

# Introduction to version control with Git

INTRODUCTION TO GIT



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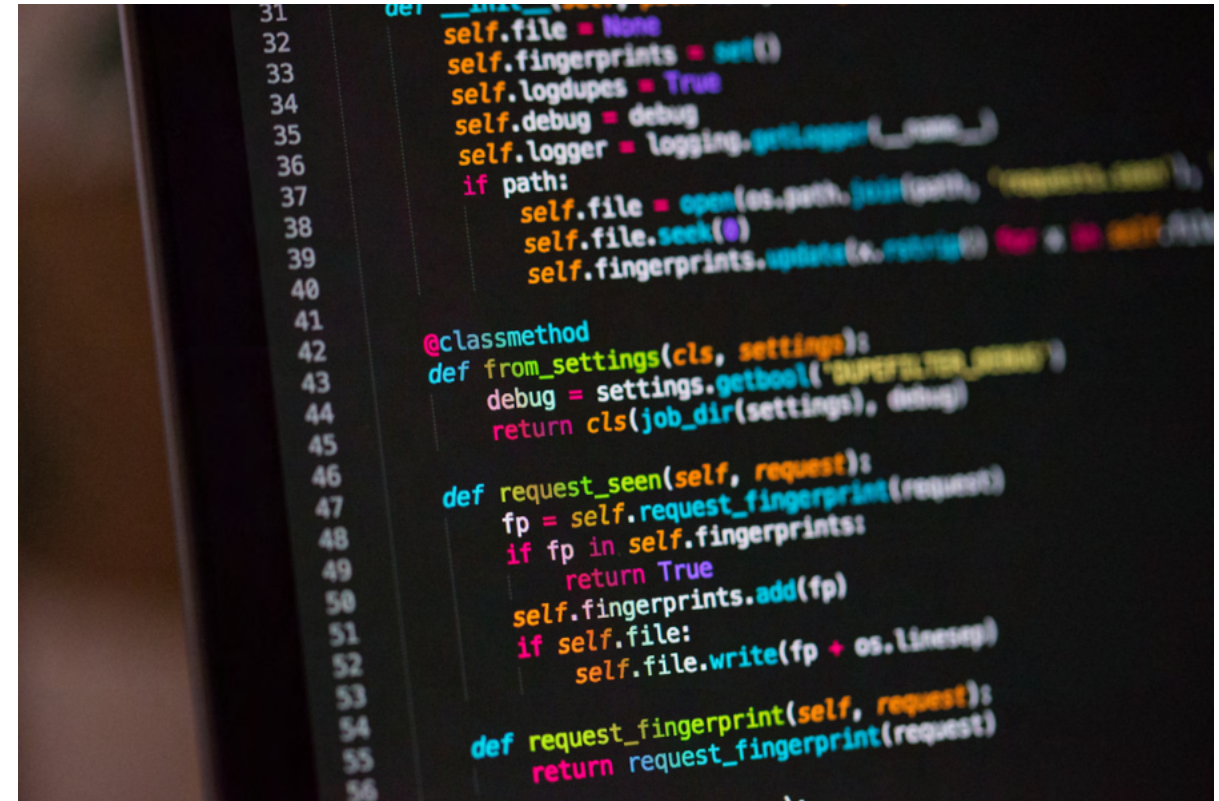
# What is a version?

1. Contents of a file at a given point in time
2. Metadata (information associated with the file):
  - The author of the file
  - Where it is located
  - The file type
  - When it was last saved



# What is version control?

- Version control is a group of systems and processes
  - to manage changes made to documents, programs, and directories
- Version control is useful for anything that:
  - changes over time, or
  - needs to be shared



```
31 def __init__(self, settings):
32     self.file = None
33     self.fingerprints = set()
34     self.logdupes = True
35     self.debug = debug
36     self.logger = logging.getLogger(__name__)
37     if path:
38         self.file = open(os.path.join(path, 'requests.log'),
39                         'a')
40         self.file.seek(0)
41         self.fingerprints.update(self._get_fingerprints())
42
43 @classmethod
44 def from_settings(cls, settings):
45     debug = settings.getbool('DEBUG', False)
46     return cls(job_dir(settings), debug)
47
48 def request_seen(self, request):
49     fp = self.request_fingerprint(request)
50     if fp in self.fingerprints:
51         return True
52     self.fingerprints.add(fp)
53     if self.file:
54         self.file.write(fp + os.linesep)
55
56 def request_fingerprint(self, request):
57     return request_fingerprint(request)
```

<sup>1</sup> Image credit: <https://unsplash.com/@cdr6934>

# What is version control?

- Track files in different states
- Simultaneous file development (Continuous Development)
- Combine different versions of files
- Identify a particular version
- Revert changes

# Why is version control important?

finance\_data.csv

finance\_data\_clean.csv

finance\_data\_v2.csv

finance\_report.ppt

finance\_report\_v2.ppt

finance\_report\_modified.ppt



# Why is version control important?



<sup>1</sup> Image credit: <https://unsplash.com/@mvdheuvel>

# Git

- Popular version control system for software development and data projects
  - Open source
  - Scalable
- 
- Git is not GitHub, but
    - it's common to use Git with GitHub





# Benefits of Git

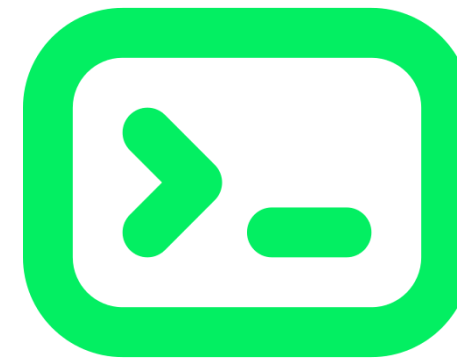
- Git stores everything, so nothing is lost
- Git notifies us when there is conflicting content in files
- Git synchronizes across different people and computers





# Using Git

- Git commands are run on the **shell**, also known as the *terminal*
- The shell:
  - is a program for executing commands
  - can be used to easily preview, modify, or inspect files and directories
- Directory = folder



Documents



Mental Health in  
Tech Project

# Useful shell commands

```
pwd
```

```
/home/rep1/Documents
```

```
ls
```

```
archive    finance.csv  finance_data_clean.csv  finance_data_modified.csv
```

# Changing directory

```
cd archive
```

```
pwd
```

```
/home/repl/Documents/archive
```



# Editing a file

```
nano finance.csv
```

- Use `nano` to:
  - delete,
  - add,
  - or change contents of a file
- Save changes: `Ctrl + O`
- Exit the text editor: `Ctrl + X`

# Editing a file

- `echo` —create or edit a file
- Create a new file `todo.txt`

```
echo "Review for duplicate records" > todo.txt
```

- Add content to existing file `todo.txt`

```
echo "Review for duplicate records" >> todo.txt
```

# Checking Git version

```
git --version
```

```
git version 2.17.1
```



# Let's practice!

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# Saving files

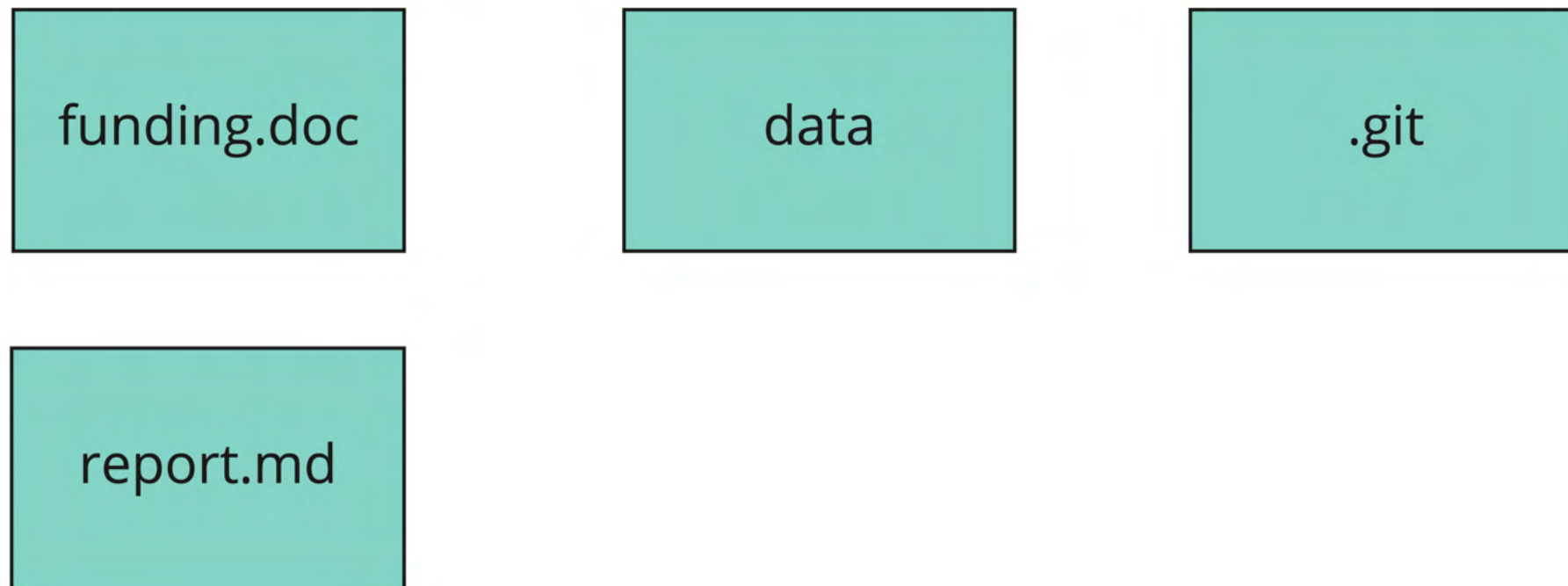
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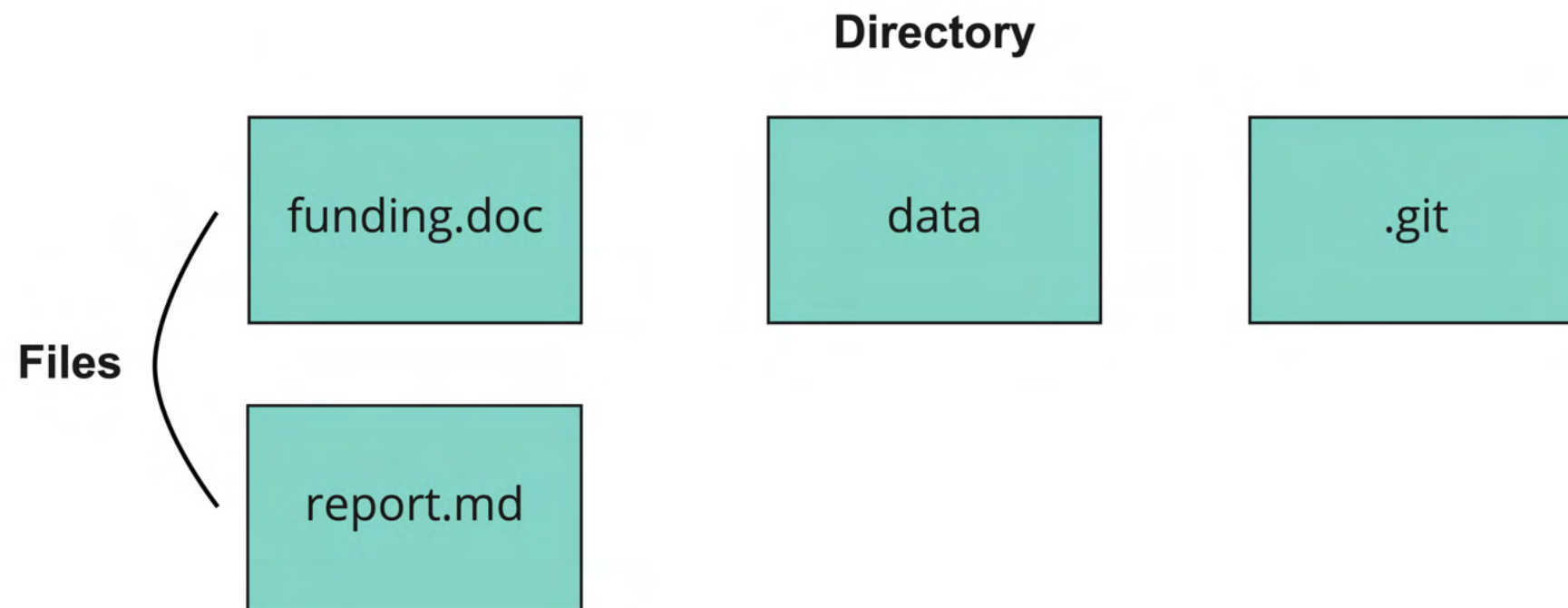
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# A repository

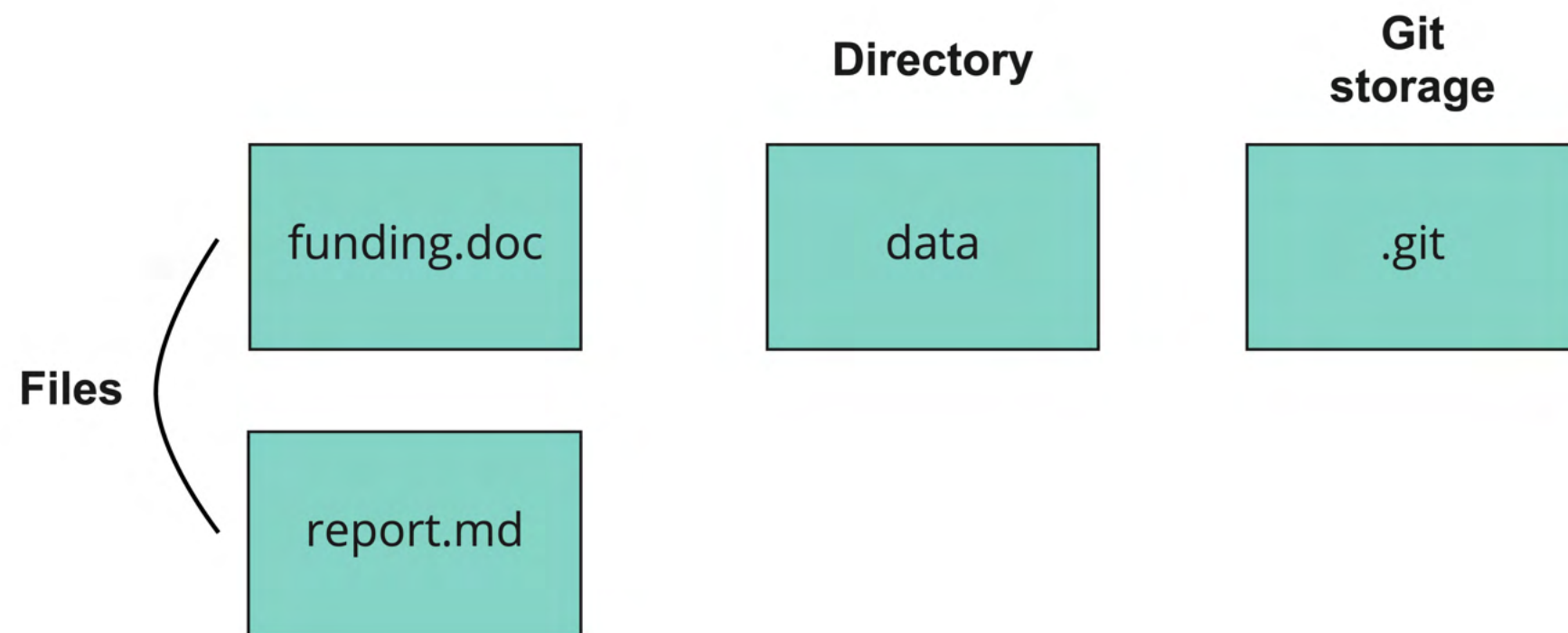




# A repository



# A repository



Do not edit `.git` !

# Staging and committing

- Saving a draft
  - Staging area
- Save files/update the repo
  - Commit changes

<sup>1</sup> Image credits: <https://unsplash.com/@brandomakesbranding>; <https://unsplash.com/@almapapi>



# Staging and committing

## Staging area



## Making a commit



# Accessing the .git directory

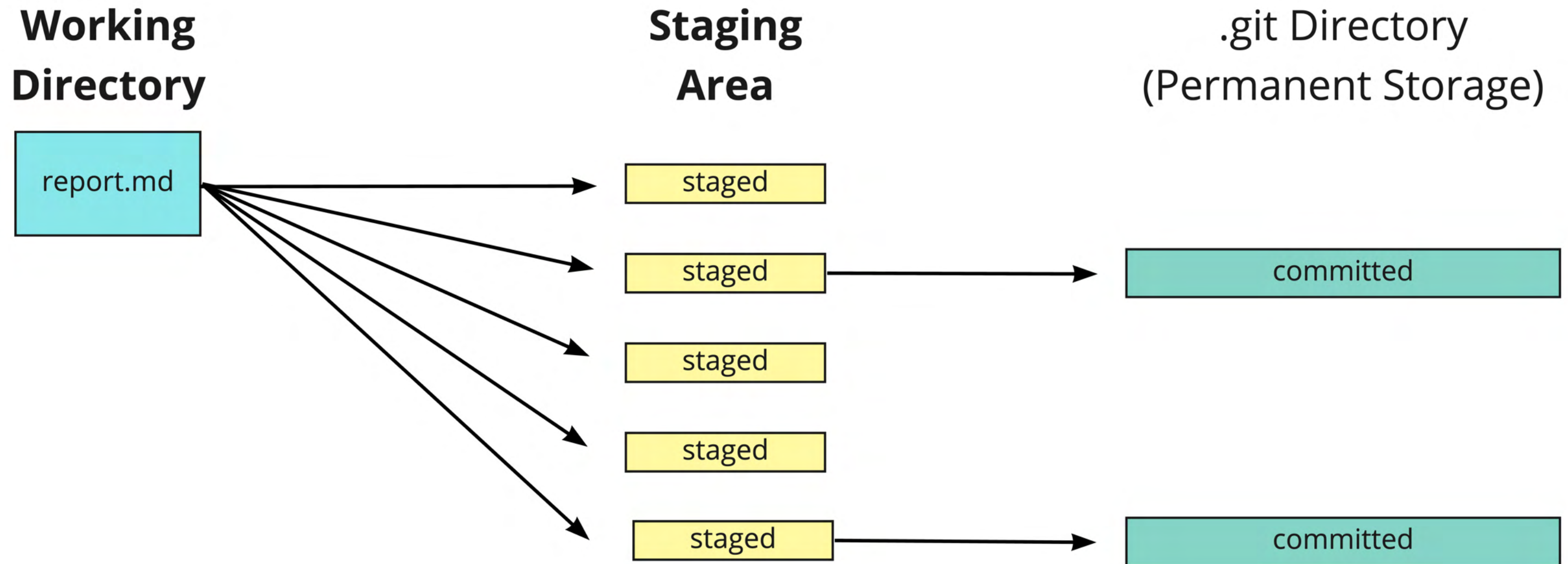
```
ls
```

```
data  report.md
```

```
ls -a
```

```
.      .DS_Store  data  
..     .git      report.md
```

# Making changes to files



# Git workflow

- Modify a file
- Save the draft
- Commit the updated file
- Repeat



# Modifying a file

```
nano report.md
```

```
# Mental Health in Tech Survey  
TODO: write executive summary.  
TODO: include link to raw data.
```

Save using `Ctrl + O` and `Ctrl + X`

# Saving a file

- Adding a single file

```
git add report.md
```

- Adding all modified files

```
git add .
```

- `.` = all files and directories in current location

# Making a commit

```
git commit -m "Updating TODO list in report.md"
```

- Log message is useful for reference
- Best practice = short and concise

# Check the status of files

```
git status
```

```
on branch main  
Changes to be committed:  
(use "git restore --staged <file>..." to unstage)  
modified: report.md
```

```
git commit -m "New TODO in report.md"
```

# Let's practice!

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# Comparing files

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# Why compare files?



<sup>1</sup> Image credit: <https://unsplash.com/@mluotio83>



# Comparing a single file

```
nano report.md
```

```
# Mental Health in Tech Survey  
TODO: write executive summary.  
TODO: include link to raw data.  
TODO: █
```

# Updating the file

```
git add .
```

```
git commit -m "Adding tasks for references and summary statistics in report.md"
```

# Updating the file again

```
nano report.md
```

```
# Mental Health in Tech Survey  
TODO: include link to raw data.  
TODO: add references.  
TODO: add summary statistics.  
TODO: cite funding sources.
```

```
git diff report.md
```

# Comparing an unstaged file with the last commit

```
diff --git a/report.md b/report.md
index 6218b4e..066f447 100644
--- a/report.md
+++ b/report.md
@@ -1,5 +1,5 @@
 # Mental Health in Tech Survey
 -TODO: write executive summary.
  TODO: include link to raw data.
  TODO: add references.
  TODO: add summary statistics.
 +TODO: cite funding sources.
```

# Comparing an unstaged file with the last commit

## Line changes

```
diff --git a/report.md b/report.md
index 6218b4e..066f447 100644
--- a/report.md
+++ b/report.md
@@ -1,5 +1,5 @@
 # Mental Health in Tech Survey
-TODO: write executive summary.
+TODO: cite funding sources.
 TODO: include link to raw data.
 TODO: add references.
 TODO: add summary statistics.
```



# Comparing an unstaged file with the last commit

Line changes

Removed lines

```
diff --git a/report.md b/report.md
index 6218b4e..066f447 100644
--- a/report.md
+++ b/report.md
@@ -1,5 +1,5 @@
 # Mental Health in Tech Survey
-TODO: write executive summary.
  TODO: include link to raw data.
  TODO: add references.
  TODO: add summary statistics.
+TODO: cite funding sources.
```

# Comparing an unstaged file with the last commit

Line changes →

Removed lines →

Added lines →

```
diff --git a/report.md b/report.md
index 6218b4e..066f447 100644
--- a/report.md
+++ b/report.md
@@ -1,5 +1,5 @@
 # Mental Health in Tech Survey
-TODO: write executive summary.
  TODO: include link to raw data.
  TODO: add references.
  TODO: add summary statistics.
+TODO: cite funding sources.
```

# Comparing a staged file with the last commit

```
git add report.md
```

```
git diff -r HEAD report.md
```

- `git diff -r` won't work if it isn't followed by `HEAD`

# Comparing a staged file with the last commit

```
diff --git a/report.md b/report.md
index 6218b4e..066f447 100644
--- a/report.md
+++ b/report.md
@@ -1,5 +1,5 @@
  # Mental Health in Tech Survey
-TODO: write executive summary.
  TODO: include link to raw data.
  TODO: add references.
  TODO: add summary statistics.
+TODO: cite funding sources.
```

# Comparing multiple staged files with the last commit

```
cd data
```

```
nano mh_tech_survey.csv
```

```
git add mh_tech_survey.csv
```

# Comparing multiple staged files with the last commit

```
git diff -r HEAD
```

```
diff --git a/mh_tech_survey.csv b/mh_tech_survey.csv
index 4208ed3..d758efb 100644
--- a/mh_tech_survey.csv
+++ b/mh_tech_survey.csv
@@ -47,3 +47,4 @@ age,gender,family_history,treatment,work_interfere,
ntal_health_interv
 28,M,No,Yes,Rarely,Yes,No,Yes
 29,F,No,Yes,Rarely,Don't know,No,Don't know
 23,M,Yes,No,Sometimes,No,No,No
+37,F,No,No,Rarely,Don't know,No,No
diff --git a/report.md b/report.md
index 6218b4e..066f447 100644
--- a/report.md
+++ b/report.md
@@ -1,5 +1,5 @@
 # Mental Health in Tech Survey
-TODO: write executive summary.
+TODO: cite funding sources.
 TODO: include link to raw data.
 TODO: add references.
 TODO: add summary statistics.
```

# Recap

- Compare an unstaged file with the last committed version:
  - `git diff filename`
- Compare a staged file with the last committed version:
  - `git diff -r HEAD filename`
- Compare all staged files with the last committed versions:
  - `git diff -r HEAD`



# Let's practice!

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