

# Introduction to Git and GitHub

## Version Control Workshop

- **Goal:** Learn the basics of version control with Git and GitHub and how it's used in software development everyday.

# What is Version Control?

## Why Version Control?

- Keeps track of code changes over time
- Allows collaboration on projects
- Protects against data loss and accidental overwrites

## Key Terms

- **Repository:** A project's storage location
- **Commit:** A saved change in the project
- **Branch:** An independent line of development

# The alternative

Why can't I just directly edit my own files and share them to whoever?

*Says the non-git user.*

Many issues:

- No way to track individual changes to each file
- Can't identify who made each change
- No way to review code changes

# Git and GitHub

## What is Git?

- **Git** is a distributed version control system
- Tracks changes and allows for reverting to previous versions

## What is GitHub?

- **GitHub** is a hosting platform for Git repositories
- Facilitates collaboration with features like pull requests and issues

# Setup

1. Download Git: <https://git-scm.com/downloads>
2. Download GitHub Desktop: <https://desktop.github.com/download/>
3. Create a GitHub Account: <https://github.com/signup>

# Git Setup

## Initialize a Git Repository

1. **Navigate to your project folder** in the terminal
2. Run `git init` to create a new Git repository

```
$ git init
```

- Creates a `.git` folder to track changes

# Tracking Changes

## Key Commands

- `git status` – See the current status of the repo
- `git add <file>` – Stage changes for a commit
- `git commit -m "message"` – Save staged changes with a message

# Committing Changes

## Making a Commit

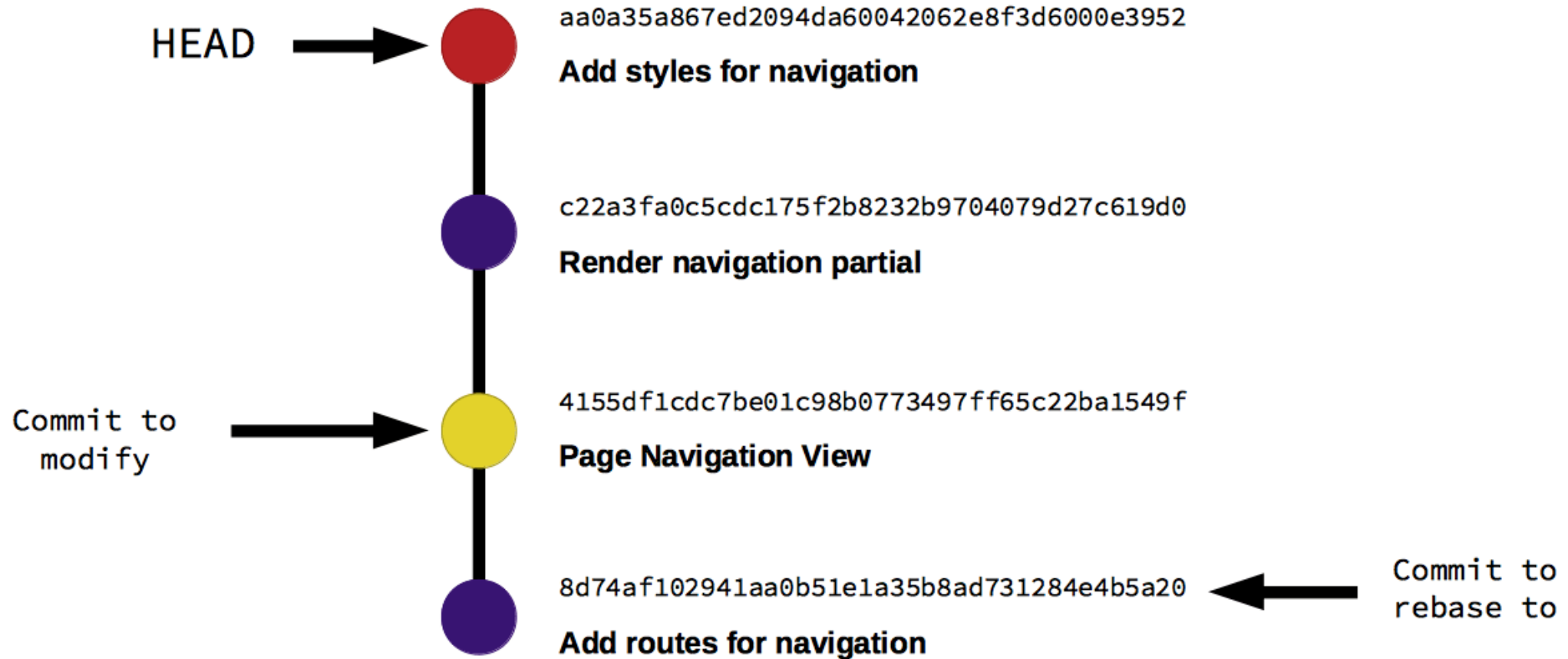
1. **Stage** your changes with `git add <file>`
2. **Commit** with a message describing the changes

```
$ git add .  
$ git commit -m "Initial commit"
```

- A **commit** saves your work at that point in time



# Visualizing Commit History



# Branching

## Why Branch?

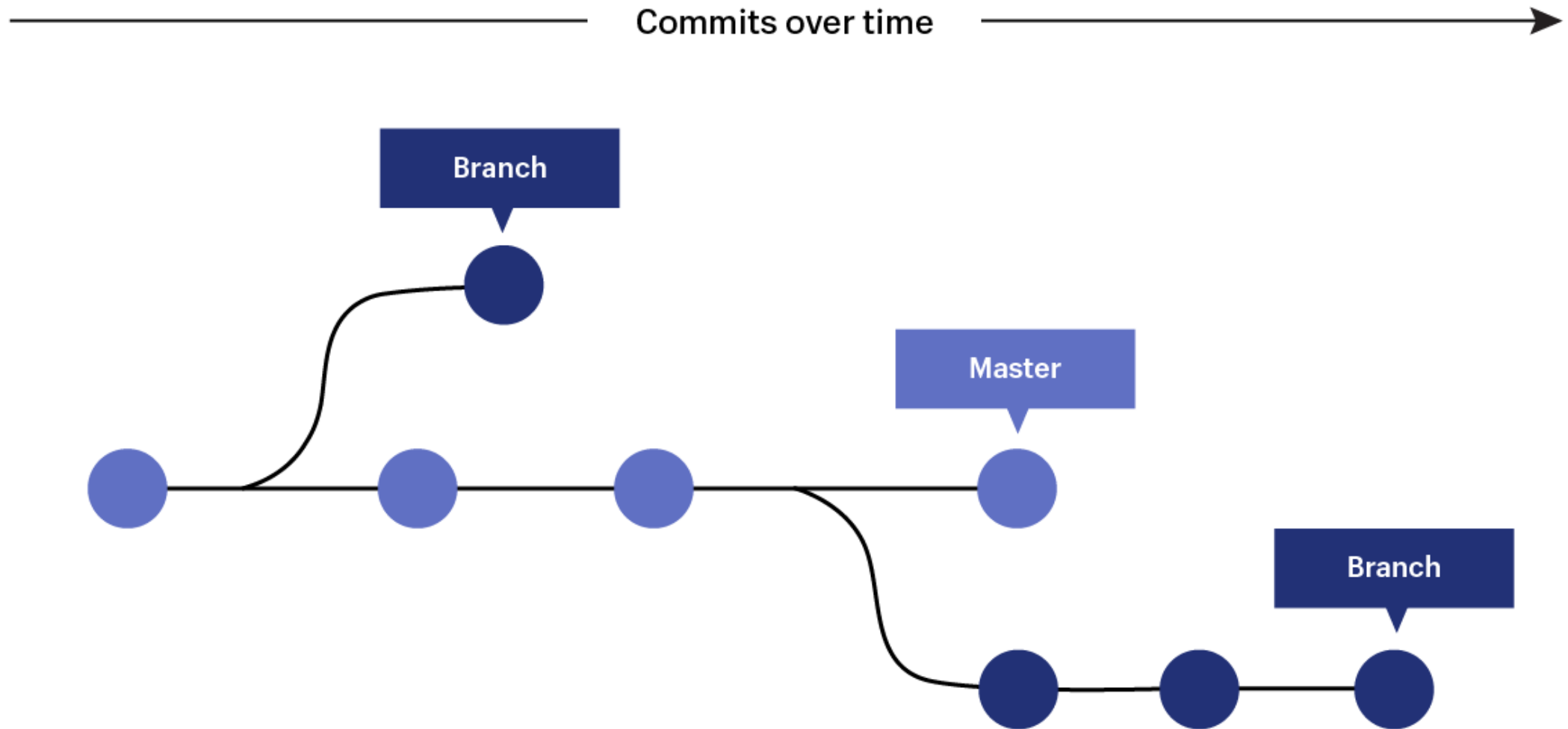
- Branching allows for experimentation without affecting the main code
- Common to create branches for new features or bug fixes

## Create a Branch

```
$ git branch <branch-name>  
$ git checkout <branch-name>
```

- Creates an isolated working environment

# Visualizing Branching



# Merging


## Merging Branches

- Use `git merge` to integrate changes from one branch into another
- **Example:** Merge a feature branch into the main branch

```
$ git checkout main  
$ git merge <branch-name>
```

- **Resolve conflicts** if Git cannot automatically combine changes

# An Example



A vertical line on the left side of the table represents the commit history. It features a blue line for the main branch, a green line for a feature branch, and a pink line for another branch. Colored dots (blue, green, pink) are placed along these lines to indicate the commit history for each branch. The lines and dots show the branching strategy used for the development of the chat app, including merges and feature branches.

origin/firebase added docs for chat app	4 Mar 2023 18:36	Zavaar Shah	7bb0b789
Merge pull request #8 from WSU-Society-of-Co...	4 Mar 2023 18:31	Zavaar Shah	e2e9e590
finished chat-app	4 Mar 2023 18:29	Zavaar Shah	faa9d197
install cmd	4 Mar 2023 17:57	Zavaar Shah	e8d12e38
Merge pull request #7 from WSU-Society-of-Co...	3 Mar 2023 16:47	Zavaar Shah	465527be
readme change	3 Mar 2023 16:45	Zavaar Shah	73fd8749
finished TODO dom app	3 Mar 2023 16:33	Zavaar Shah	f55029a9
Form validation	3 Mar 2023 14:12	Zavaar Shah	e01d1dfc
Accessing/Manipulating DOM	3 Mar 2023 13:35	Zavaar Shah	38ecc412
Merge pull request #6 from WSU-Society-of-Co...	3 Mar 2023 02:07	Zavaar Shah	37956ad0
Merge pull request #5 from WSU-Society-of-Co...	3 Mar 2023 01:53	Zavaar Shah	aecde34e
added another preview	3 Mar 2023 01:46	Zavaar Shah	74074f0e
finished todo app	2 Mar 2023 22:09	Zavaar Shah	241cb009
Create and read completed for todos app	2 Mar 2023 21:55	Zavaar Shah	bf960110
todos start	2 Mar 2023 01:34	Zavaar Shah	62acde01
dom init commit	26 Feb 2023 20:16	Zavaar Shah	4a3f7d96
firebase initial commit	24 Feb 2023 13:00	Zavaar Shah	674f5edb
Merge pull request #4 from WSU-Society-of-Co...	28 Nov 2022 21:39	Zavaar Shah	d005a3bf

# Connecting to GitHub

## Adding a Remote Repository

1. Create a repository on GitHub
2. Link it to your local repo

```
$ git remote add origin <url>
```

- `origin` is the default name for the remote repo

## Push Changes to GitHub

```
$ git push -u origin main
```

# Collaboration on GitHub

## Forking and Pull Requests

- **Fork:** Copy a repository to your GitHub account
- **Pull Request:** Request to merge your changes into the main repository

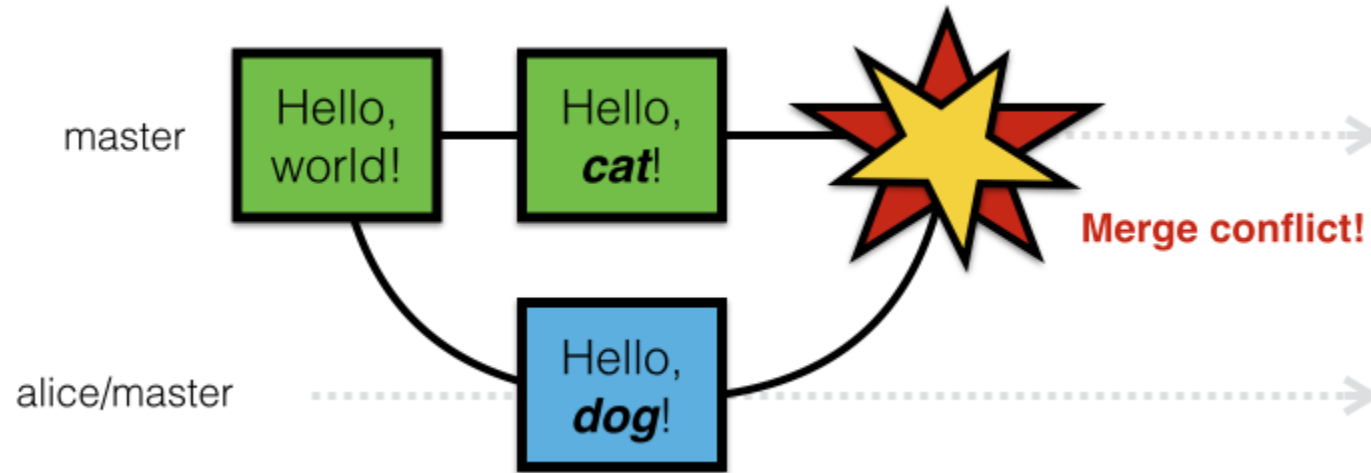
## Steps to Contribute

1. Fork the repository
2. Make changes in your fork
3. Open a pull request to suggest changes

# Resolving Merge Conflicts

## What are Merge Conflicts?

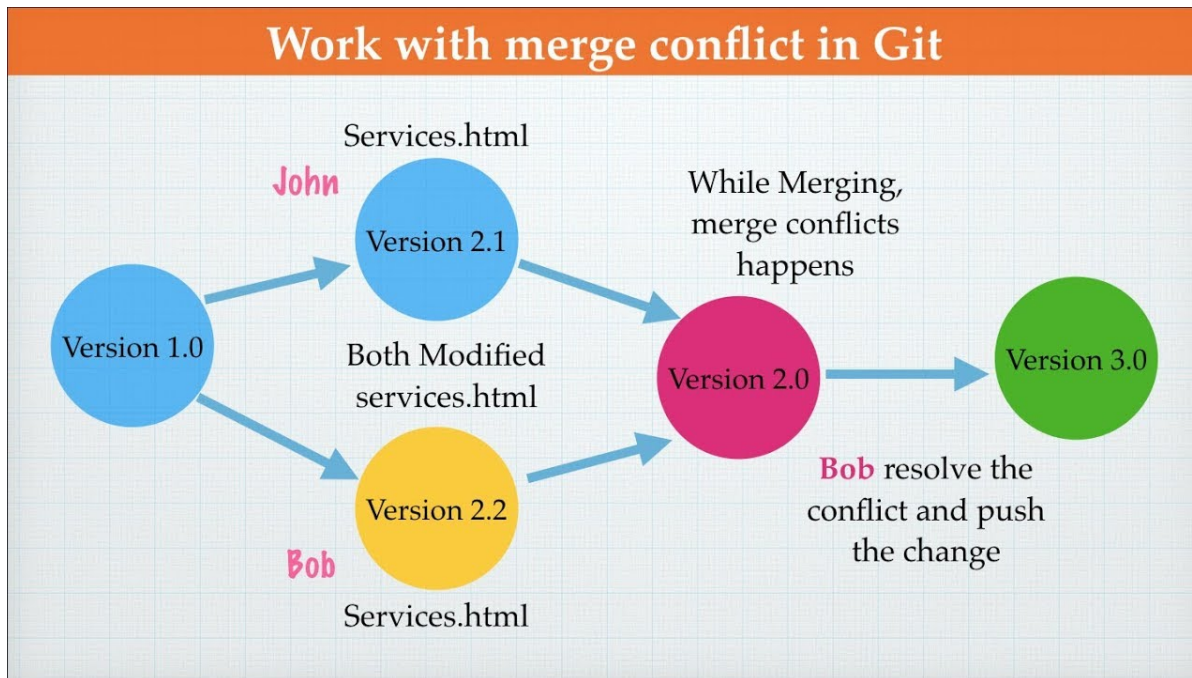
- Occur when two branches have conflicting changes
- Git will highlight conflicting files





# Resolving Conflicts

1. Open the conflicted files
2. Edit to combine or reject the changes
3. Commit the resolved changes



# Summary

## Key Takeaways

- **Git** helps track changes in your code
- **GitHub** enables collaboration and version control
- **Commit often**, and use branches for safe experimentation

# Q&A

## Questions?

- Thank you for attending!
- Additional resources:
  - Git Documentation: <https://git-scm.com/doc>
  - GitHub Docs: <https://docs.github.com/en>
  - Connect with me on [LinkedIn](#)