CS1530 LECTURE 3

Agile / Scrum

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SOFTWARE DESIGN METHODOLOGY

- Our methodology: Agile / Scrum
  - Not the “perfect” methodology - which does not exist - but for our project, it fits well
  - Relatively lightweight
  - Flexible
  - Focus is on understanding customer needs
  - Popular in industry
  - Allows you to focus on development - doesn’t get in your way

AGILE MANIFESTO

- http://agilemanifesto.org/
  - *Individuals and interactions* **over** *processes and tools*
  - *Working software* **over** *comprehensive documentation*
  - *Customer collaboration* **over** *contract negotiation*
  - *Responding to change* **over** *following a plan*

SCRUM

- Almost certainly the most popular agile methodology, although far from the only one…
  - Extreme Programming (XP)
  - Lean Software Development (LSD)
  - Dynamic Systems Development Method (DSDM)
  - Feature-Driven Development (FDD)
  - Agile Unified Process (AgileUP)
  - Crystal {Clear, Yellow, Orange, Red, Maroon}

SCRUM

- Not an acronym!
- Comes from a rugby scrum - everyone on team moving in one direction
- Teams are almost entirely self-managed
- Three roles
  - Product owner - Act as representative for the customer
  - Scrum master - They act as a “firewall” for the outside world and a centralized place to ask for help / facilitate meetings / etc.
  - Team - Everyone else: QA, developers, etc.

SCRUM

- Product-focused, end-user focused
  - Transparency - Work should be visible to those who need to see it
  - Inspection - Work should be examined regularly to ensure that the team is on the right path, or are doing things in a suboptimal manner
  - Adaptation - Work should be modifiable as requirements and limitations are better understood

USER STORIES

- A description in "plain language" that states what the user needs the software to do
- Related to requirements, but not exactly the same!
- Often in the *Connextra template*:
  - As a <role>
    I want <feature>
    So that <reason>

USER STORIES

- Examples:
  - As a manager
    I want to the software to display the current status of each engineer
    So that I can more effectively write status reports
  - As an Engineer
    I want the ability to enter my daily status on a web page
    So that I can update my manager on my status more easily
  - As a user of Excel
    I want a keyboard shortcut to select text
    So that I can quickly grab text without spending extra time reaching for my mouse

USER STORIES

- Allows us to not only see what they want, but more importantly, ***why***
- Gives us further flexibility if what they say they want is difficult/impossible, but can do something else that gives them the same result, or if there is a better way to achieve that objective

PRODUCT BACKLOG

- List of all items to be done
- In the beginning, should be all user stories
- Should be prioritized
- Differs from a Software Requirements Specification in that this is a living document - it will change as defects are added, user stories modified or removed, etc.
- Think of it as a kind of mixed to-do list / software specification

SPRINTS

- Software development is split into “sprints” - iterations of (usually) 2 - 3 weeks where work is done from the backlog (our sprints will be two weeks)
- At the beginning of the sprint, there is a sprint planning session where it’s determined which user stories will be worked on and who will work on which ones
- These are not set in stone! Some may run over or you may work on extra. We will *estimate* how much can get done during our sprint planning sessions.
- This session is facilitated by the Scrum Master

ESTIMATING – USER STORIES AND STORY POINTS

- Note that this is one method for estimating effort
- For each user story, allocate story points.
- Story points can be powers of two - 1, 2, 4, 8, or 16 points
- To start:
  - 16 points - a story which would take one developer the entire sprint to do
  - 1 point - Trivial change (fixing typo, off-by-one error, etc.)
- Why powers of two? We're horrible at estimating software development time.
  - "Better to approximately right than exactly wrong"

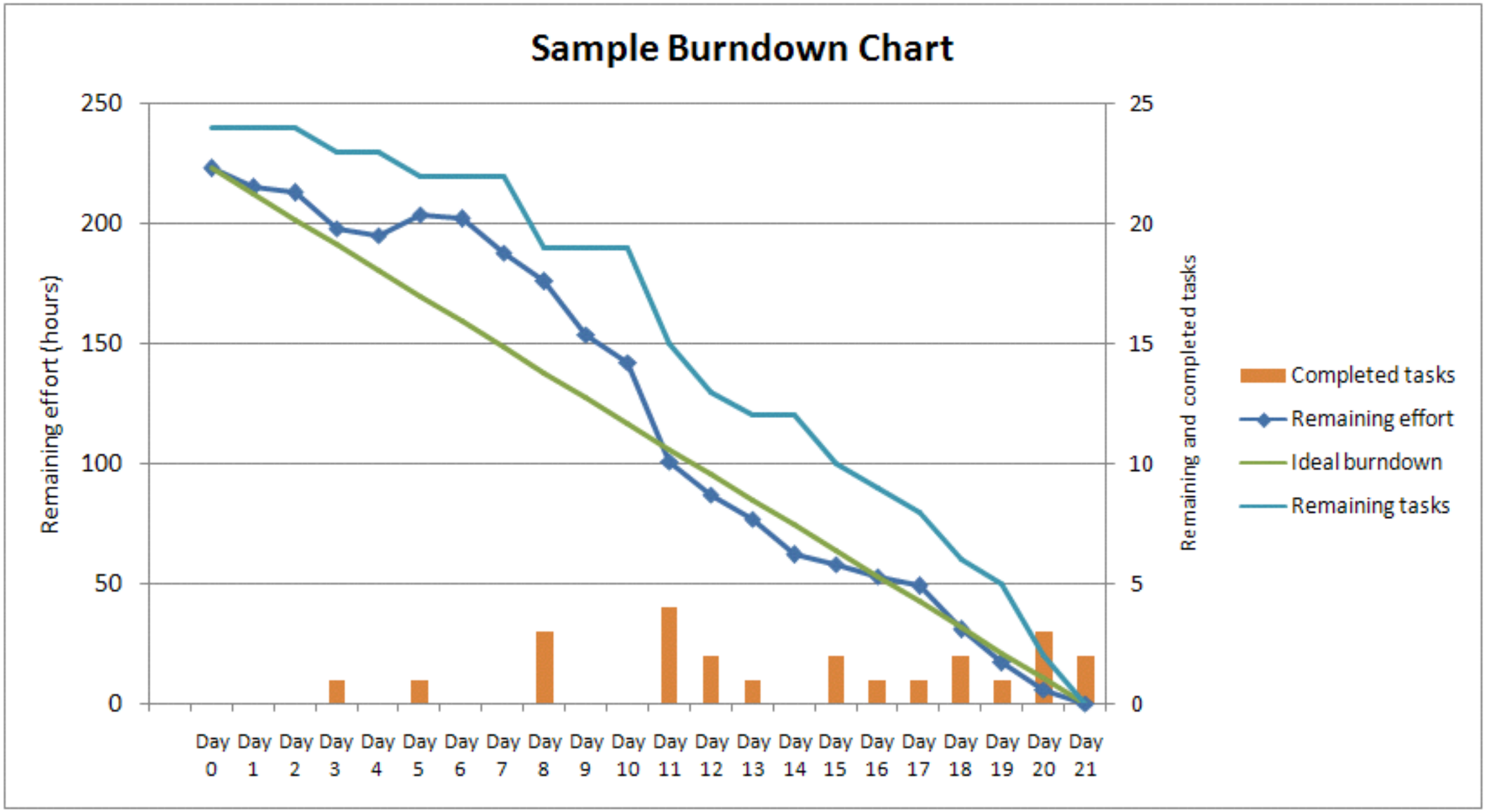
OTHER TASKS

- Other tasks can also be allocated story points, but they are not user stories!
- For example:
  - Fixing defects
  - Paying off technical debt
  - Spike (research)
- These will also be part of the product backlog - they are items that should be completed at some point

BURNDOWN CHARTS

- Burndown charts show how much work is left compared to how much time is left
- Usually at sprint level, but can be project-level or higher

SAMPLE BURNDOWN CHART



Source: https://en.wikipedia.org/wiki/Burn_down_chart#/media/File:SampleBurndownChart.png (public domain)

NOTE THESE WILL NOT BE IDEAL!

- Usually more work ends up being completed at end of sprint, so actual compared to ideal is usually concave curve
  - People tend to spend more time at the end of the sprint finishing up
  - Last pieces fall into place
- Can be convex, though (front-loaded work)
  - Something was easier than you thought it was going to be
  - Finishing one story makes it much easier to finish others
  - Rarer than one would like

VELOCITY

- Definition - how many story points got done last sprint?
  - NOT how many were planned, how many were completed
- Example - You have four devs on a team. You plan to complete (4 * 16) or 64 story points' worth of stories. You actually complete 32. Your velocity is 32.
- Now you can better estimate / calibrate the number of story points to shoot for next time, as well as your estimating ability - maybe you've been underestimating the amount of work necessary for stories, or overestimating how much time you'd be able to dedicate to development and not external meetings, etc.

SPRINTS

- At every point, and ESPECIALLY at the end of the sprint, you should have WORKING software
- It does not need to be feature-complete, but compiles, runs, etc.
- Adding a feature means it has met “the definition of done”
  - Code
  - Documentation
  - Integration
  - Testing

STANDUPS

- Standups - usually daily and very short communications with the rest of the team during the sprint
  - What have I done in the last 24 hours?
  - What do I plan to do in the next 24 hours?
  - Do I need any help or have any blockers?
- You can probably do this 3x/week, probably not necessary for every day
- However, this is up to you
- Facilitated by scrum master

RETROSPECTIVES

- At the end of each sprint, the team comes together to discuss:
  - What went well?
  - What could go better?
  - What can we do different in the next sprint?
- Once again facilitated by the scrum master

SPRINTS, STANDUP AND RETROSPECTIVES

- For our class, every other Wednesday will mark the end of a sprint. Ends of sprint should include:
  - Retrospective on previous sprint
  - Sprint planning for next sprint
- Scrum Master position will change each sprint (different person each sprint).
  - Old scrum master handles retrospective; new scrum master handles sprint planning

KANBAN BOARD

- A board or software which shows status of user stories and other items (research, defects, etc.)
- At a glance, can show status of all items to be worked on during this sprint
- There should be a small number of possible statuses.

Example:

- Planned
- In progress
- In test
- Completed

KAIZEN

- Japanese for “continuous improvement”
- You should work to not only think “how can the software be made better?” but also “how can the process be made better?”
- Explicit discussion of this in retrospectives
- Examples:
  - We spend lots of time getting authentication working. Could a third-party provider do this better?
  - Our stand-ups are taking up too much time. Could we limit people talking to one minute?
  - I never know where to find information on the product. Can we put together a wiki page?