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Version Control

Based on the materials by
Mike Jackson, Katy Huff, Paul Ivanov, Rachel Slaybaugh,
Anthony Scopatz, and Greg Wilson

With version control we can…

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- Keep track of changes like a lab notebook for code and documents
- Roll back changes to any point in the history of changes to our files
- Back up our entire history of changes in various locations
- Work on our files from multiple locations
- Identify and resolve conflicts when the same file is edited within two repositories without losing any work
- Collaboratively work on code or documents or any other files

Different version control systems

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- Centralized version control, for example SVN
- Distributed version control, for example Mercurial or **Git**

- Remote repositories hosting services, for example **GitHub** and BitBucket
- Ask about a repository at your research institution!

Git

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- Distributed version control
- Very powerful
- Widely used
- May seem a steep learning curve but it's well worth it!

```
add         Add file contents to the index
bisect      Find by binary search the change that introduced a bug
branch      List, create, or delete branches
checkout    Checkout a branch or paths to the working tree
clone       Clone a repository into a new directory
commit      Record changes to the repository
diff        Show changes between commits, commit and working tree, etc
fetch       Download objects and refs from another repository
grep        Print lines matching a pattern
init        Create an empty git repository or reinitialize an existing one
log         Show commit logs
merge       Join two or more development histories together
mv          Move or rename a file, a directory, or a symlink
pull        Fetch from and merge with another repository or a local branch
push        Update remote refs along with associated objects
rebase      Forward-port local commits to the updated upstream head
reset       Reset current HEAD to the specified state
rm          Remove files from the working tree and from the index
show        Show various types of objects
status      Show the working tree status
tag         Create, list, delete or verify a tag object signed with GPG
```

Distributed version control

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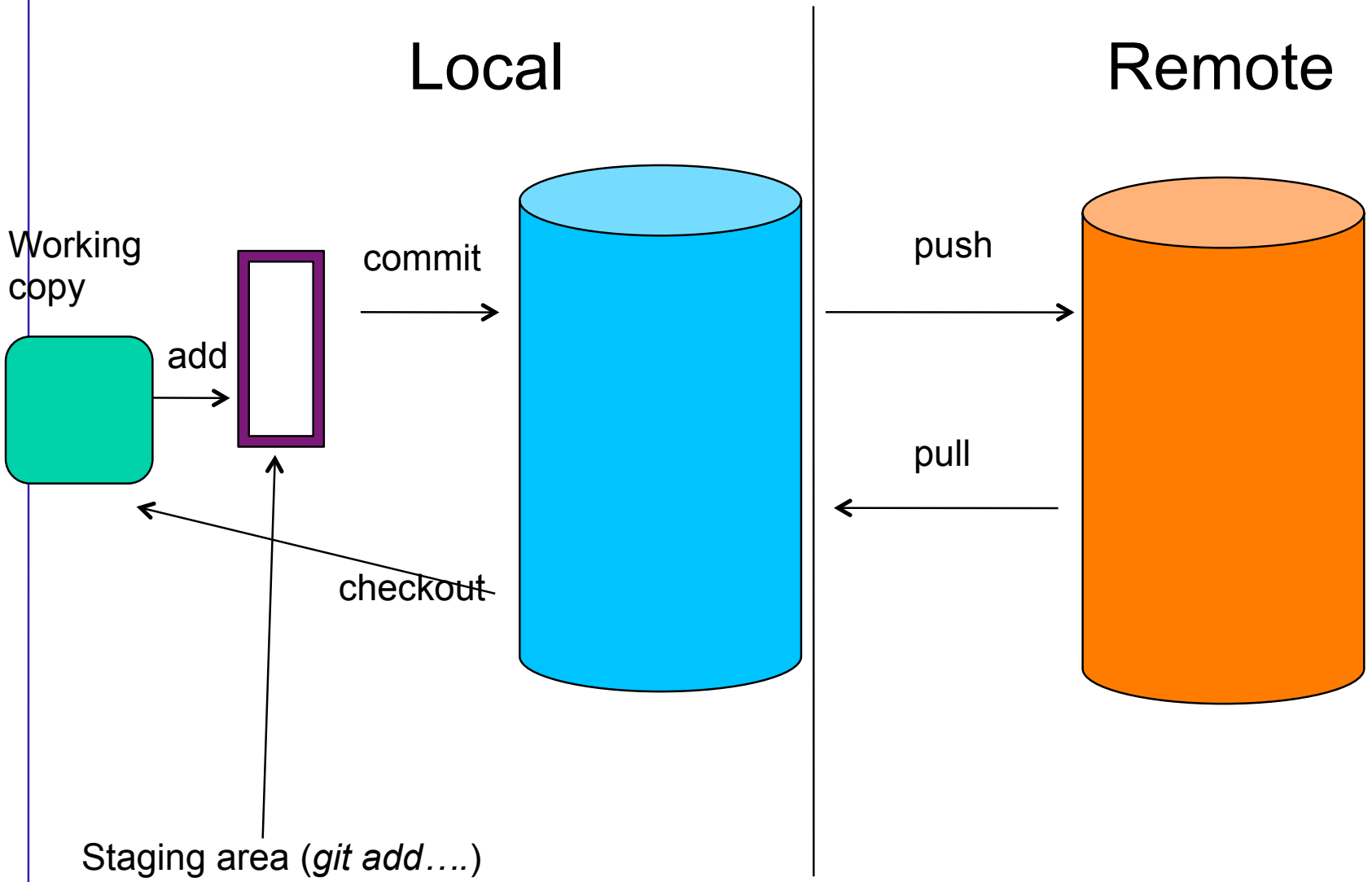

Commits

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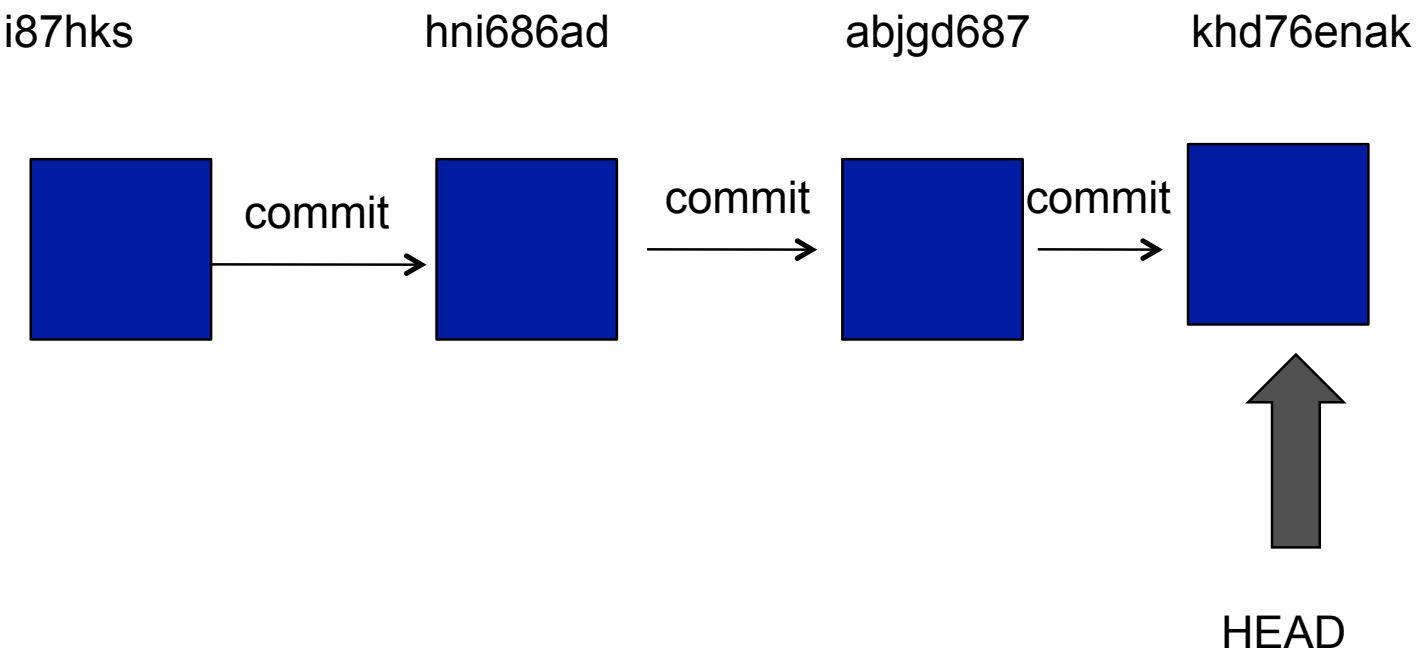
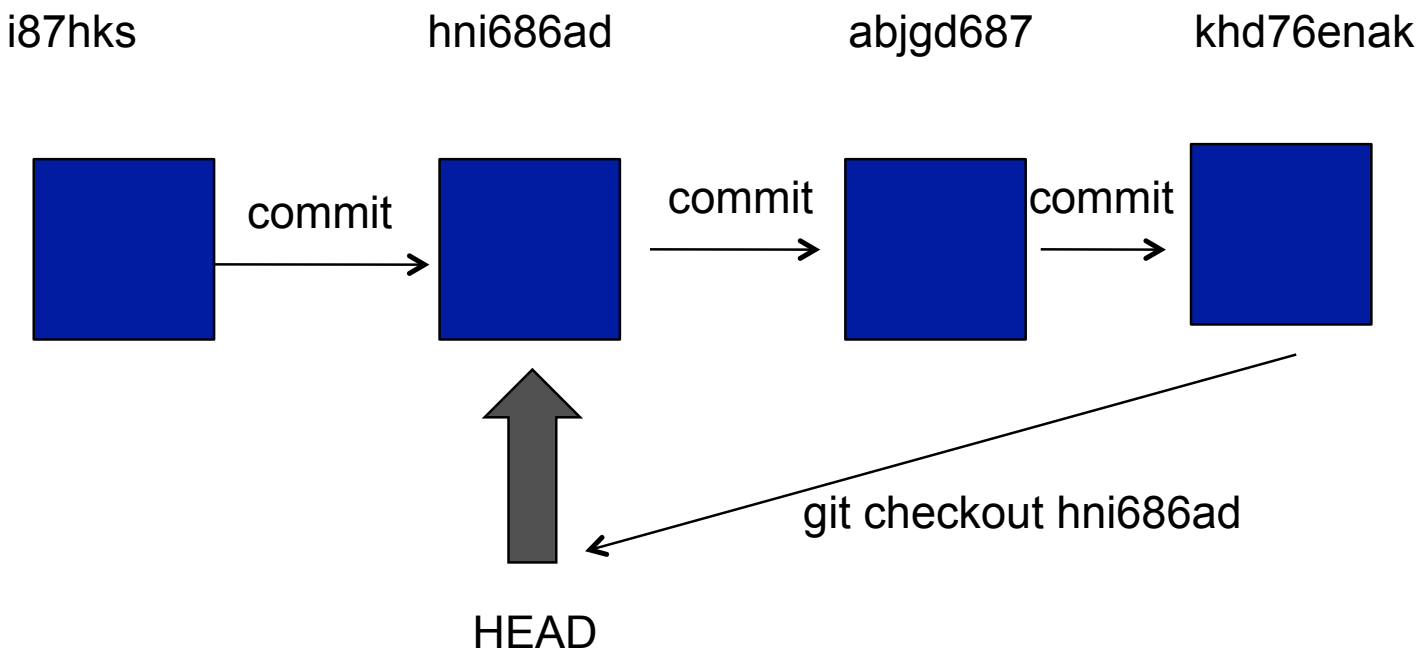


Commits - checkouts



Branching

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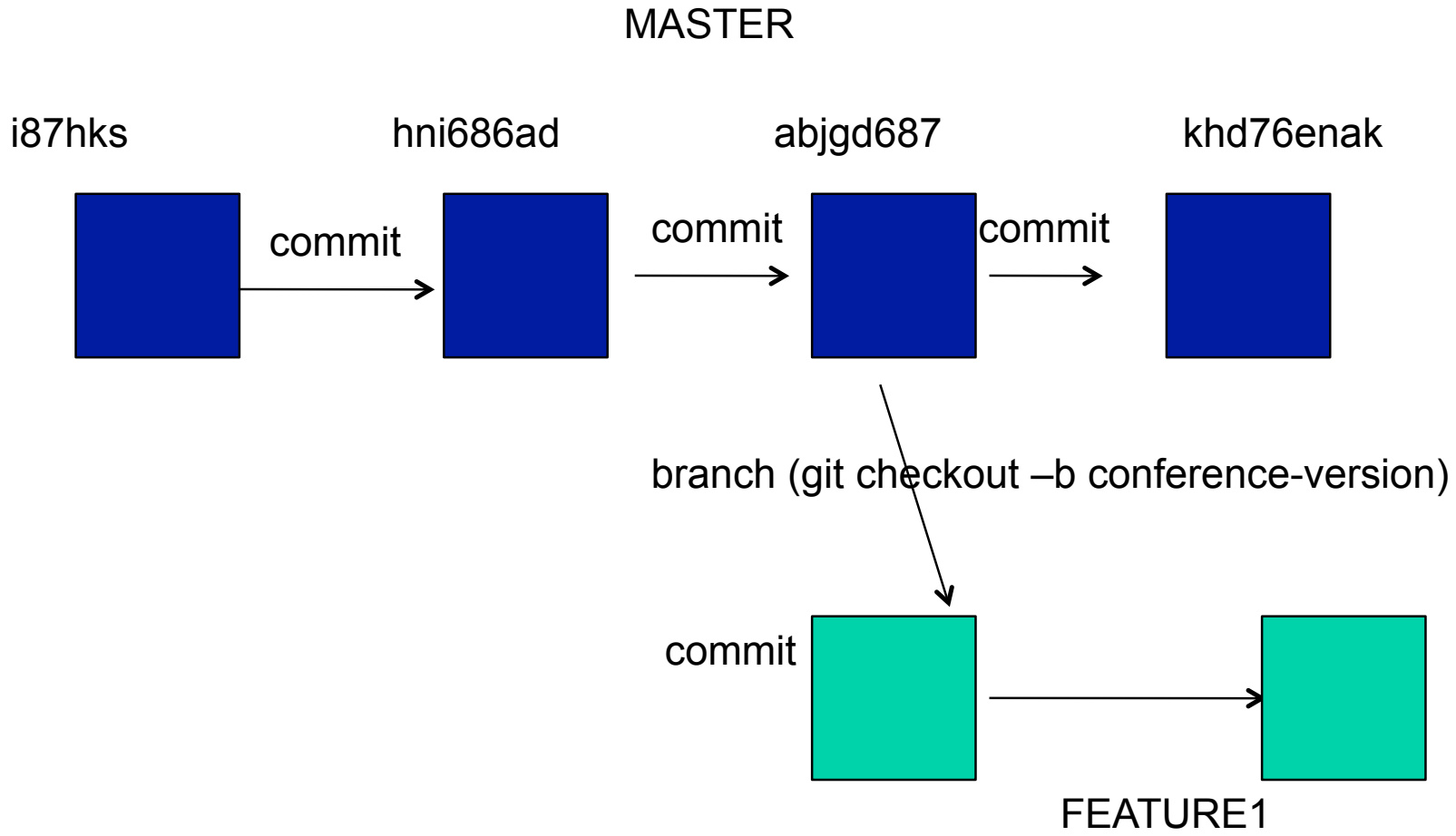

Merging a branch

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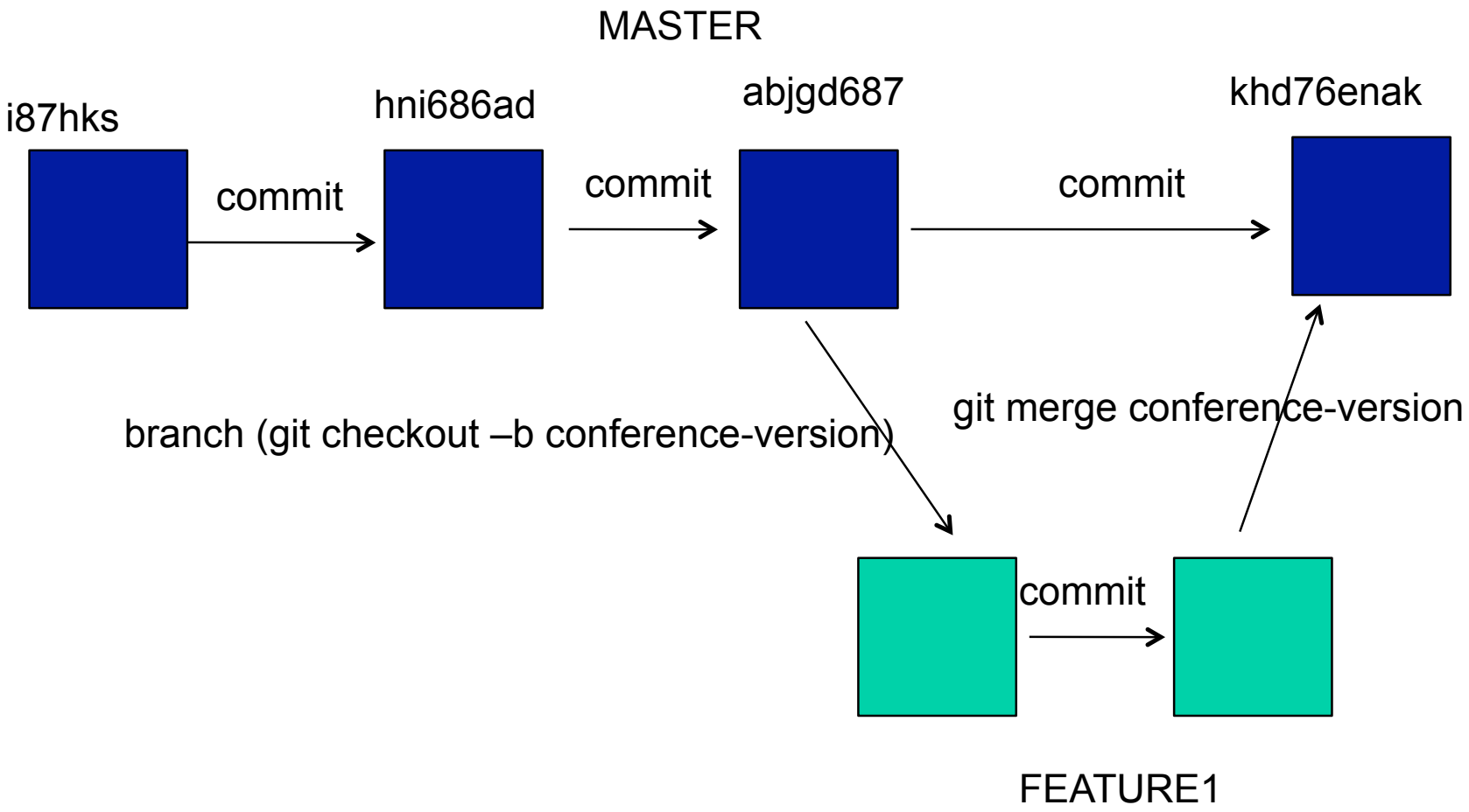

Working with remote repository

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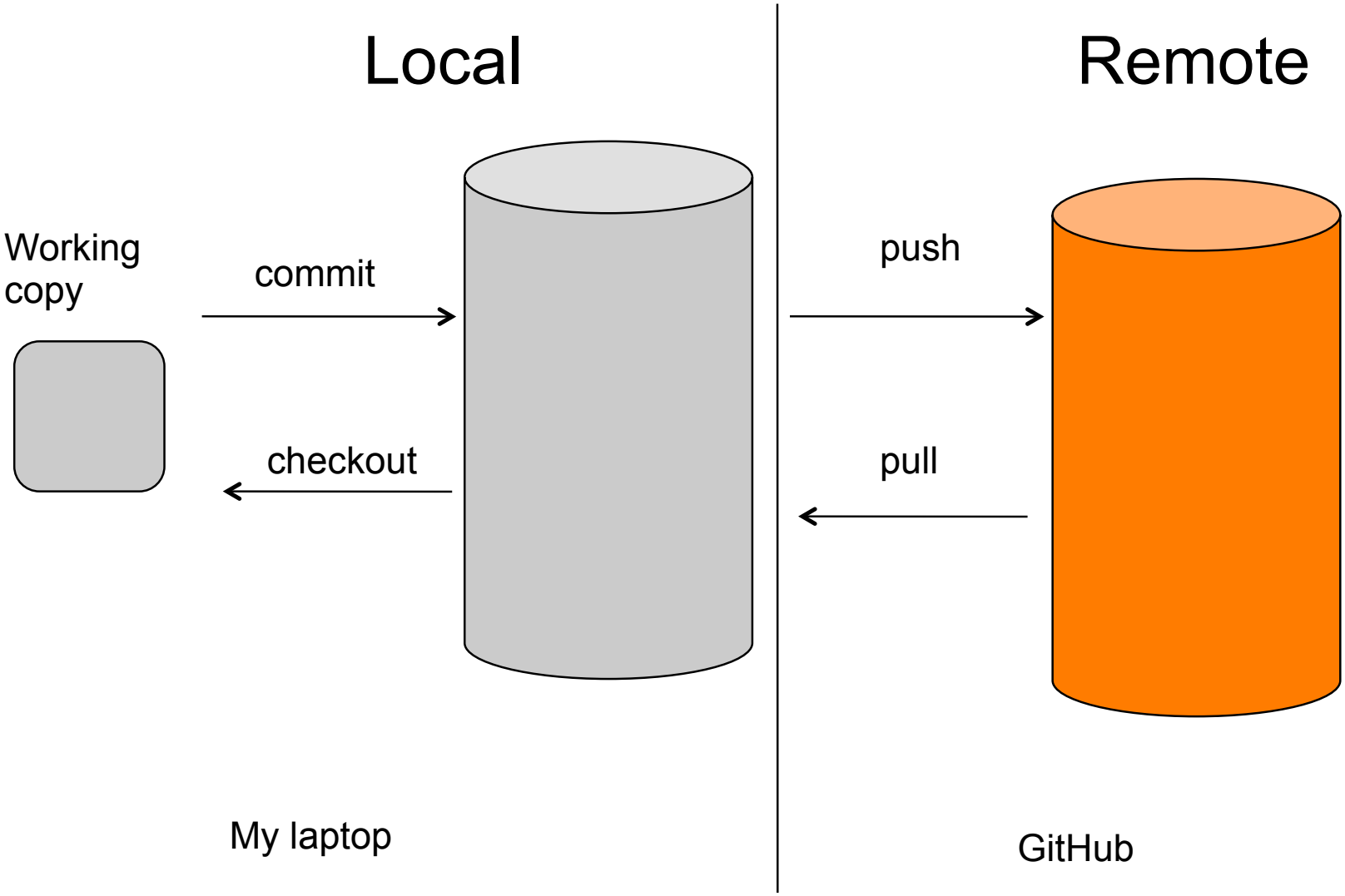

Working with remote repository

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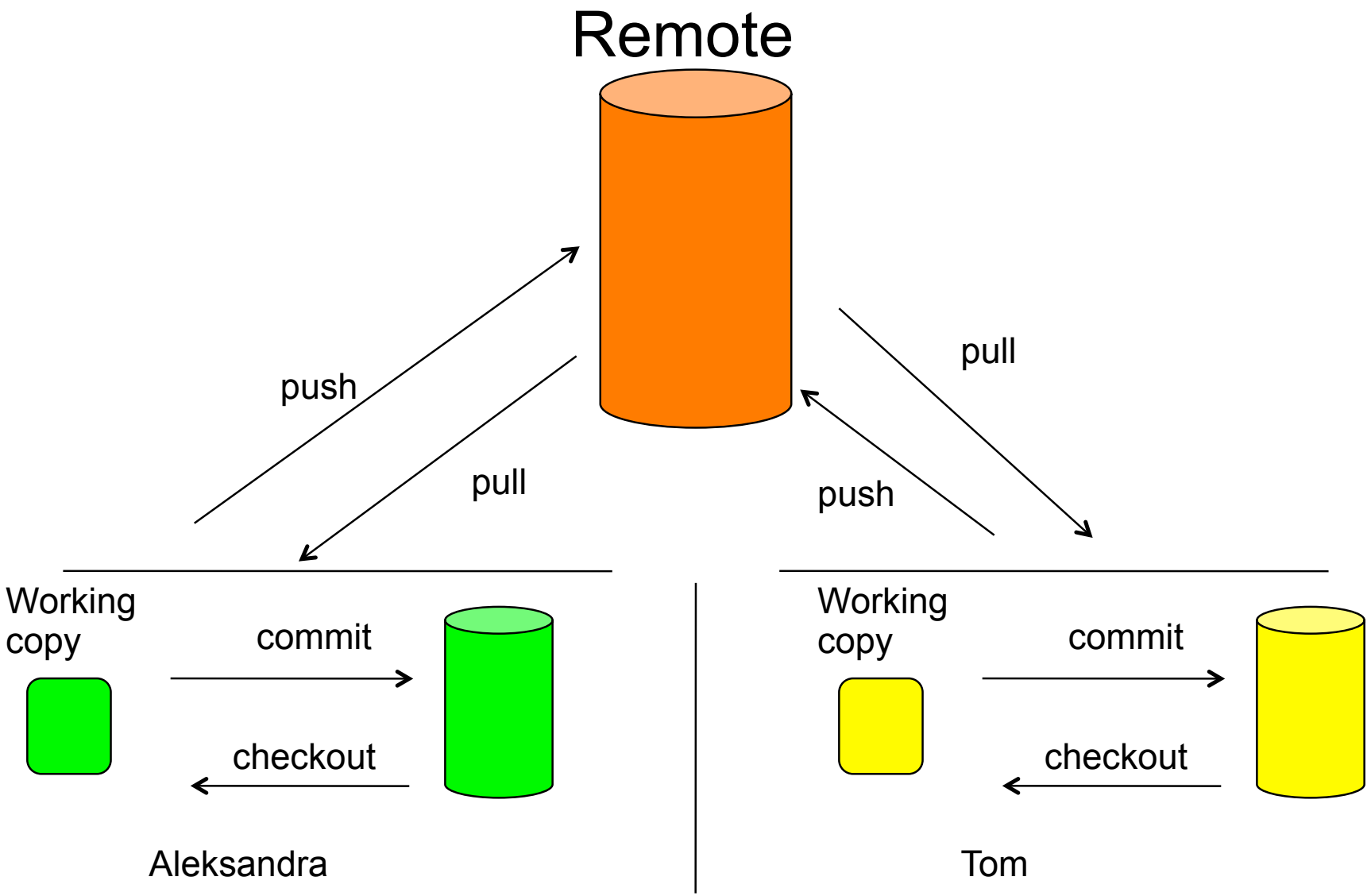

Workflows and best practices

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- Thinking about joining and contributing to project that uses a version control?
- Check their workflow and recommended practice (for example, each new feature in a new branch).
- If in doubt, ask questions!