

Project Management

UNC COMP 523

Wed Aug 26, 2020

Prof. Jeff Terrell

Announcements

- welcome TA Yiyuan "Bill" Li!
- his OH: Tue 5-7, Wed 4-6, and Fri 4-6
- added team-based groups to Piazza
- UNC Product Management Club kicking off tonight @ 6:30
 - details: <https://uncpclub.com/> Late breaking news: new pass/fail policy announced
 - *please*, be kind to your team and don't be a slacker
 - I'm considering whether to reduce the minimum individual project grade multiplier down from 0.7

Assignments reminder

A1 (project management board ☕) due this week - any questions?

- you'll discuss that this week with your mentor
- I'll show an example Trello board in a bit A2 (web site ☕☕) due next week
 - this will serve info about your project, including deliverables A3 (user stories ☕☕) due the week after
 - note: you need to meet with your client to complete this assignment Beware A4 (clickable prototype ☕☕☕☕) due the following week

Plan for today

- . announcements

1. ~~assignments reminder~~
2. example Trello board
3. project management concepts
4. quiz 1

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How familiar are you with Trello?
Visit poll.ev/jeffterrell to answer

Example Trello board

see the Trello board for the Clem project here:

- <https://trello.com/b/y3bceH3w/clem-the-clojure-error-mediator>

concepts

- lists (columns) and cards (collapsed or expanded)
- comments and checklists (for tasks or prereqs)
- kanban: moving tasks from left to right
- stages of work, from backlog to deployed
- labels, especially "blocked"
- container cards
- card numbers

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Project management

- **goal: to keep the project moving**
- (Hence the music before class: *Float On* by Modest Mouse)
- what's hard about that?
- for a single person, only complexity is navigating dependency relationships
- for multiple people, you have to coordinate: who works on what?
- example: no inter-thread coordination or communication required for a single-threaded program

The Mythical Man-Month

- *The Mythical Man-Month* by Frederick P. Brooks, Jr. (heard of him?)
- question: is a 1 person x 12 month project equivalent to a 12 person x 1 month project?
- almost as ridiculous as tasking 9 women to have a baby in 1 month
- key insight: rating project effort by person month *assumes no communication overhead*

Communication overhead

- if there are 3 people in a room, how many handshakes are possible?
- answer: 3
- how about for 4 people?
- answer: 6
- adding 1 person doubled the number of handshakes!
- formula: $n * (n - 1) / 2$
- similar idea: how many communications must take place to coordinate n developers?
- *the overhead scales exponentially!*
- "Brooks' Law": adding developers to a late project only makes it later
- why? because the new developer has to catch up, adding communication cost to the project

Reducing overhead

- recall primary goal of project management: keep the project moving
- secondary goal: to add as little overhead as possible
- in my experience in industry, most companies are moving to teams of 3–6 developers
- how to scale up? *not* with a broadcast (all-to-all) paradigm
- how do we scale up with data? fascinatingly similar question
- a good solution: trees, which tend to have $O(\lg(n))$ operations
- *this is why hierarchy is useful*
- (there are also risks and dangers with hierarchy, of course...)

Practicalities

- how can we assign tasks?
- key idea: look for natural seams in the work
- ex: if there are 3 pages to create for the web site assignment, assign each person a page
- but it's not that simple
- there is often pre-work, before the parallelizable work: if nothing else, finding the seams and making assignments
- and there might be post-work, to synthesize everything into a coherent whole afterwards
- it's not uncommon to have serial pre-work and post-work and parallelizable work in between
- similar to the map/reduce paradigm in distributed algorithms

Pulling communication to the beginning

- say we each have a page to do for the web site, and you find a font face and size that you like
- for consistency, it'd be nice if all pages on the site shared the same style
- but that wasn't specified in advance; what to do?
- probably message teammates and mention your innovation, and request that they copy it
- analogy: inter-thread communication
- not bad (sometimes necessary), but best if it can be avoided by foresight during task definition phase
- other possibility: getting started, then having a clarifying question for client
- might need to "park the thread" of implementation for a while until you hear back
- key: *do communication during task definition phase* (as much as possible)

The written word

- **write things down**
- why? our human memory is fallible
- we tend to remember things in our own favor :-)
- but having things written keeps us honest and avoids needless conflict
- comment threads in Trello cards are a good place to ask questions etc.

Sizing tasks

- how big should tasks be?
- no right answer, but there are some tradeoffs
- too small means you spend a lot of time just managing cards
- too big means you don't actually see progress very often, which can be frustrating
- (did you really do anything last week, teammate? I can't tell.)
- in a full-time development gig, I'd recommend 4-8 hour-sized tasks as a sweet spot
- for y'all, I'd shoot for more like 2-4 hours per task
- obviously, estimation is hard, and not all tasks fit that Goldilocks ideal
- goal: *traction* on the project, like tires on the road

Finer breakdown

- I actually break even my 2 hour tasks into small steps
- I think this is one reason I tend to be pretty productive and efficient
- demo (if time)
- gives me a psychological/emotional boost to see progress being made
- helps me stay focused, because none of my attention is given to remembering what needs to be done

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Quiz 1

Visit class site in Sakai and take quiz there