Advanced git techniques

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For with Git nothing shall be impossible.
- Luke 1:37

DLR

Intro

In this talk I present some advanced techniques of git that I learned during my years working with git.

I am an (expert) git **user**, I am **not** a **git expert –** so don´t expect me to know everything.

I will show you specific use cases, not detailed instructions.

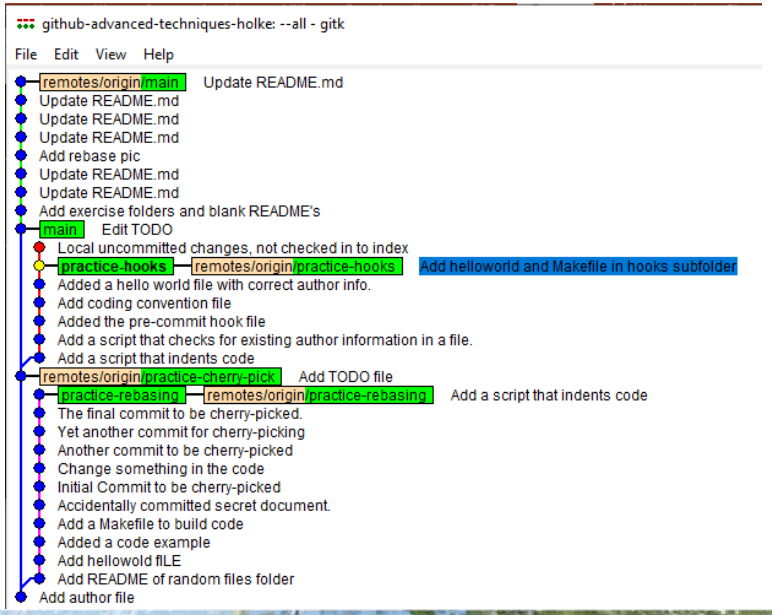
What you need

To repeat the exercises:

1. **Fork** the repository https://www.github.com/holke/git-advanced-workshop
2. Clone your fork
3. Follow the exercises/*/README.md

Terminal:

gitk:



Content

- Cherry-picking (mild warmup)
- Interactive rebase (rewrite history)
- Reflog (you can´t mess up)
- Hooks (automation 1)
- Filters (automation 2)
- Additional worktrees
- Bisect

Cherry-picking

Apply commits from other branches without merging the whole branch.

Remember:

```
git cherry-pick <commit>

git cherry-pick <commitA>^..<commitB>
```

Interactive rebase

Rewrite your history. Unleash the full power of git.

Remember:

```
git rebase -i HEAD~N
```

Workflow to edit a commit:

1. git reset --soft HEAD~
2. EDIT COMMIT
3. git commit -c ORIG_HEAD

Reflog

Remember:

git reflog

Hooks

A hook is a script that is automatically executed during a git action (commit, push, etc.).
A hook can decide whether to abort this action.

Enforce coding conventions
Deny commits that do not compile
…

Remember:
.git/hooks/

Useful: for file in `git diff --cached --name-only`

Filter

We have all been here:

```
void merge(int arr[], int l, int m, int r)
{
    int n1 = m - l + 1;
    int n2 = r - m;

    int L[n1], R[n2];

    cout << "No segfault so far...\n"; // debug

    for(int i = 0; i < n1; i++) {
        /* I think it breaks here, but am not sure */
        cout << "Before: " << L[i] << std::endl; // debug
        L[i] = arr[l + i + 1];
        cout << "After: " << L[i] << std::endl;  // debug
    }
    for(int j = 0; j < n2; j++) {
        /* I am debugging this for 3 hours now.
         * God, why j, m, R...?!?!??!???
         * Give your variables useful names, arghhhh!
         */
        R[j] = arr[m + 1 + j];
    }

    cout << "If we reach this without segfault, we should be good\n"; // debug
```

Filter

With filters, we can modify file contents on-the-fly before we commit them or check them out.

Keep your private code bites out of the repo.

- print-debugging
- comments that are not meant for others

clean: modify before git sees it

smudge: modify before i see it (rarely used)

Remember: .git/config

```
[filter "gitignore"]
        clean = exercises/filter/gitignore_filter.scp
        smudge = cat
```

.git/info/attributes

```
*.c  filter=gitignore
*.h  filter=gitignore
*.py filter=gitignore
```

Worktrees

With worktrees we can make additional copies of our working directory.

- No copying of .git files
- git prevents you from working on the same branch twice

Why?

- Code review
- Work on multiple features
- Work on branch A while branch B compiles
- …

Remember:

```
git worktree add  PATH  BRANCH

git worktree prune
```

Bisect

Binary search your history for bad commits.

Remember:

```
git bisect start
git bisect bad
git checkout GOOD_COMMIT
git bisect good
# Mark incoming commits with git bisect good/bad
# git will tell you the first bad commit
git bisect reset
```

Thank you for your attention