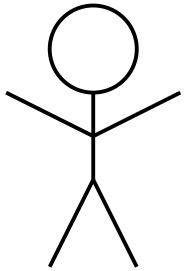


Snapshots

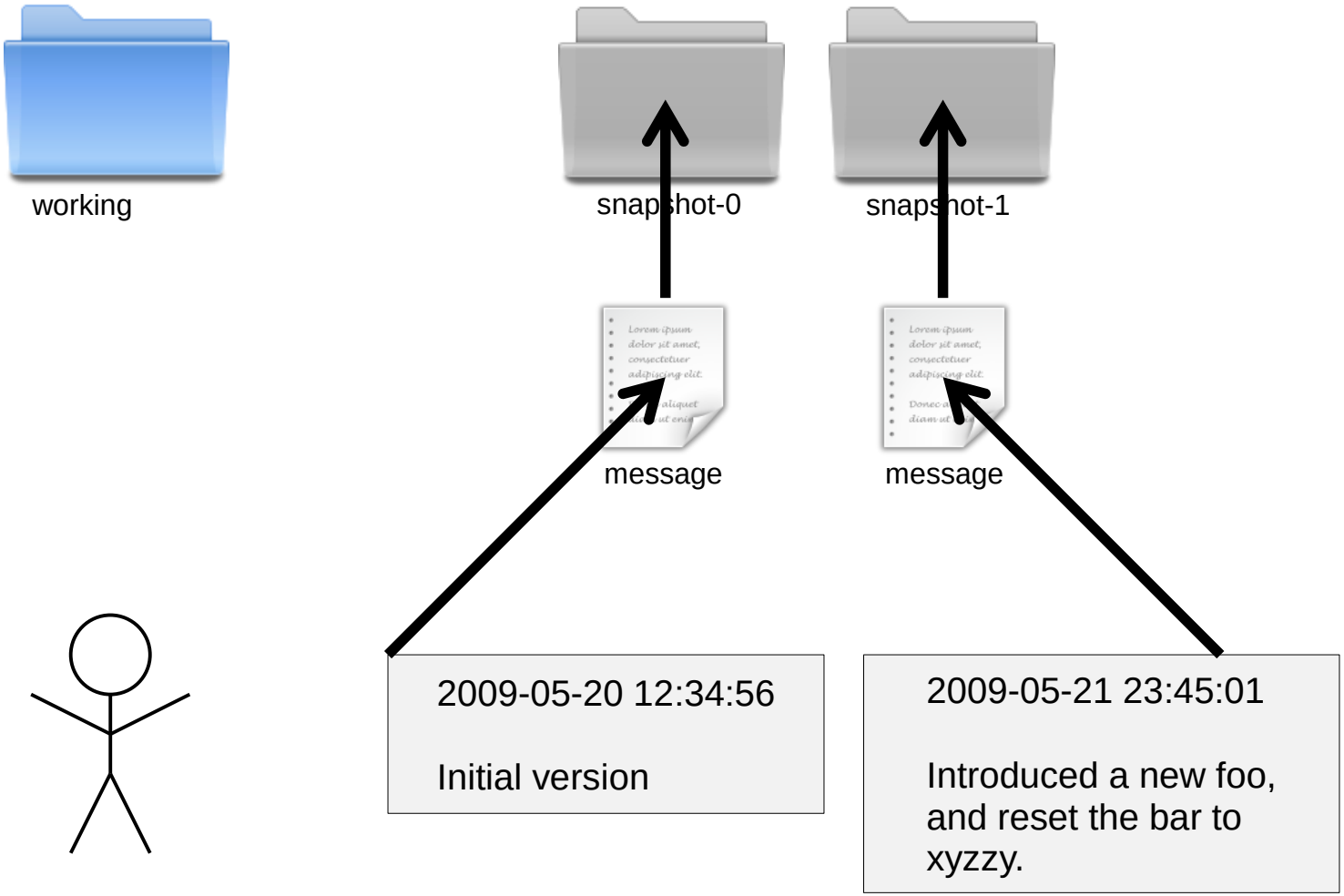


Snapshots





Snapshots


working
snapshot-0
snapshot-1
message
message
2009-05-20 12:34:56
Initial version
2009-05-21 23:45:01
Introduced a new foo, and reset the bar to xyzzy.

Branches

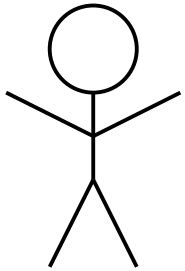
working

snapshot-0

snapshot-1

. . .

snapshot-99



Branches

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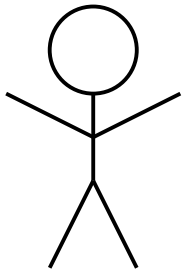

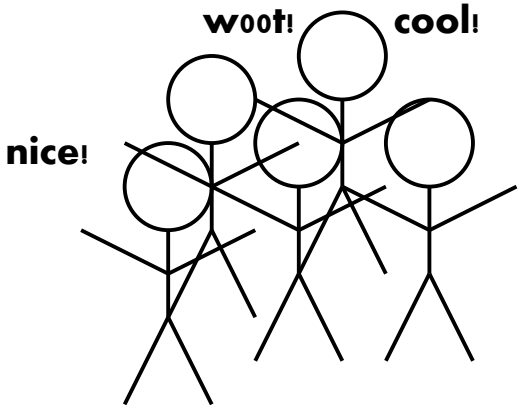

Branches

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snapshot-1

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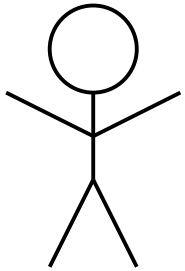
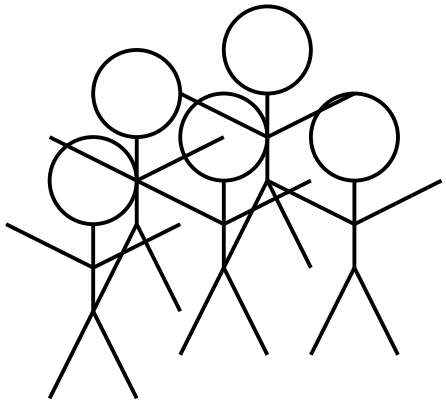
snapshot-109





Branches

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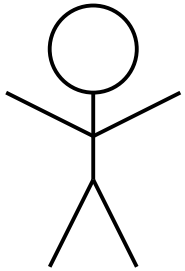
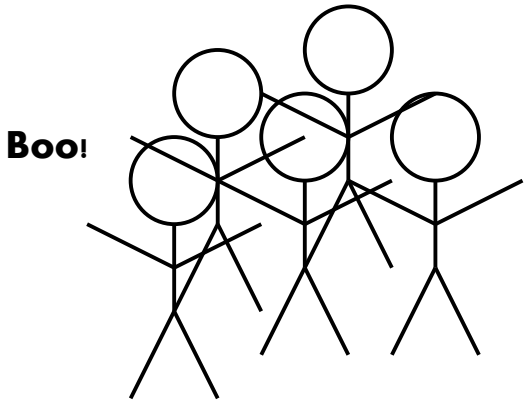
snapshot-109





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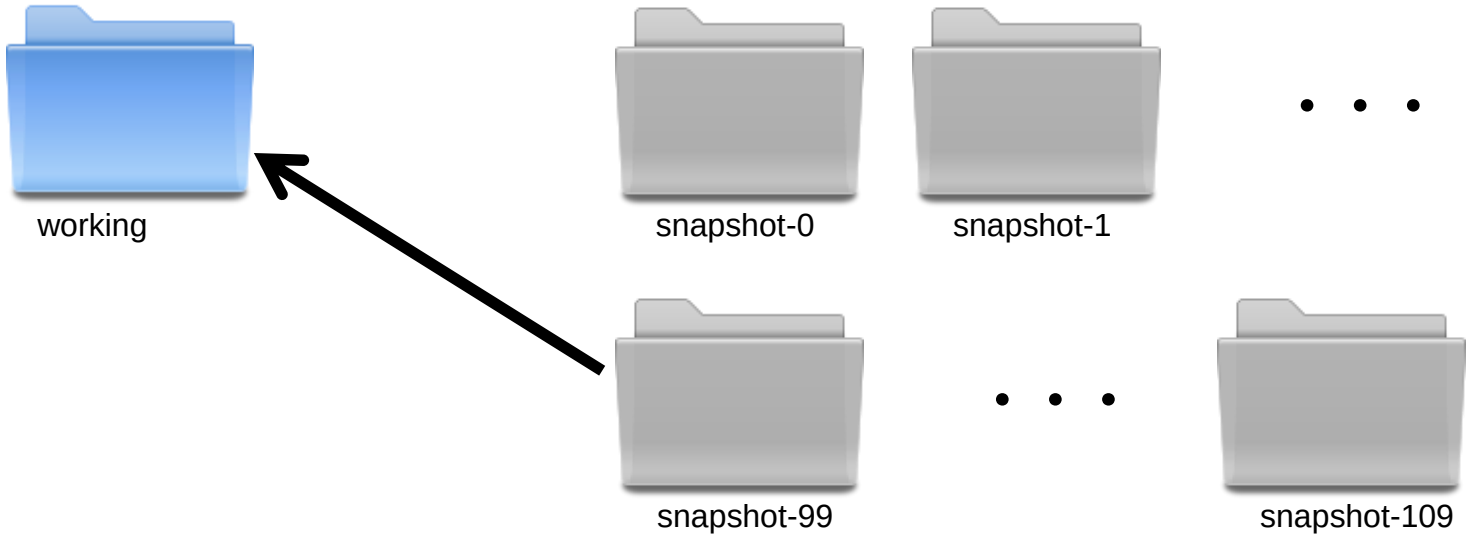

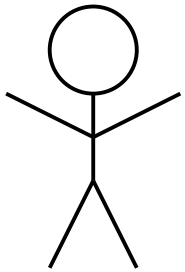

Branches

working

snapshot-0

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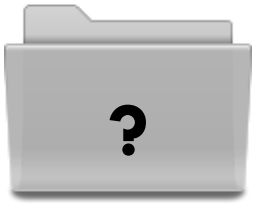
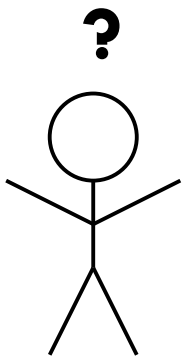
snapshot-109



snapshot-110



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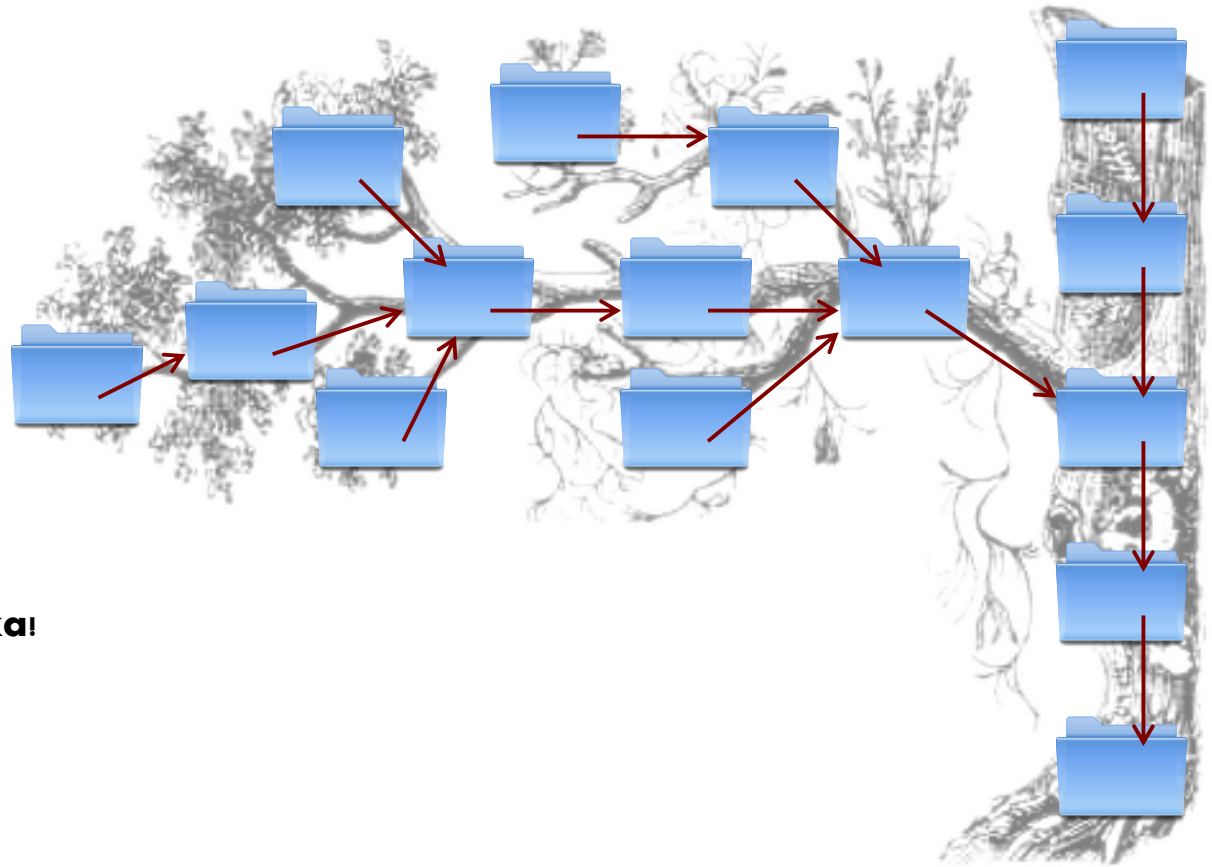

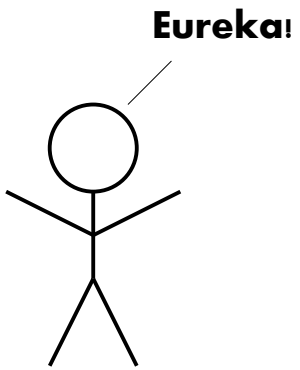

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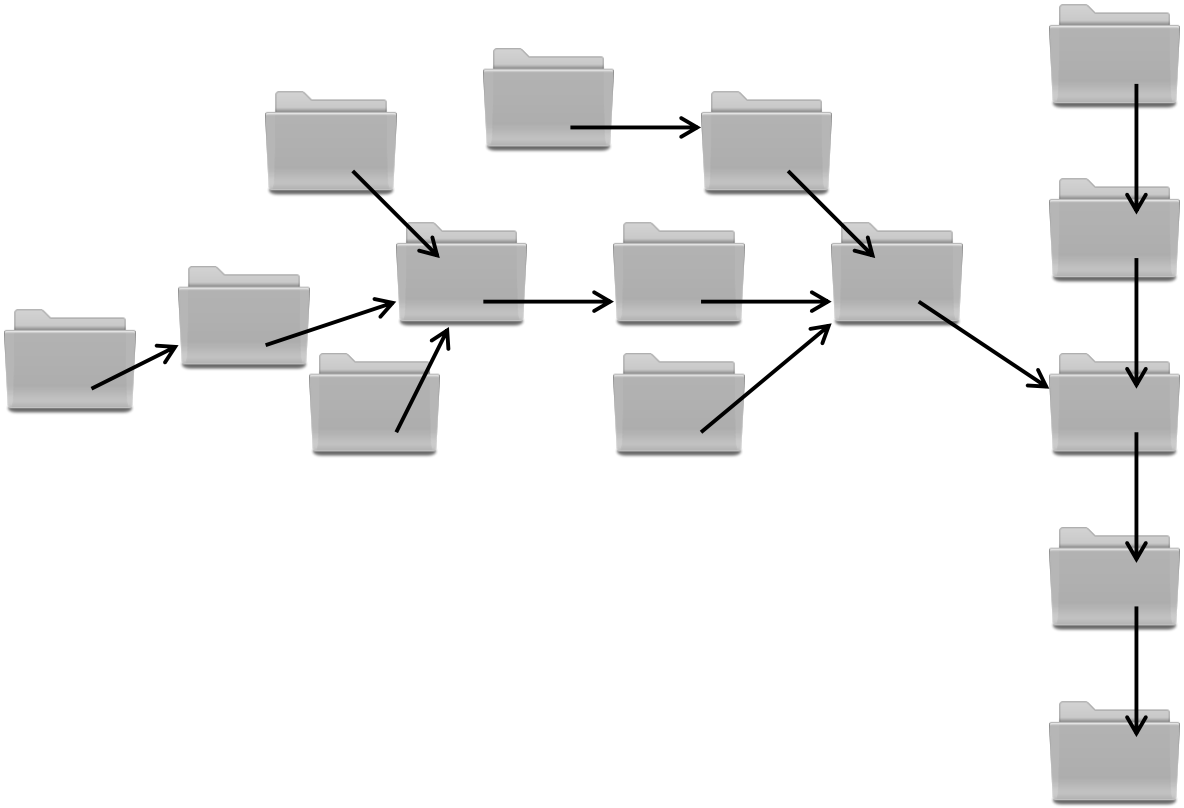

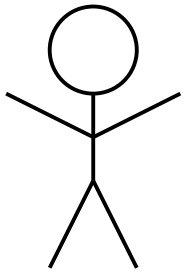

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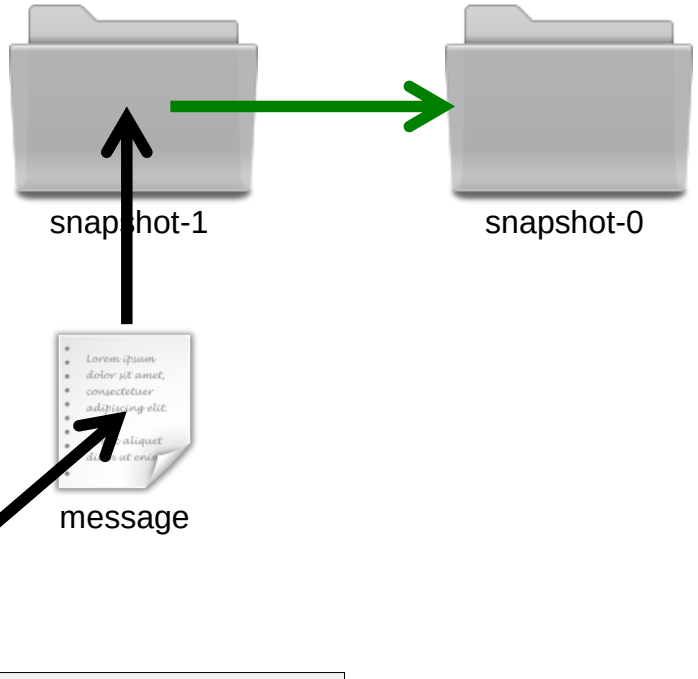

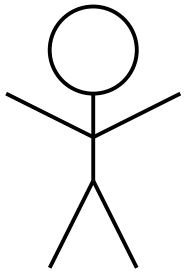

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Introduced a new foo, and reset the bar to xyzzy.

Branch Names

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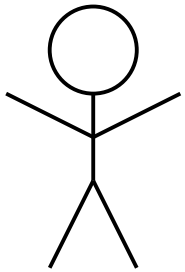

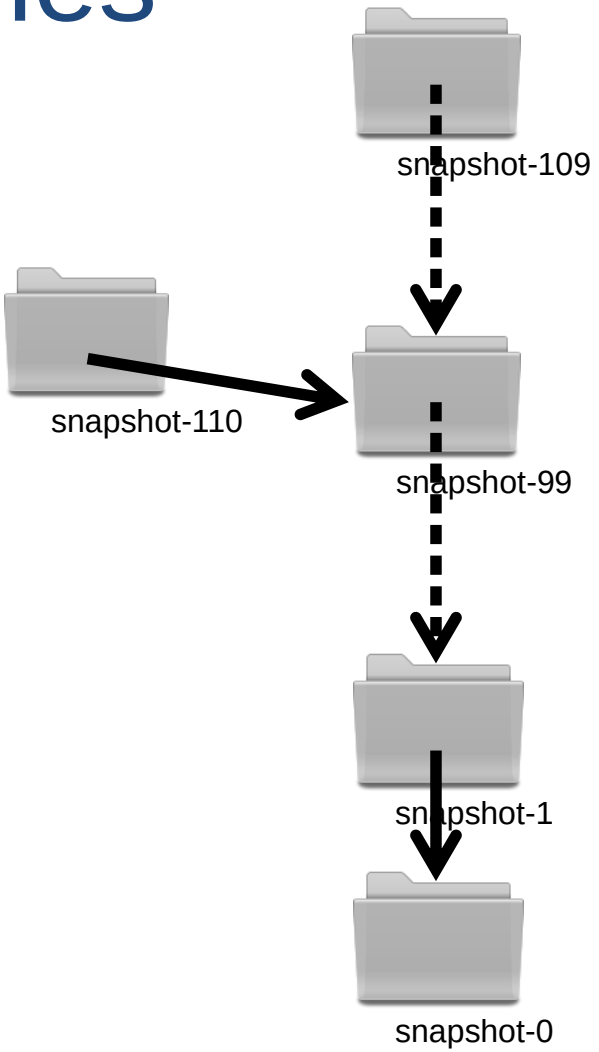

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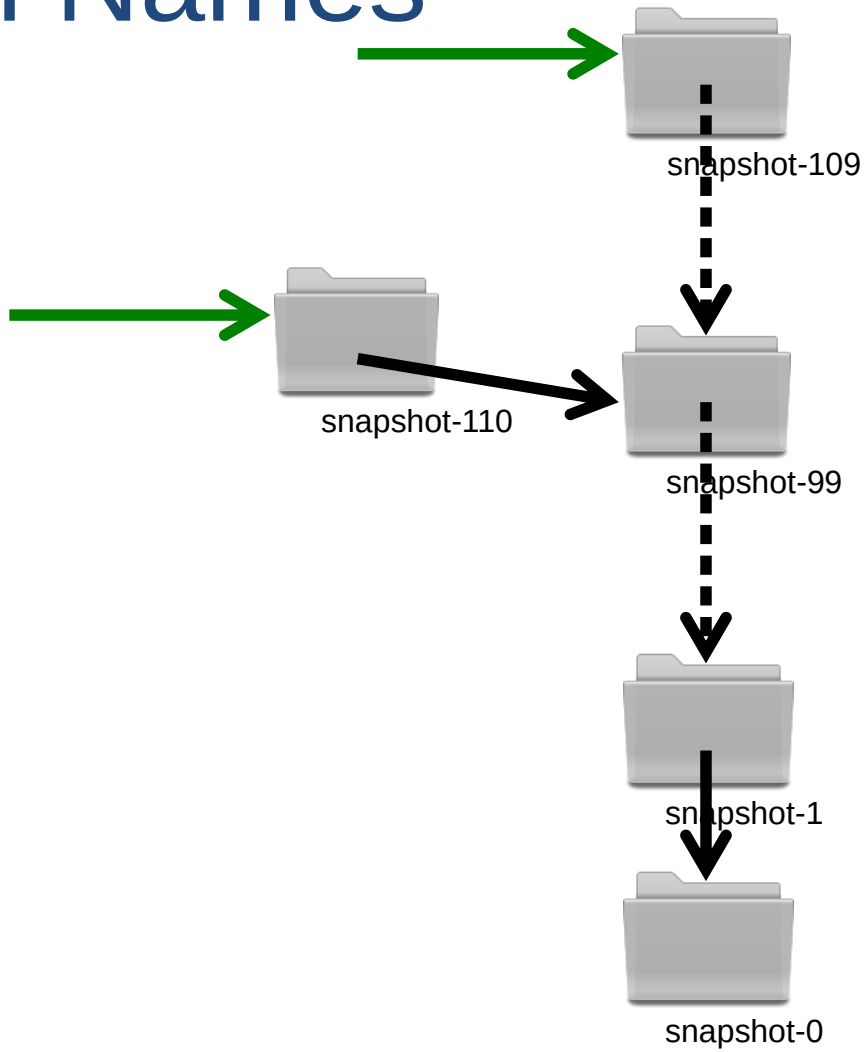

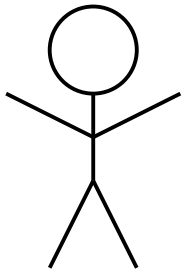

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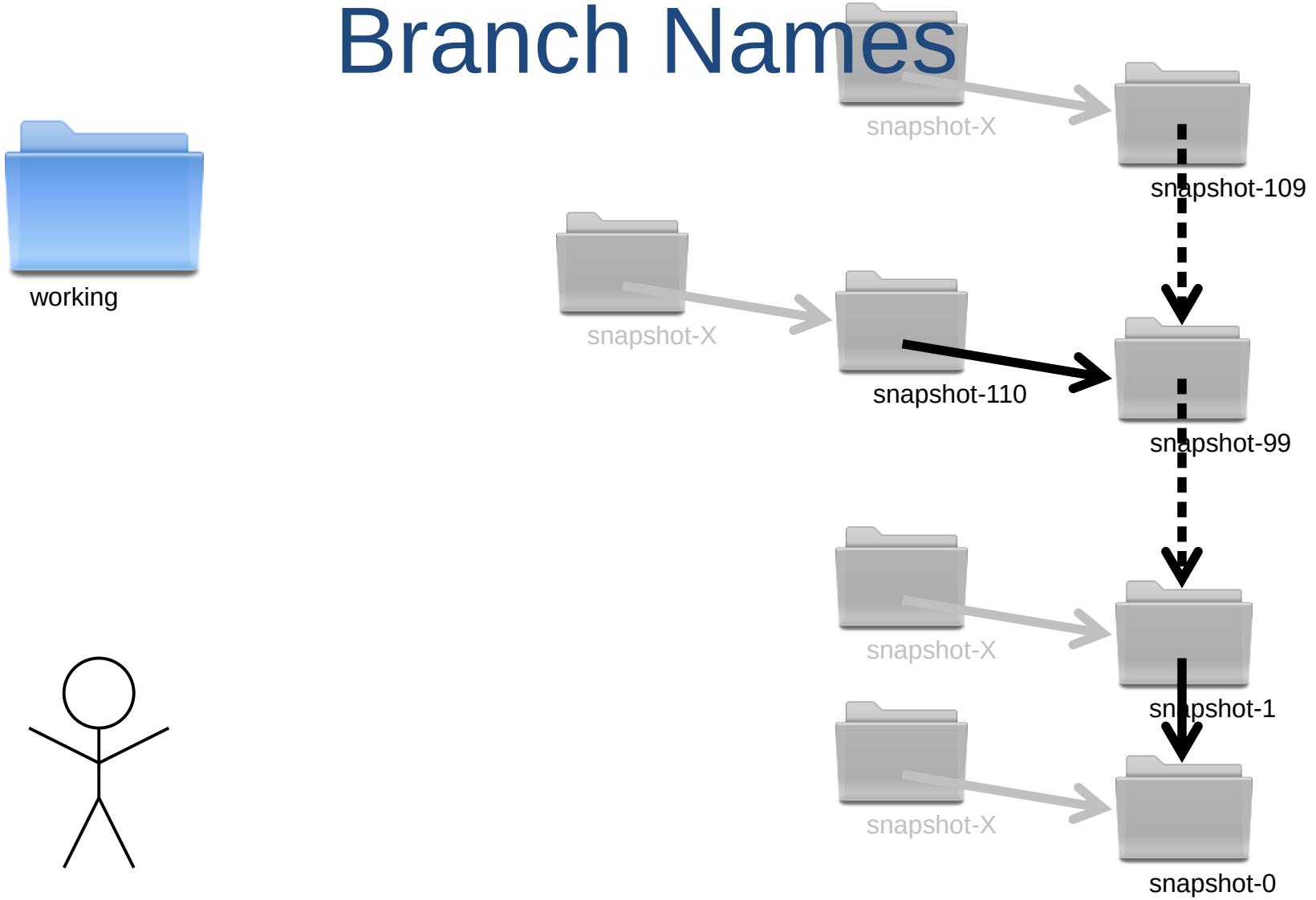

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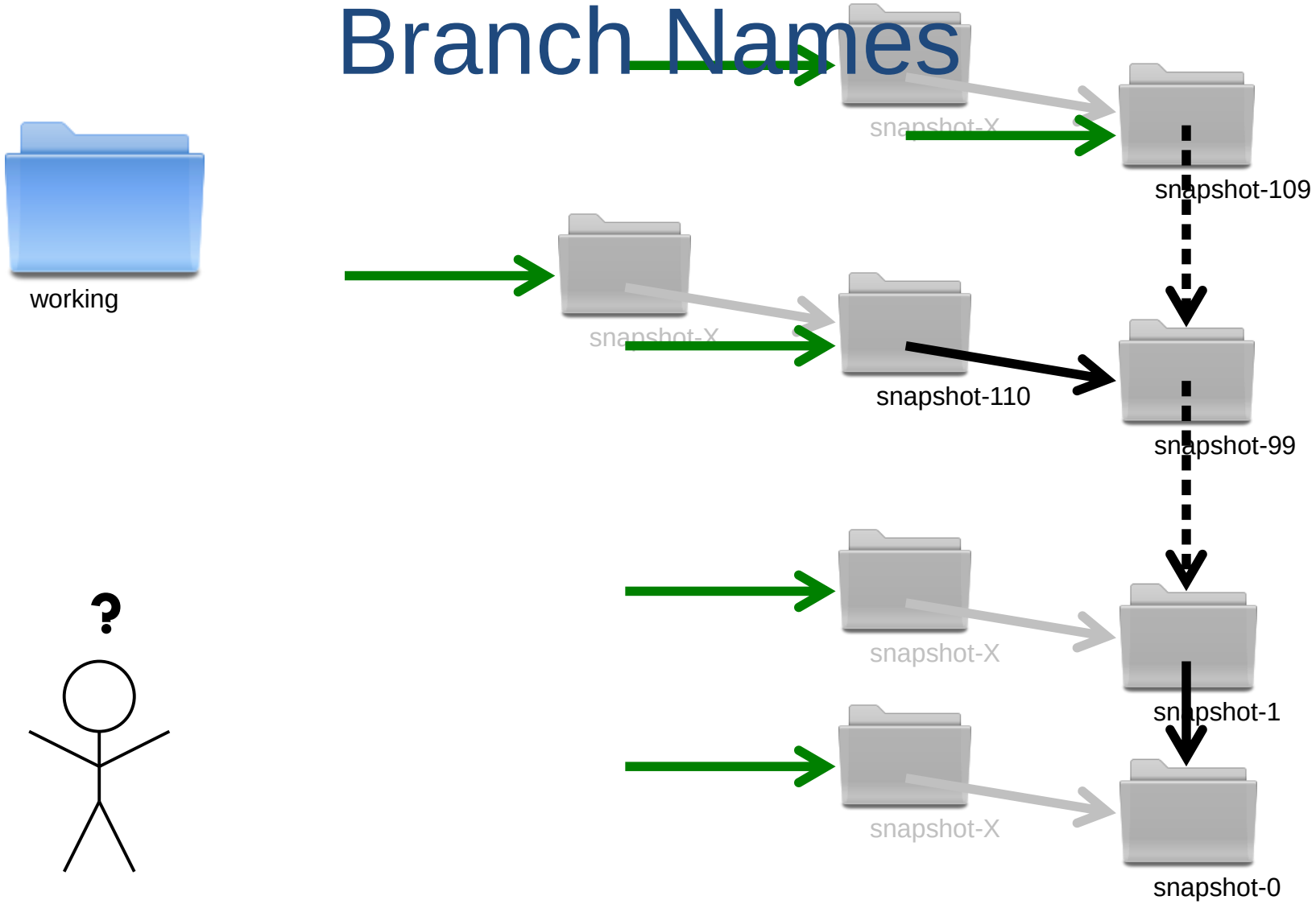

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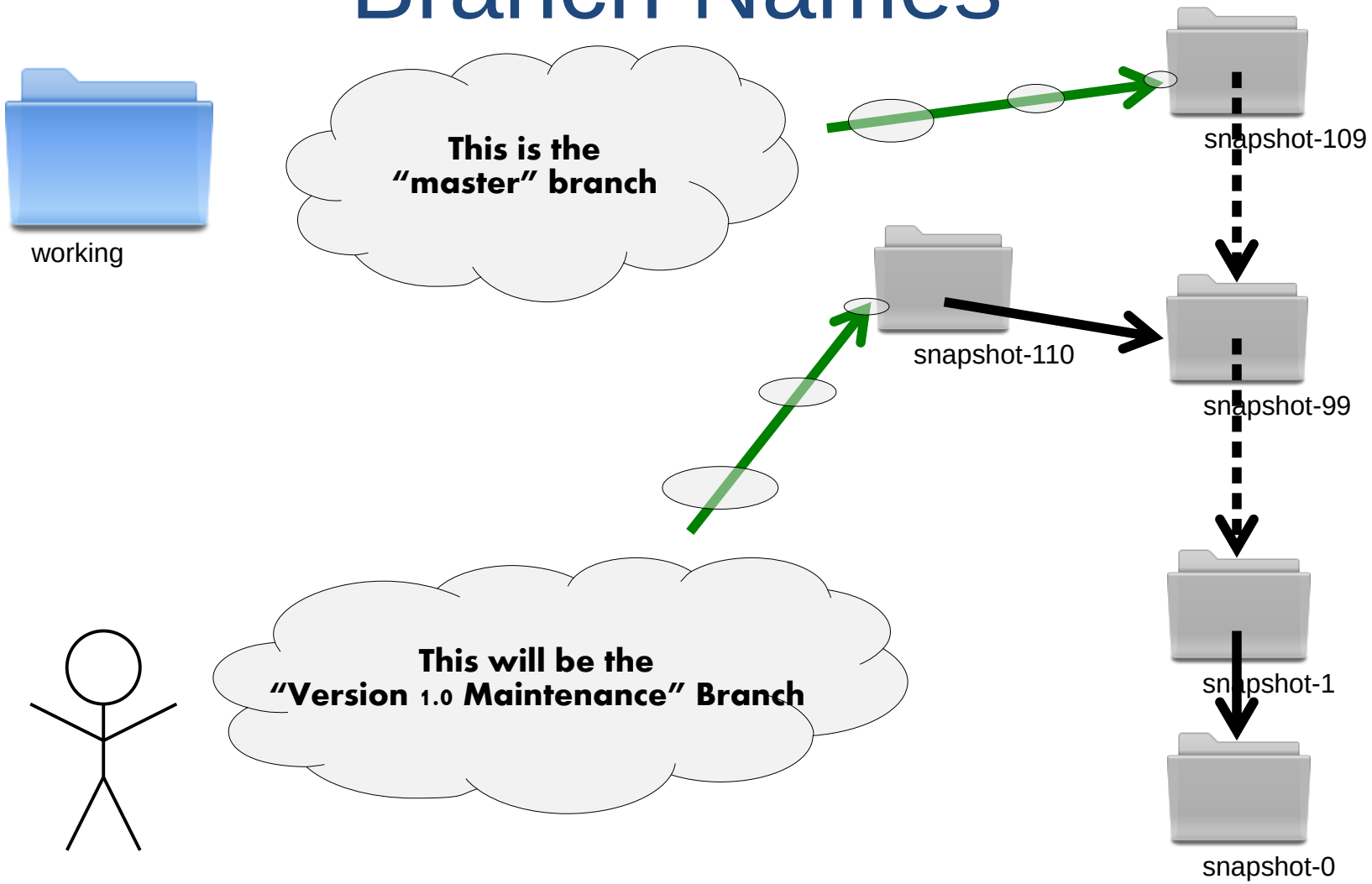

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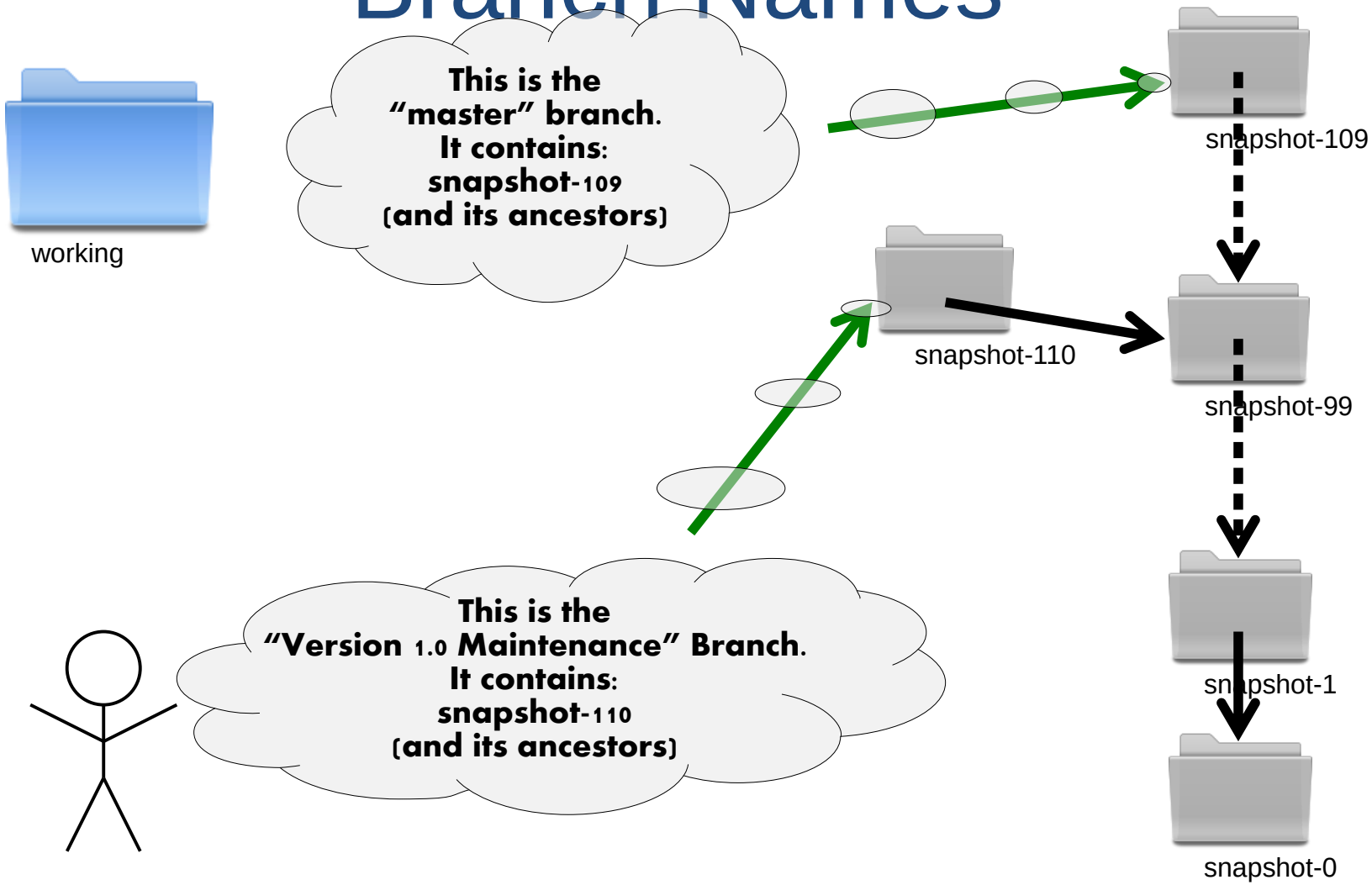

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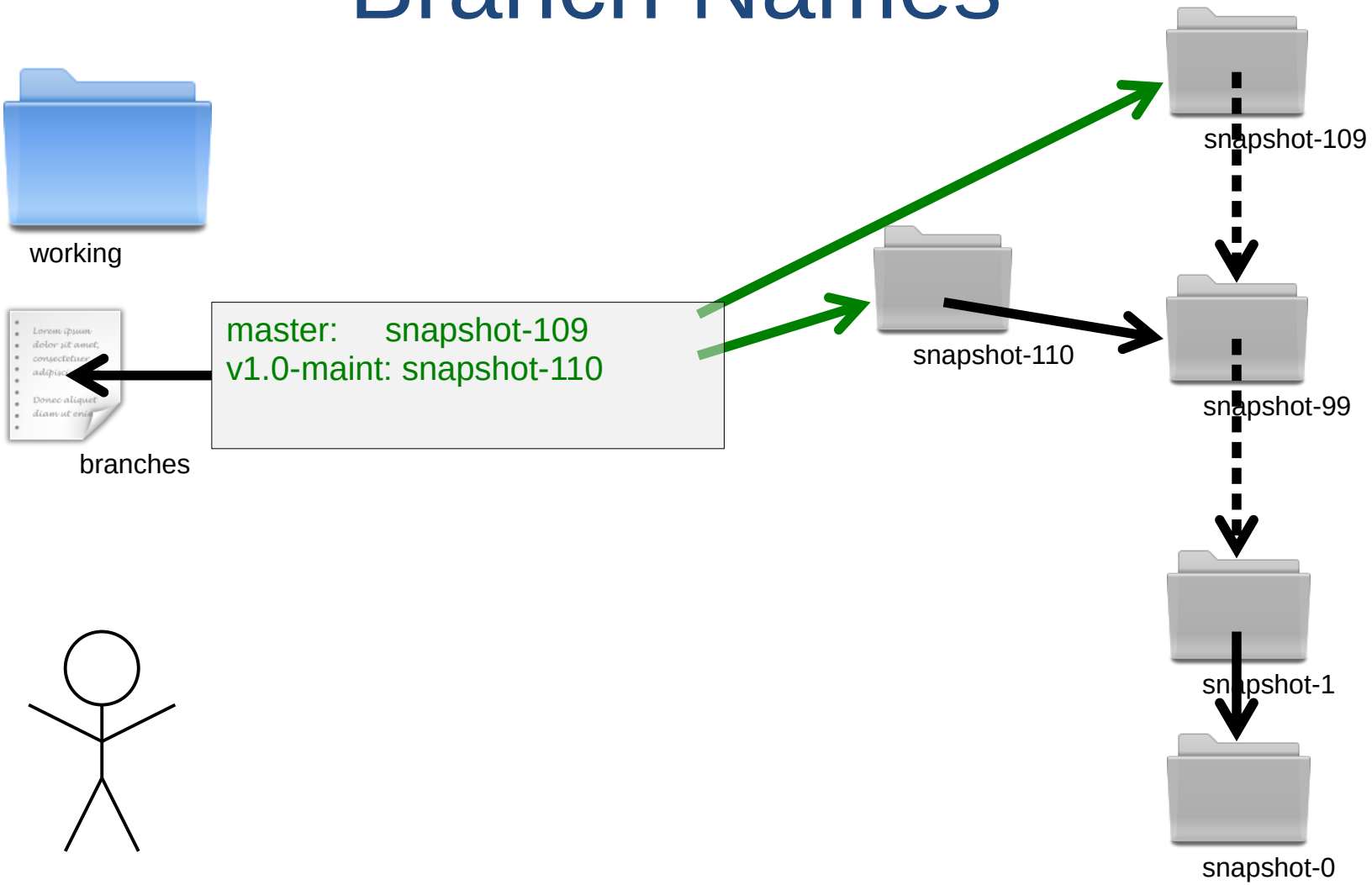

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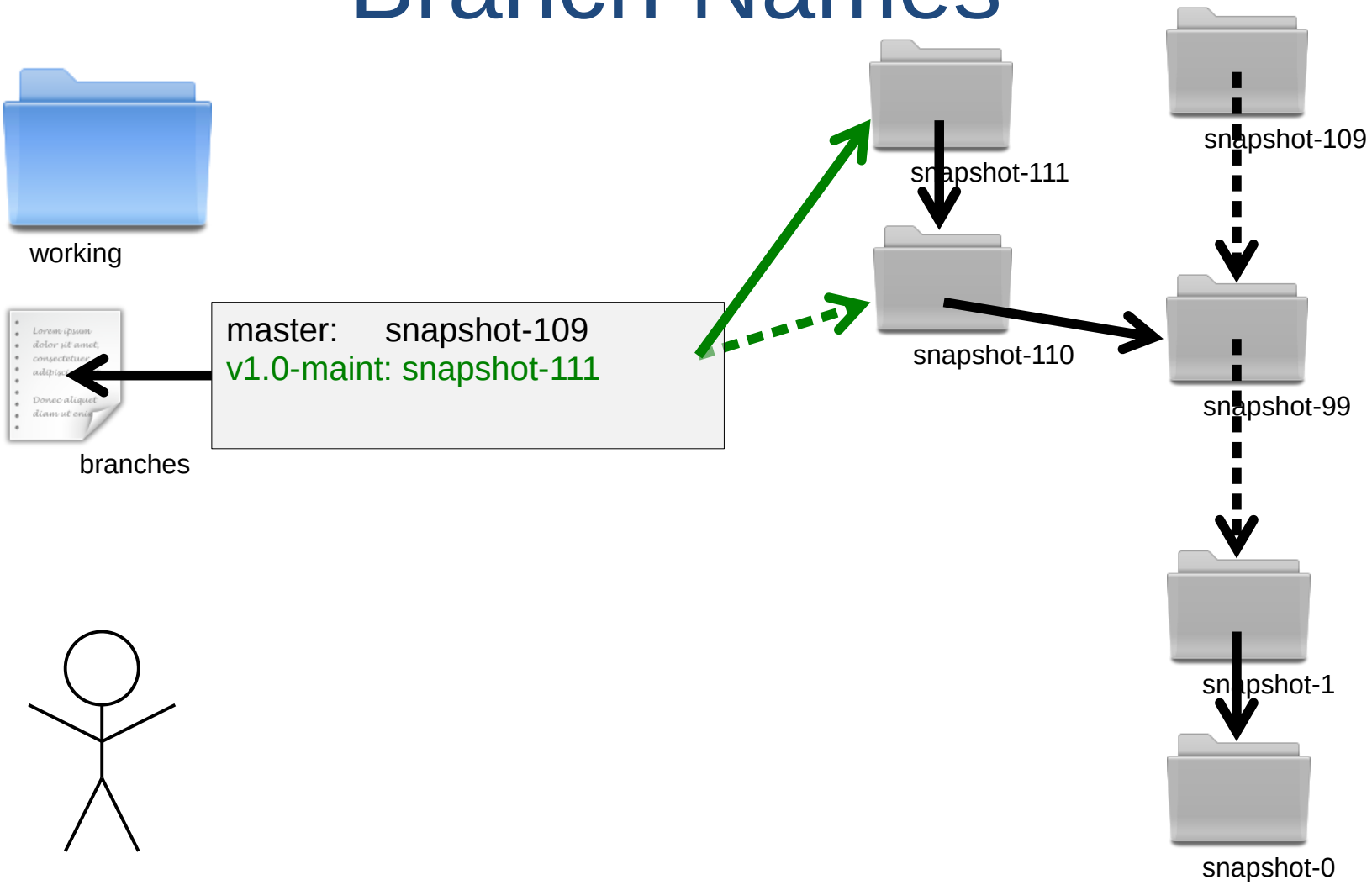

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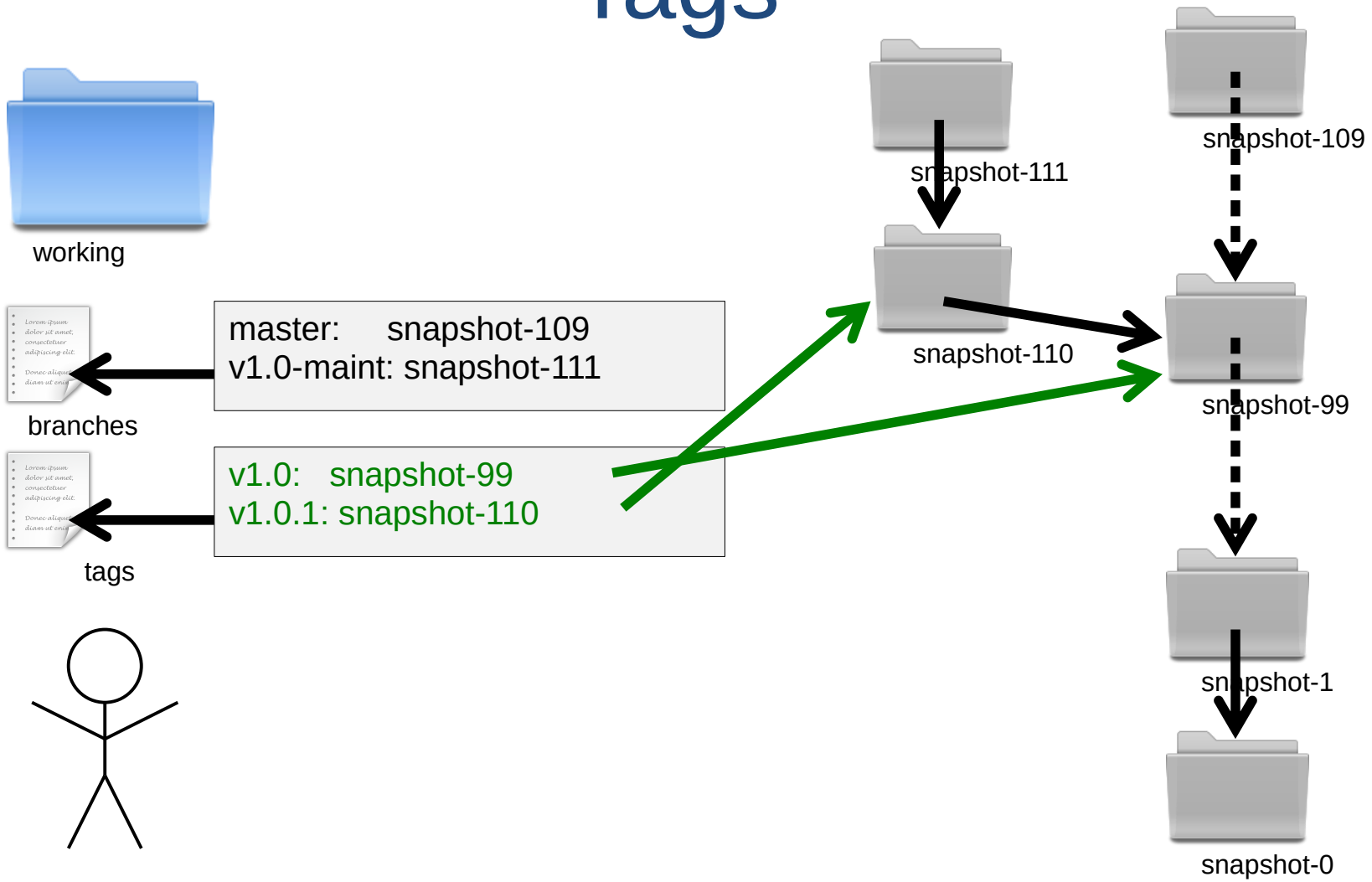
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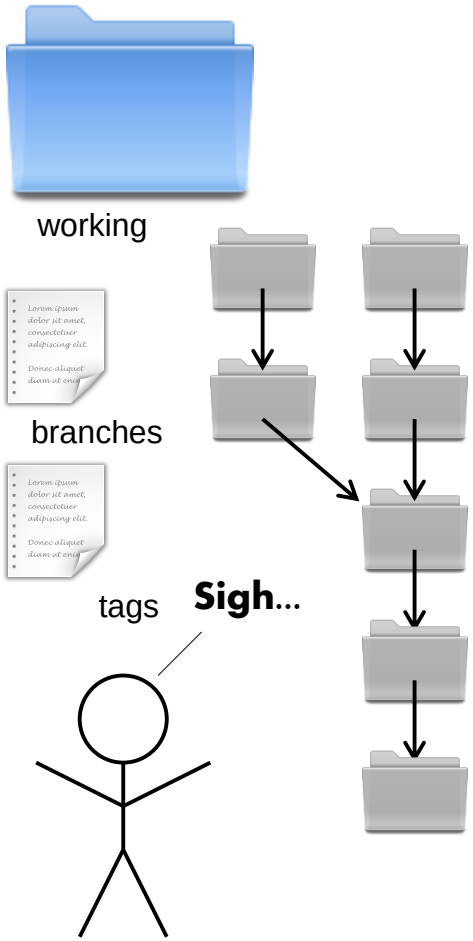

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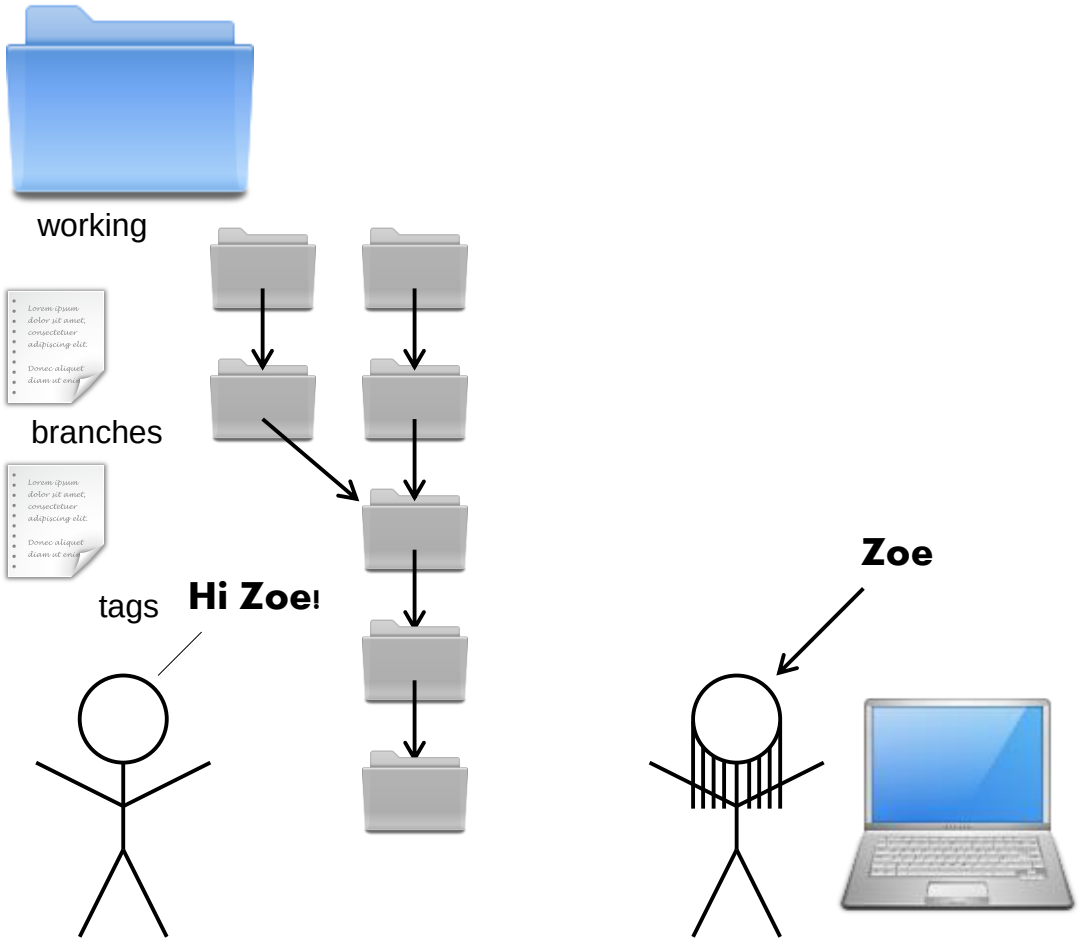

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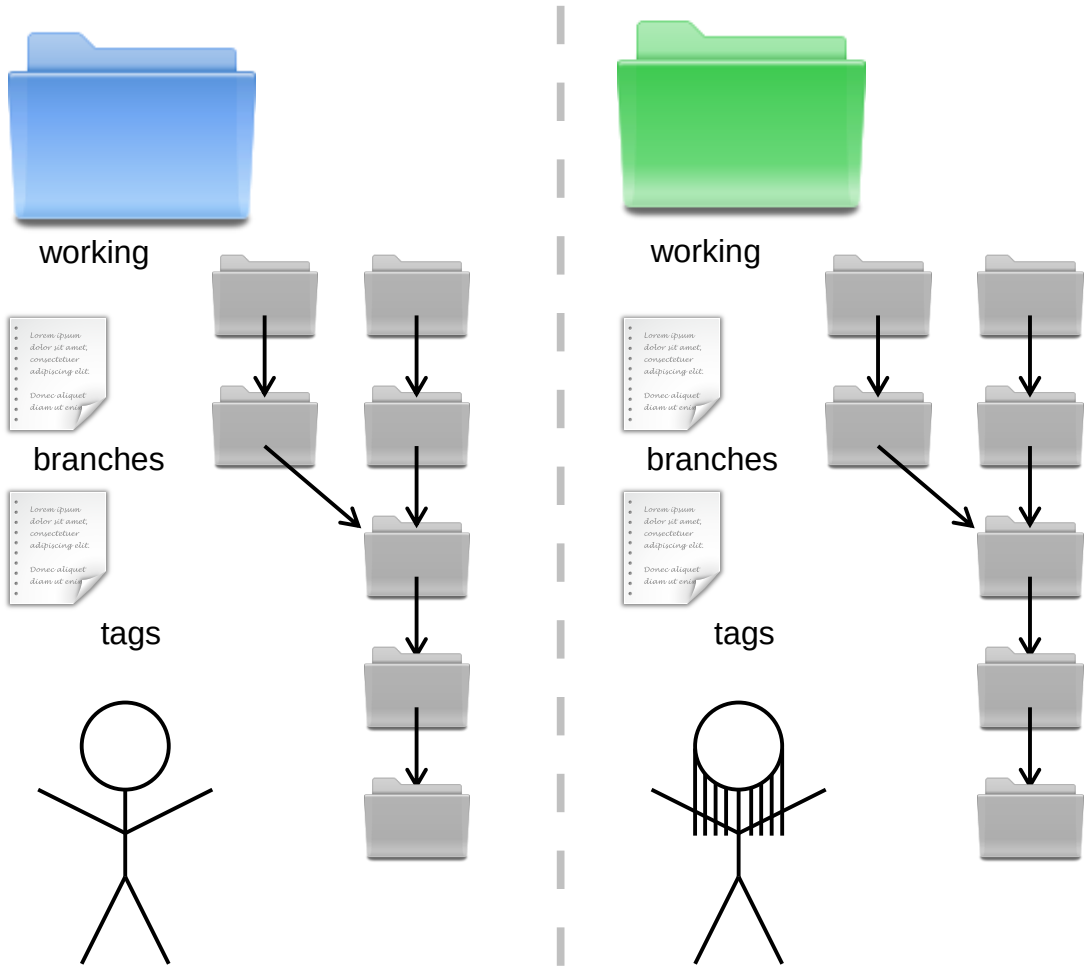

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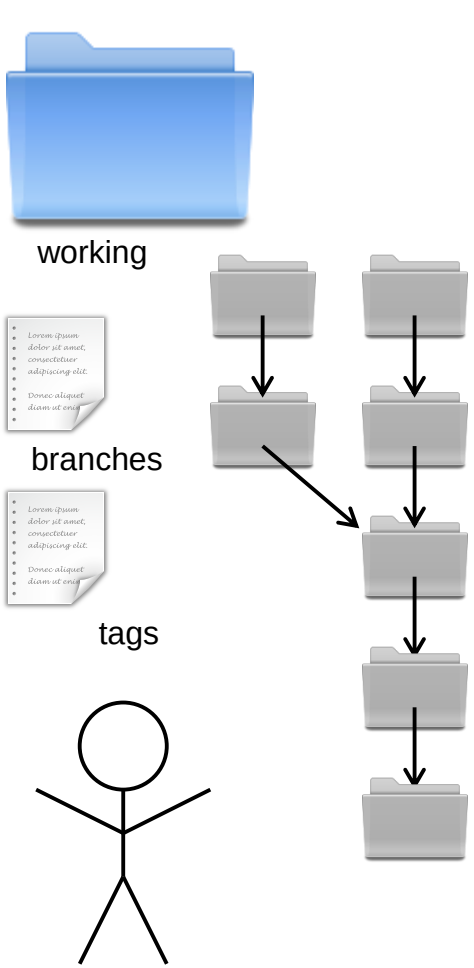

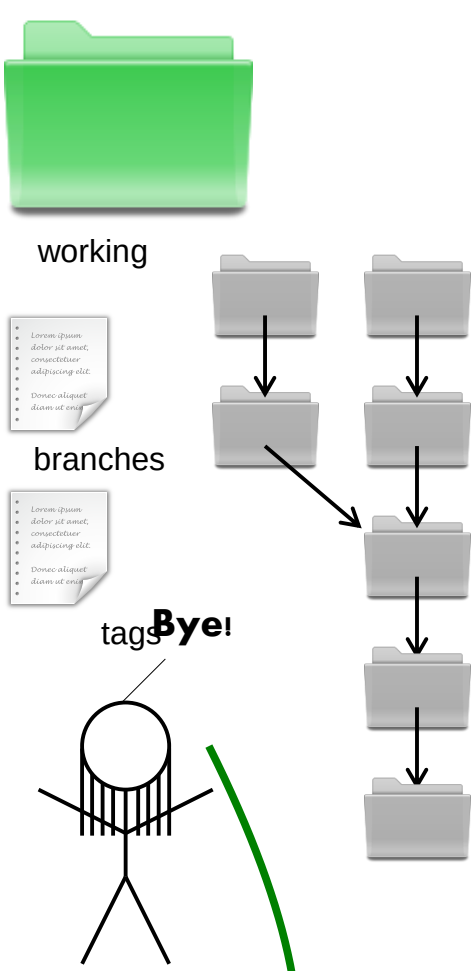

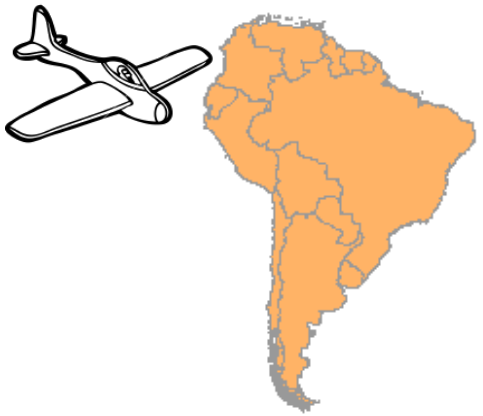

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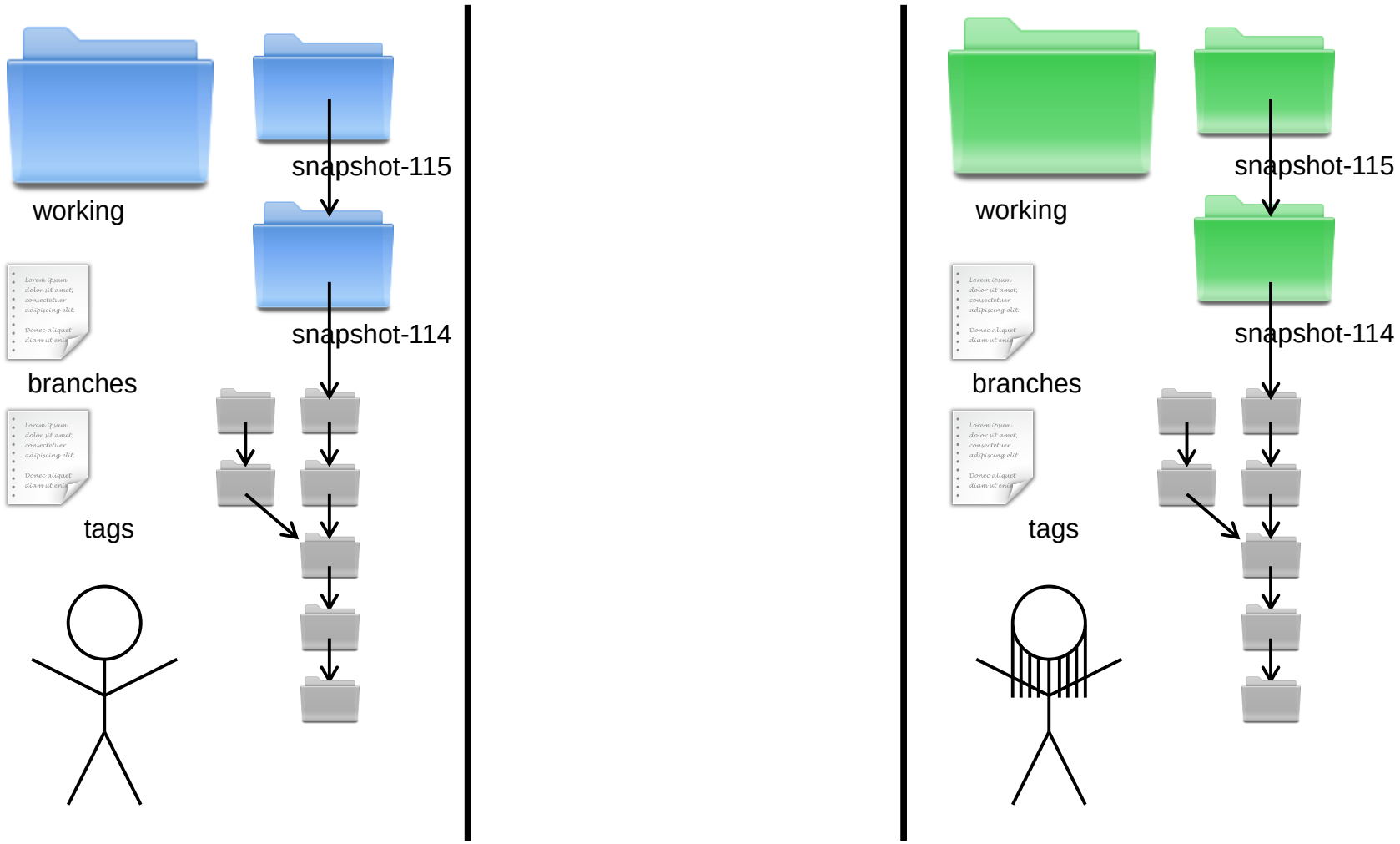

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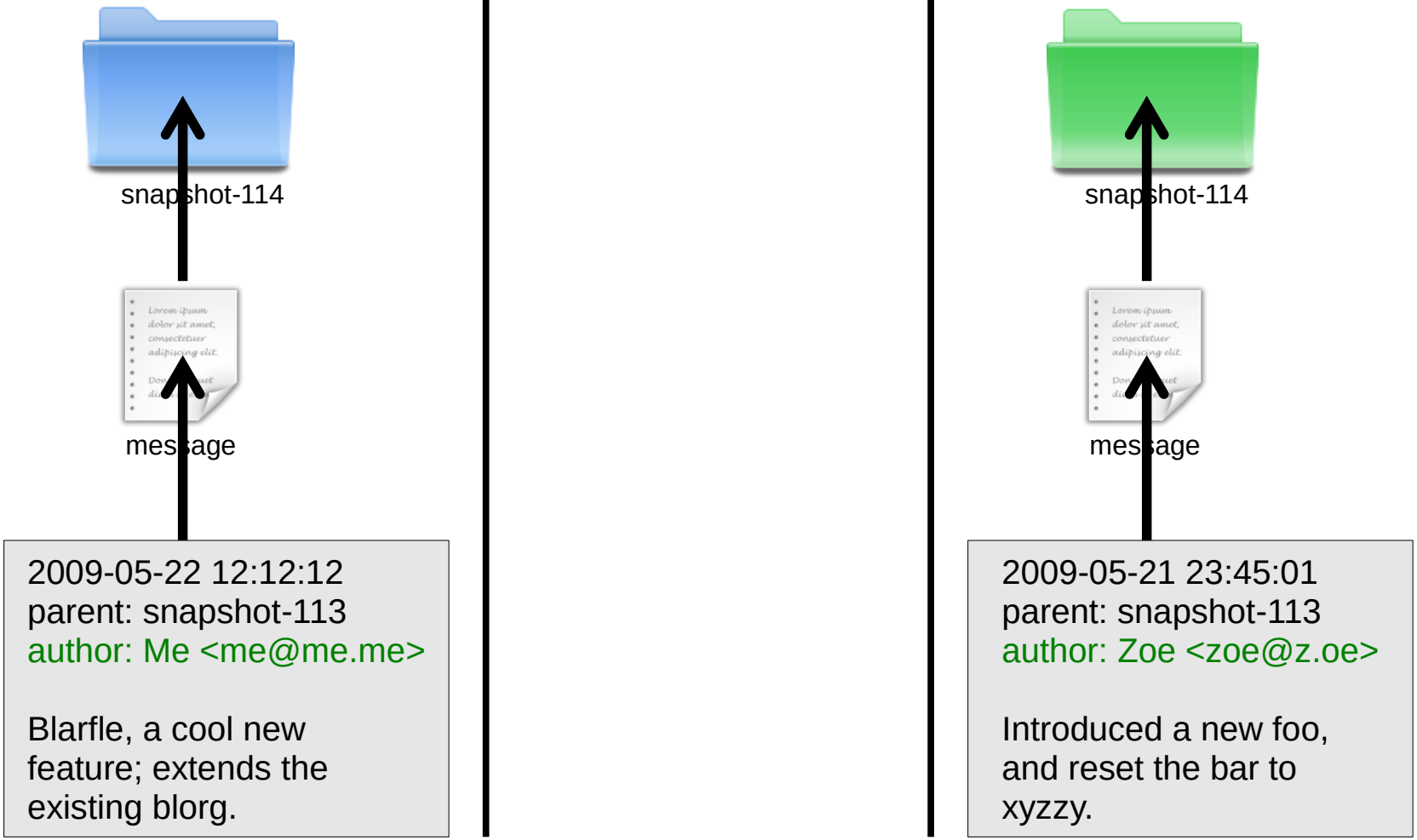

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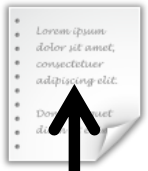

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2009-05-22 12:12:12
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author: Me <me@me.me>

Blarfle, a cool new feature; extends the existing blorg.

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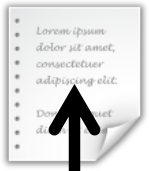
SHA1



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Introduced a new foo, and reset the bar to xyzzy.

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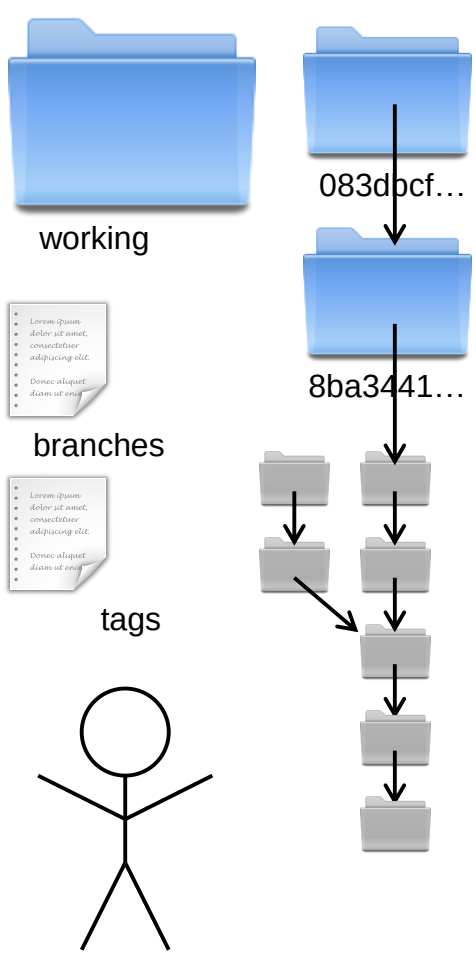

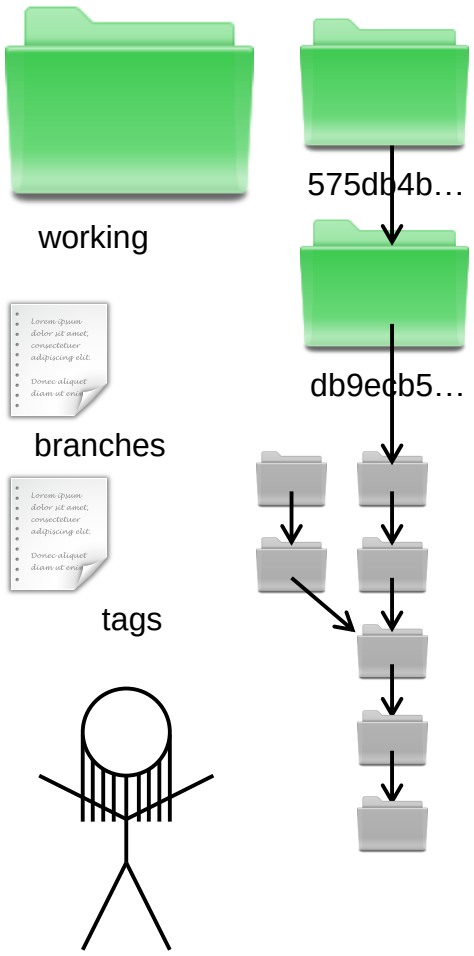

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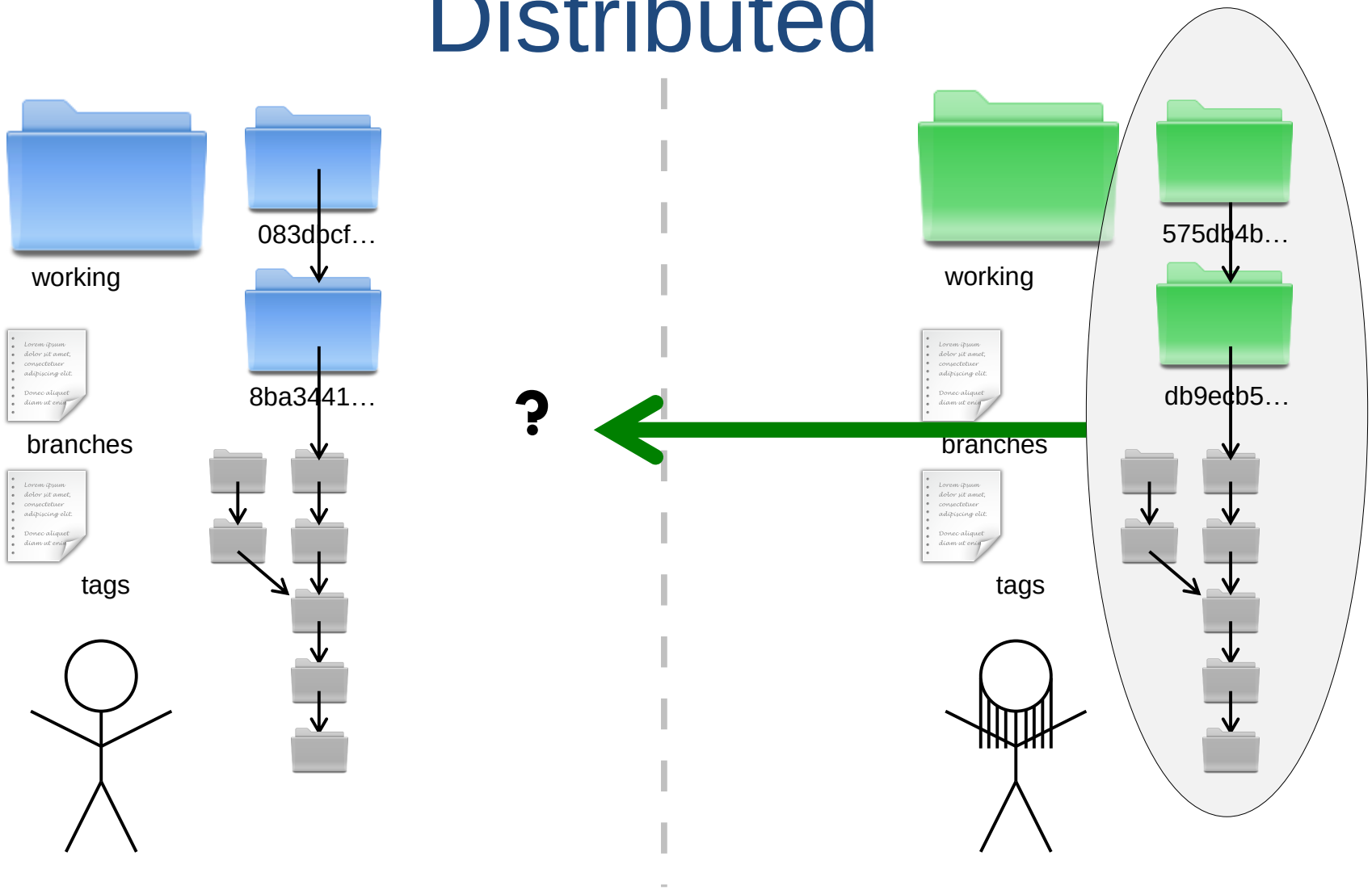

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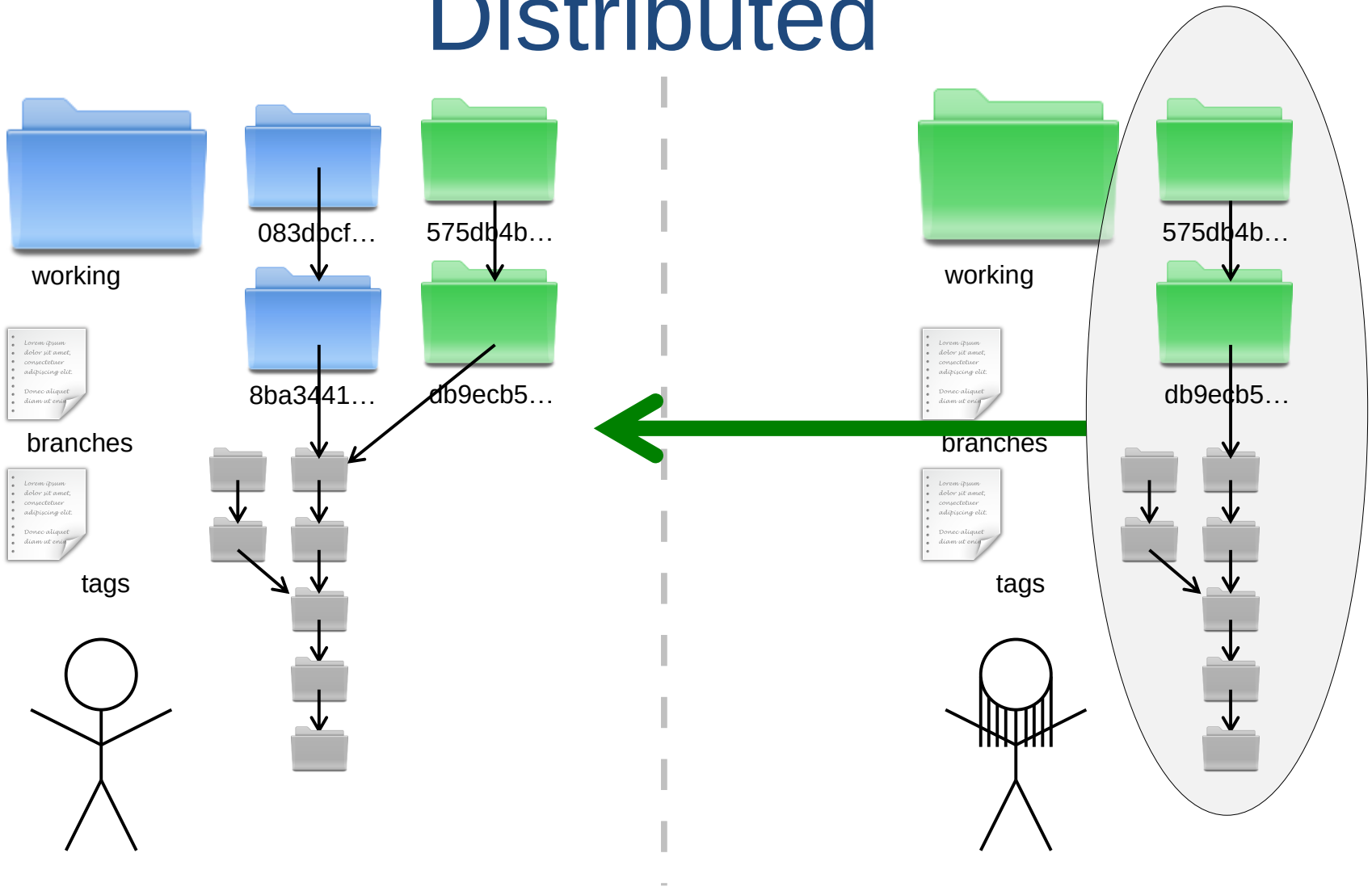

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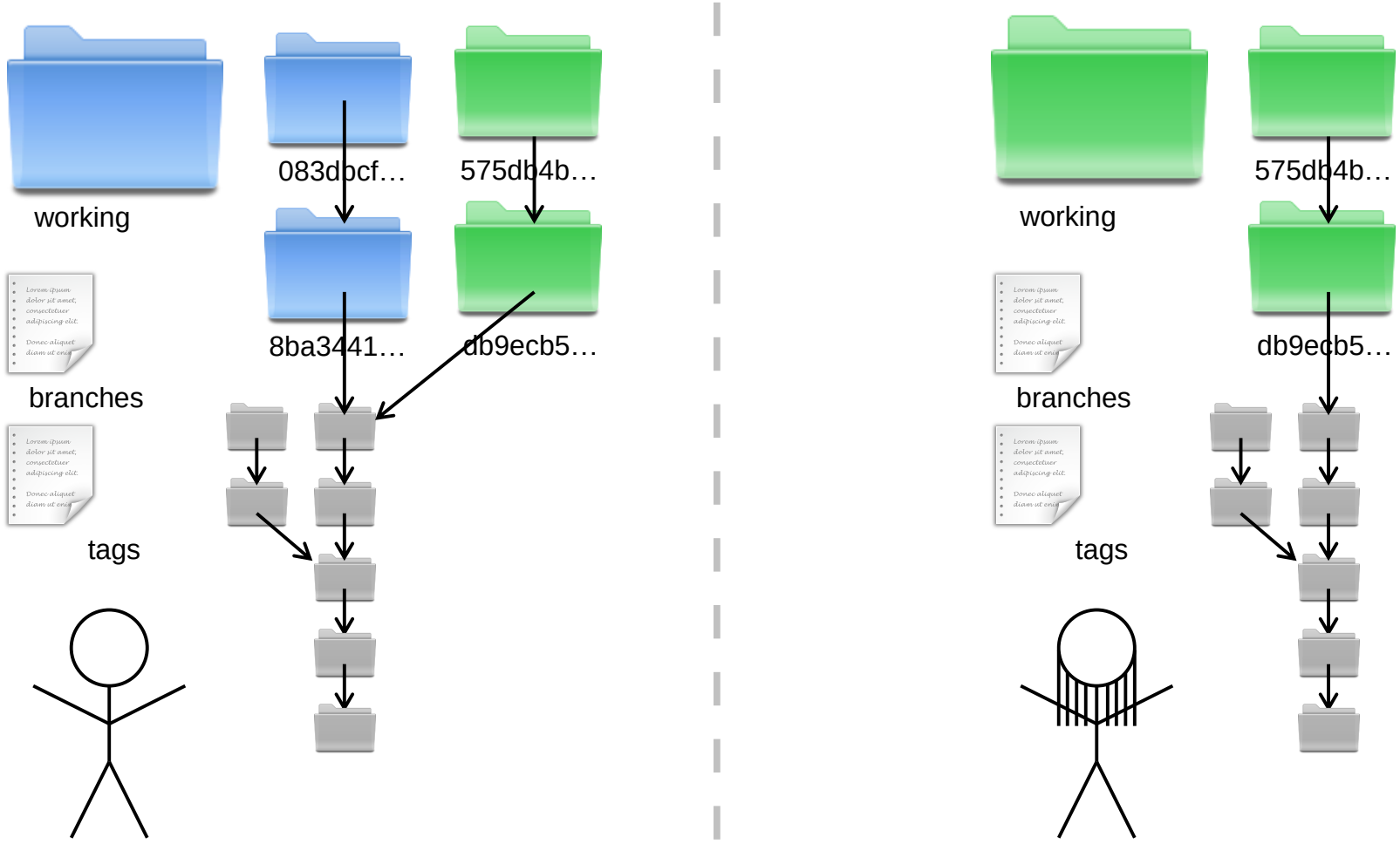

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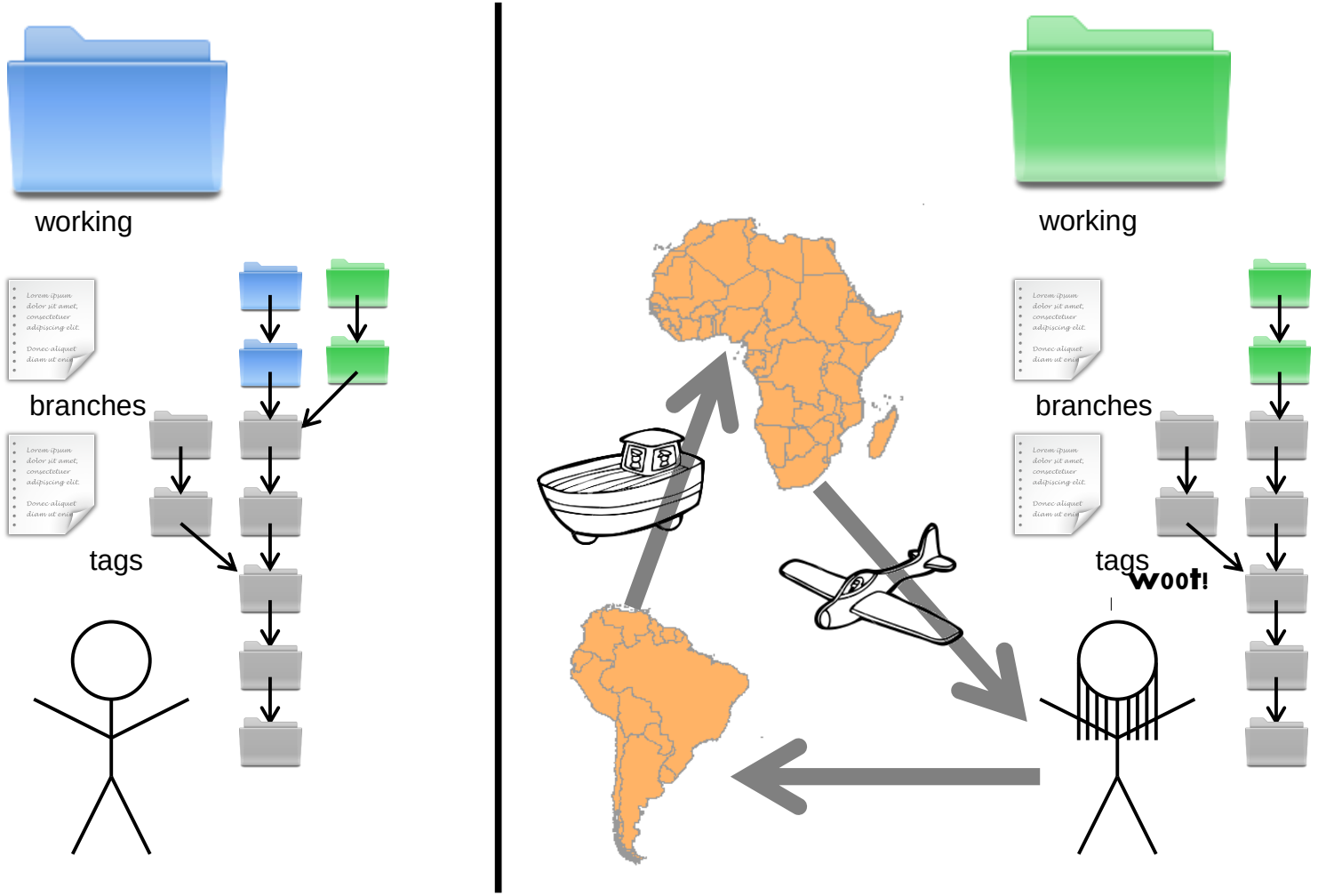

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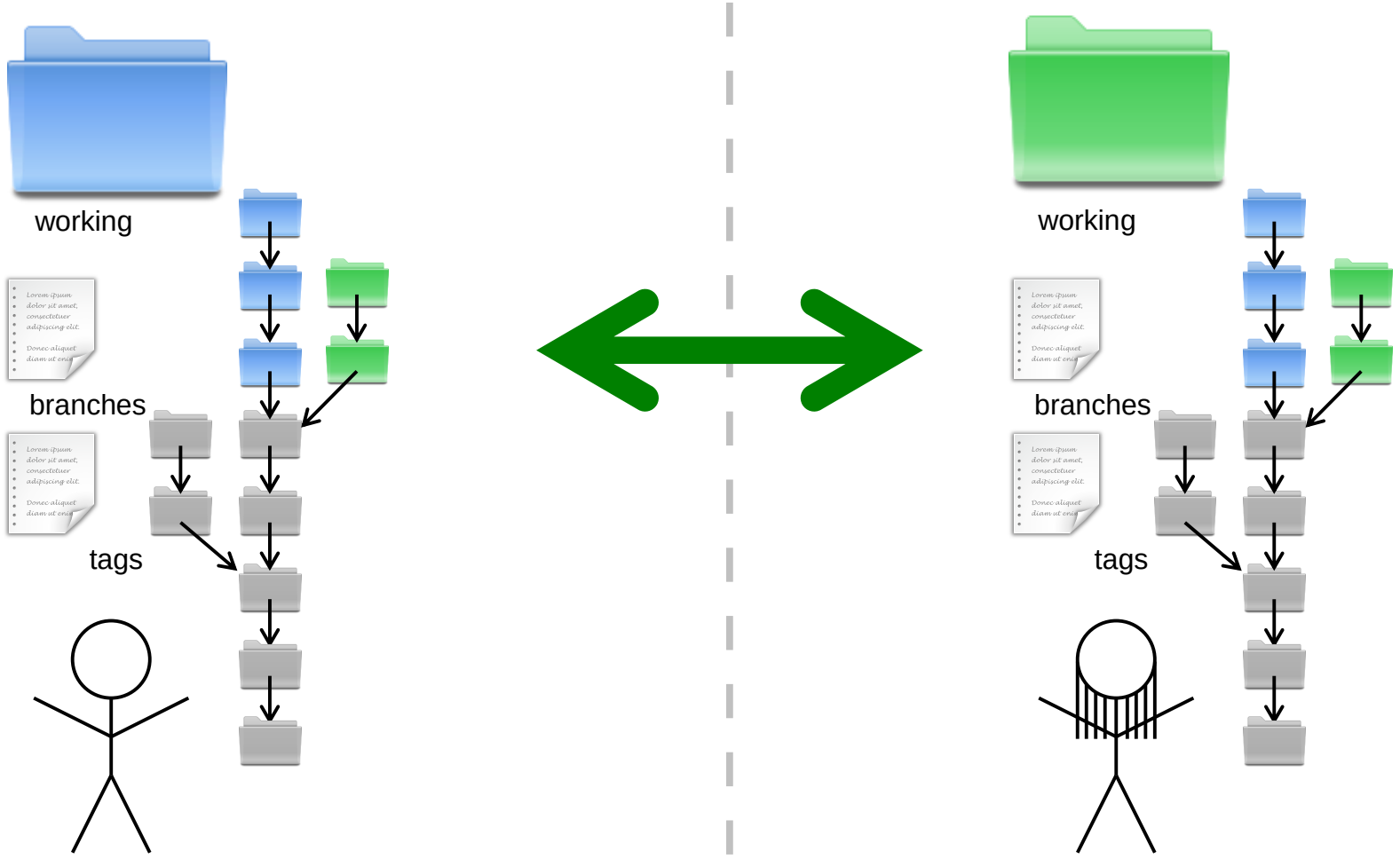

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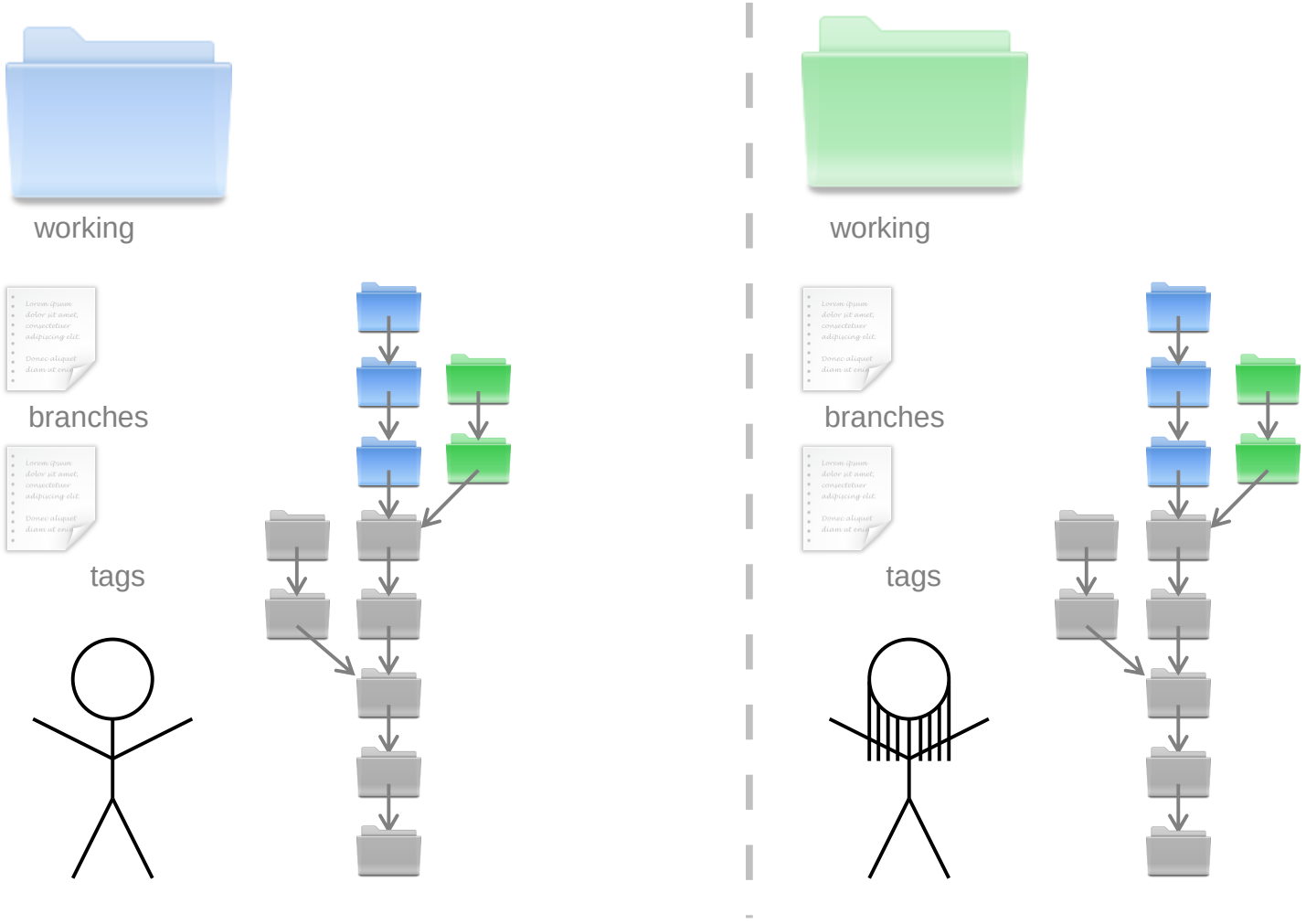

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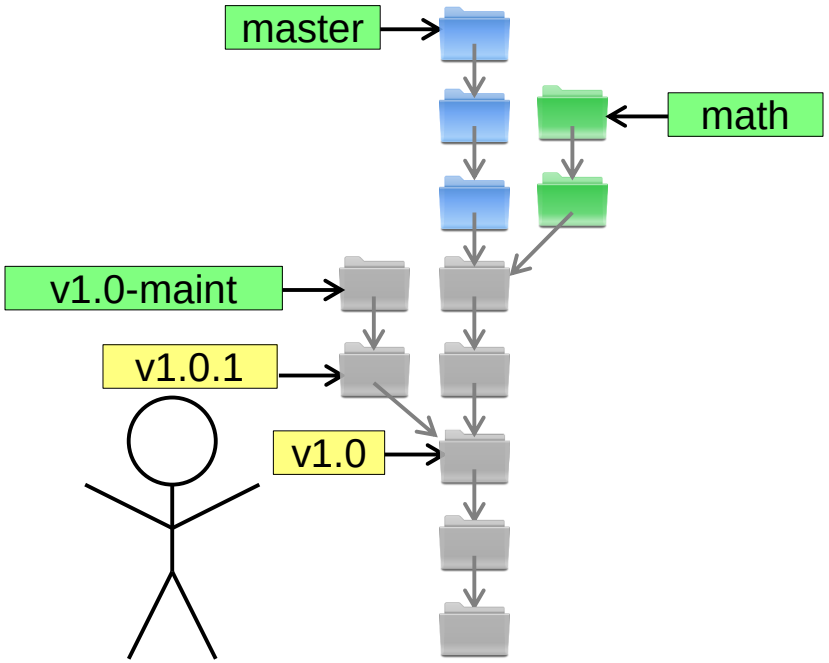

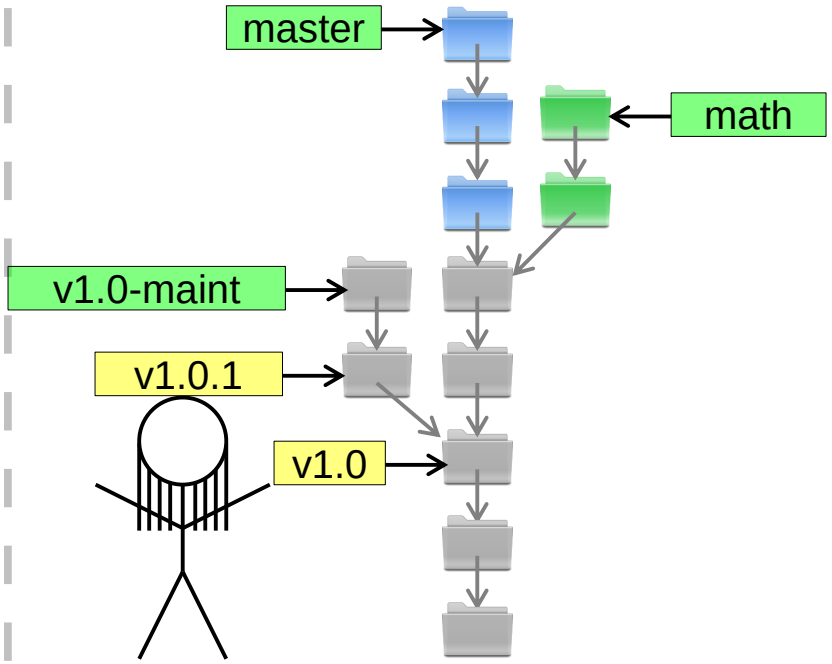

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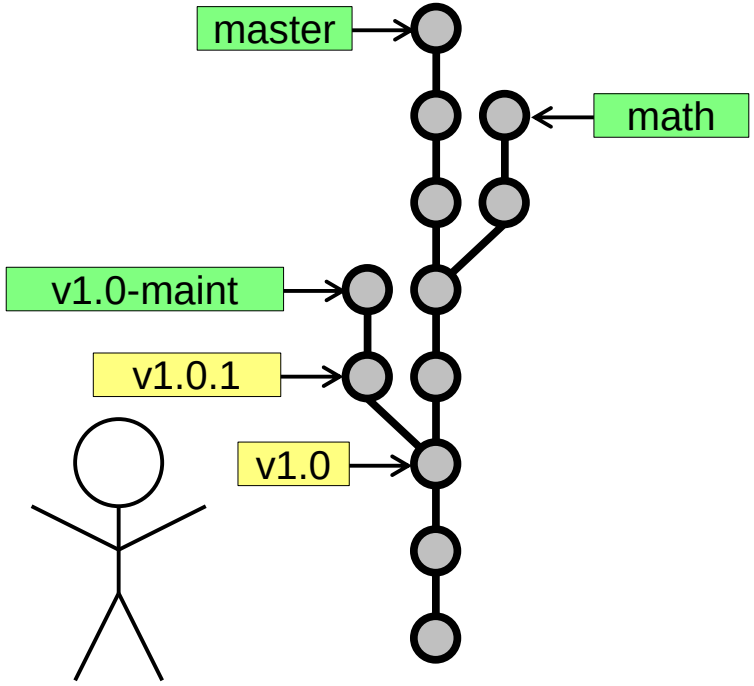

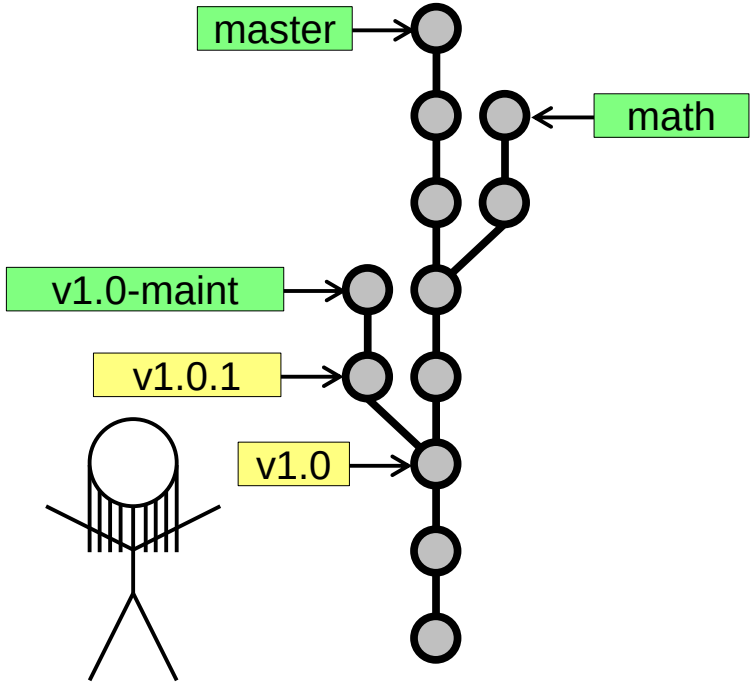

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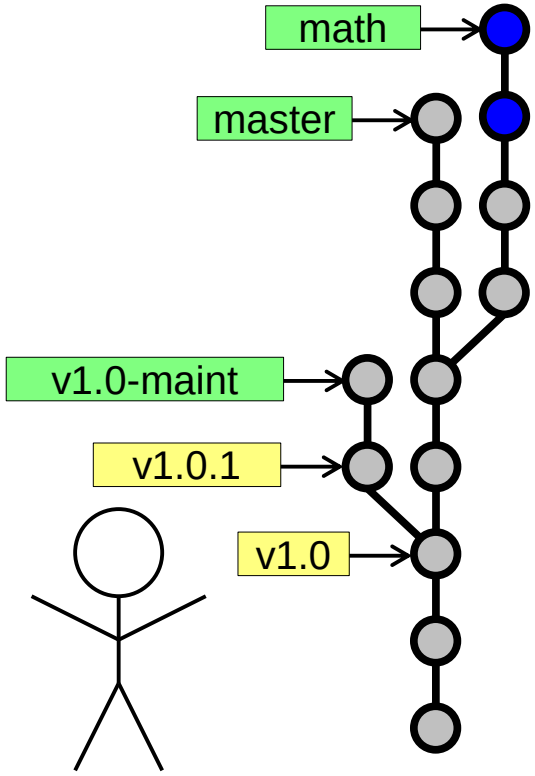
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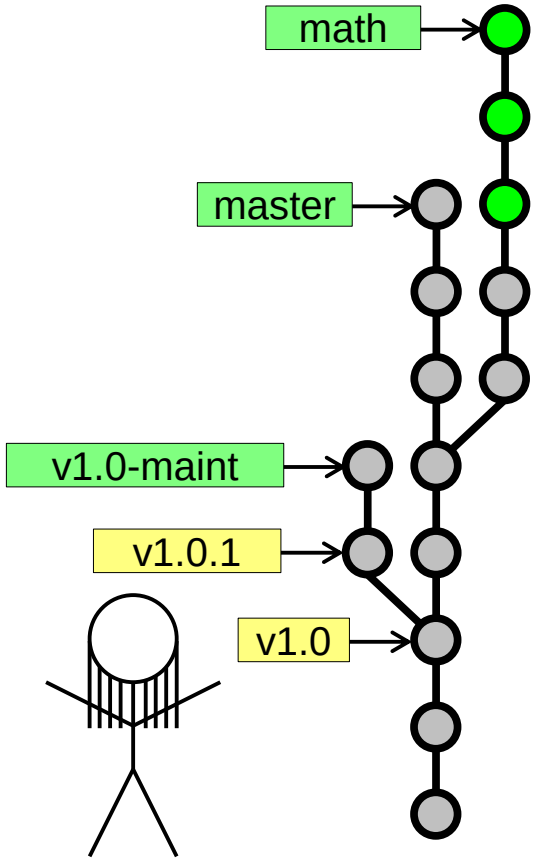
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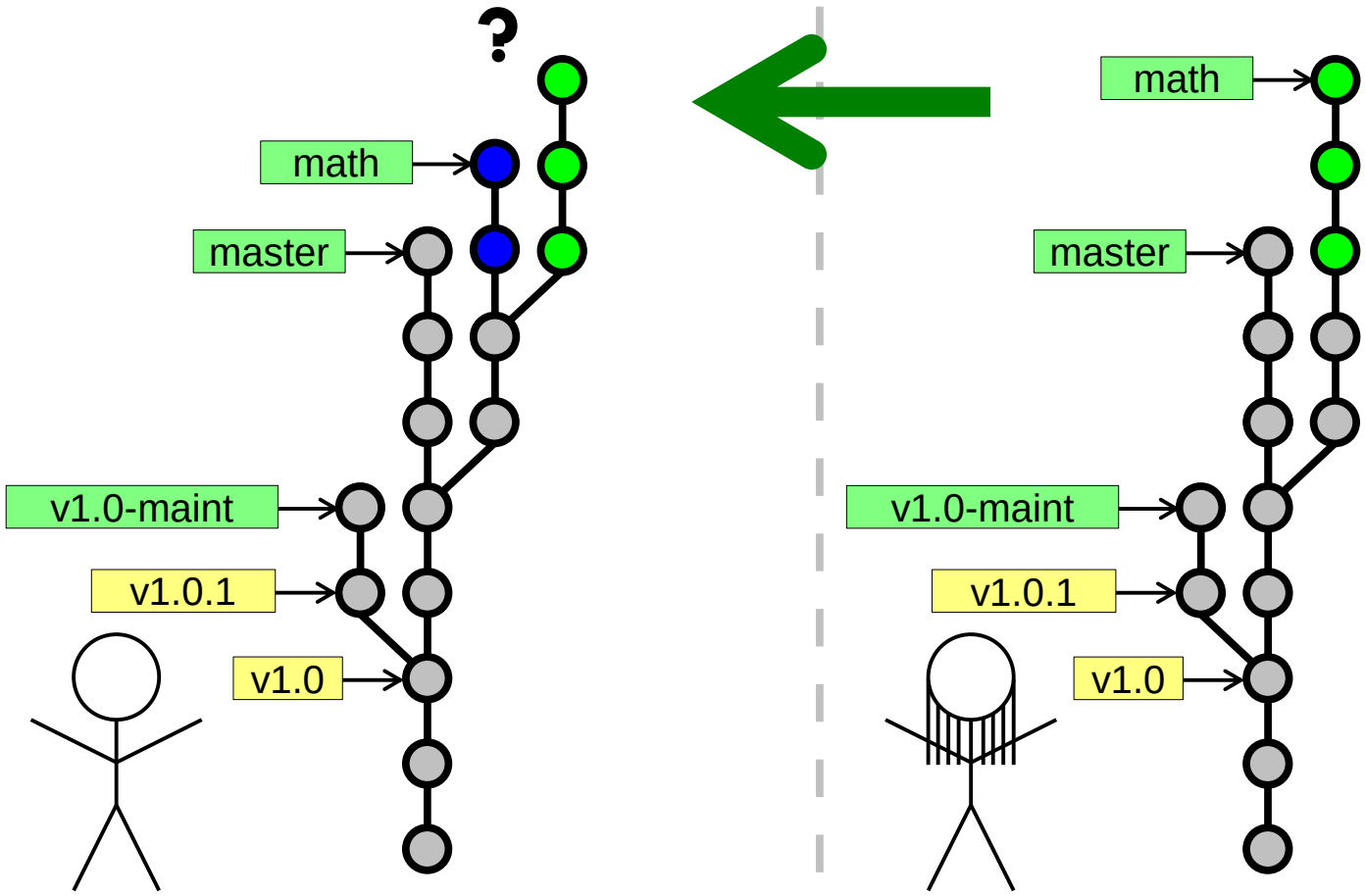
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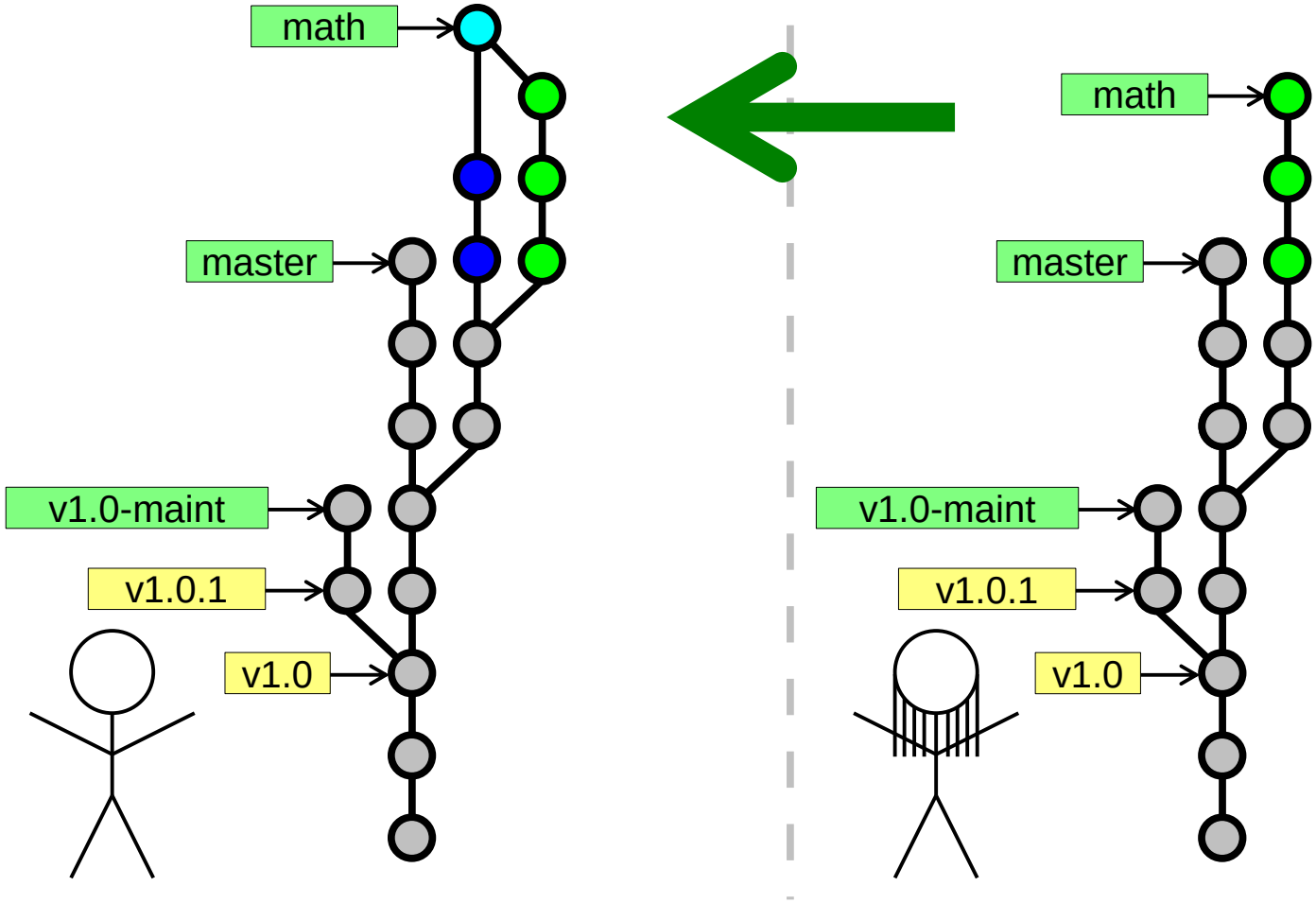
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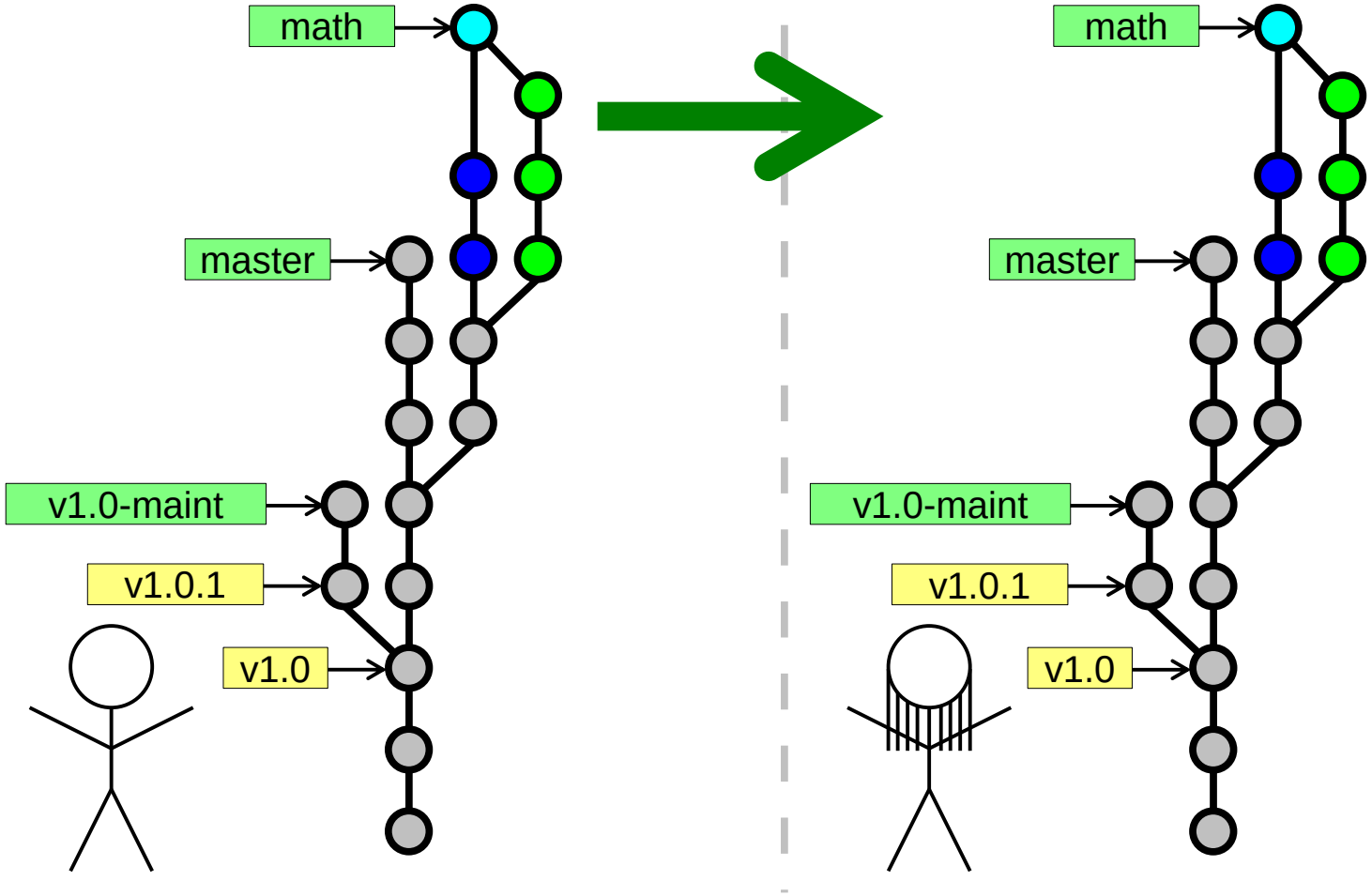
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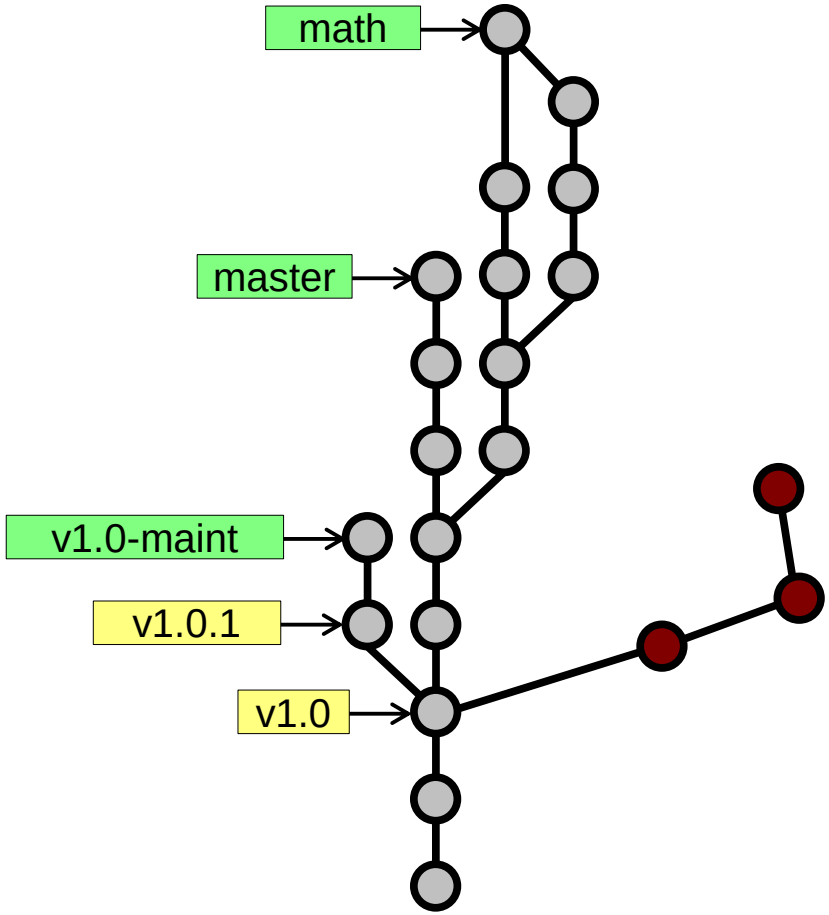

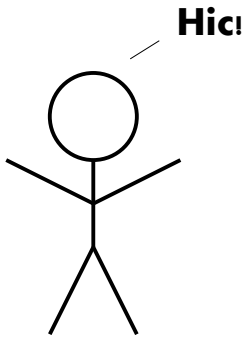

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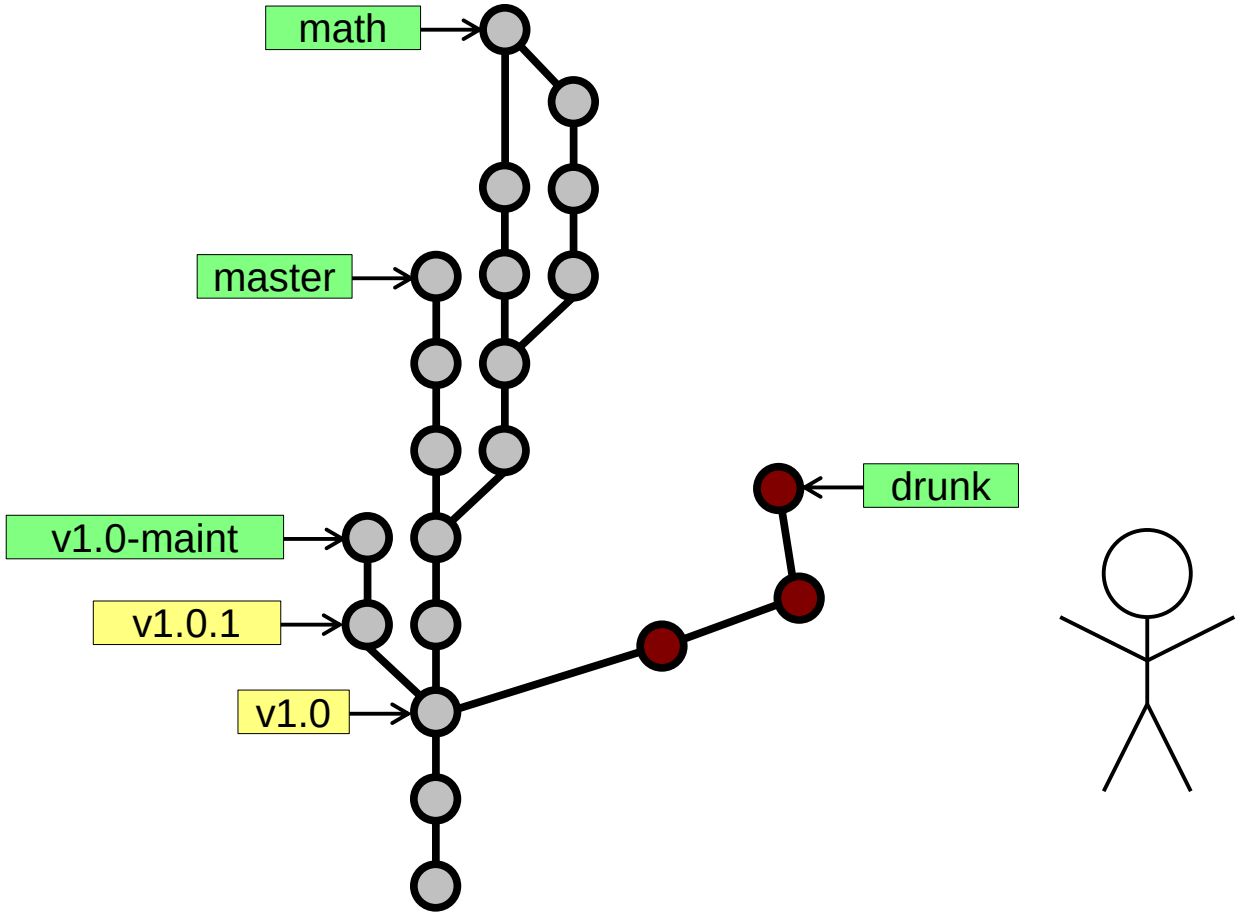
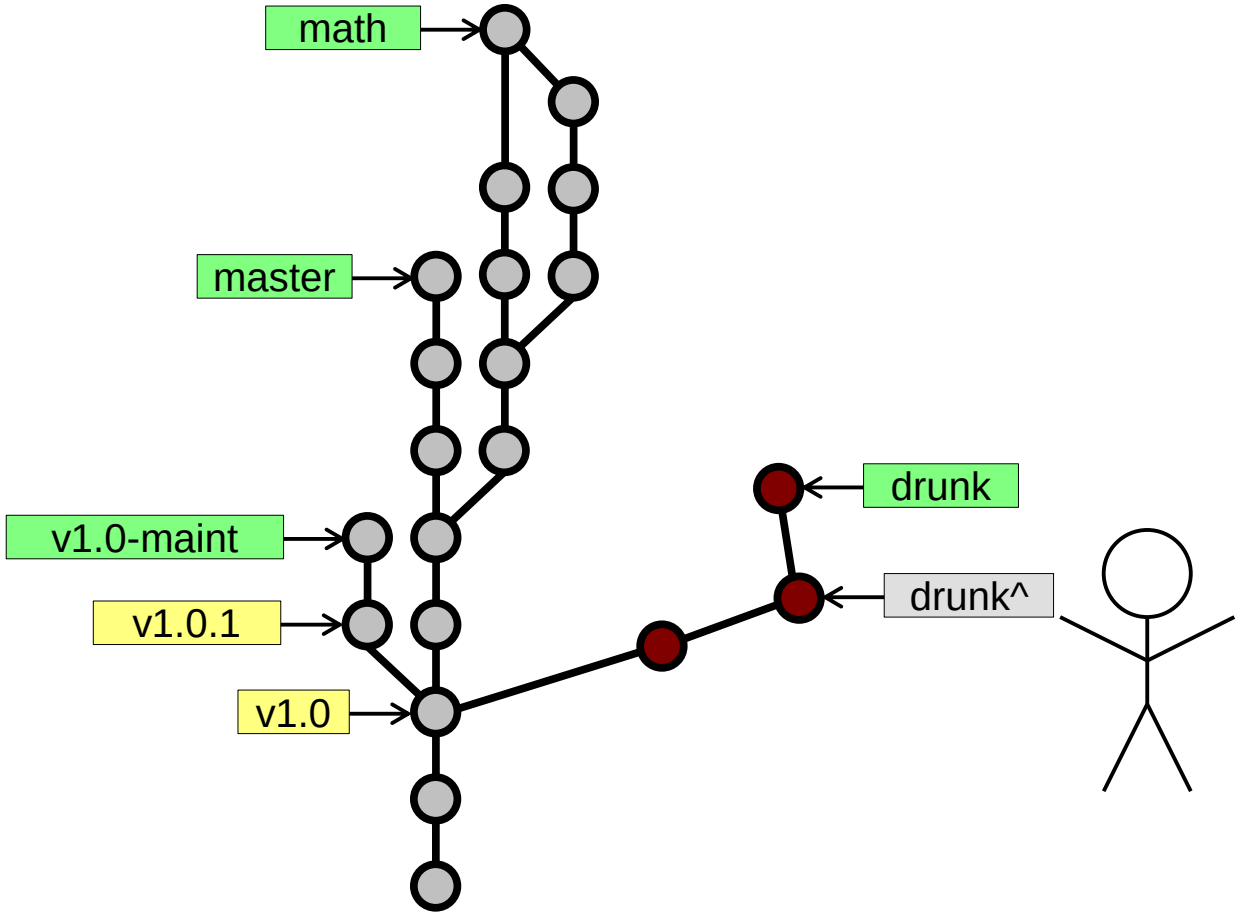


Rewriting History



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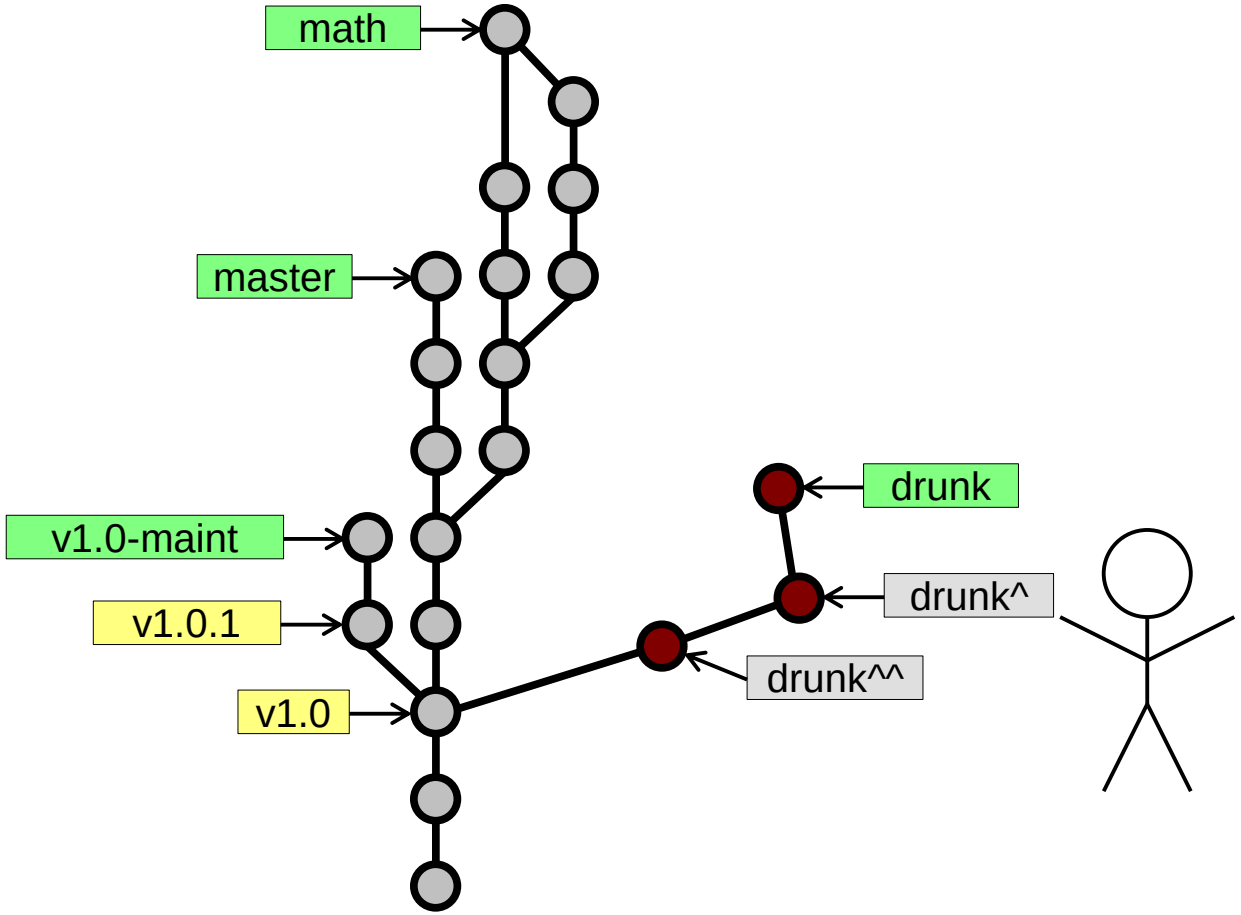

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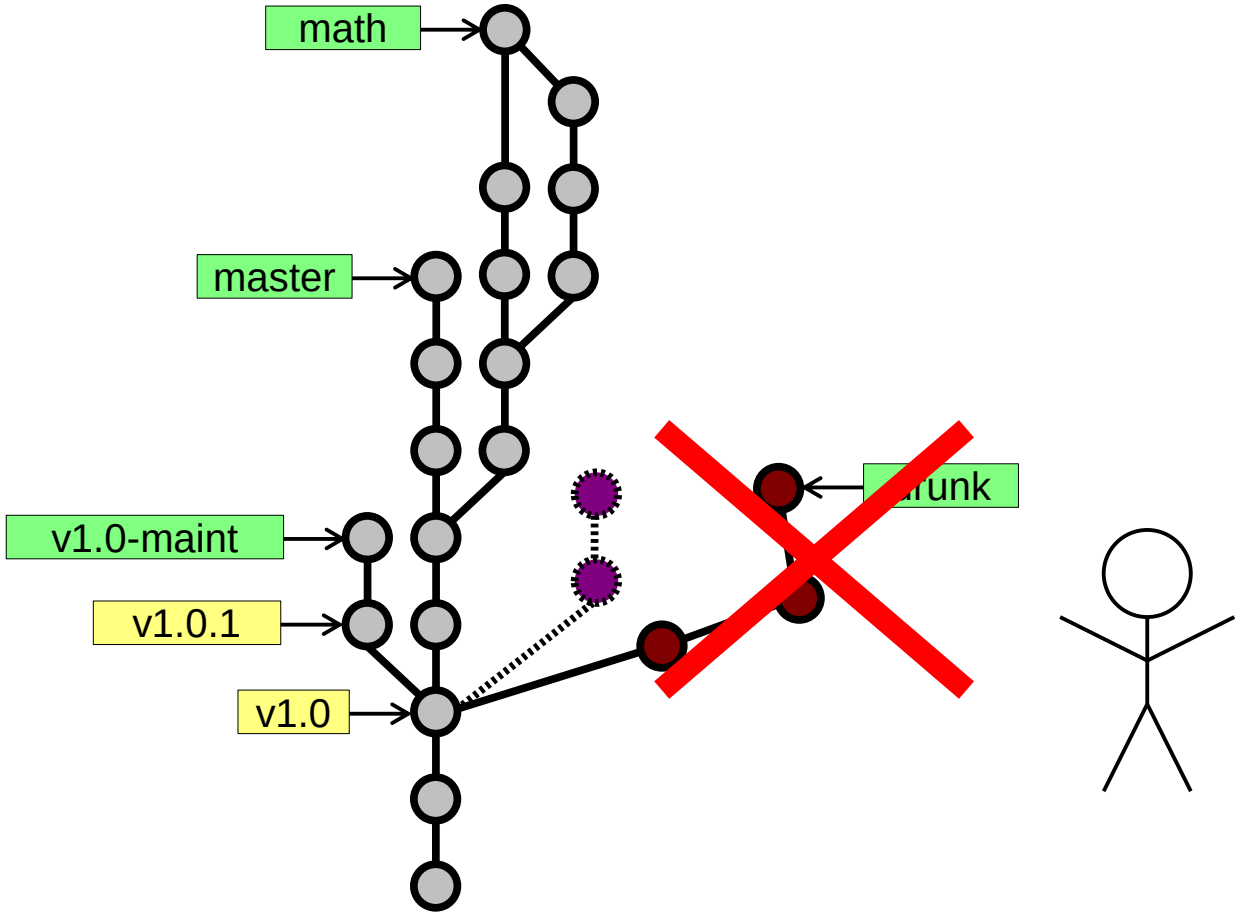

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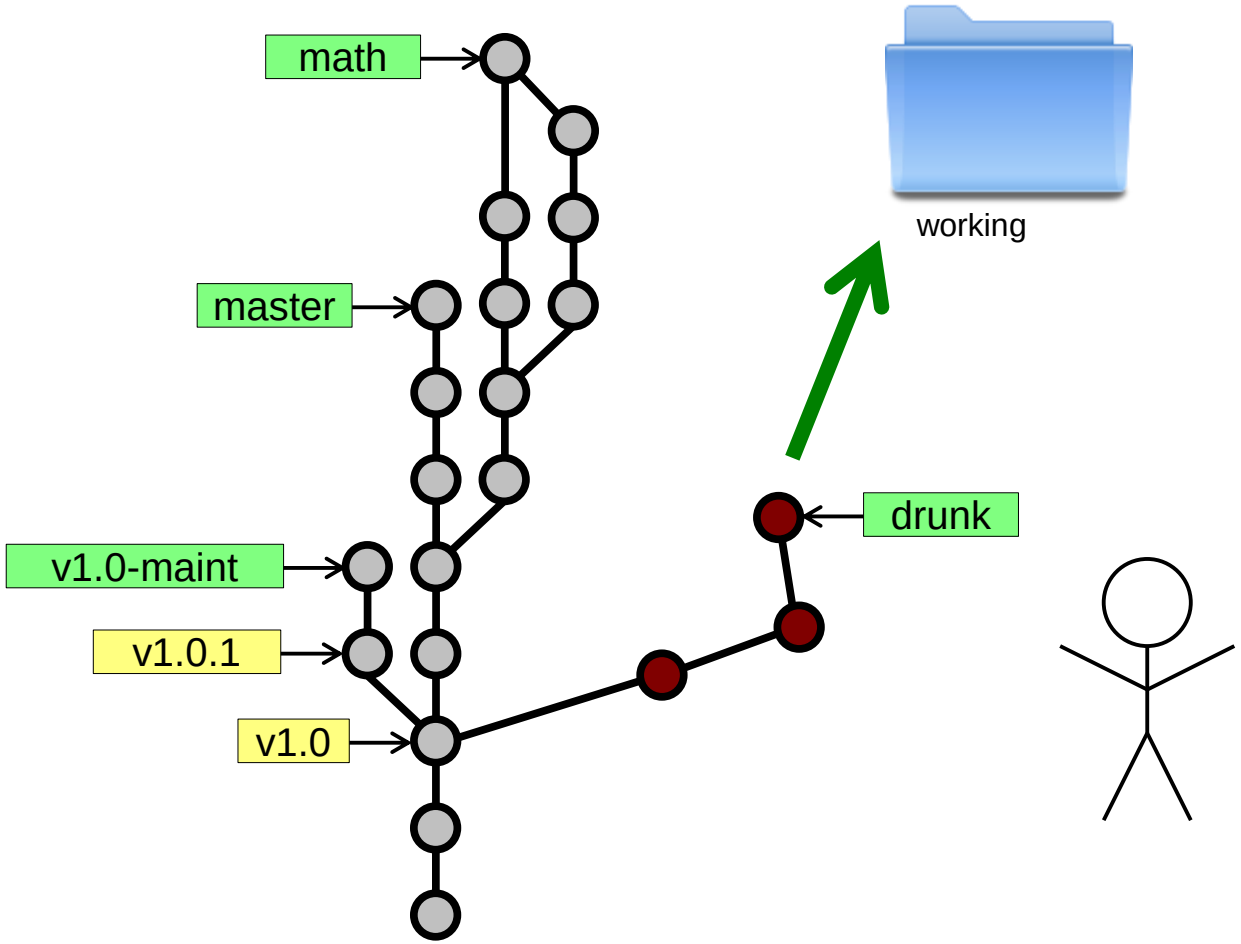

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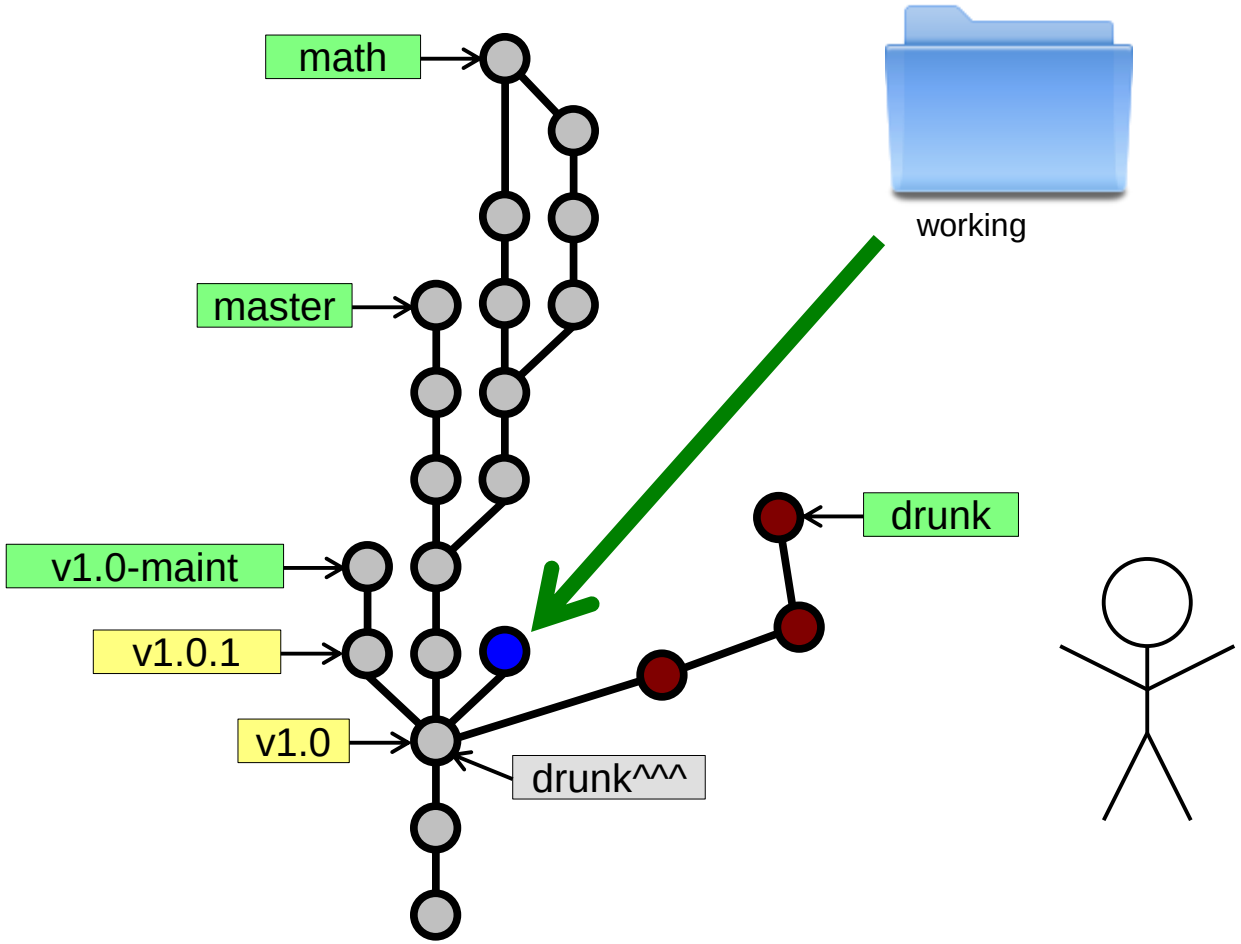

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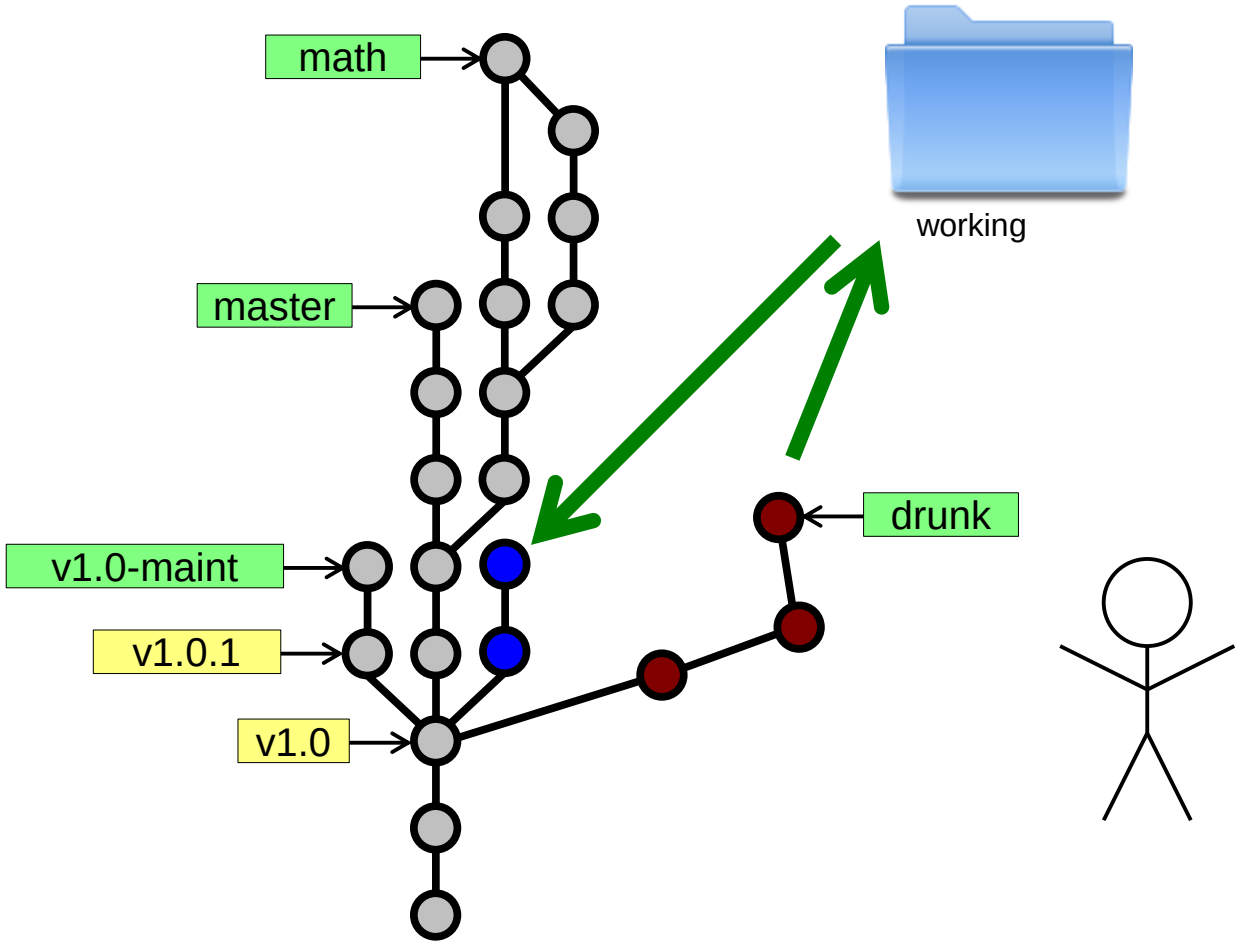

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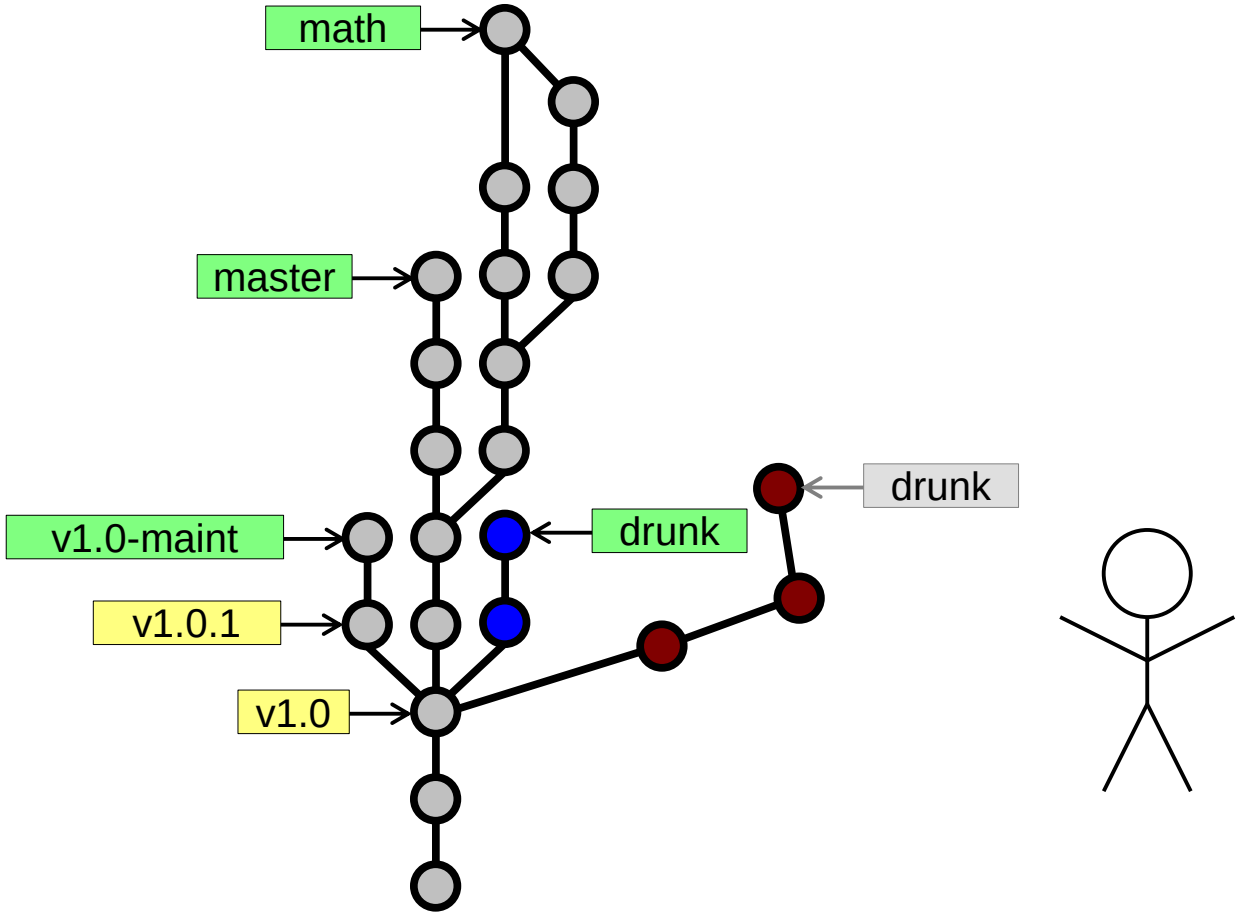

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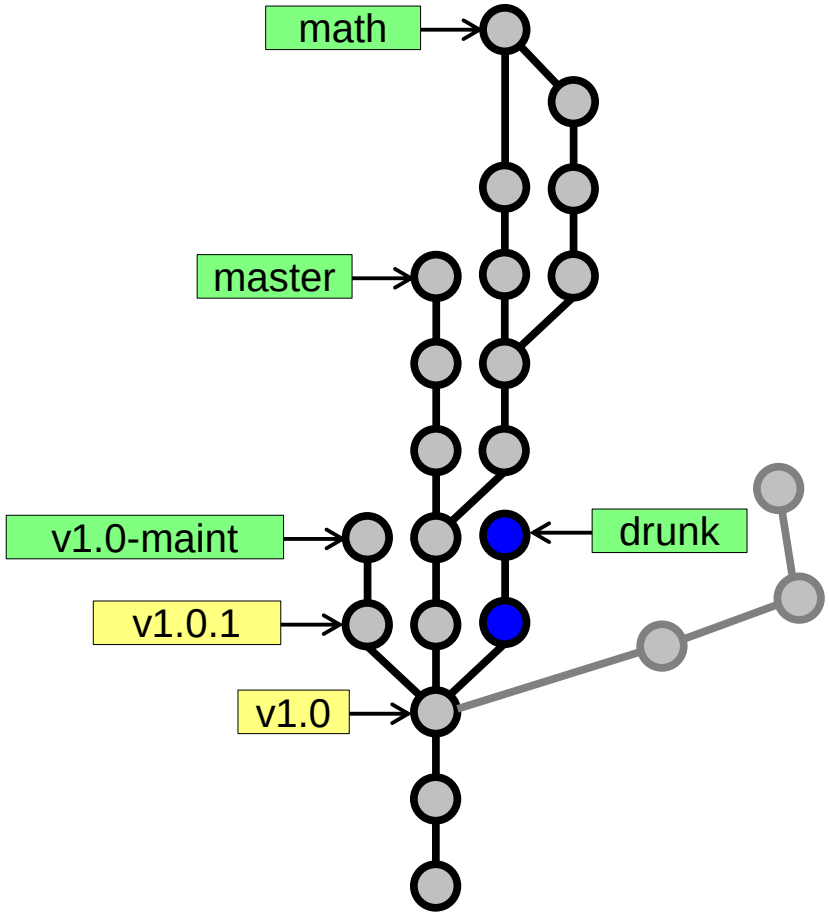

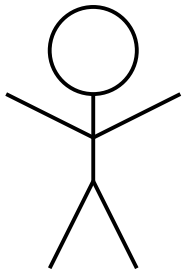

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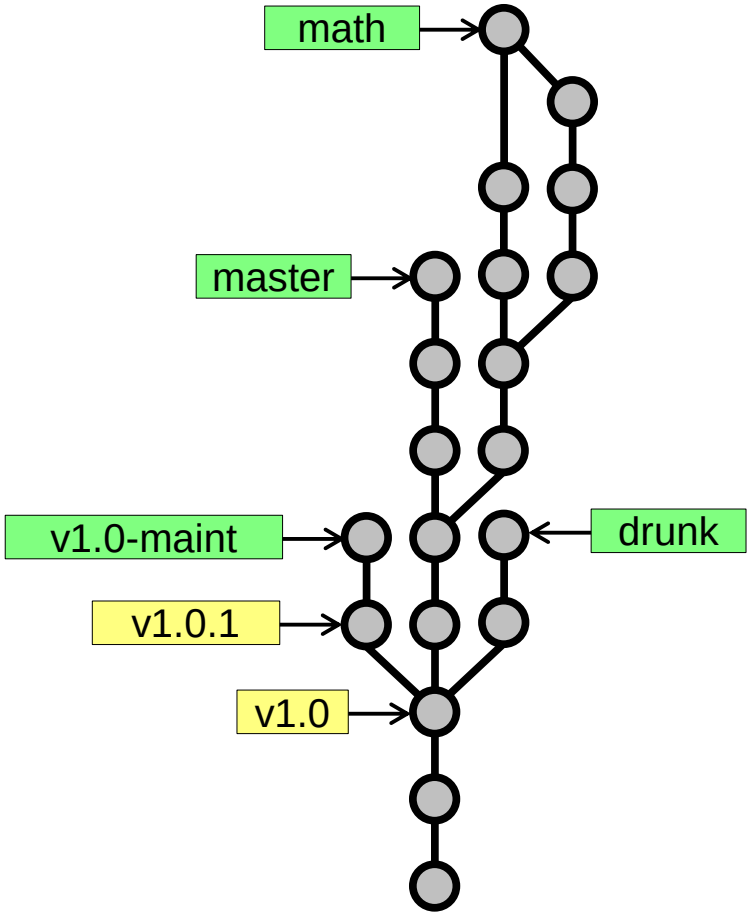

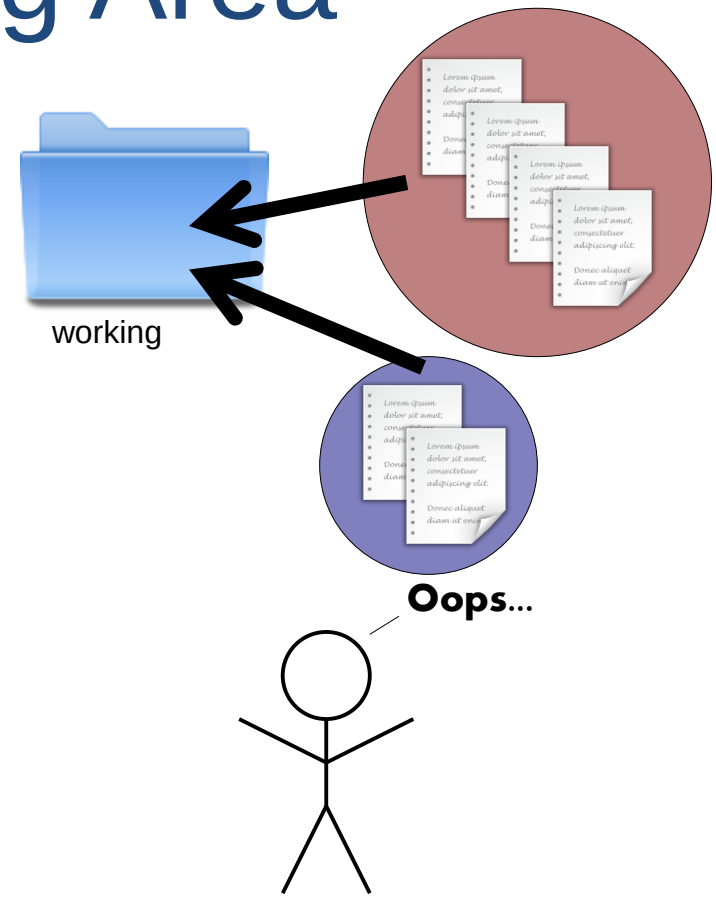

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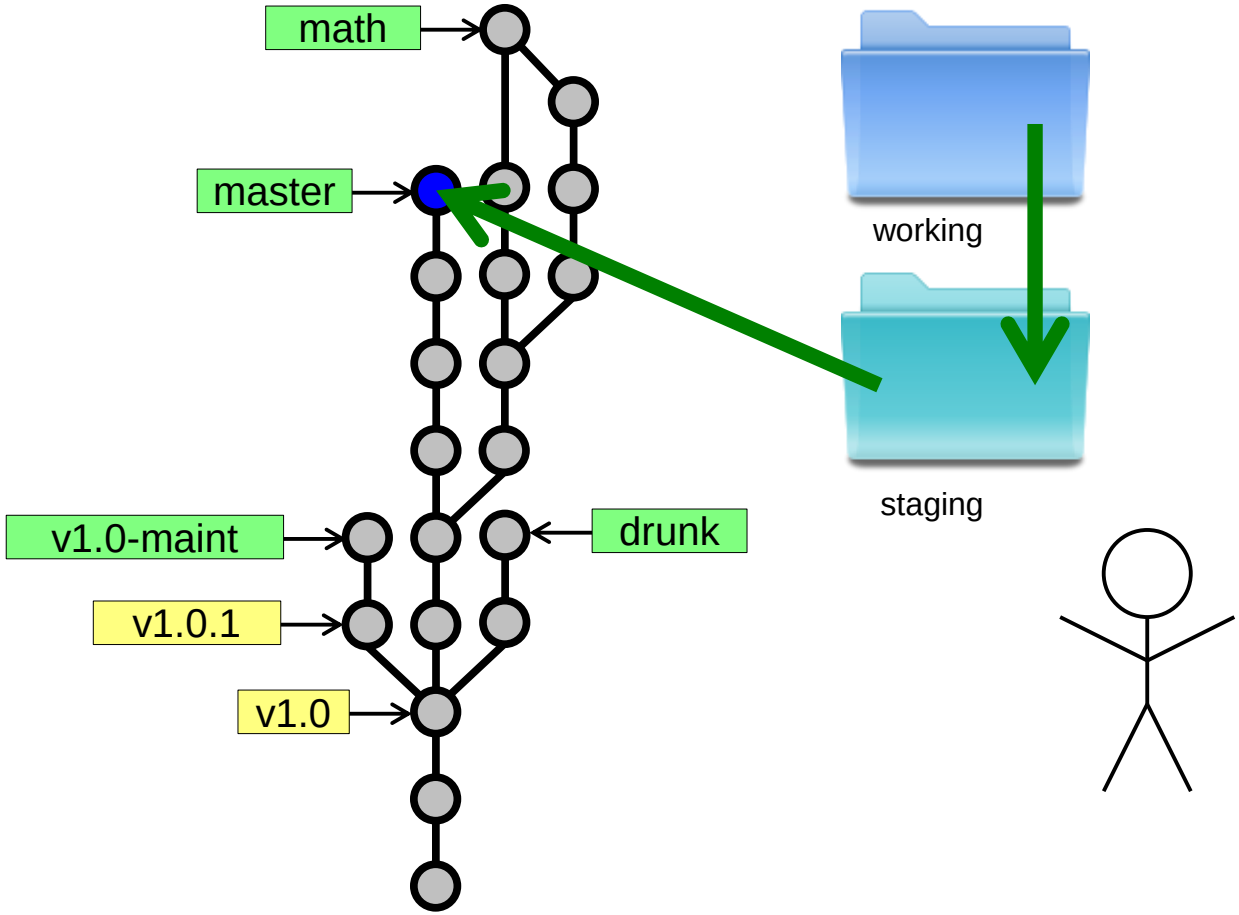

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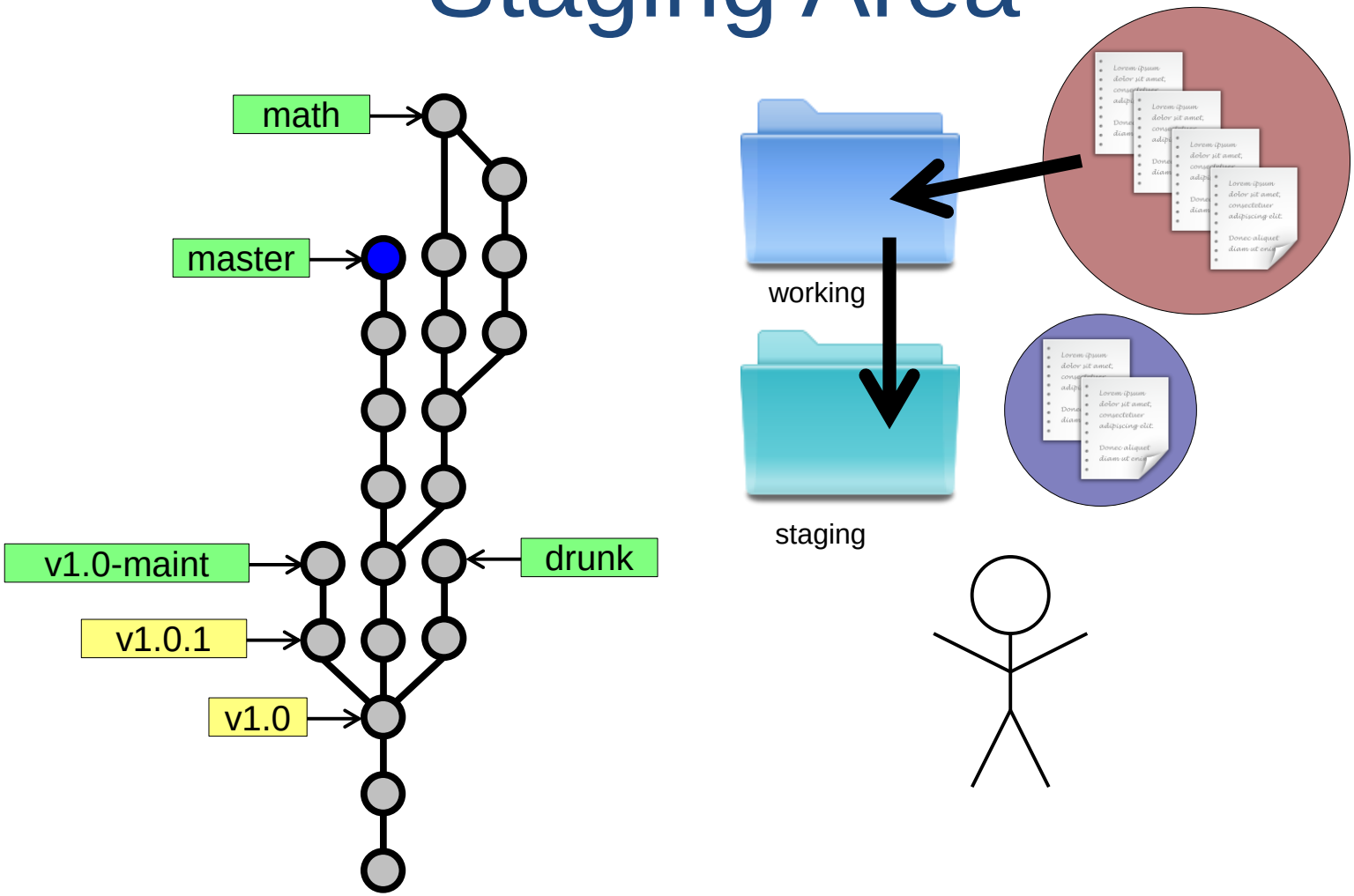

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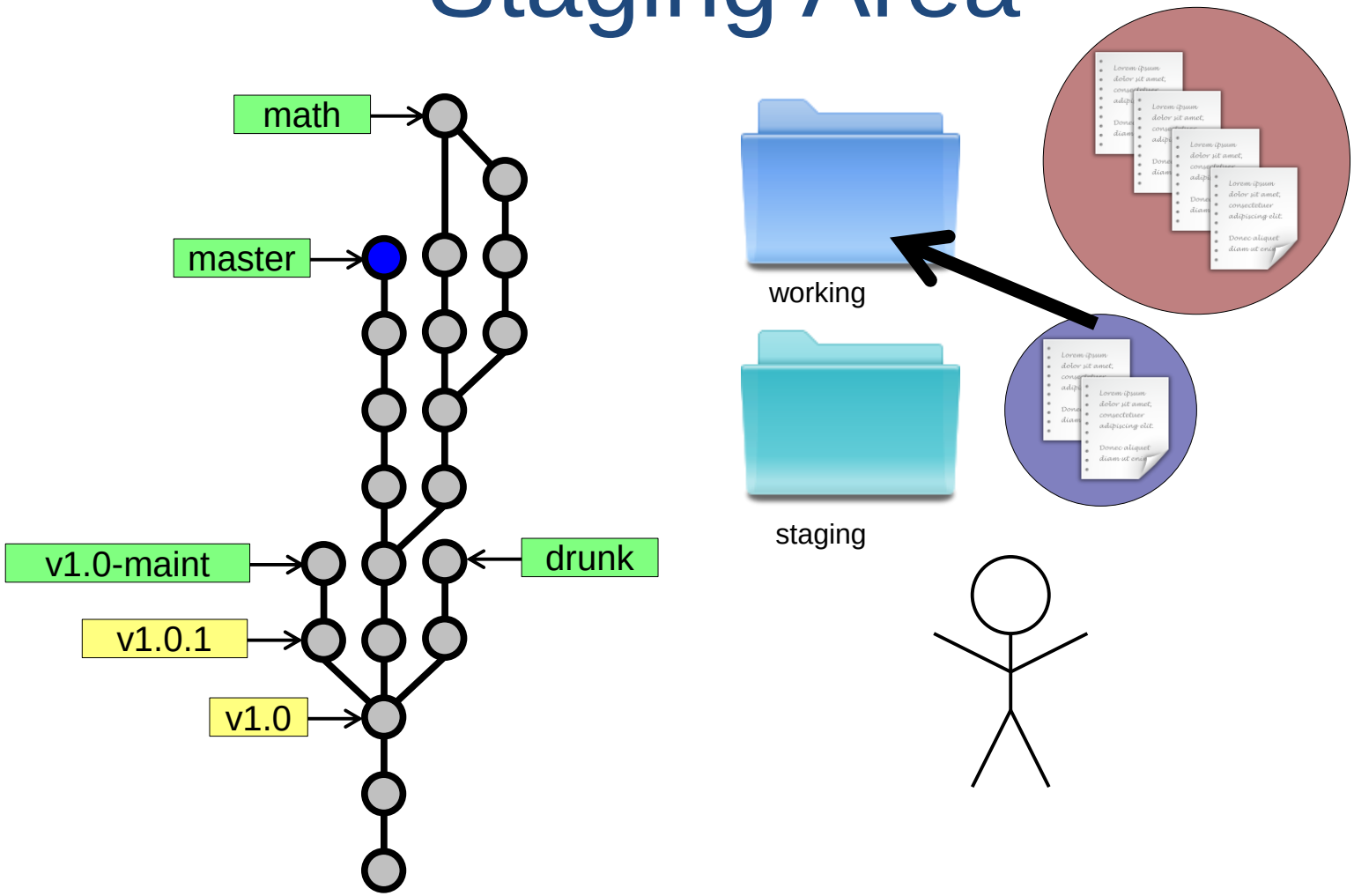

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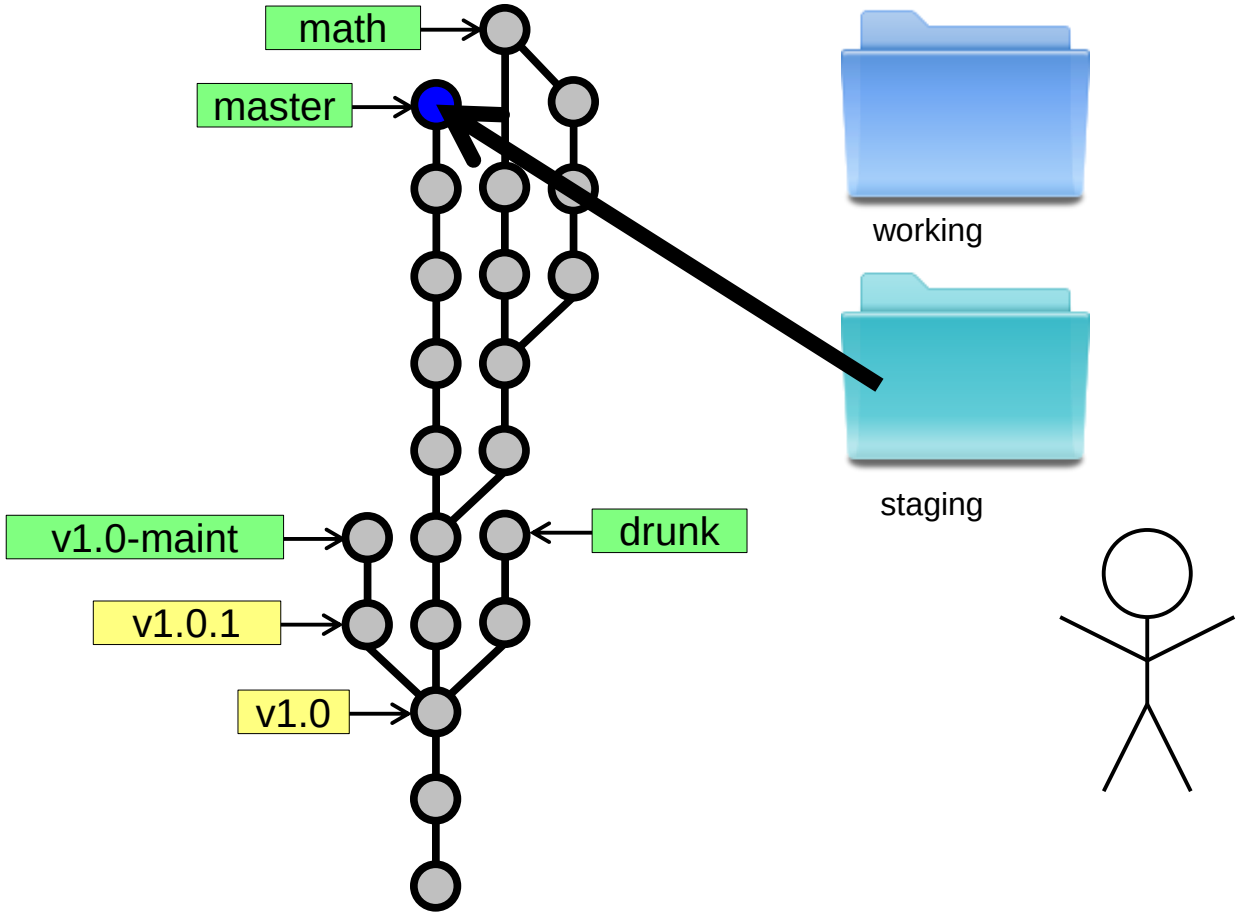

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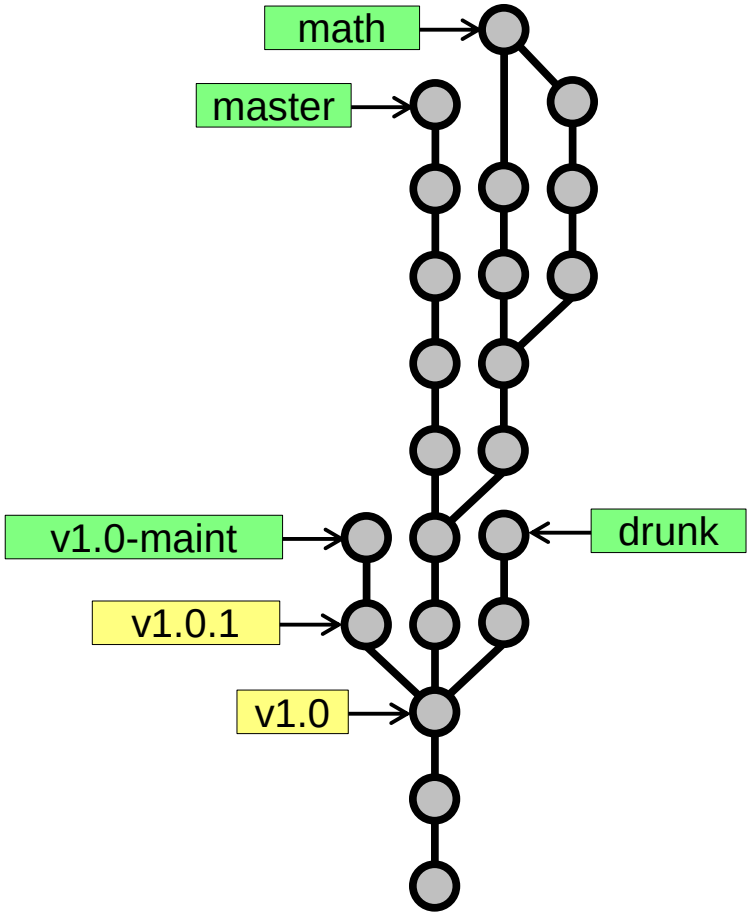

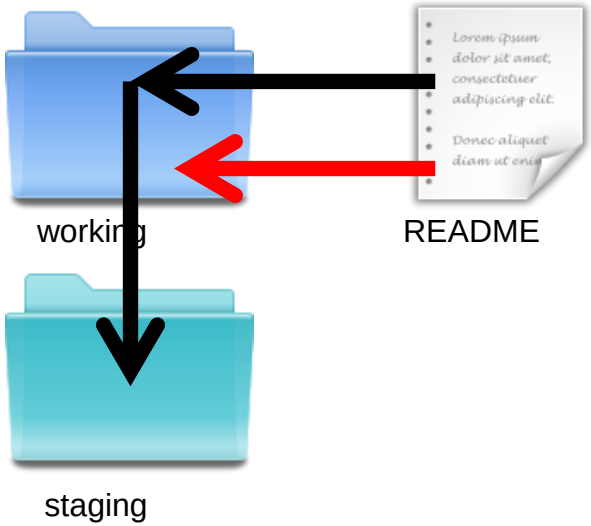

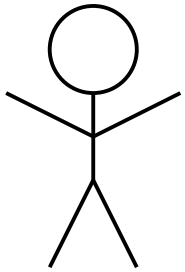

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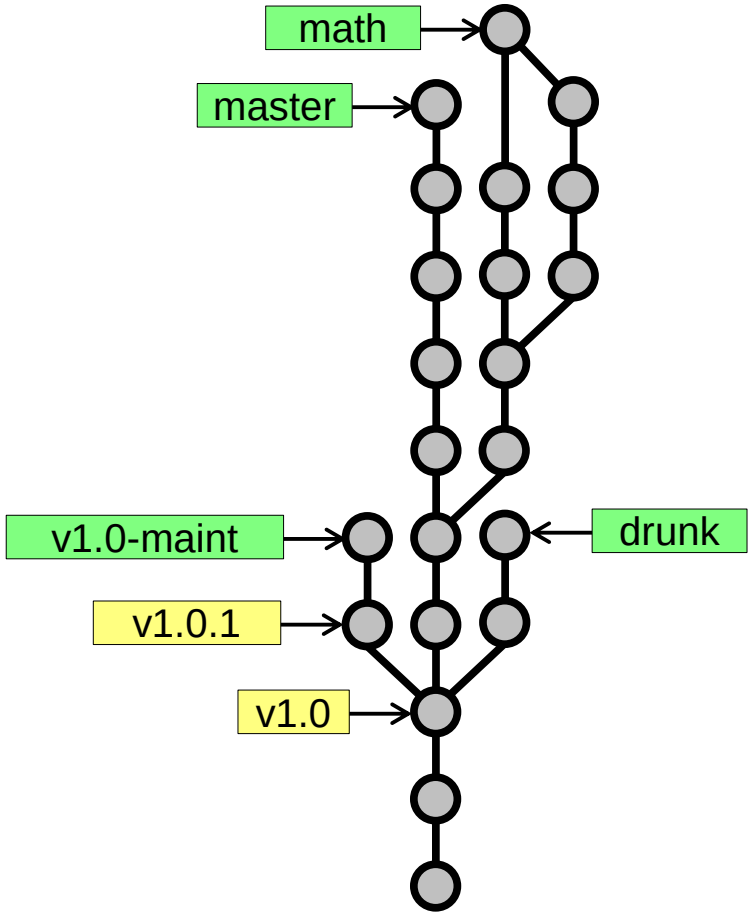
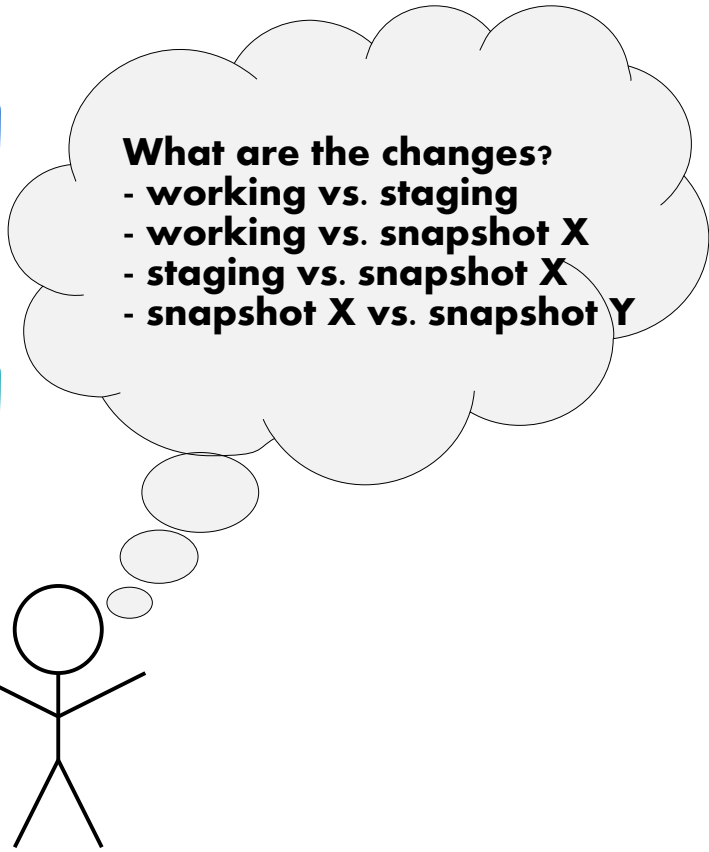
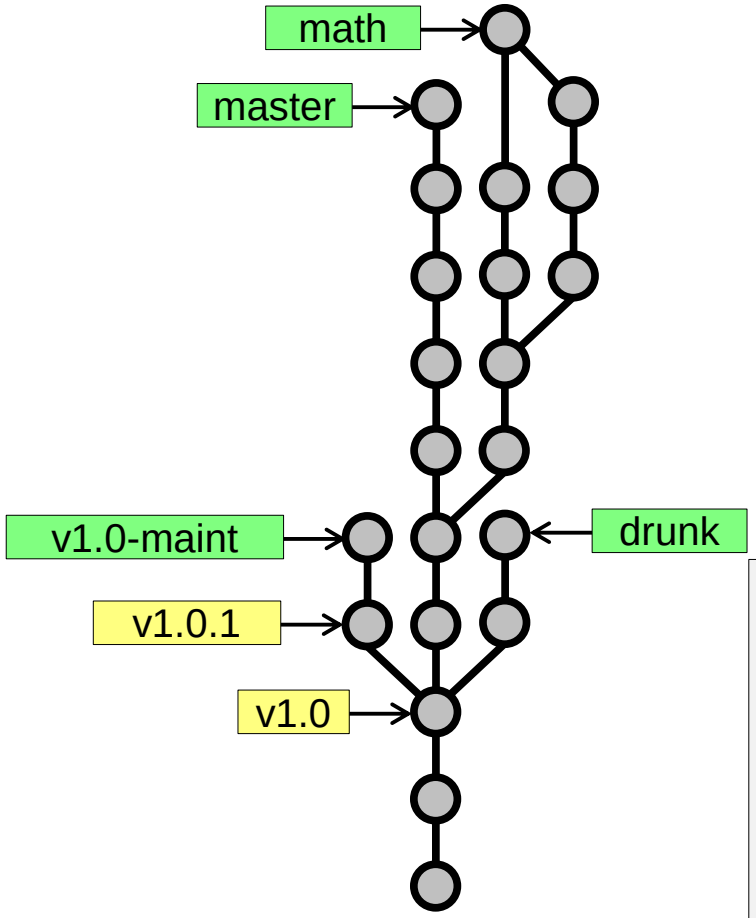


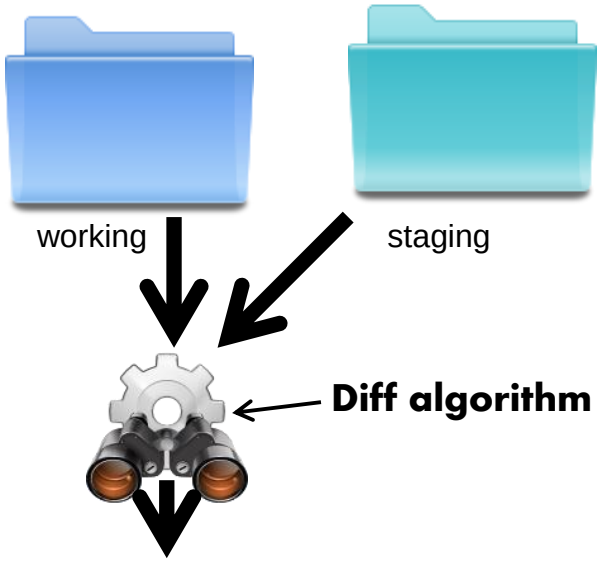
working

staging



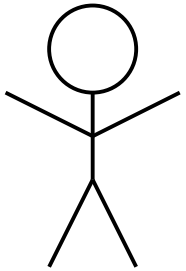
Diffs






```
--- staging
+++ working

 foo
-baz
+bazzle
 xyzzy
```



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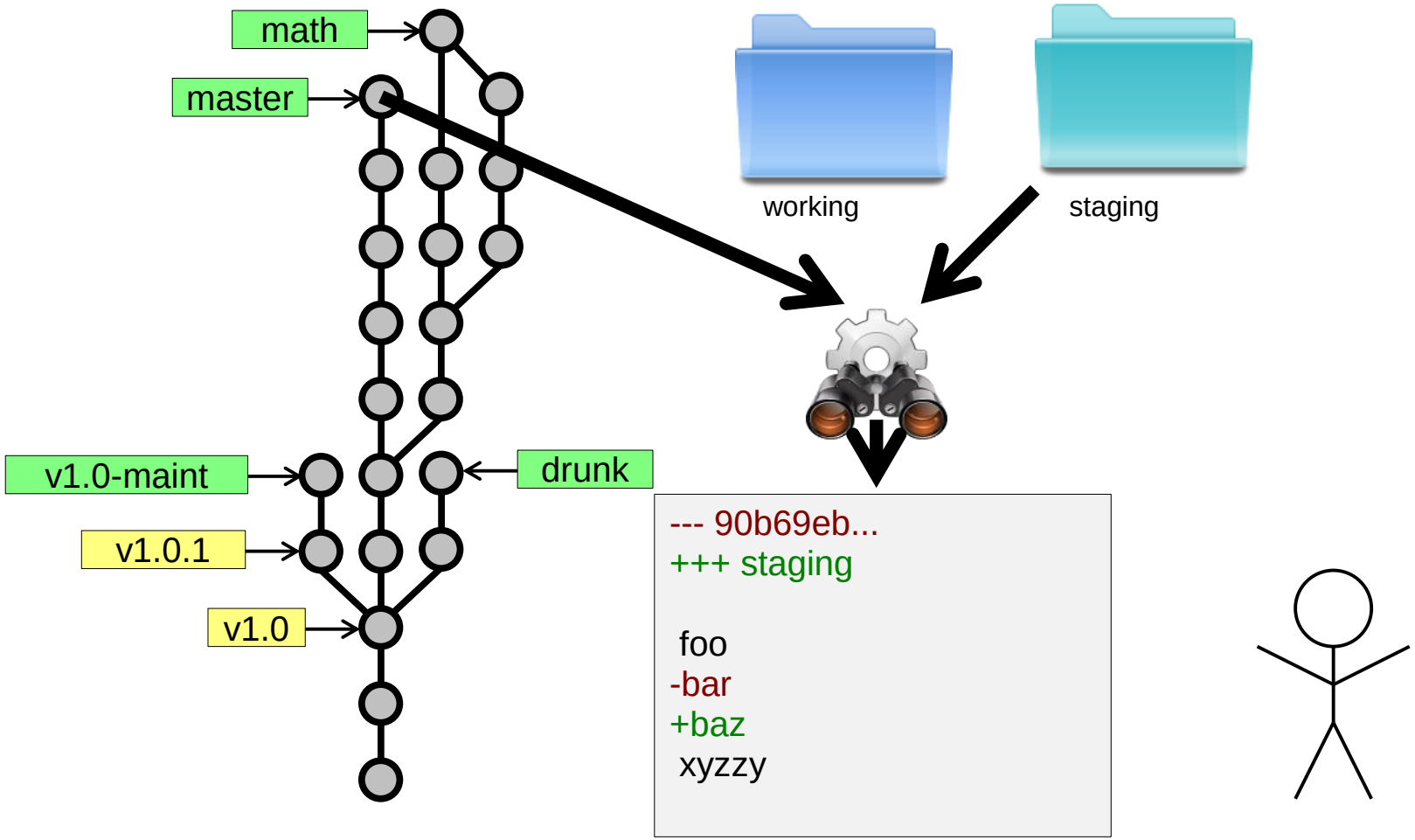
math
master
v1.0-maint
drunk
v1.0.1
v1.0
working
staging
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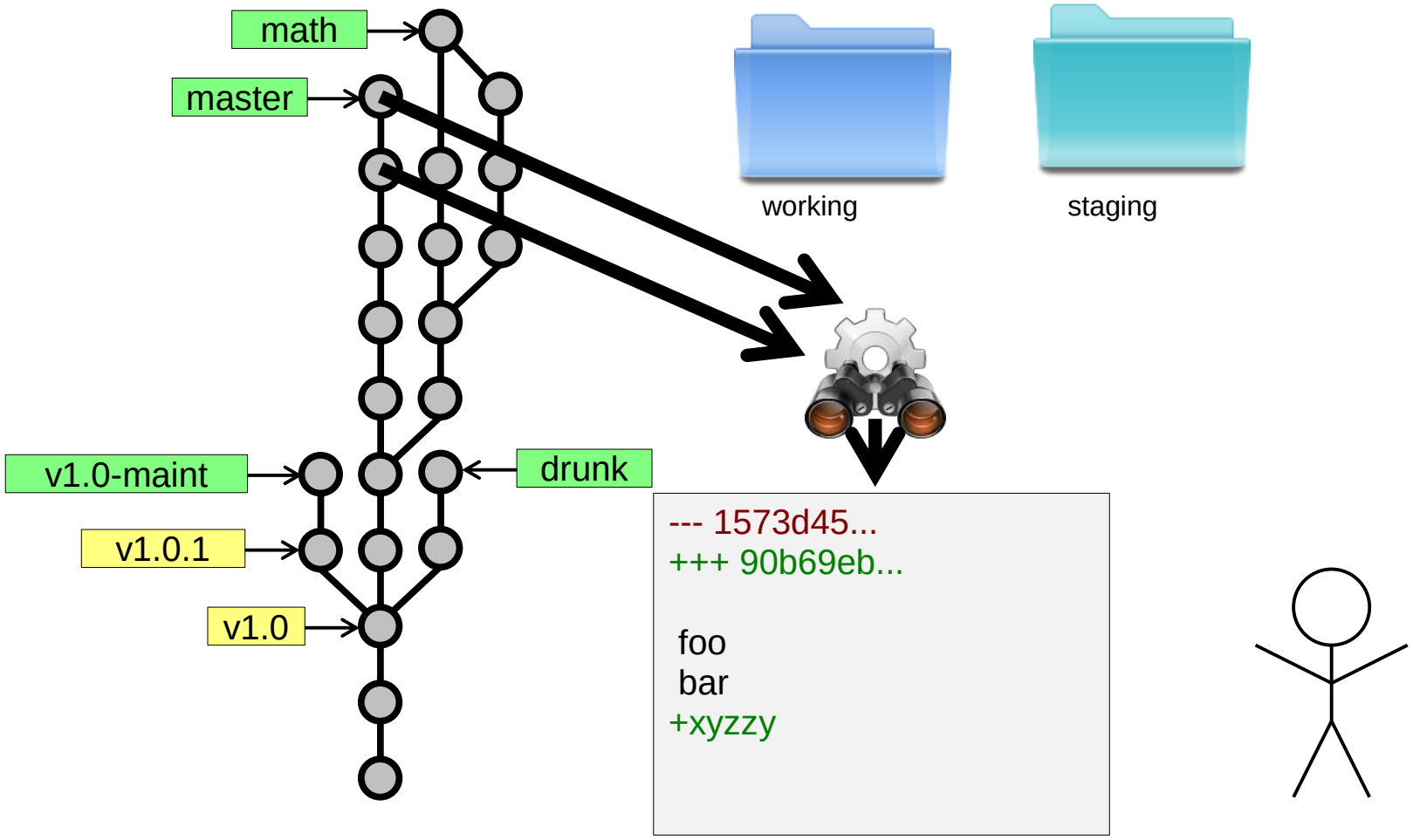
+++ staging
foo
-bar
+baz
xyzzy

Diffs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master
v1.0-maint
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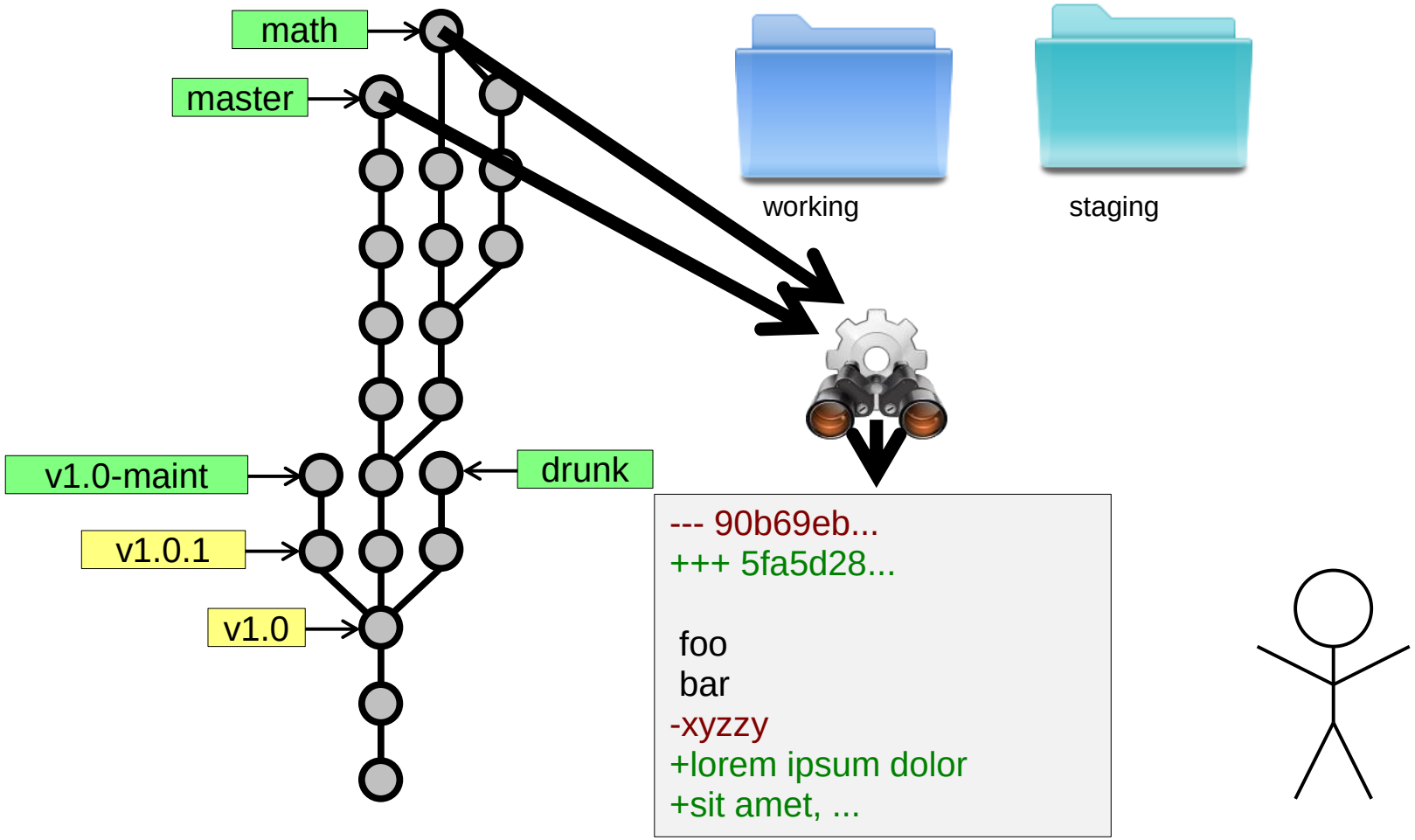
--- 1573d45...
+++ 90b69eb...
foo
bar
+xyzzy

Diffs


math
master
v1.0-maint
drunk
v1.0.1
v1.0
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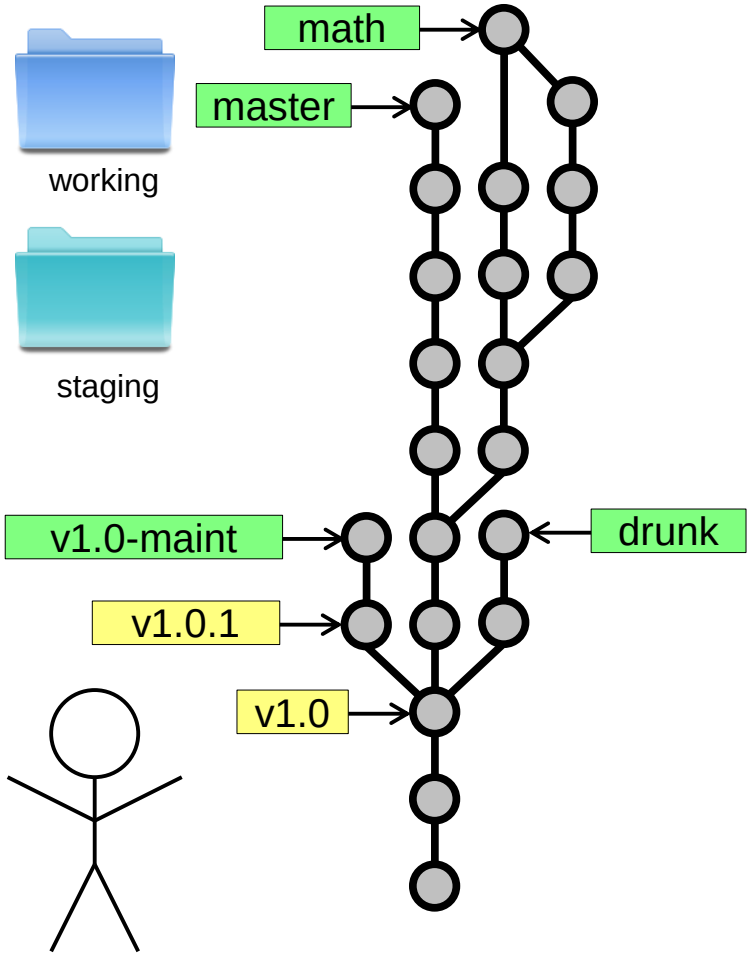
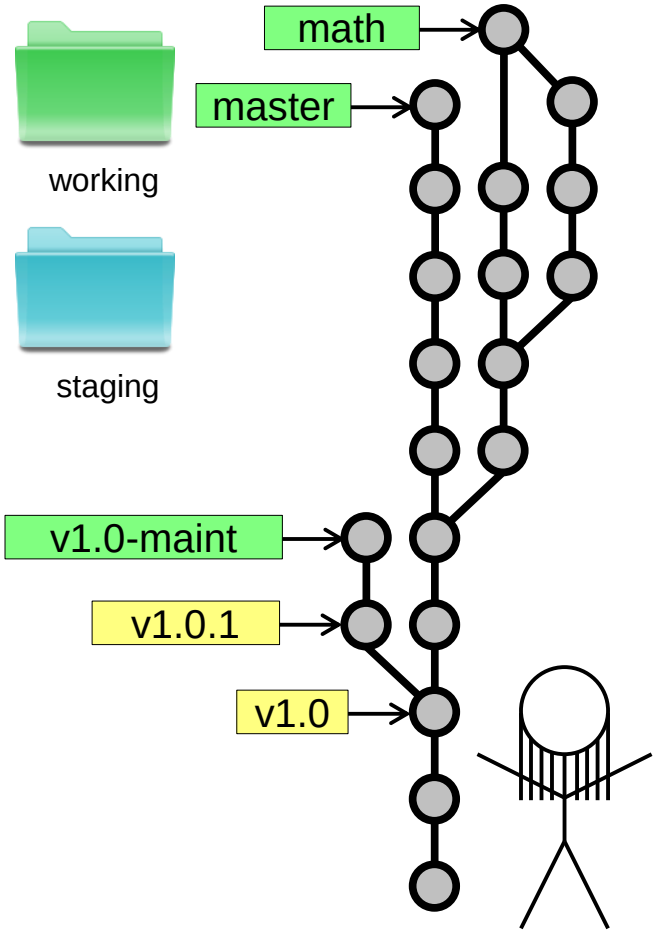
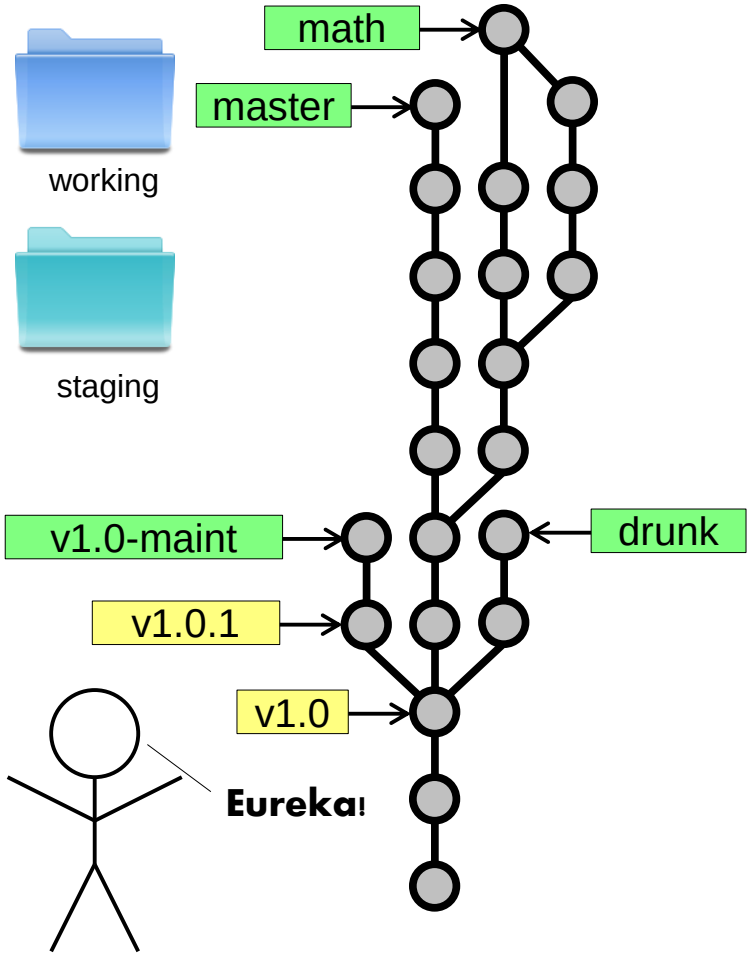
+++ 5fa5d28...
foo
bar
-xyzzy
+lorem ipsum dolor
+sit amet, ...

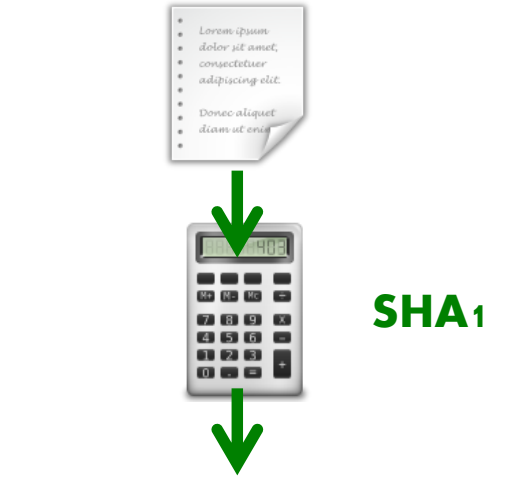
Eliminating Duplication





Eliminating Duplication





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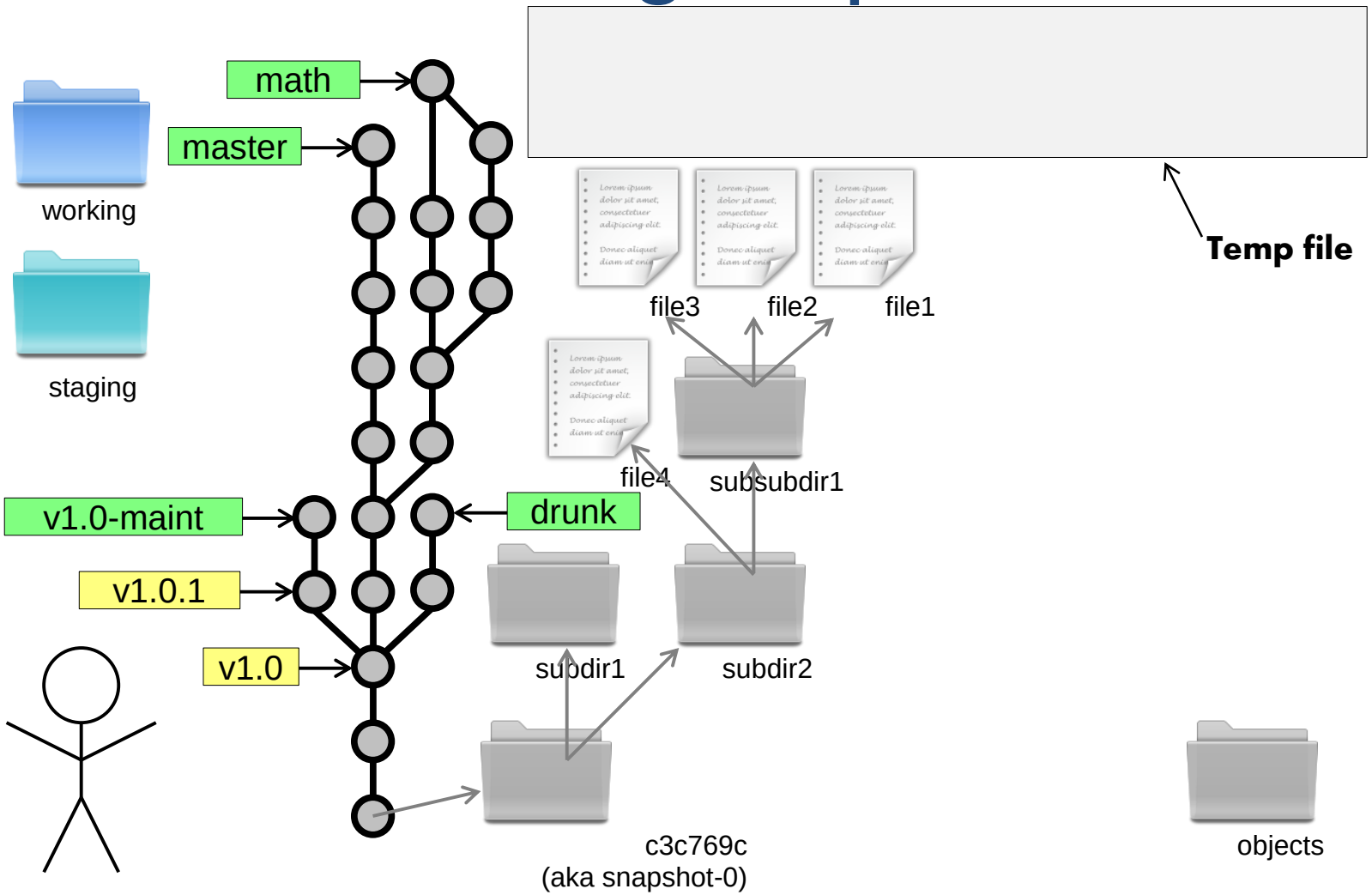

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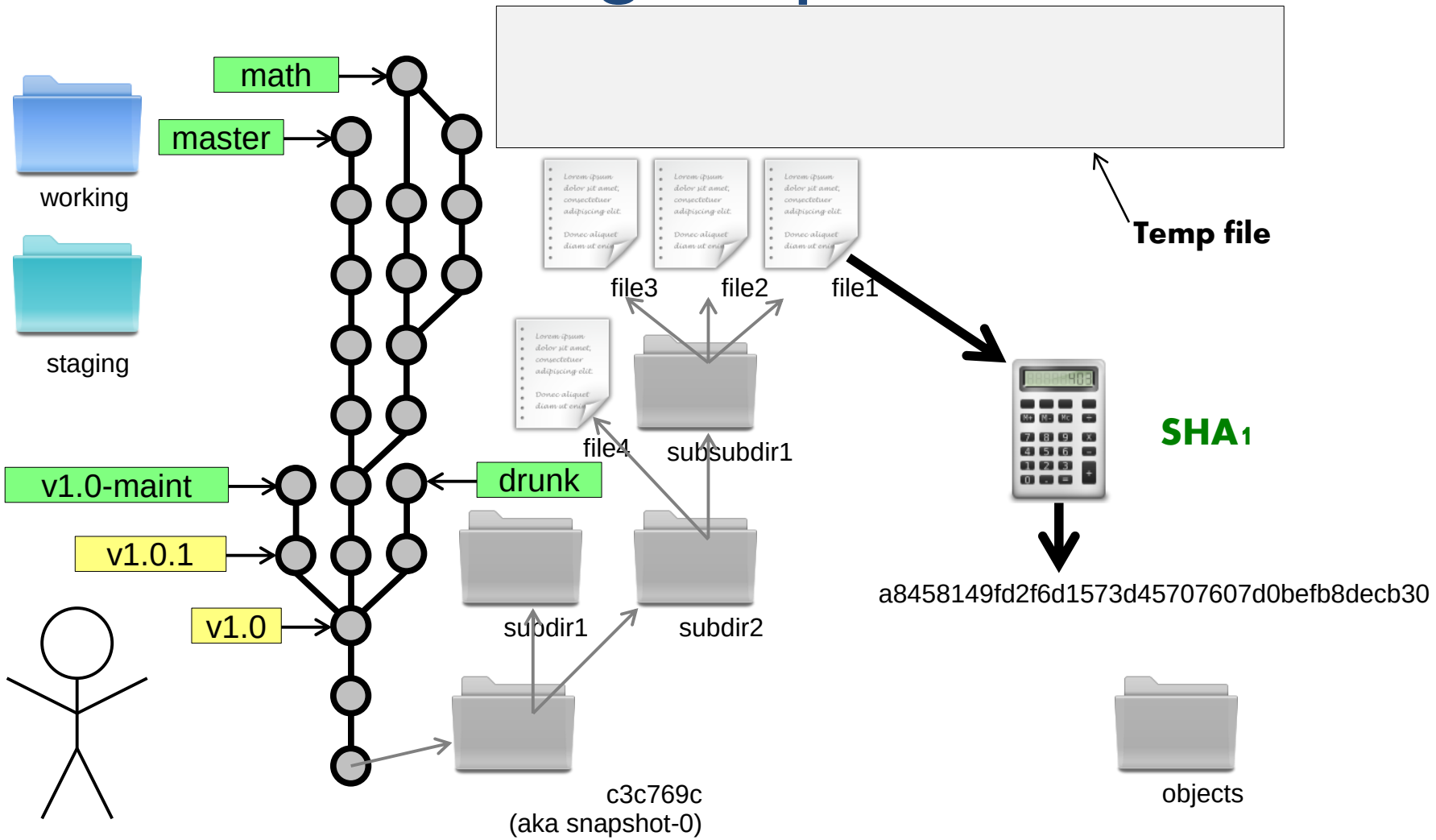

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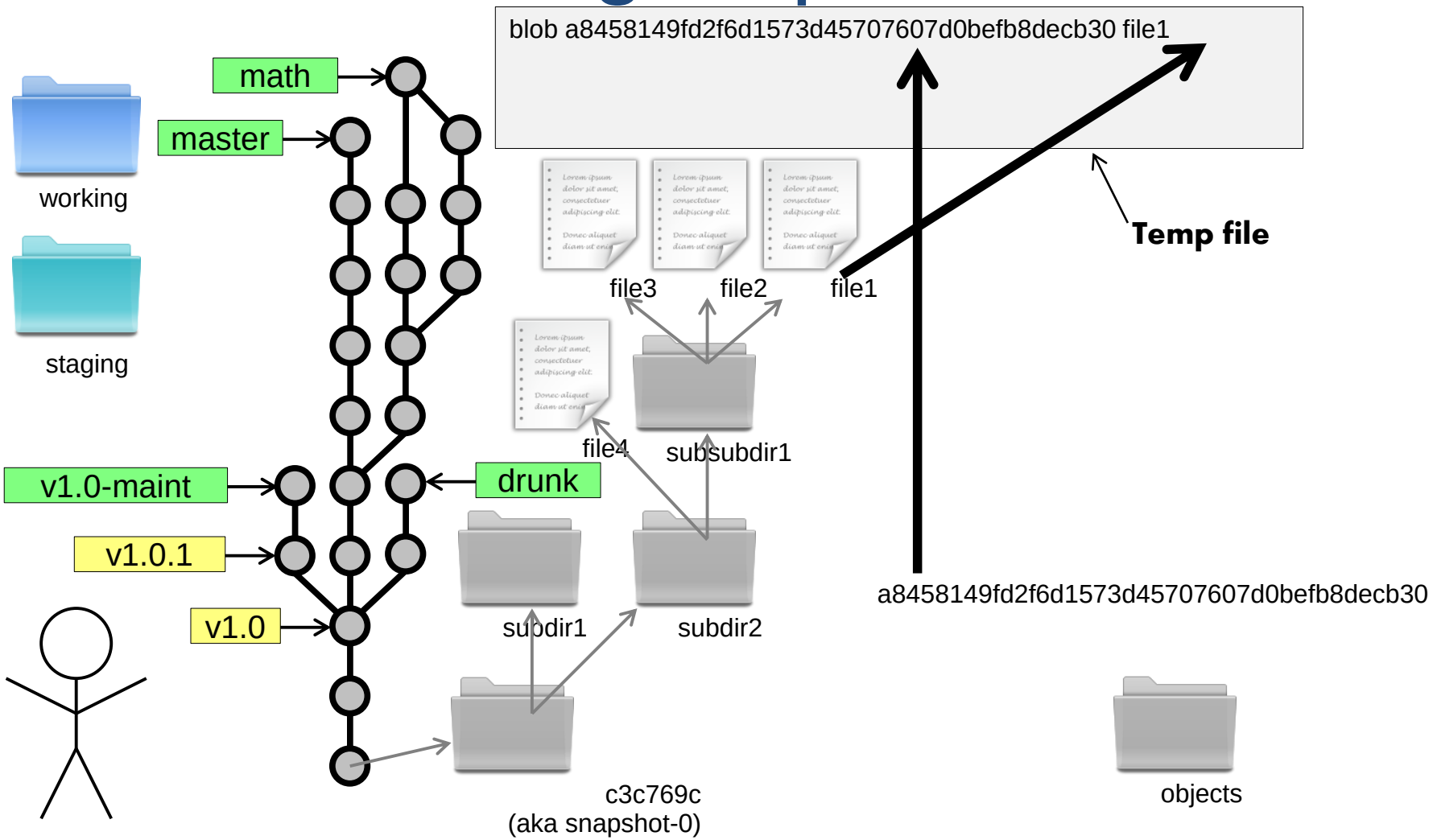

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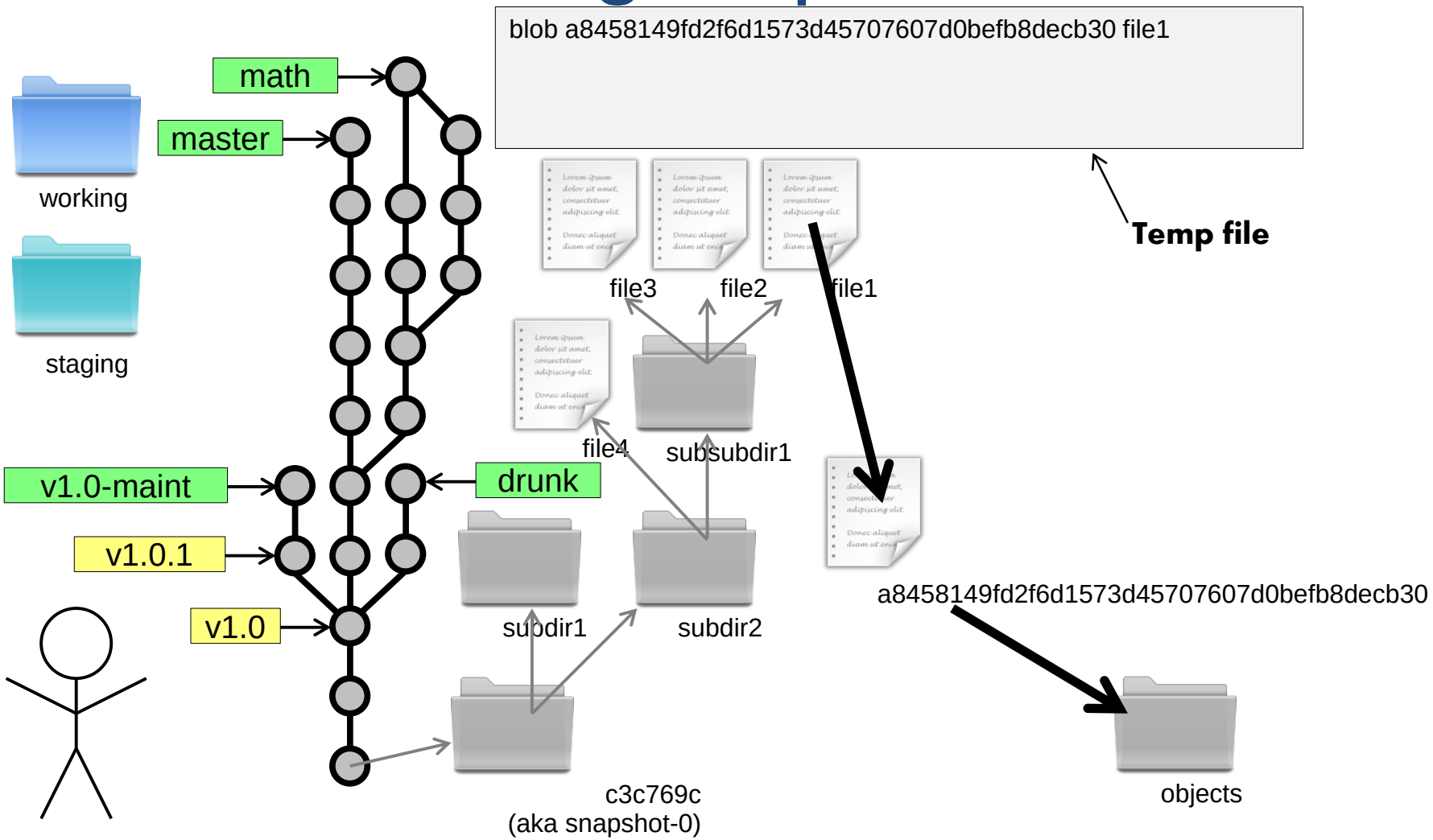

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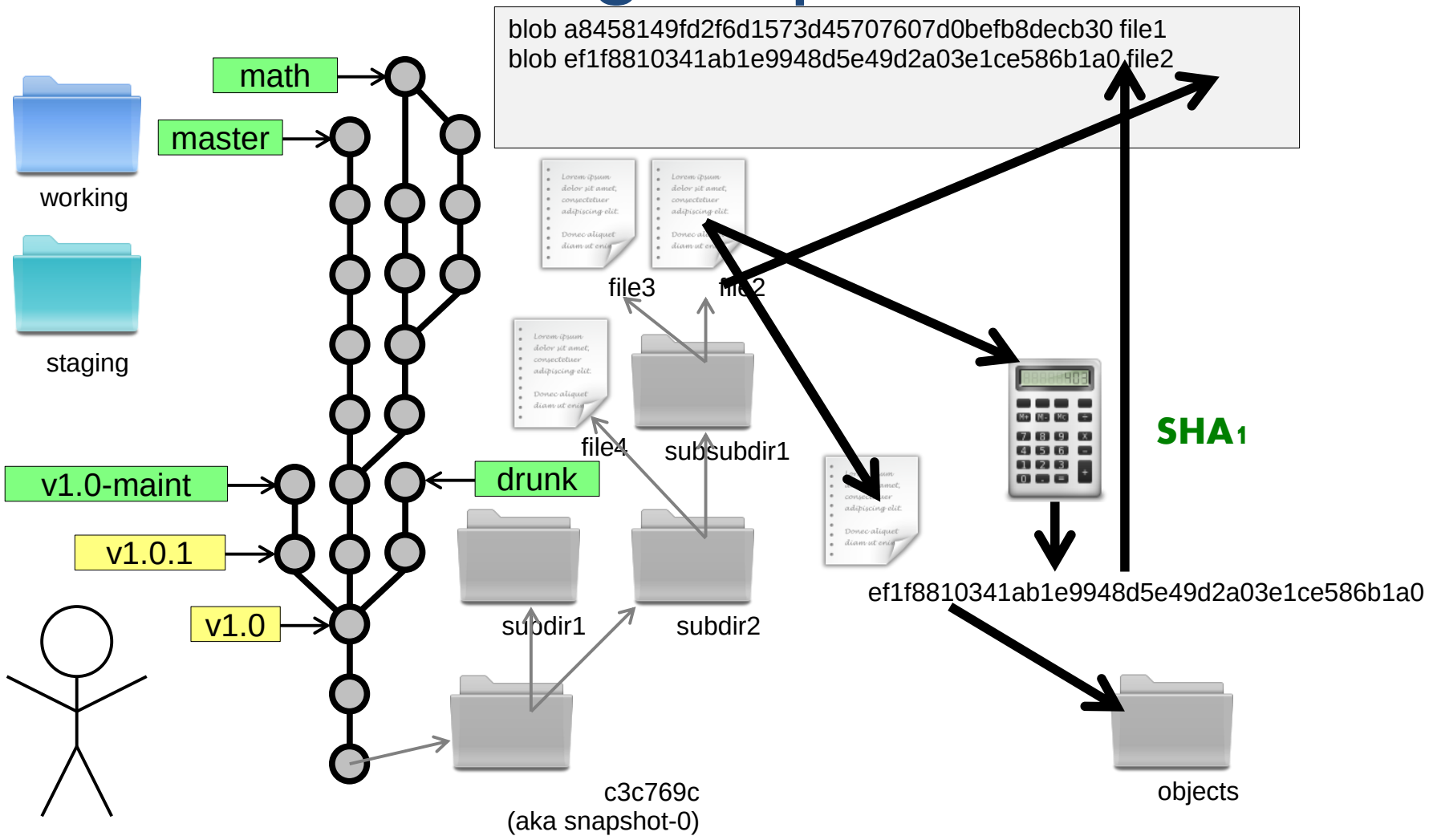

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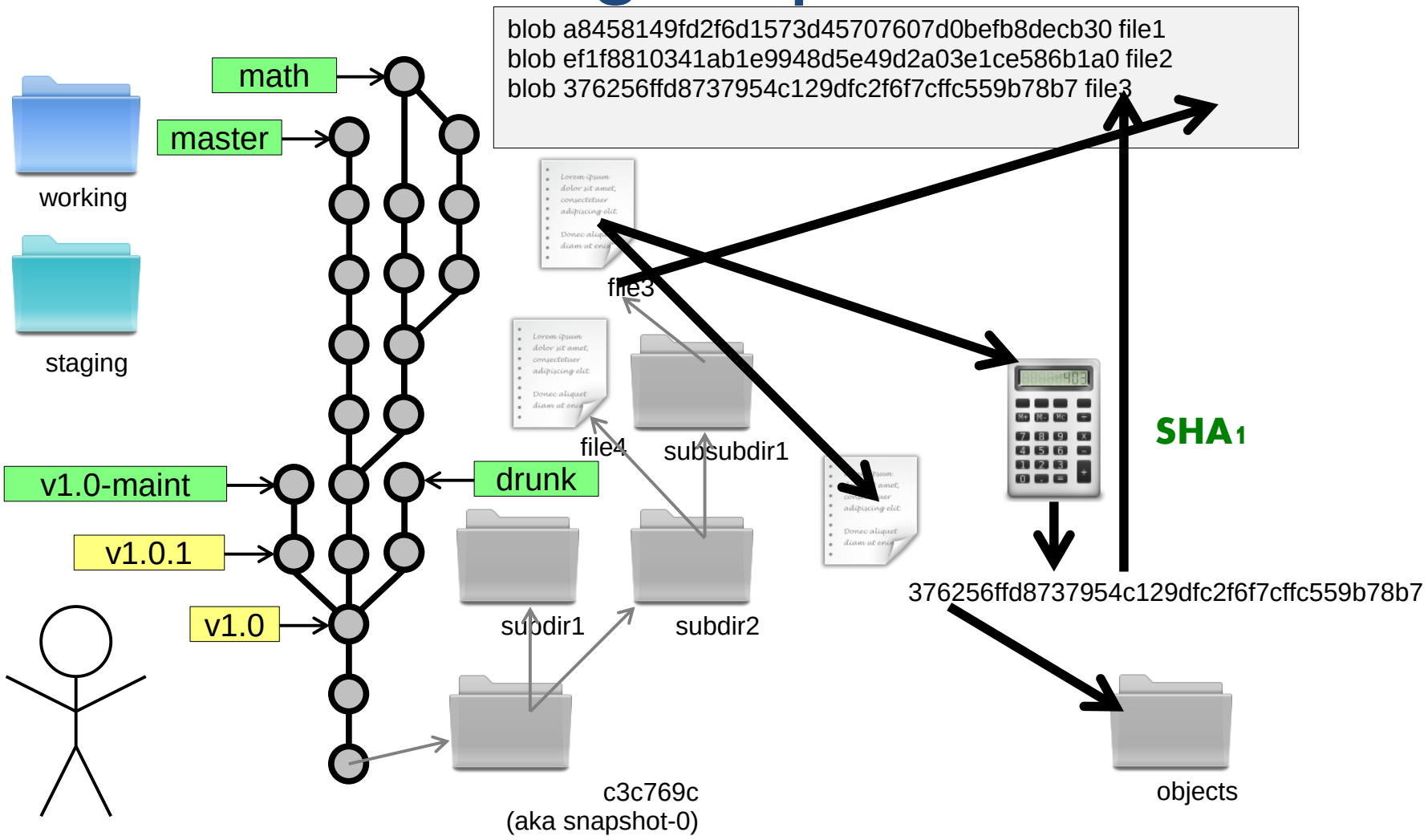

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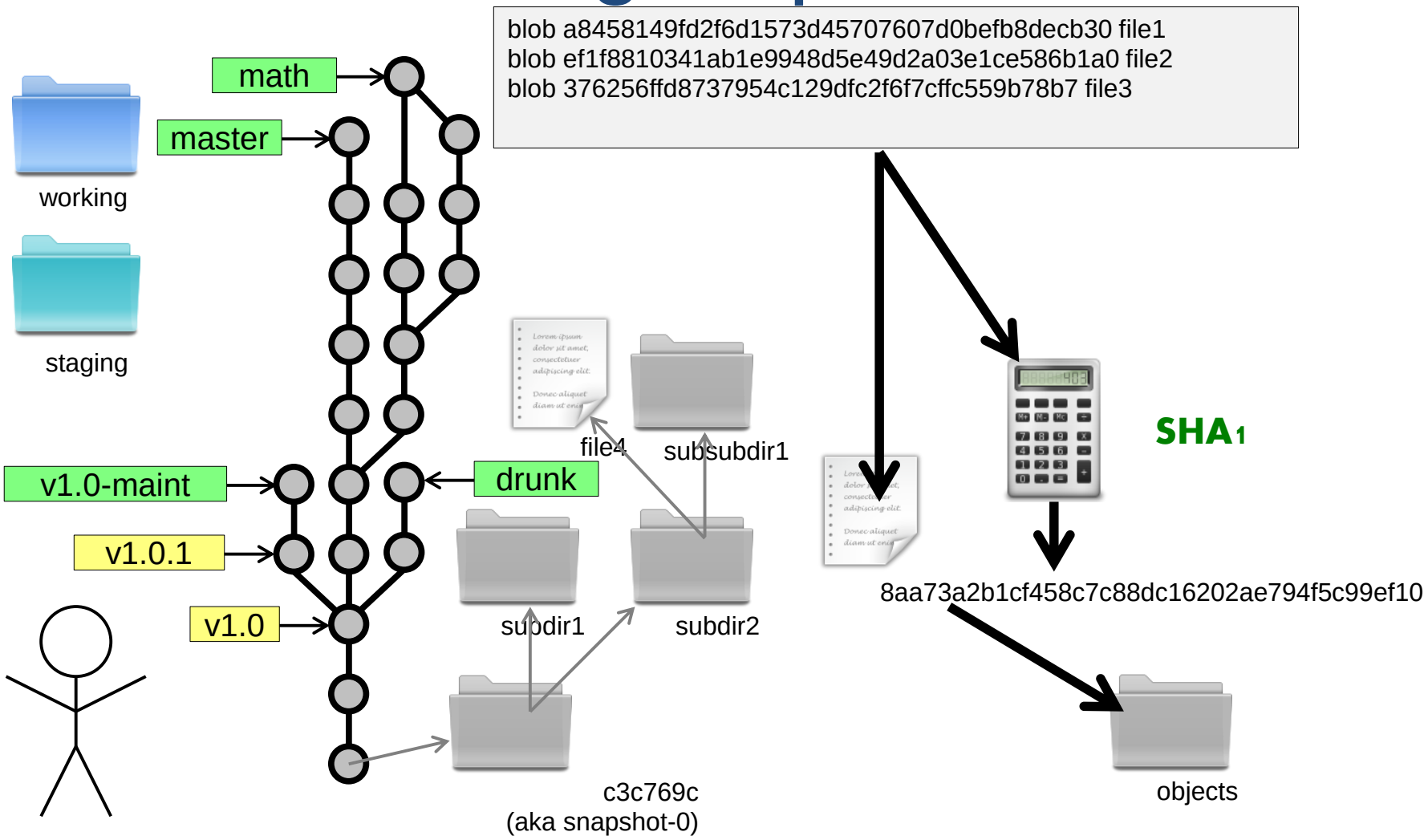

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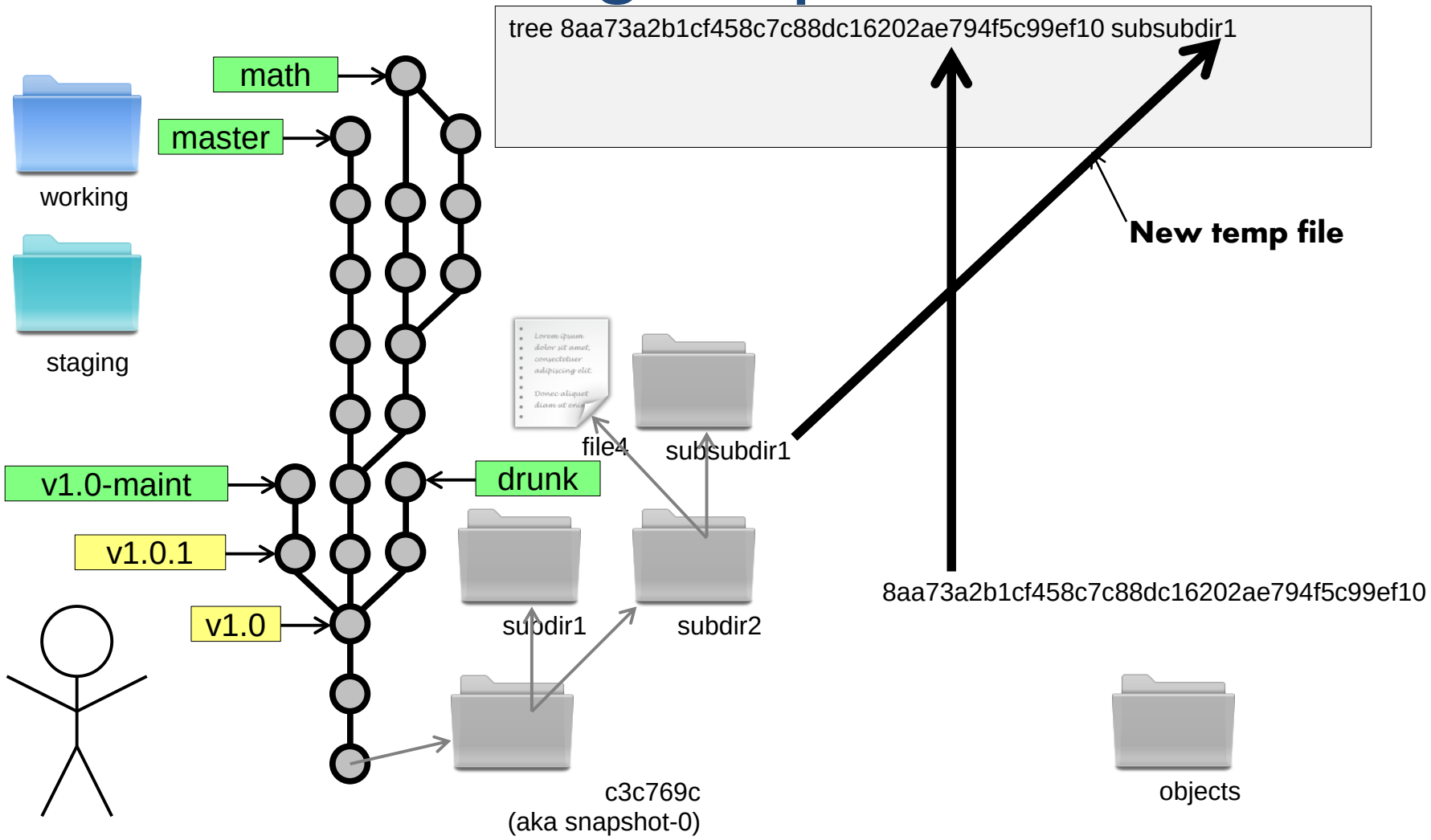

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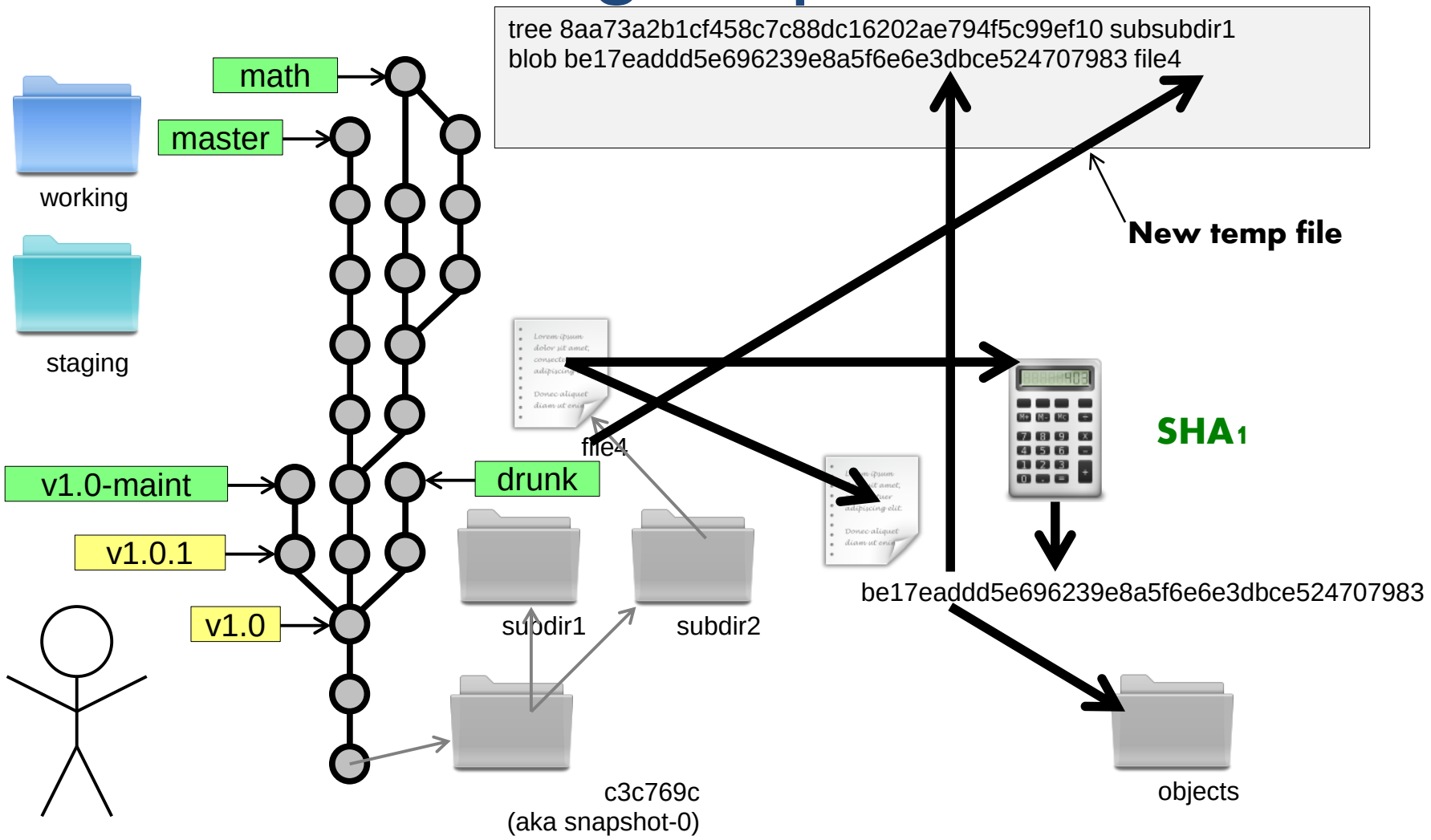

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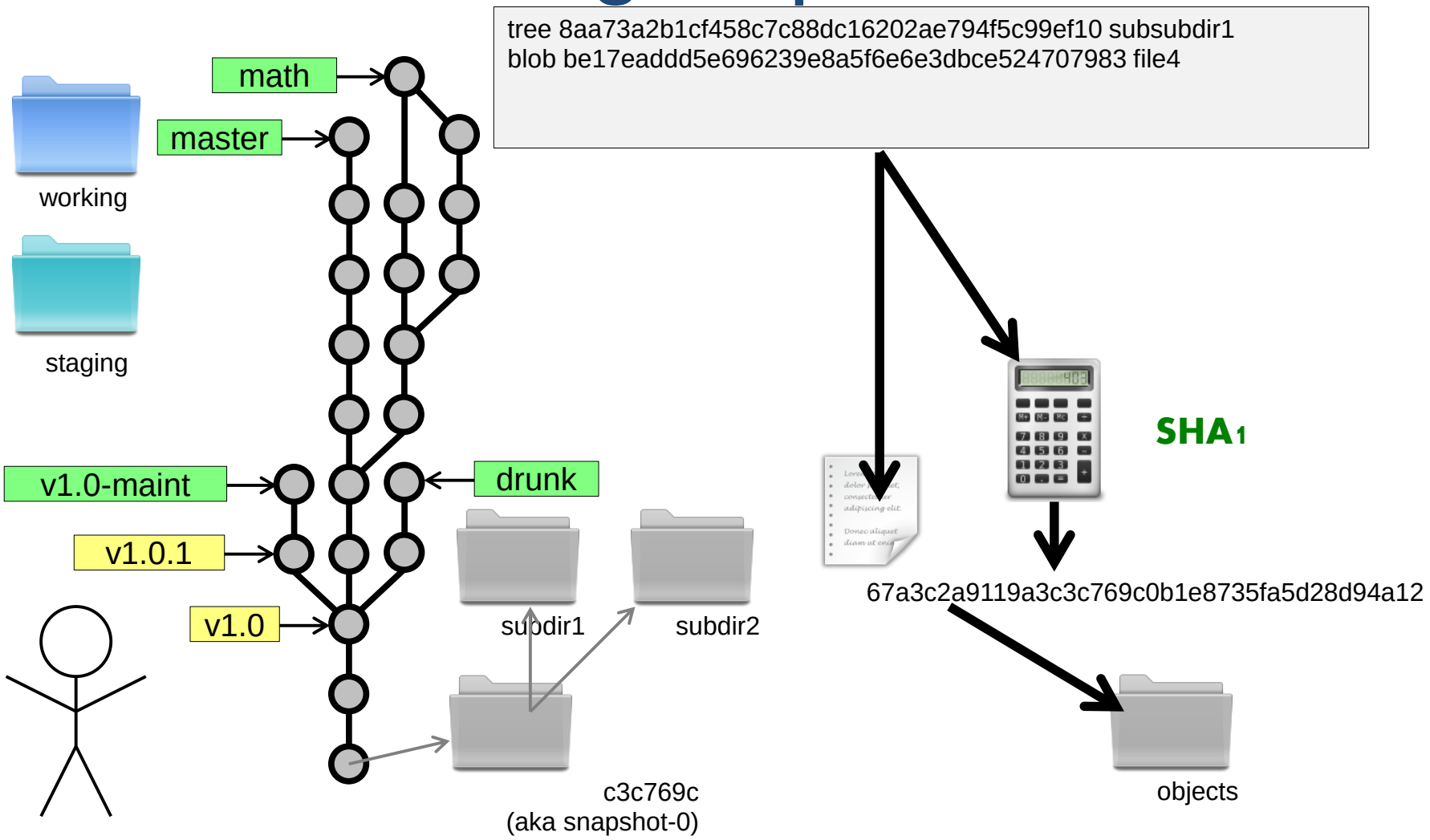

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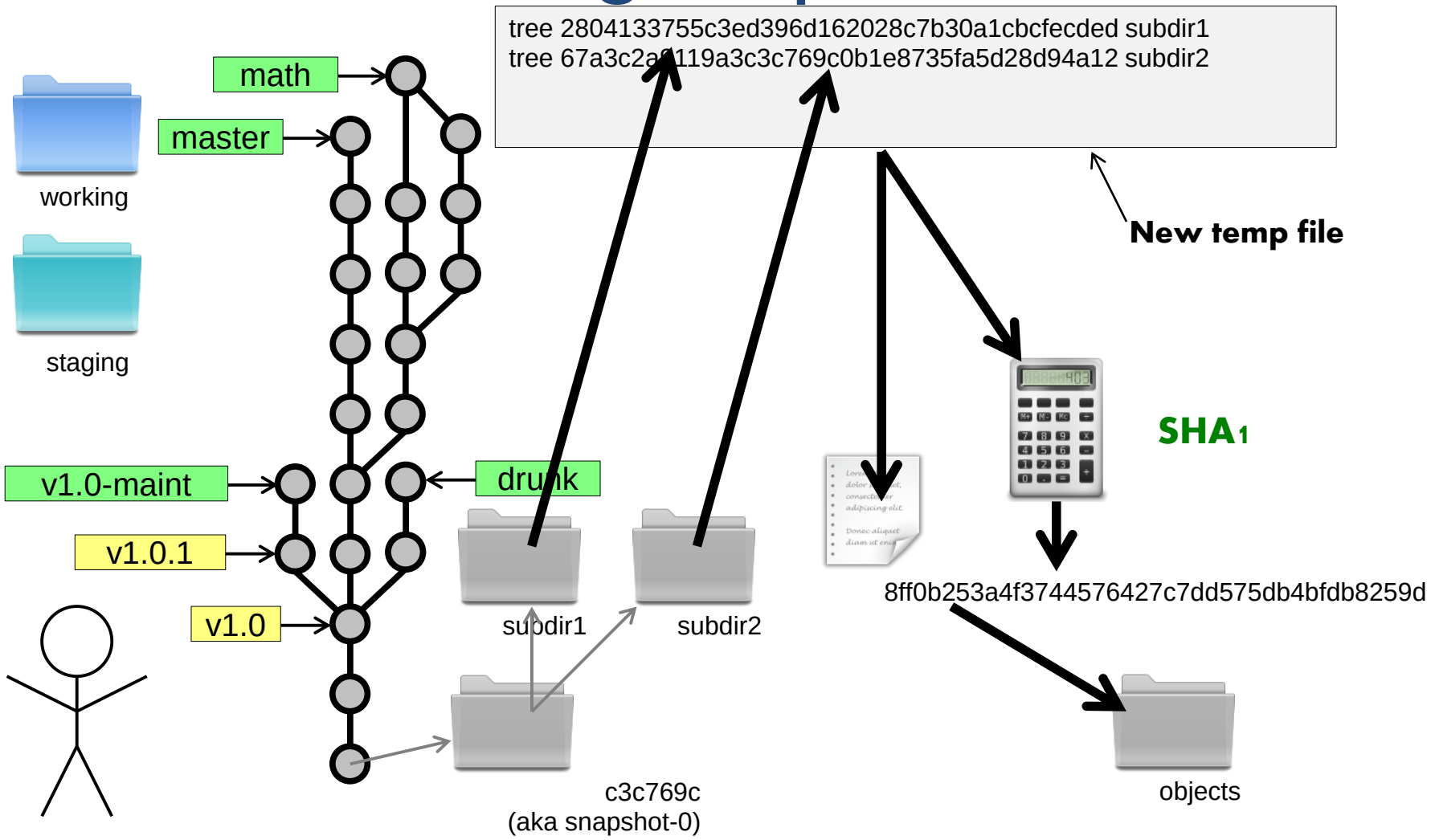

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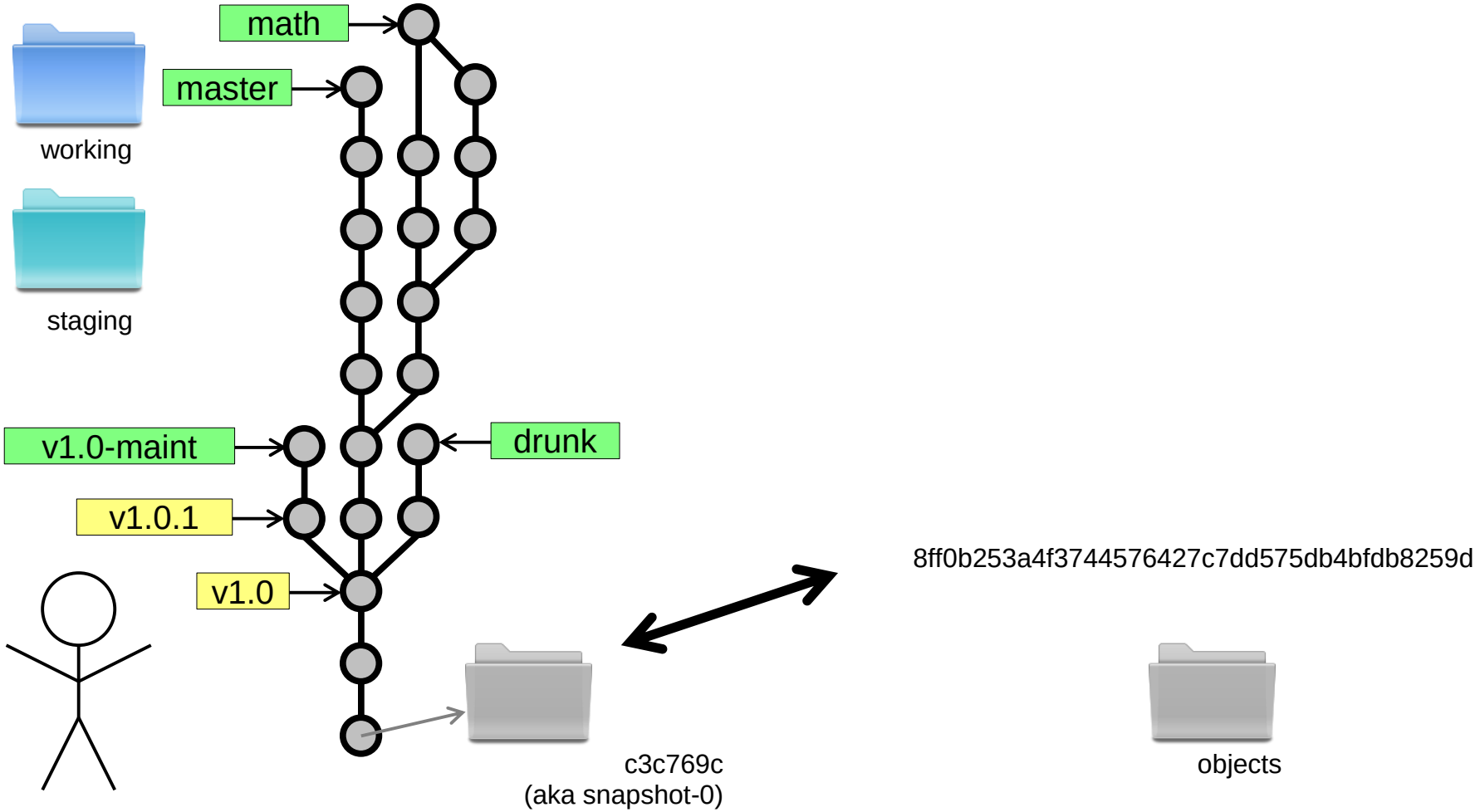

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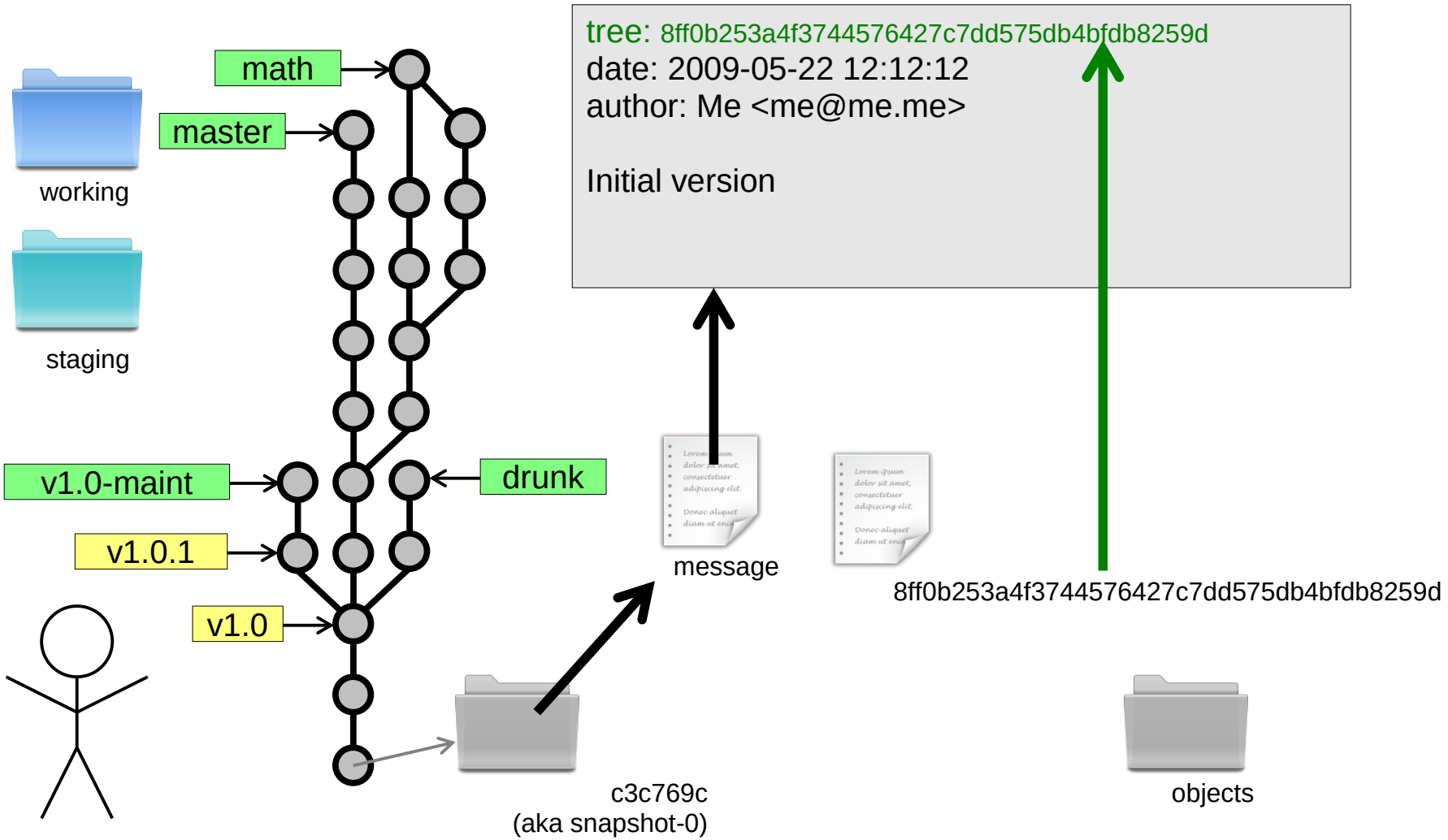

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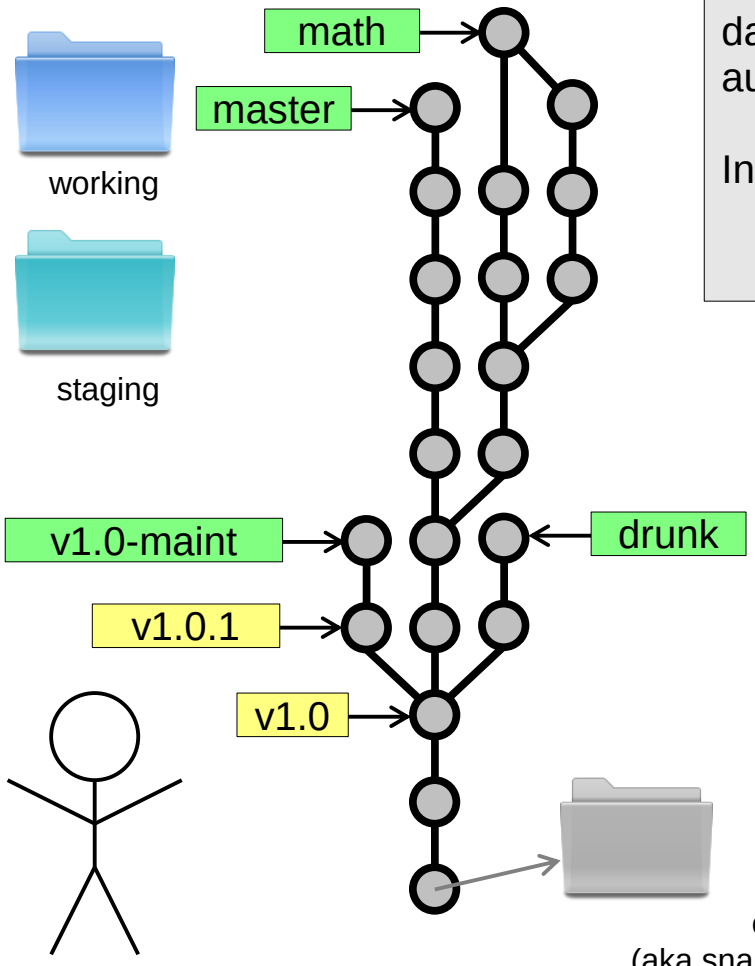

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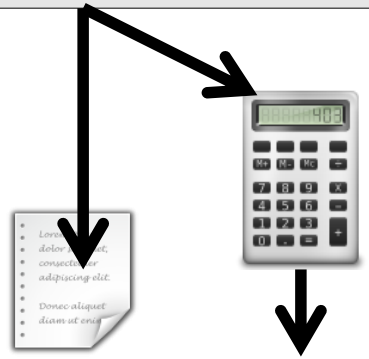

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objects

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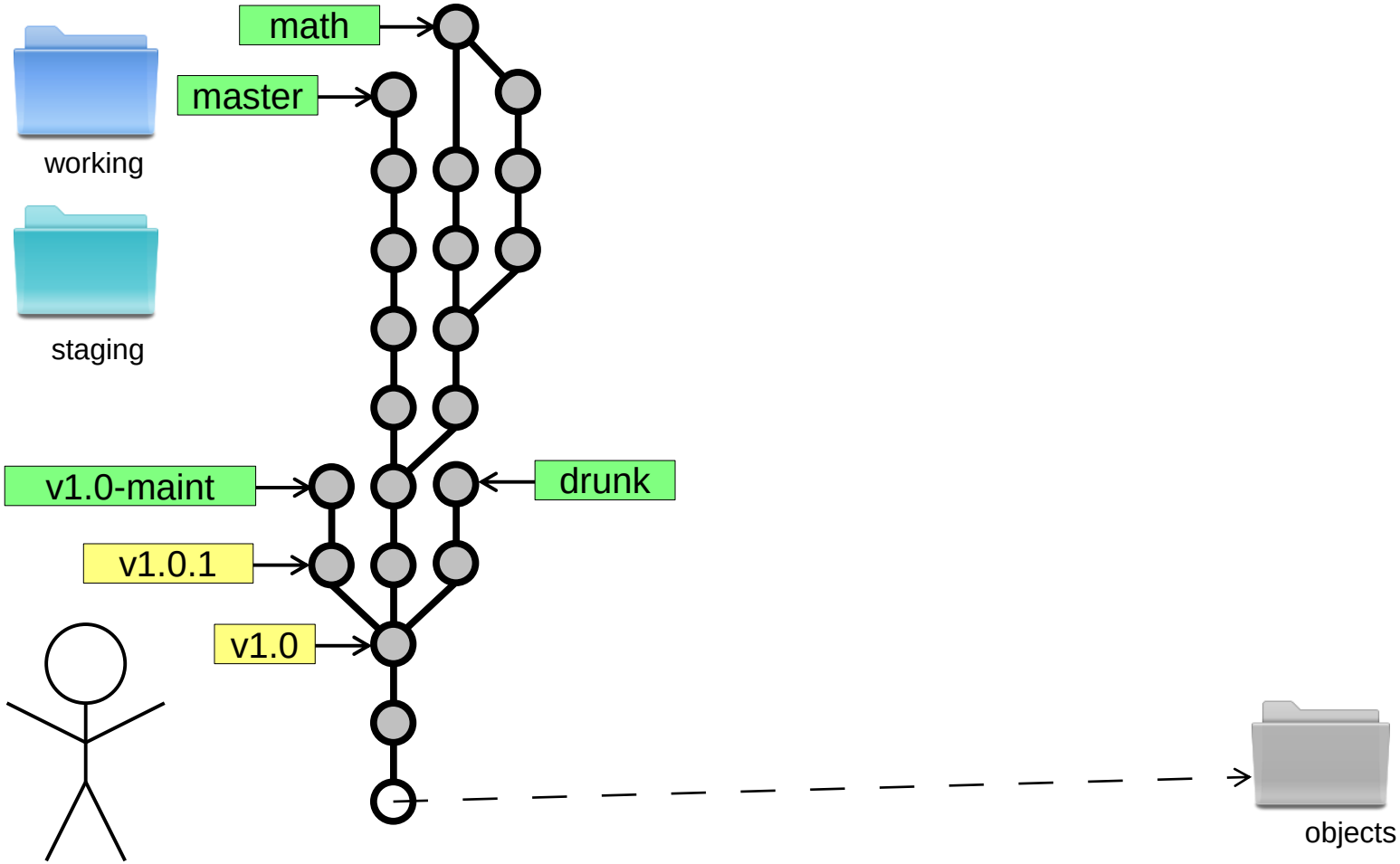
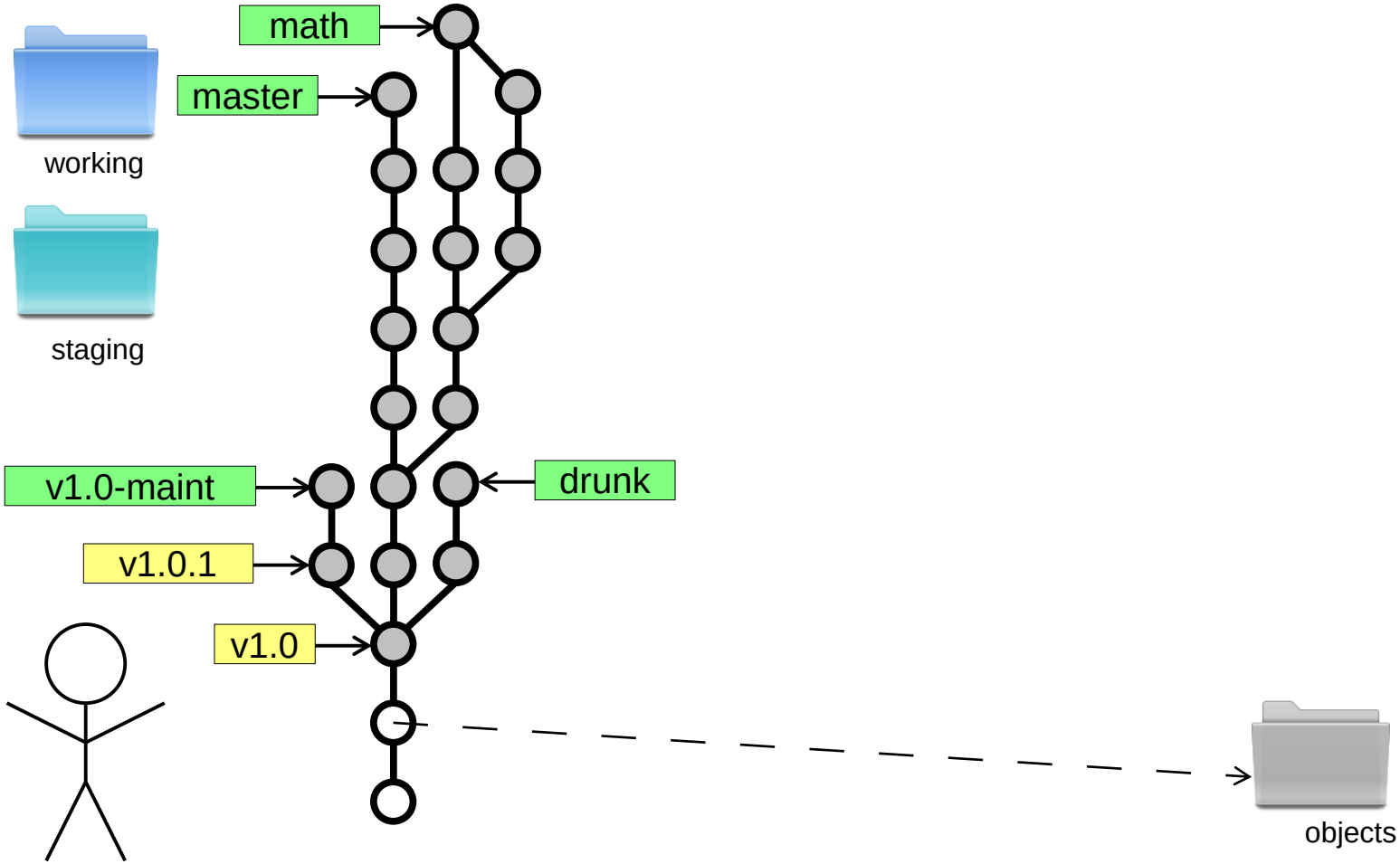
(aka snapshot-0)

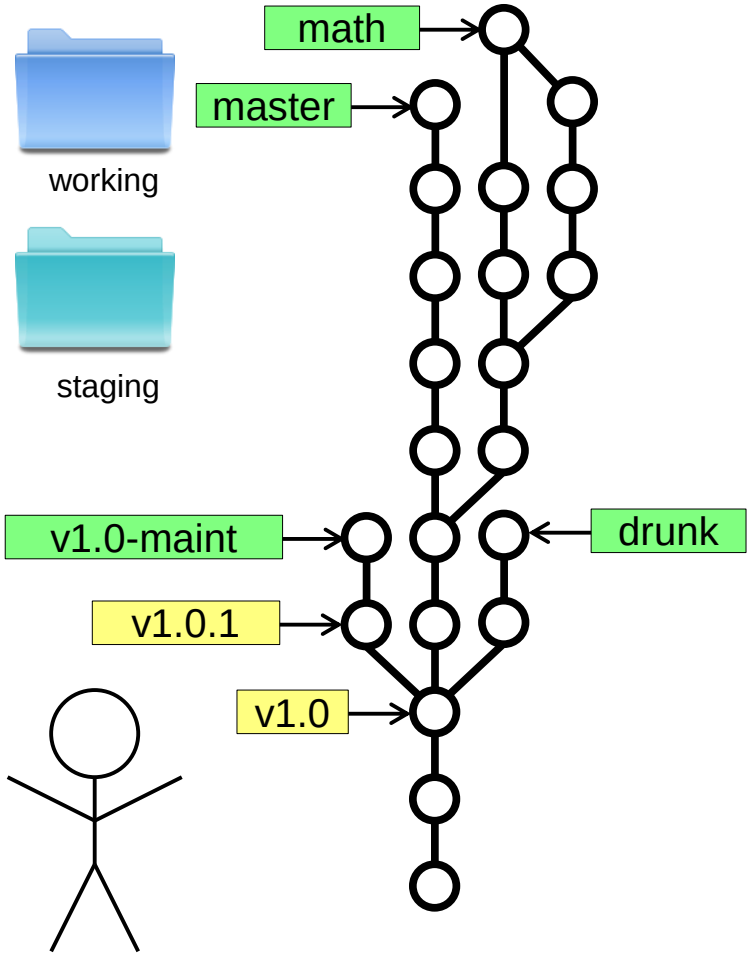
Eliminating Duplication



Eliminating Duplication

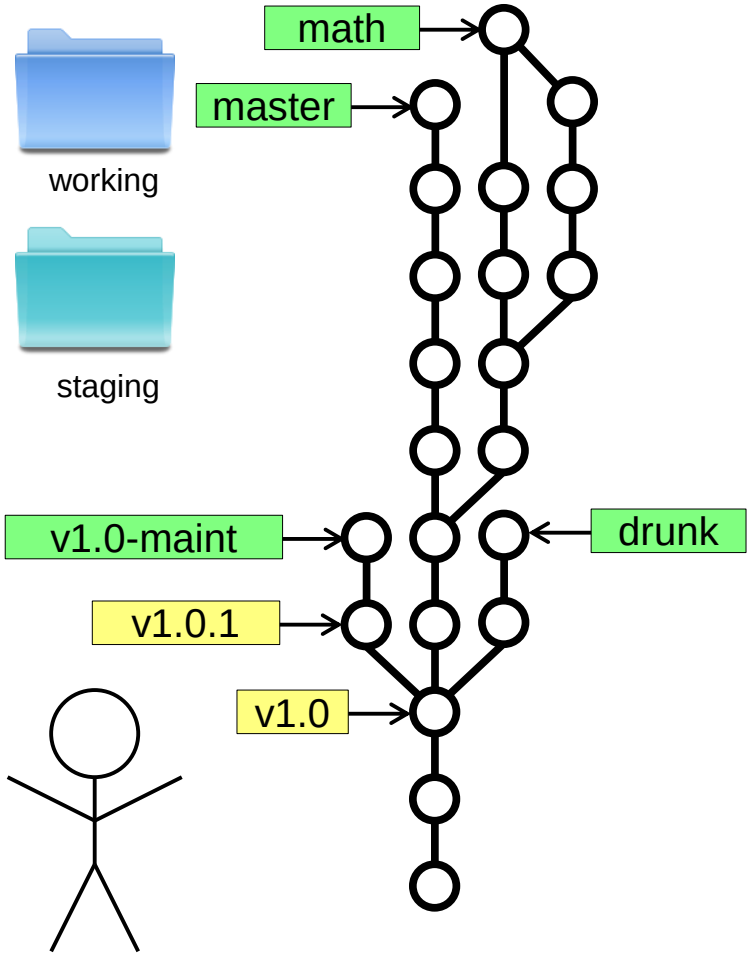


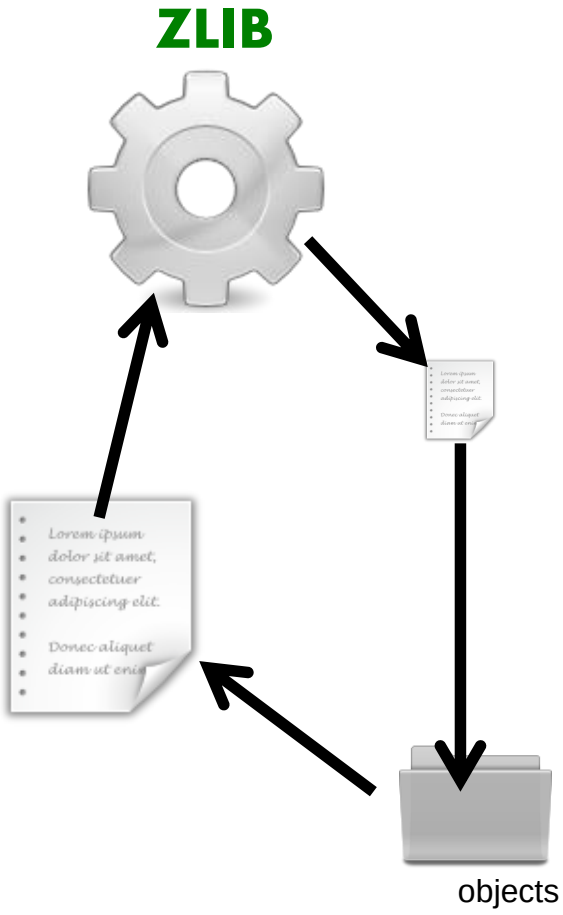
Eliminating Duplication



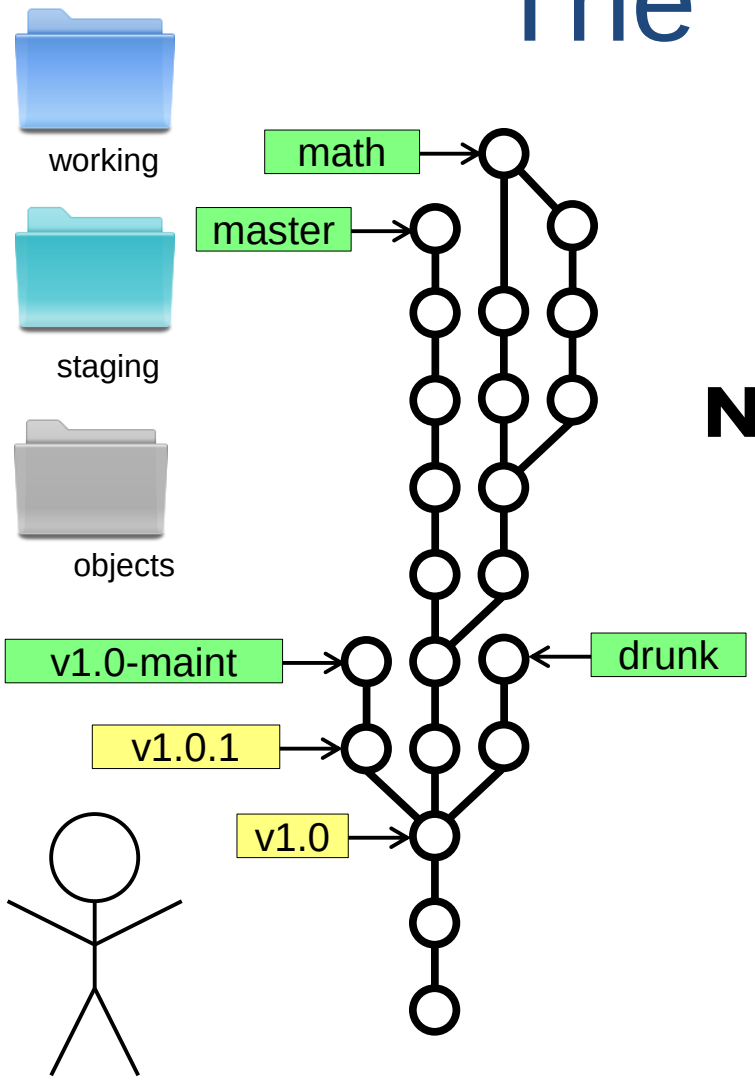
objects

Compressing Blobs





The True Git

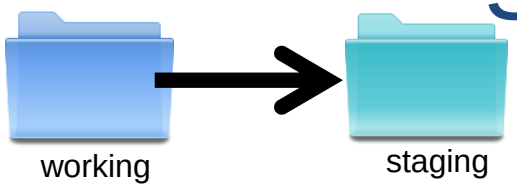


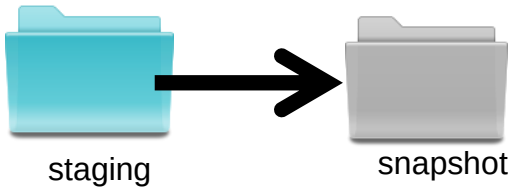
- **TADAA!**
- **This is pretty much Git**
- **Nicer command line tools for all these operations**
- **Many, many other tools**

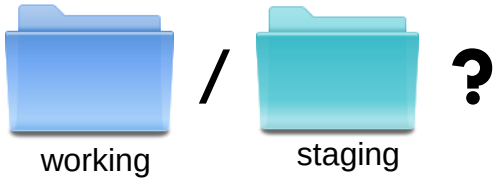
Commands: Getting Started

- First, tell Git who you are:
  - git config --global user.name “My Name”
  - git config --global user.email “my@email.address”
- Get help:
  - git <command> -h
  - git help <command>
- Start a new Git repository:
  - git init

Commands: Making snapshots





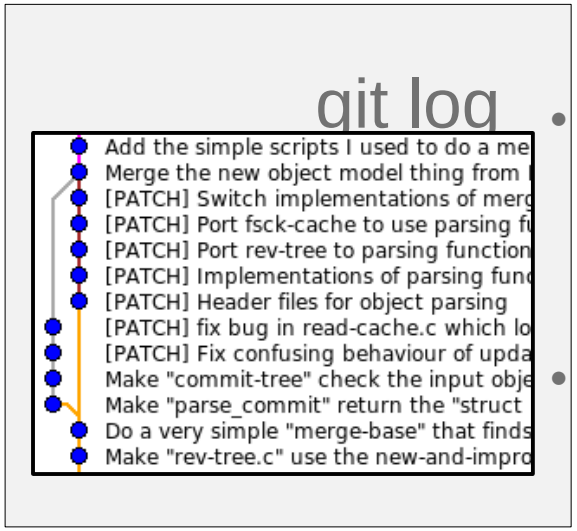


/ ?

git add .

git commit -a

git commit .



gith

Commands: Diffing


working

vs.


staging

git diff .


staging

vs.


snapshot

git diff --staged .


working

vs.


snapshot

git diff HEAD .


snapshot

vs.


snapshot

git diff <from> <to> .

Commands: Branches & Tags

- git branch
- git branch <branch>
- git checkout <branch>

git checkout -b ...

- git tag -l
- git tag <tag>

Commands: Fetching & Merging

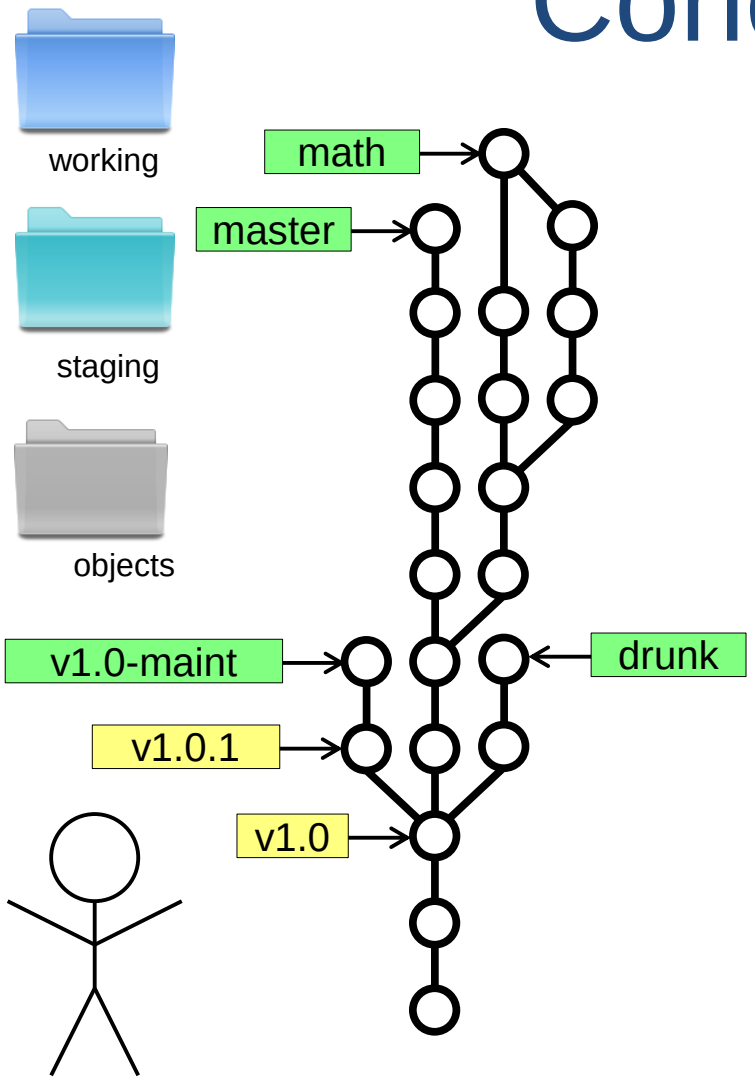
git remote add <name> <URL> .

git fetch <name> .

} git pull

git merge <name>/<branch> .

Conclusion



- Keep this parable in mind
- Git is simple and powerful
- One more thing:

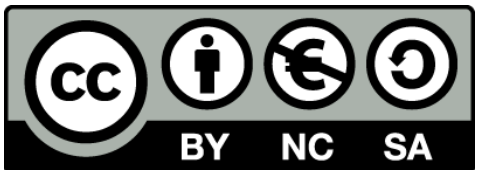
git reflog

Where to go next?

- Git homepage: http://git-scm.com
- Pro Git: http://git-scm.com/book
- Git Reference: http://gitref.org
- GitHub: http://github.com
- Gitorious: http://gitorious.org

Questions?

- Thanks for your attention!
- These slides are available at: https://github.com/jherland/git_parable
- Reach me at <johan@herland.net>



לסיכום

- תהליך: בקרת תצורה וגרסאות
- כלים: git / github
- שיטות: למשל git flow
- עוד: Git For Ages 4 And Up

סיכום הקורס

- נושאים שעברנו
- סקר ודיון
- מה הלאה