Project Management Tips

Christoph Matthies (christoph.matthies@hpi.de)

Software Engineering II
WS 2018/19

Enterprise Platform and Integration Concepts

Agenda

1. **Value-based Software Engineering**
   - Requirements Prioritization
   - Minimum Viable Product
2. Organizing your Project
3. Git Tricks

Value-based Software Engineering

- "Requirements are often analyzed in a value-neutral environment" [1]
  - "Earned value" systems track project cost and schedule, not stakeholder value
  - "separation of concerns": developers only turn requirements into verified code
- 80% of the value is expressed in 20% of the requirements (Pareto principle) [2]
- A value-oriented approach is more appropriate

- How to do that?
  - Identify the system's success-critical stakeholders
  - Obtain their value propositions with respect to the system
  - Estimate / find out value of a requirement to the stakeholders
  - Estimate effort to implement a requirement

[1] Barry Boehm. 2003. *Value-based software engineering: reinventing*. SIGSOFT Software Engineering Notes 28, 2. DOI: 10.1145/638750.638775

[2] Koch, Richard. 1998. *The 80/20 Principle : the Secret of Achieving More with Less*. New York: Doubleday. ISBN 9780385491747.

MoSCoW Prioritization

Reach common understanding with stakeholders on the importance of delivering each requirement

MoSCoW: Must have, Should have, Could have, and Won't have

- Description instead of *high*, *med* and *low*
- Get customers to better understand the impact of setting a priority
- Try to deliver all the *Must haves*, *Should haves* and *Could haves*
- *Should haves* and *Could haves* will be removed first if plan for delivery is threatened

Dai Clegg, Richard Barker. 1994. *Case Method Fast-Track: A RAD Approach*. Addison-Wesley. ISBN 978-0-201-62432-8.

MoSCoW Prioritization

Must have

- Critical for success of delivery
- If only a single *Must have* is missing, project delivery is considered a failure

Could have

- Desirable, but not necessary. Included if time and resources permit
- Could improve customer satisfaction for little development cost

Should have

- Important, but not necessary for delivery in the next iteration
- Can be as critical as *Must haves*, maybe not as time-sensitive or workaround exist

Won't have (this time)

- Lowest-payback items or not appropriate at this time
- Not planned into the schedule for the next delivery. Outside of current scope.
- Either dropped or reconsidered for inclusion in a later timebox

Dai Clegg, Richard Barker. 1994. *Case Method Fast-Track: A RAD Approach*. Addison-Wesley. ISBN 978-0-201-62432-8.

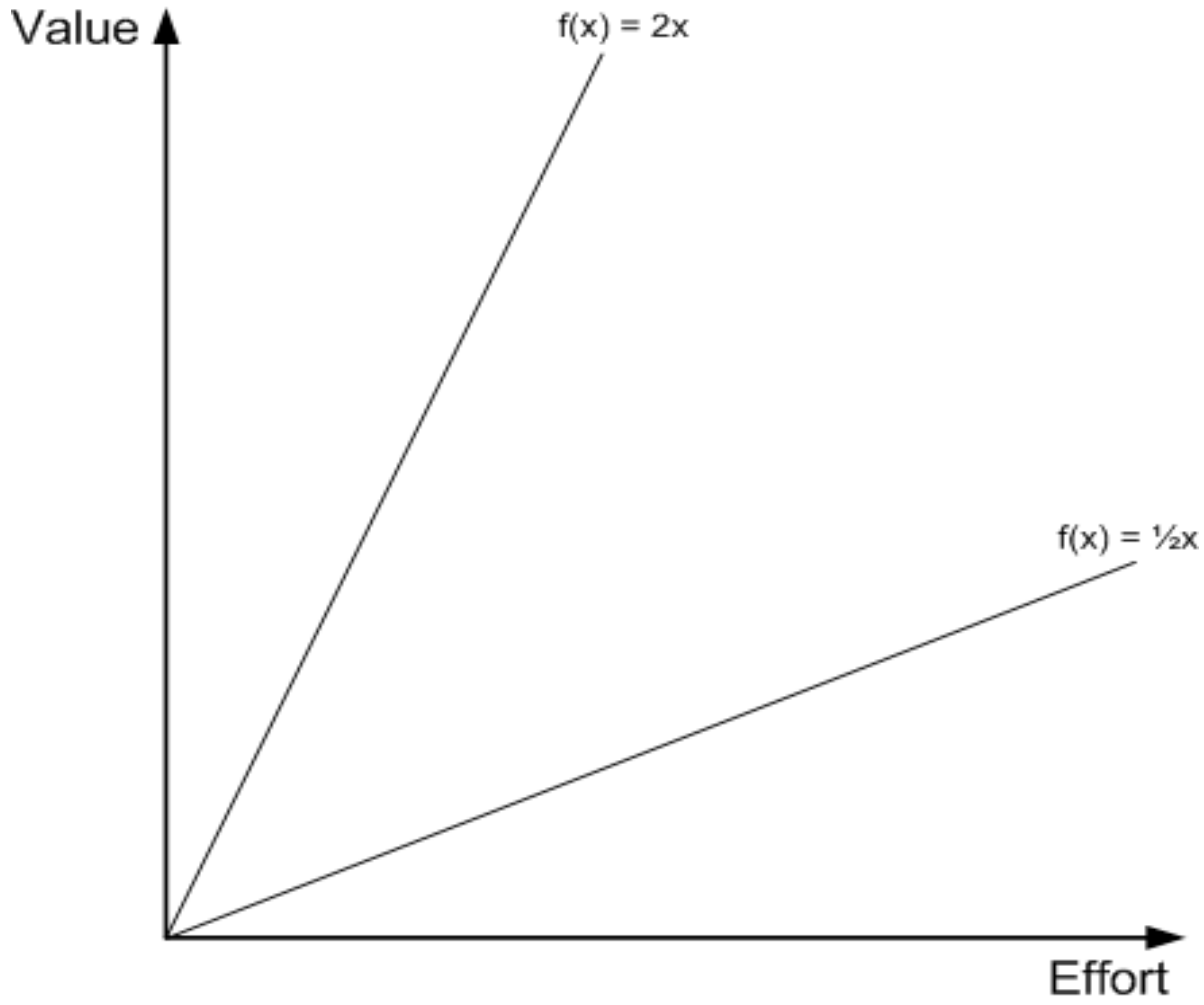
MoSCoW Prioritization

Criticism

- Lack of reason
  - Why is a requirement *Must have* and not *Should have*?
  - Why is this requirement *Won't have?*
- Lack of time information
  - Are *Won't have* requirements not in this delivery or never?
- Dealing with technical debt
  - What priority does refactoring have?
  - What about bux fixes?

Wiegers, Karl; Beatty, Joy (2013). *Software Requirements*. Washington, USA: Microsoft Press. pp. 320–321.

Value-based Requirements Prioritization



Idea

- Plot requirements on the dimensions of value and effort
- Implement: Above 2x
- Skip: Below 1/2x
- In-between: **Review**

Challenges

- Whole truth?
- Beware of dependencies!
- Keep in sync

Value-based Requirements Prioritization

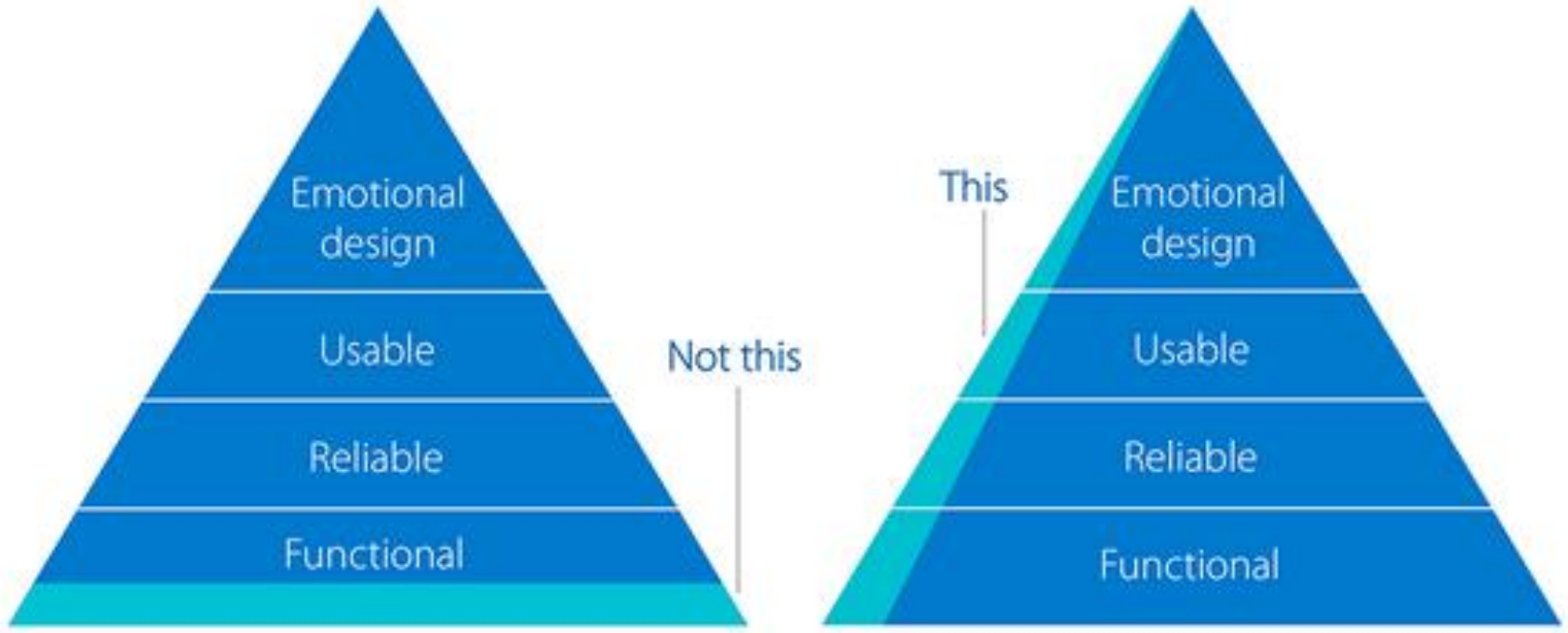
Lean Startup 2x2 Matrix

- Do first: Quick Wins
- Do second: Big Bets
- Think about Maybes
- Try to avoid Time Sinks

Pavel Kukhnavets. 24.04.2018. *Value/Effort Matrix: Lean Prioritization for Product Managers.* https://hygger.io/blog/lean-prioritization-approach-ongoing-pm-issues/

Minimum Viable Product (MVP)

Product with just enough features to satisfy early customers,
and to **provide feedback** for further development.



MVP (Dis-)Advantages

Advantages

- **Early user feedback**
  - Test initial understanding of user needs, test product hypothesis
  - Limited resources spent on MVP
- Move into production early
  - Software is developed for a reason, solve a problem!
  - Generate revenue
  - Entering a market first can be a competitive advantage

Challenges

- Definition of **minimally viable** *(why?)*
  - *Smallest possible* way to *meet the market need* with a *useful output*
  - Requires smart requirements management
- Requires early focus on usability, deployment, support, marketing

MVP Contexts

"Minimum Viable Product" is used in many contexts.
Some possible variants:

- Marketing MVP
  - Product to test the market that is being targeted
  - Check demand assumptions
- Technical Demonstration MVP
  - Prototype or proof-of-concept
  - Explore software designs
  - Prove that it will work using the technology
- "Must-Haves" MVP
  - Product with only "the most important features"
  - Might not be truly minimal in terms of effort
  - *Smaller version of full software? Is the main goal feedback collection?*

Allan Kelly, Allan Kelly Associates, https://techbeacon.com/mvp-broken-its-time-restore-minimum-viable-product

Agenda

1. Value-based Software Engineering
2. **Organizing your Project**
   - Scrum Burn-Down Chart
   - Communication
   - Dealing with Dependencies
   - Estimating Large Backlogs
   - Beyond Scrum
3. Git Tricks
4. Outlook

Organizing your Project

Questions:

- Which stories are part of Sprint#1?
- Who is working on which tasks?
- Which version is a good one that can be shown to the customer?

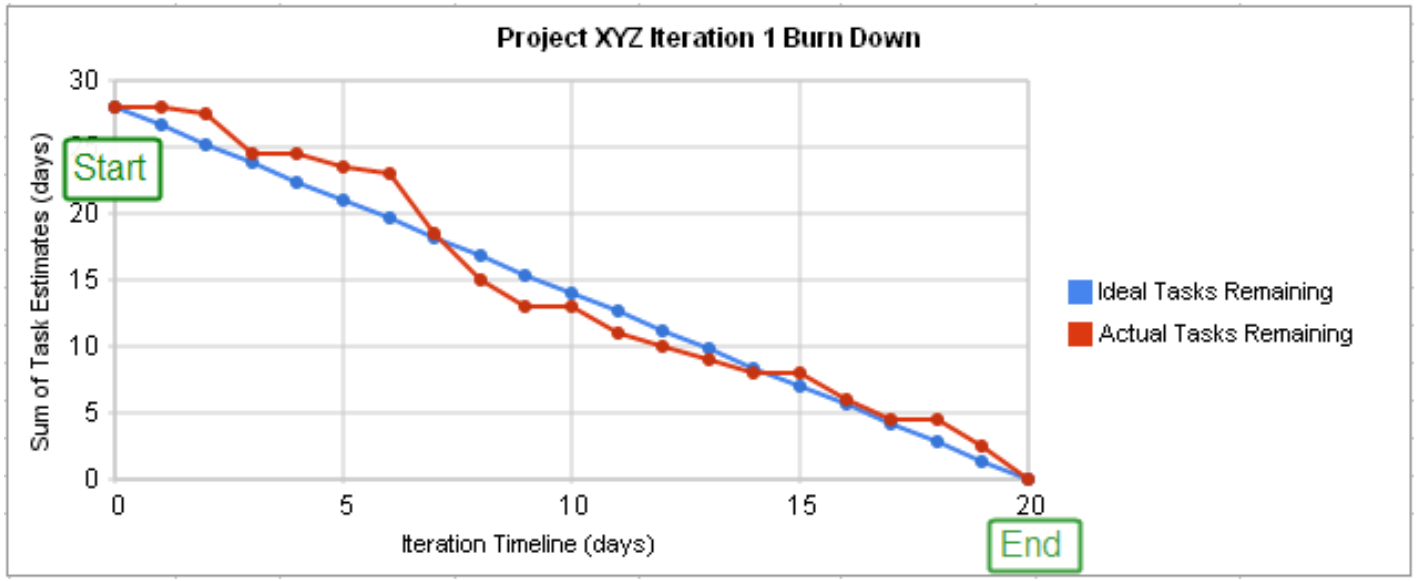
Side note:
When assigning tickets to devs it's helpful if usernames are identifiable (or there is some info on the profile).
"Who is ‚gronkh12' again?"

Tools that might help:

- Put your user stories & tasks into Github's issue tracker
  - Assign issues to developers
  - Use milestones to assign user stories to sprints
  - Use issue tags, e.g. to denote responsible teams or status
  - Use "project management" tools that give an overview of GH issues, e.g. https://waffle.io/ or https://www.zenhub.io/
- Tag versions that can be presented

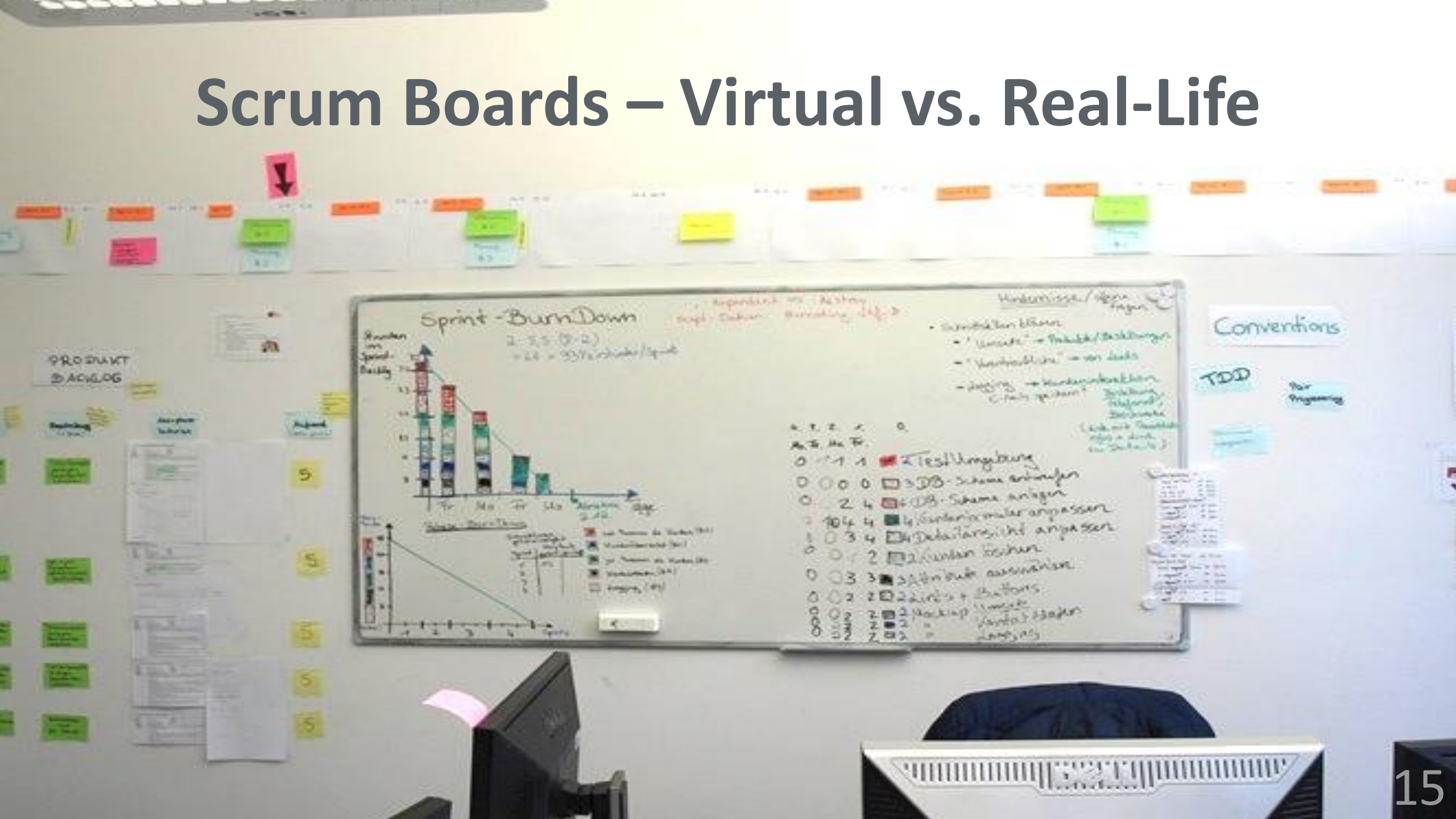
```
$ git tag –a v0.1 –m 'version after Sprint#1 without US #2'
```

Scrum Burn-Down Chart



- Graphical representation of work left to do versus time
- X-Axis: sprint timeline, e.g. 10 days
- Y-Axis: work that needs to be completed in sprint (time or story points)
- "Ideal" work remaining line: straight line from start to end
- Actual work remaing line
  - above ideal → behind schedule, below ideal → ahead schedule

Scrum Boards – Virtual vs. Real-Life



Definition of Done

How do I know when to stop?

- Acceptance criteria fulfilled
- All tests are green
- Code looks good
- Objective quality goals
- Second opinion
- Internationalization
- Security
- Documentation

The Definition of Done is the team's consensus of what it takes to complete a feature.

Definition of Ready

- Similar to Definition of Done, but for user stories
- Answer the question: **When is a user story ready for implementation?**

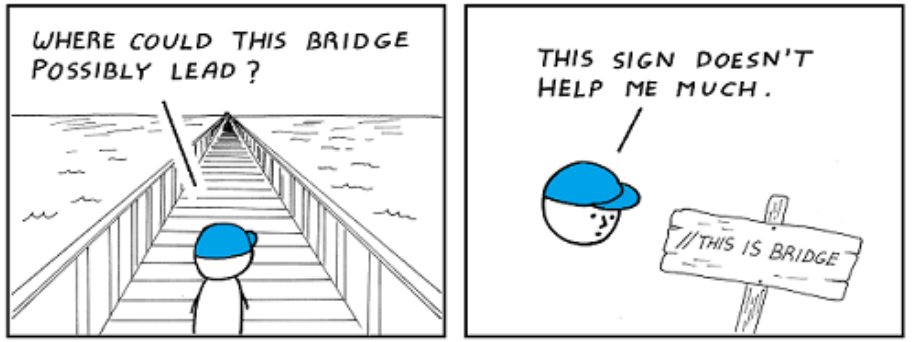
Examples

- Estimated
- Acceptance criteria
- Mockups for UI stories

Communication

Questions:

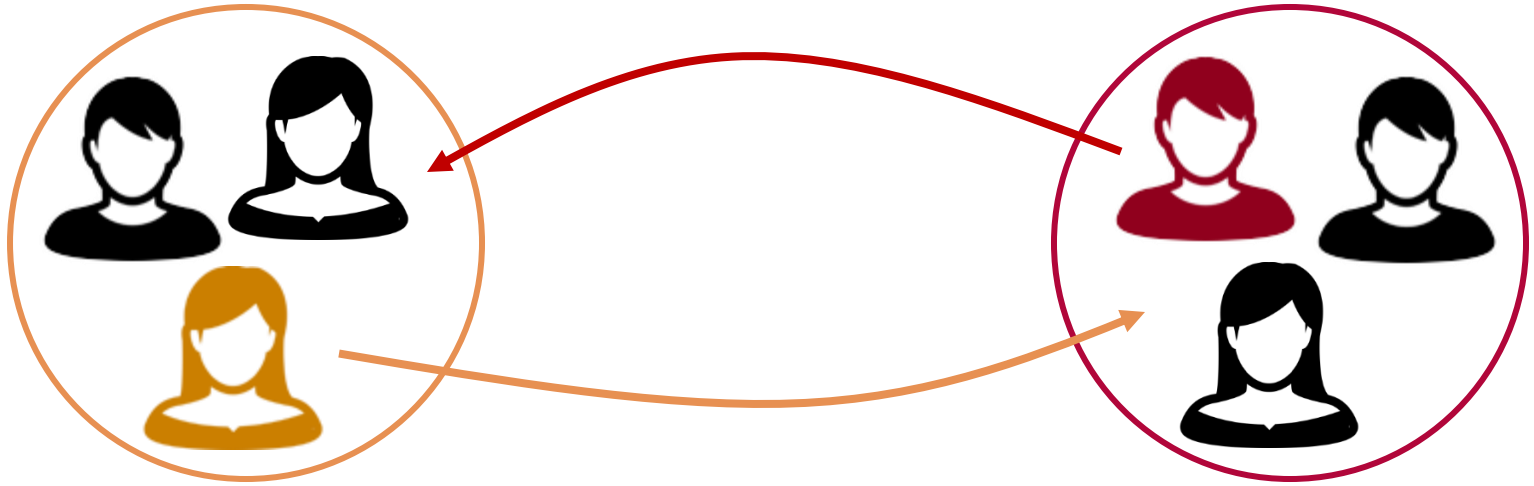
- How do we communicate in and between teams?
- How do I find out about architecture changes?
- How do I know how to use other people's code?



Tools that might help:

- Github wiki to (briefly!) document how to use components
- Code comments explaining the larger context, common pitfalls
- One(!) common communication channel for announcing changes, e.g. E-Mail list, IRC, IM, Slack, Google Hangouts, Facebook group

Dealing with Dependencies
Ambassadors



- Mutual Exchange of team members
  - Improves efficiency of communications
  - Allows deeper understanding of problems
  - Prevents coordination problems early in the process
- Ambassadors should be fully integrated team members
- Especially useful for API development, design, etc.

[Pichler, Scrum – Agiles Projektmanagement erfolgreich einsetzen, 2007]

Dealing with Uncertainty
Spikes

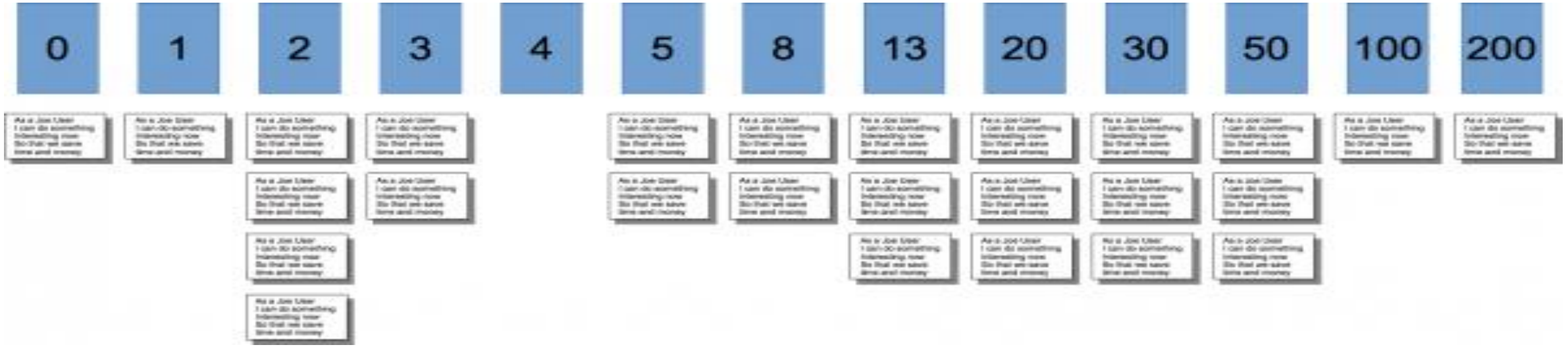
What can we do if no team members lack knowledge in a particular domain?

- Hard to estimate with little knowledge
- Take time out of the sprint to research and learn
- Spike
- For example, evaluate new technologiess

Estimating Large Backlogs (1/2)

Bucket Estimation (Jukka Lindström) [Scrumcenter, 2009]

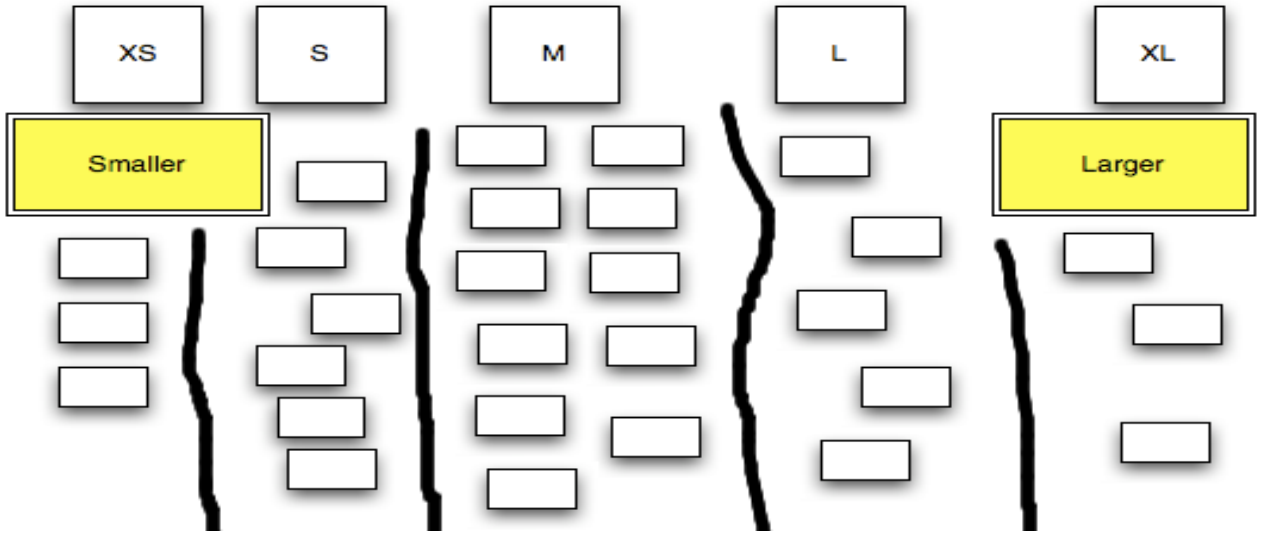
- Create physical buckets based on examples (2-3 per bucket)
- Assign items to buckets one by one through
  - Comparing & discussing
  - Planning Poker



Estimating Large Backlogs (2/2)

Affinity Estimation (Lowell Lindstrom) [Scrumcenter, 2009]

- Read each story to the entire team
- Arrange stories horizontally based on size (no talking!)
- Place Fibonacci numbers above the list
- Move each story to the preferred number



Beyond Scrum

Scrum critique:

- Scrum and agile are by no means universally accepted as "the way" to do software engineering (“Agile Hangover”)
- Michael O. Church - *Why “Agile” and especially Scrum are terrible (2015)* https://michaelochurch.wordpress.com/2015/06/06/why-agile-and-especially-scrum-are-terrible/
  - *Business-driven engineering* — Scrum increases the feedback frequency while giving engineers no real power
  - *Terminal juniority* — Architecture and R&D and product development aren’t part of the programmer’s job
  - *It’s stupidly, dangerously short-term* — engineers are rewarded or punished solely based on the completion, or not, of the current two-week “sprint”

Agenda

1. Value-based Software Engineering
2. Organizing your Project
3. **Git Tricks**

Git Tricks — amend, interactive staging

Change commit message of previous commit
(Careful, don't do this if you already pushed the commit)

```
$ git commit --amend -m "new message"
```

Forgot to commit files?

```
$ git add [missing files]
$ git commit --amend  #uses the previous commit's message
```

Undo the amending

```
$ git reset --soft HEAD@{1}
$ git commit -C HEAD@{1}
```

Interactive staging (also allows committing only parts of files)

```
$ git add -i
$ git add --patch [file]
```

Opinion:
Interactive staging (`git add -i`) is probably the most powerful git feature you're not using yet.

Git Tricks — reflog, diff, stash

Log of all recent actions

```
$ git reflog
```

What did I work on recently?

Show differences that are not staged yet

```
$ git diff
```

Shows differences between staging and the last file version

```
$ git diff --staged
```

Temporarily store/retrieve all modified tracked files

```
$ git stash
$ git stash pop
```

List all stashed changesets

```
$ git stash list
```

Tip:

`git stash` is often helpful if you don't want to directly commit your changes, but need to checkout another branch/commit.

Git Tricks — log, blame, rebase

Shorter version of the git log

```
$ git log --abbrev-commit --pretty=oneline
```

Show pretty graph of git history

```
$ git log --graph --decorate --pretty=oneline --abbrev-commit
```

Show changesets in the log

```
$ git log -p
```

Show what revision and author last modified each line

```
$ git blame --date=short [file]
```

History is becoming cluttered with merge commits

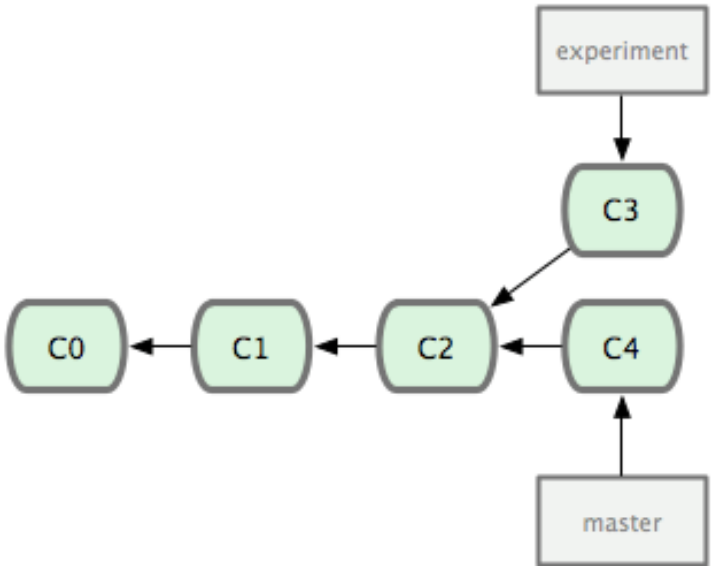
```
$ git rebase <branch>
```

Warning:
Do not rebase commits that others have worked with!
"people will hate you, and you'll be scorned by friends and family."
https://git-scm.com/book/en/v1/Git-Branching-Rebasing#The-Perils-of-Rebasing

Git Rebase — setup

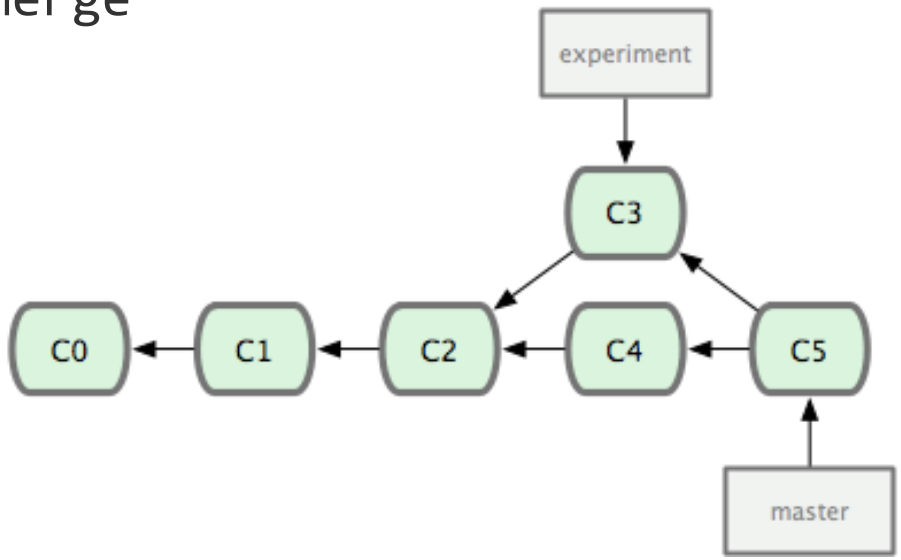
- Created "experiment" branch to try something out

```
$ git checkout –b "experiment"
$ git commit –a –m "C3"
```



- Easiest way to integrate the branches is `merge`
  - Will create merge commits

```
$ git checkout master
$ git merge experiment
```

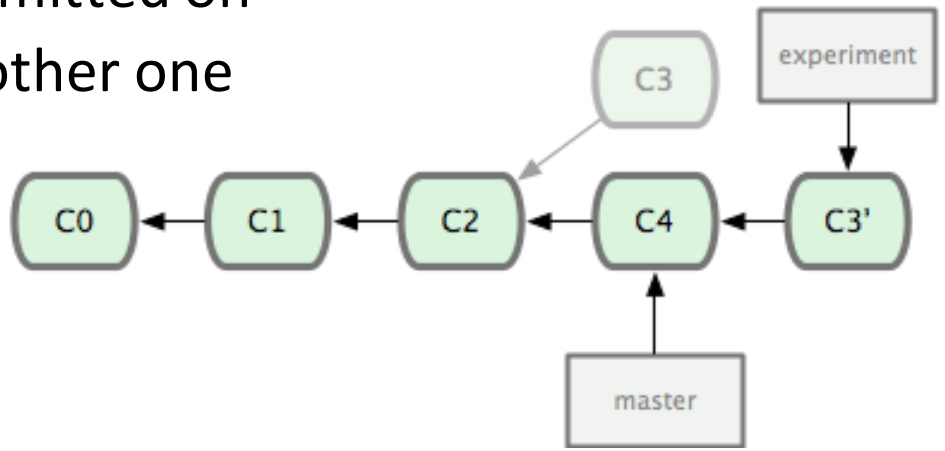


https://git-scm.com/book/en/v1/Git-Branching-Rebasing (MIT)

Git Rebase — execution

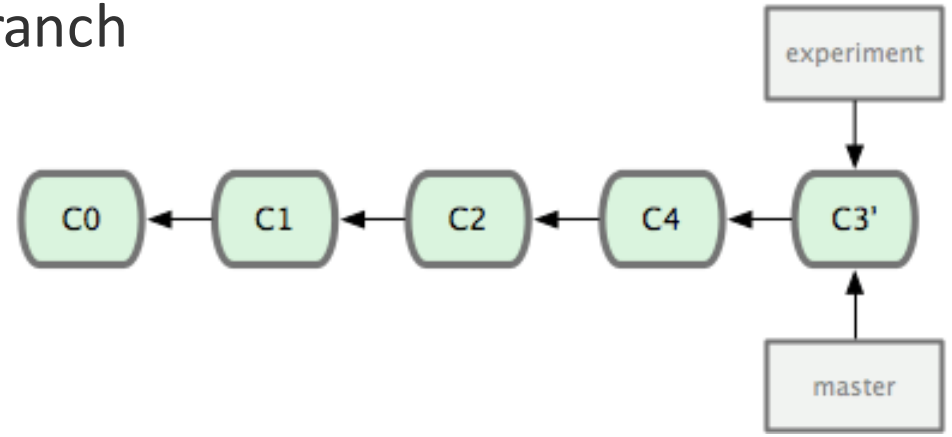
- `git rebase`
  - Take all the changes that were committed on one branch and replay them on another one
  - Only do this with local commits

```
$ git checkout experiment
$ git rebase master
```



- Afterwards: fast-forward the master branch
  - No merge commits

```
$ git checkout  master
$ git merge experiment
```



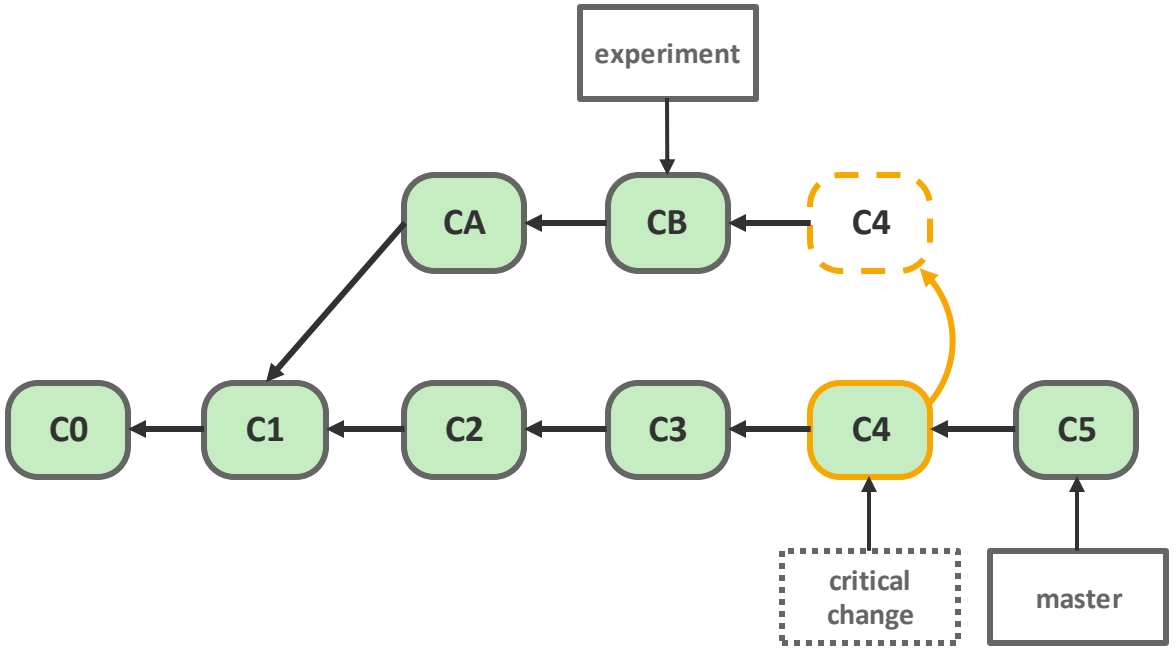
https://git-scm.com/book/en/v1/Git-Branching-Rebasing (MIT)

Git cherry-pick

- **Problem**: Quickly get changes from other commits without having to merge entire branches
- `git cherry-pick`
  - apply the changes introduced by existing commits

```
$ git checkout master
$ git log --abbrev-commit --pretty=oneline
d7ef34a  C3: Implement feature
0be778a C4: critical change introduced
```

```
$ git checkout experiment
$ git cherry-pick 0be778a
```

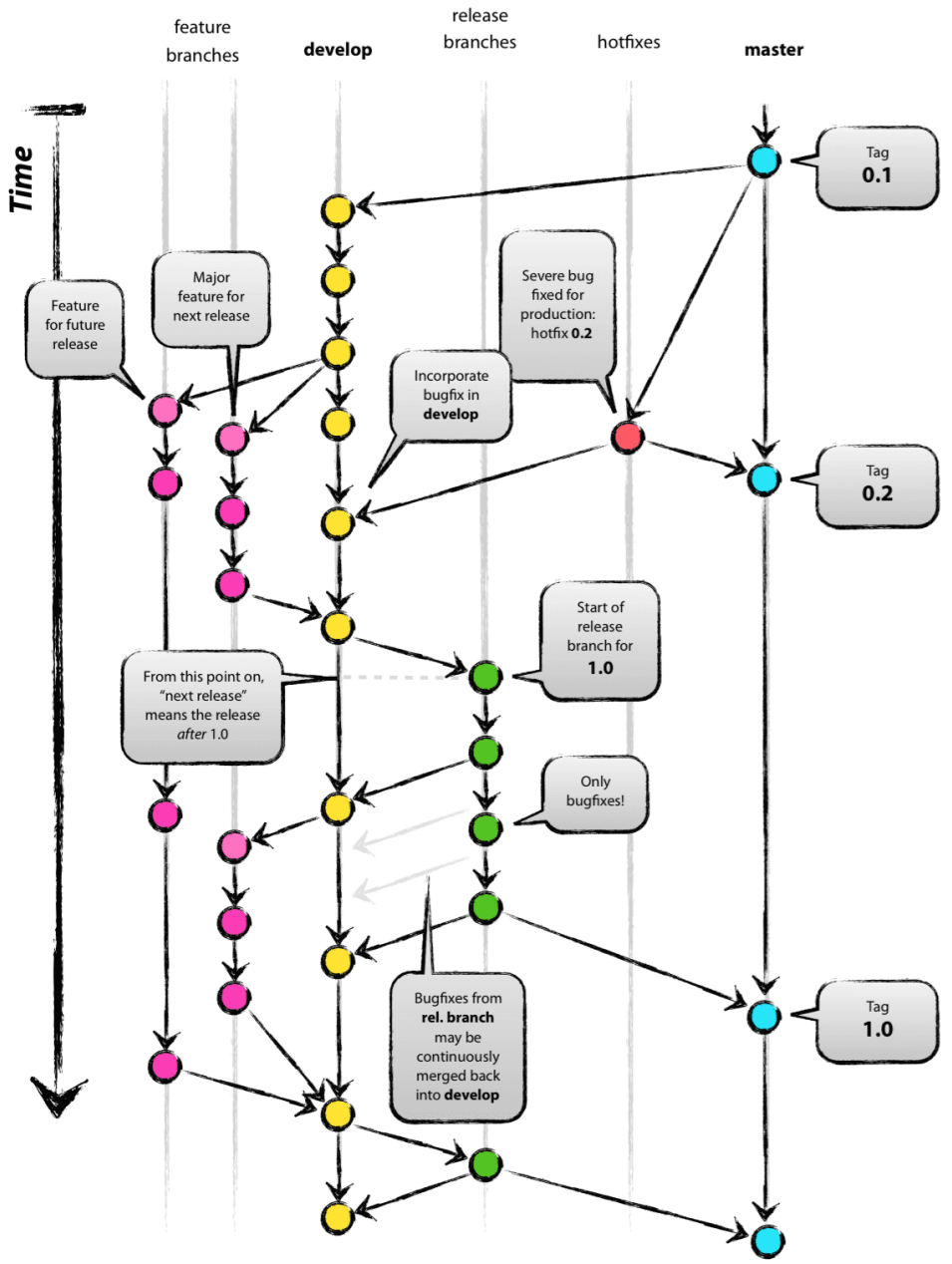


https://git-scm.com/book/en/v1/Git-Branching-Rebasing (MIT)

Branching

Ideas

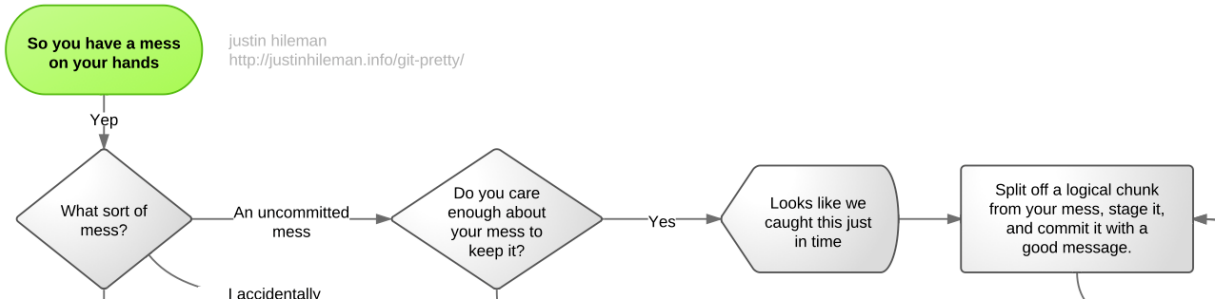
- Never merge in master or release branches
- Never break build in shared branches



http://nvie.com/posts/a-successful-git-branching-model/

Git Self-help Resources

- How to undo (almost) anything with git – guide by Github
  - https://github.com/blog/2019-how-to-undo-almost-anything-with-git one
- Git cheat sheet – by Github
  - https://training.github.com/kit/downloads/github-git-cheat-sheet.pdf
- Git FAQ – answers to common questions
  - http://gitfaq.org/
  - https://git.wiki.kernel.org/index.php/Git_FAQ
- Git pretty – troubleshooting flowchart
  - http://justinhileman.info/article/git-pretty/



Tooling suggestions

- Many GUIs for git available (https://git-scm.com/downloads/guis)
  - Make some complex git interactions much simpler
  - Draw pretty commit graphs, overviews of branches and merges
  - *GitX, TortoiseGit, SourceTree, Tower, SmartGit, gitg, git-cola*
- Github Integration
  - Github also provides git tools
    https://mac.github.com/, https://windows.github.com/
- Git extras (https://github.com/tj/git-extras)
  - Common git commands bundled