Scrum

CSCI 5040: Professional Master's Project (1 of 2)

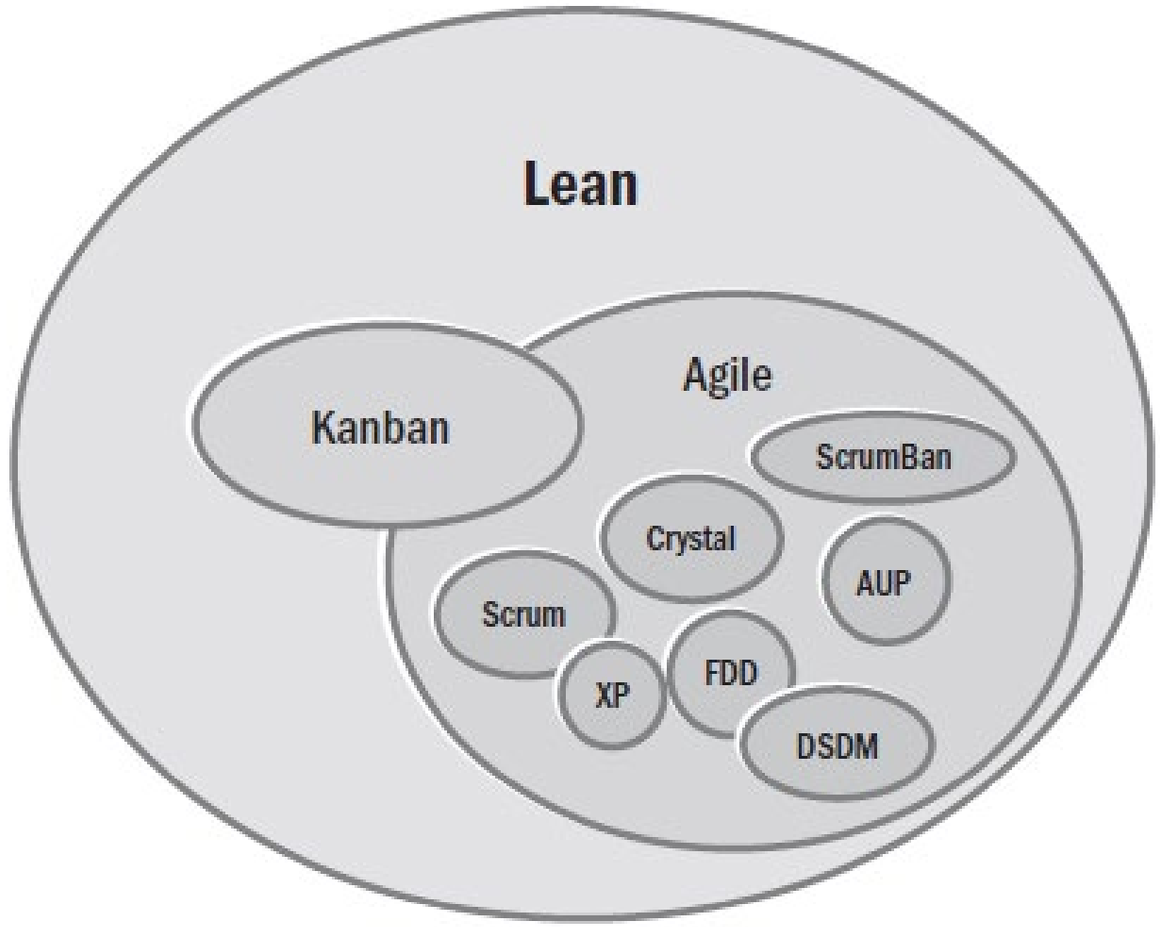
Lecture 9

Learning Objectives

- Review Scrum-based software project management and related best practices
  - You'll use Scrum the rest of this semester and for the first half on next semester before changing to Kanban
- Review design team activities/class schedule & deliverables

The variety of Agile process methods

- Many different processes in the category of Agile
- Most common are Scrum and Kanban
  - FDD = Feature Driven Development
  - DSDM = Dynamic Systems Development Method
  - AUP = Agile Unified Process
  - Crystal Agile = Alistair Cockburn
  - XP = Extreme Programming, Kent Beck
- Image from PMI Agile Practice Guide, 2017



Agile Techniques

- Agile methods are techniques/processes for developing software systems that rely on
  - communicating with your customer (or product owner, representing the customer) frequently
  - taking small steps (functionality wise)
  - validating the small steps with the customer before moving on
- They emphasize iteration, feedback, and communication over upfront design, detailed analysis, diagrams, etc.

Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

https://agilemanifesto.org/

Agile Principles

We follow these principles:

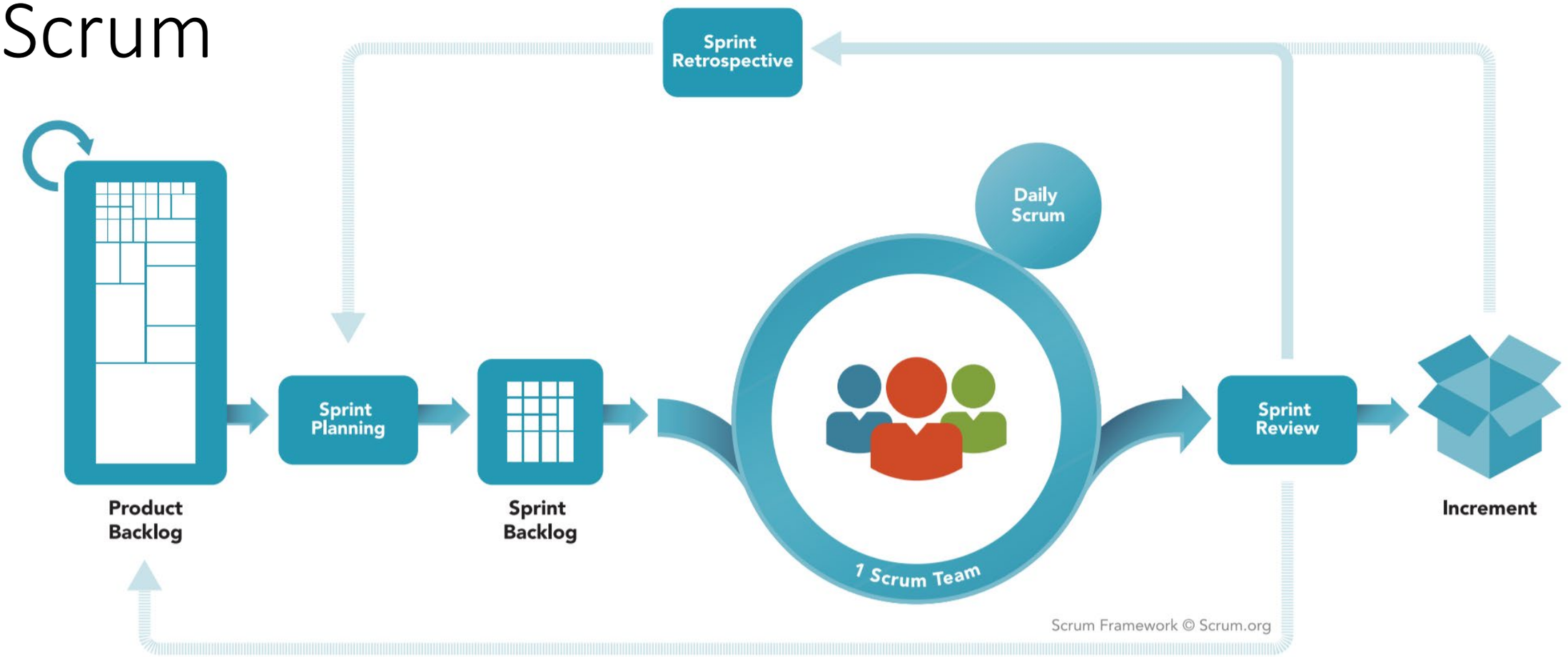
- **Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.**
- **Welcome changing requirements**, even late in development. Agile processes harness change for the customer's competitive advantage.
- **Deliver working software frequently**, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- **Business people and developers must work together daily** throughout the project.
- Build projects around **motivated individuals.** Give them the environment and support they need, and **trust them to get the job done**.
- The most efficient and effective method of conveying information to and within a development team is **face-to-face conversation**.
- **Working software is the primary measure of progress**.
- Agile processes promote **sustainable development**. The sponsors, developers, and users should be able to **maintain a constant pace** indefinitely.
- Continuous **attention to technical excellence and good design** enhances agility.
- Simplicity--the art of **maximizing the amount of work not done--**is essential.
- The best architectures, requirements, and designs emerge from **self-organizing teams**.
- At regular intervals, **the team reflects** on how to become more effective, then tunes **and adjusts** its behavior accordingly.

https://agilemanifesto.org/principles.html

Where did Scrum come from?

- When Jeff Sutherland co-created the Scrum process in 1993, he borrowed the term "scrum" from an analogy put forth in a 1986 paper by Takeuchi and Nonaka, published in the Harvard Business Review
- In that paper, the authors compare high-performing, cross-functional product development teams to rugby teams using the Scrum formation when they restart play
- https://www.scrumalliance.org/ScrumRedesignDEVSite/media/ScrumAllianceMedia/Public%20Relations_2/What-is-Scrum-Backgrounder-2014.pdf

Scrum



- Rugby term – (re)starting play, teamwork
- Product owner, development team, scrum master
- Sprints – time-boxed development, 1 week - 1 month
- Story points – estimates of effort for deliverables
- Daily scrum (stand-up meeting) – 15 minute plan for work day
- Sprint reviews and demonstrations, retrospectives for continuous improvement

Questions for Scrum stand-ups:

- What did you accomplish since the last meeting?
- What are you working on until the next meeting?
- What is getting in your way or keeping you from doing your job?

- https://www.scrum.org/resources/scrum-framework-poster

Scrum Framework

- A product owner creates a prioritized wish list called a product backlog
- During sprint planning, the team pulls a small chunk from the top of that wish list. That chunk becomes the sprint backlog. The team decides how to implement the sprint backlog within the time frame of the sprint
- The team has the given sprint (usually two to four weeks) to complete its work, but it meets each day to assess its progress (in the Daily Scrum)
- Along the way, the Scrum Master keeps the team focused on its goal
- At the end of the sprint, the work should be potentially shippable: ready to hand to a customer, put on a store shelf, or show to a stakeholder
- The sprint ends with a sprint review and retrospective
- As the next sprint begins, the team chooses another chunk of the product backlog and begins working again

- https://www.scrumalliance.org/ScrumRedesignDEVSite/media/ScrumAllianceMedia/Public%20Relations_2/What-is-Scrum-Backgrounder-2014.pdf

THE SCRUM WALL: An Agile Project Dashboard

Construx®
SOFTWARE DEVELOPMENT BEST PRACTICES

Using Information Radiators To Increase Transparency

Team Identity
Teams that have their own identities show increased morale and performance.

Roster
Rosters identify the team and ways to contact them.

Working Agreements
Effective teams have Working Agreements that establish specific dates, times, and places for all meetings.

Project Vision
Standardize on a specific format/ template for Vision statements.

TEAM AVENGERS

Team Photos: These facilitate recognition of team members.
If a team member is absent, turn their photo upside-down for the day.

ROSTER

ALEX	x1265
JOHN	x1273
JONAH	x1399
CHANDRA	x1321
YURI	x1425

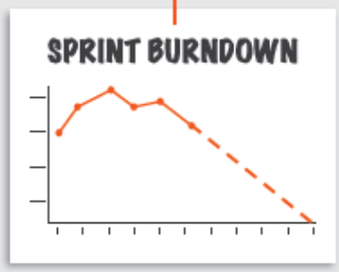
MEETINGS

Planning: First Monday
Standup: Daily 10:00-10:15 am
Review: Last Friday
Retrospective: Follows Review

See Working Agreements for specifics.

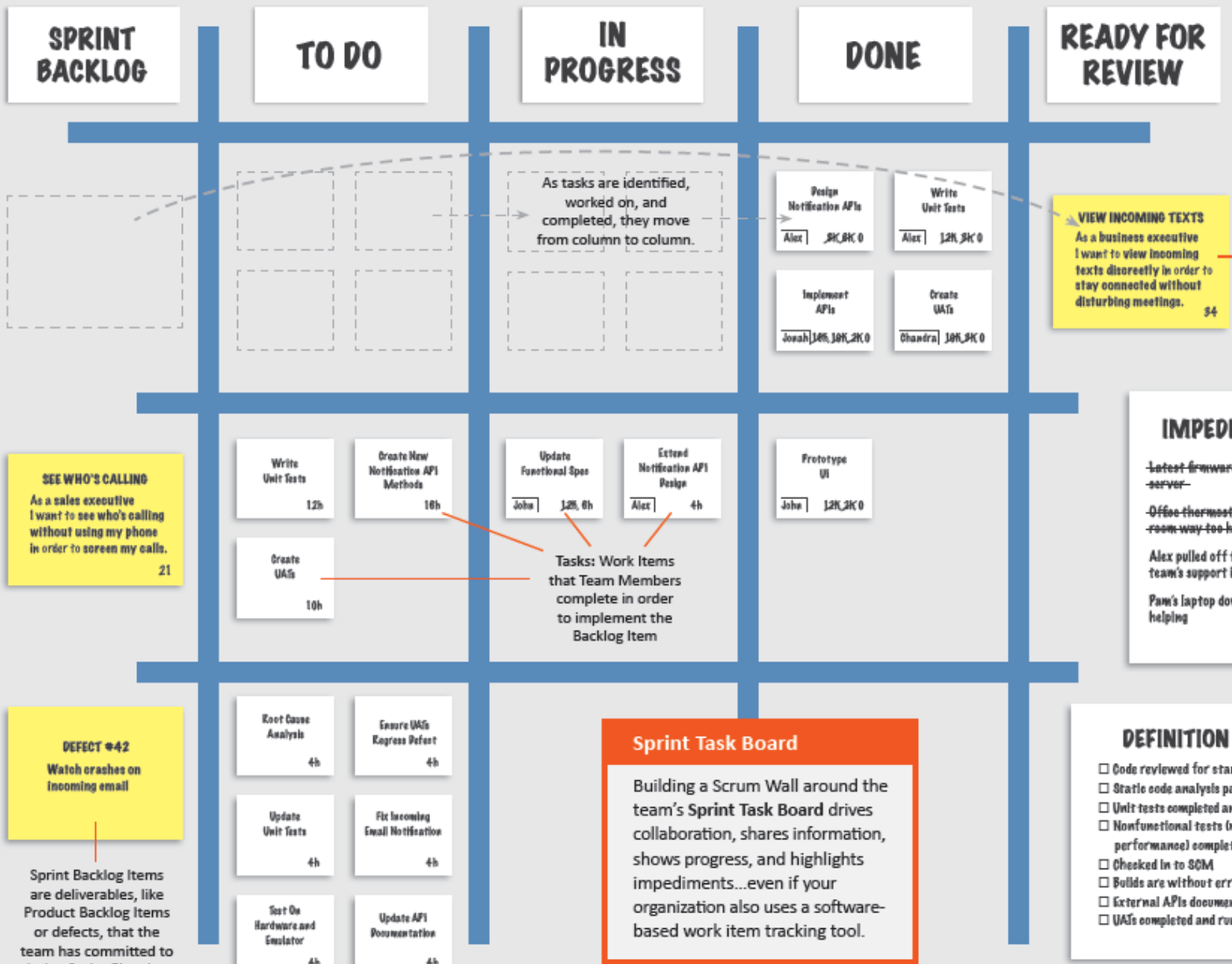
PROJECT VISION

A smart watch for smart phone owners who want to stay connected without using their smart phones.



Sprint Burndown
Use Sprint Burndowns to assess progress against sprint goals.

Release Burndown
In order to increase predictability, utilize Release Burndowns to track progress across projects.



IMPEDIMENTS

~~Latest firmware drop not on server~~
~~Office thermostat broken, team room way too hot!~~
Alex pulled off to address other team's support issues
Pam's laptop down; IT not helping

Impediments
Use a written Impediments List to track issues and show progress.

DEFINITION OF DONE

- ☐ Code reviewed for standards compliance
- ☐ Static code analysis passed
- ☐ Unit tests completed and run without error
- ☐ Nonfunctional tests (memory leaks, performance) completed and passed
- ☐ Checked in to SCM
- ☐ Builds are without errors or warnings
- ☐ External APIs documented
- ☐ UATs completed and running without error

Definition of Done
Use an explicit Definition of Done to ensure completeness and quality.

Sprint Task Board

Building a Scrum Wall around the team's **Sprint Task Board** drives collaboration, shares information, shows progress, and highlights impediments...even if your organization also uses a software-based work item tracking tool.

When all tasks are complete, backlog items move to the 'Ready for Review' column to be evaluated at the Sprint Review.

Rules: Sprint Planning

- Who: Team, Scrum Master, Product Owner, optional additions
- Part 1: Select elements from Product Backlog the Team can potentially make into completed product functionality
- Part 2: Team structures Sprint Backlog

M	T	W	Th	F
M	T	W	Th	F

- Summarized from Agile Project Management with Scrum, Schwaber, 2004, Microsoft Press

Rules: Scrum Daily Meeting

- Who: Team and Scrum Master
- 15 minutes maximum
- All must attend, all must be on time
- Each person answers three questions
  - What have you done since the last Daily Scrum?
  - What will you do between now and the next Daily Scrum?
  - What is blocking or impeding you from getting your work done?
- One person talks, no side conversations
- Arrangements can be made for follow-ups or design discussions as needed – but the work is not done here

M	T	W	Th	F
M	T	W	Th	F

Rules: Sprint

- Who: Team and Scrum Master
- If a Sprint is not proving to be viable, a Scrum Master can terminate the Sprint and start a new Sprint Planning
  - Can be caused by technology issues, business changes, or team interference
- The Team and Scrum Master can add or remove items from the Sprint if all (including Product Owner) agree
- All tasks/stories must be kept up by Team members
- Daily Scrum attendance and updates are required

M	T	W	Th	F
M	T	W	Th	F

Rules: Sprint Review

- Who: Team, Scrum Master, Product Owner, optional Stakeholders
- Scrum Master presents Sprint goal, Backlog committed to, Backlog completed
- Present any functionality that is “done”
- Artifacts that are not product functionality should likely not be demonstrated to avoid confusing Stakeholders

M	T	W	Th	F
M	T	W	Th	F

Rules: Sprint Retrospective

- Who: Team, Scrum Master, optionally Product Owner
- All Team members answer two questions
  - What went well in the Sprint?
  - What can be improved in the next Sprint?
- Scrum Master and Team prioritize action from retrospective questions

M	T	W	Th	F
M	T	W	Th	F

Scrum Advantages/Disadvantages/Goals

Advantages:

- Team and individual motivation to meet sprint deadlines
- Small story size reduces slip impacts
- Transparency for team and organization
- Focus on quality for deliveries
- Allows for reorganizing priorities for follow-on sprints

- Disadvantages
  - Focus on the part under attention in a sprint may cause losing track of whole delivery needs
  - Developer roles shifts or lack of clarity can confuse teams and interactions
- Goals
  - Faster innovation
  - Move quickly from idea to delivery
  - Increased customer satisfaction
  - Increased employee morale

- https://www.xpand-it.com/2018/10/11/top-5-agile-methodologies/
- https://www.scrumalliance.org/about-scrum/overview

Five Most Common Gaps in Scrum Use

1. Missing or Insufficient Focus on Quality
2. Insufficient Staffing of Scrum Roles
3. Insufficient Backlog Refinement
4. Missing or Ineffective Retrospectives
5. Lack of Focus on Incremental Value Delivery

- From white paper “The Five Most Common Gaps in Scrum Adoption”, Stuart et al., 2018, Construx
- www.construx.com/whitepapers

Missing Quality Focus

- Need a clear definition of “Done”
  - Should not be ignored or weak
  - Should not come from outside the team
- “Done” should include
  - Level of test – unit, integration, system
  - Reviews – vs. requirements and design, and code reviews
  - Automation required
  - Tool use – code quality, security, code style
  - Documentation needed – release notes, specifications, etc.
  - Deployment readiness

Staffing Scrum Roles

- Product Owners – Missing, Inactive, Proxy
- Scrum Masters – “Oh by the way”, Command and Control

Refining the Product Backlog

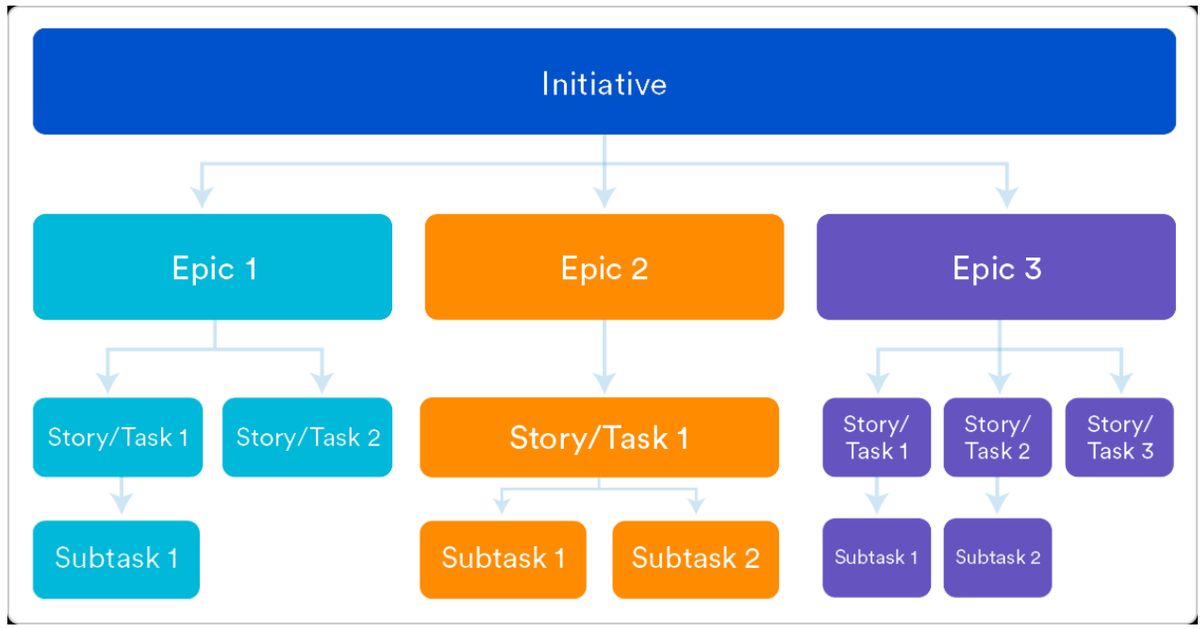
- Focused, effective, and efficient
- Should not take more than 10% of overall team's time
- Focus on the how of building, the what has been discussed (ideally)
- Scrum generally relies on just-in-time conversations, but in some cases, specifications may be needed (as a new story)
- Work consistently slipping into next sprints indicates the backlog tasks are not well decomposed or defined
- Depends on team working in parallel – clear, commons, and coherent understanding of what's being made
- Downstream rework indicates the team didn't understand the work well before starting

Issues with Retrospectives

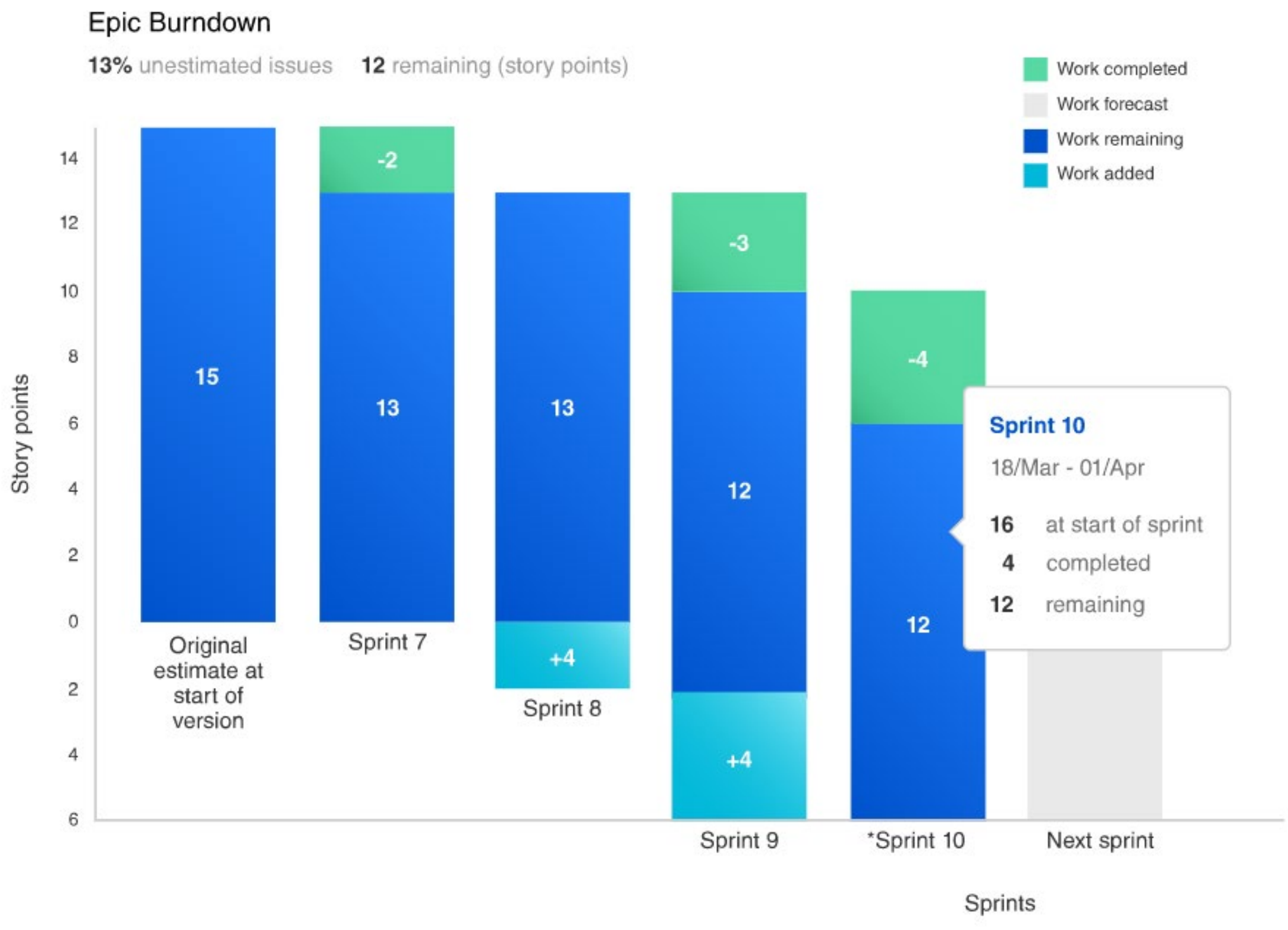
- Core issues are not discussed – cultural, interpersonal, political barriers keep real problems from being solved
- Failing to identify changes – 2017 Scrum Guide recommends at least one high-priority improvement must be included in each successive Sprint, and probably not more than two
- Vague improvements – need to lead to action
- Repetitive retrospectives – refresh approach, keep Team engaged, support open and safe discussions
- Look at past performance – Burndown Charts
- Continuous improvement via inspect and adapt!

Incremental Value Delivery Issues

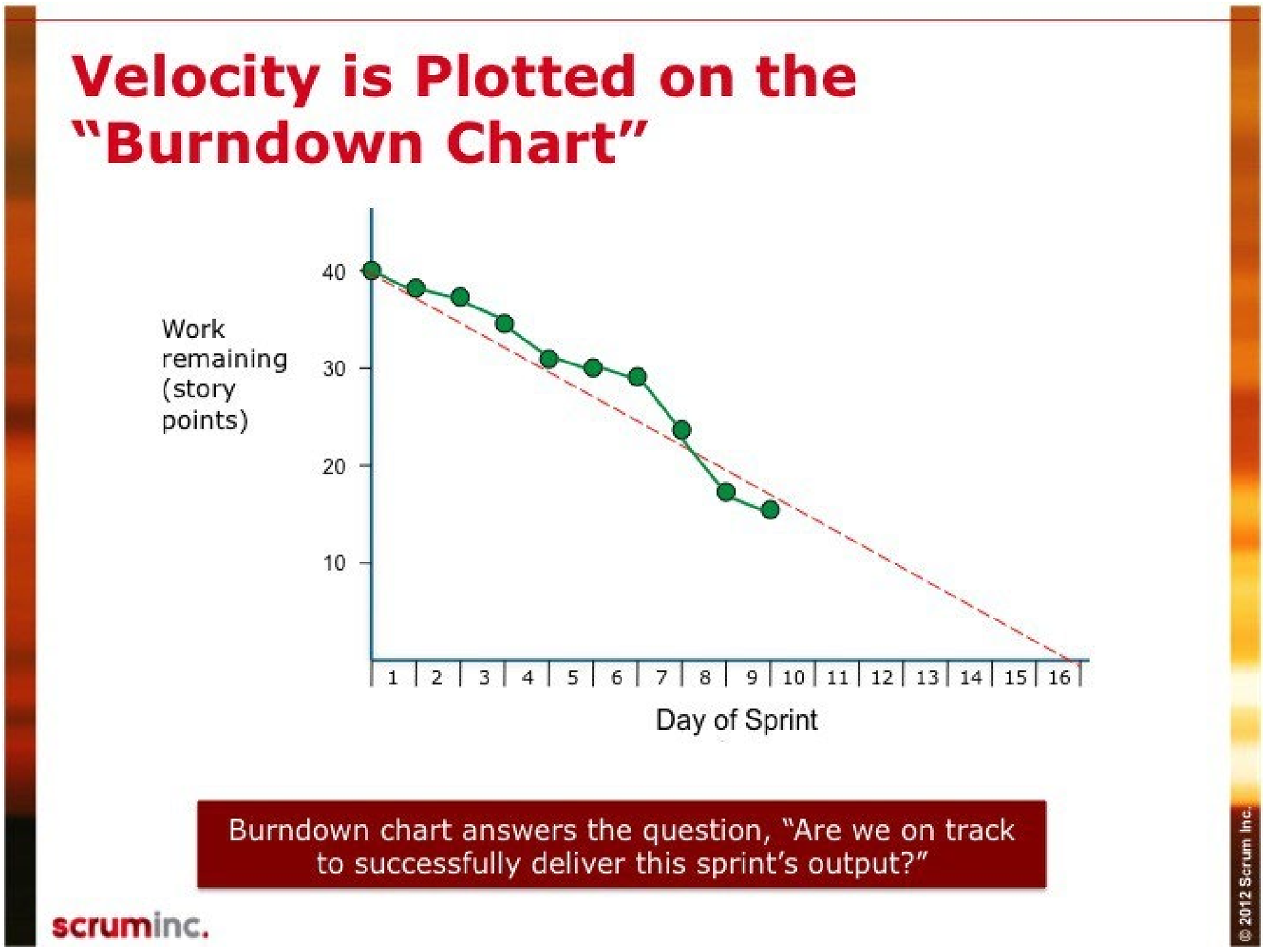
- Majority of responsibility is on Product Owner
- Understanding what Stakeholders want
- Failing to understand what has value
- Not staying current with Stakeholders
- Breaking work down in ways that do not deliver value
- Clarity on the goals of each epic
  - (image from https://www.atlassian.com/agile/project-management/epics-stories-themes)



Epic Burndown



Velocity


Velocity is Plotted on the "Burndown Chart"
Work remaining (story points)
40
30
20
10
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Day of Sprint
Burndown chart answers the question, "Are we on track to successfully deliver this sprint's output?"
scruminc.
© 2012 Scrum Inc.

User Stories

- **INVEST** – Independent, Negotiable, Valuable (to user or customer), Estimateable, Small, Testable
- Sized less than one agile iteration/sprint, generally keep small to control estimate error
- Elements
  - What: Description of the feature
  - Who: Person who will use or benefit from the feature.
  - Why: “business value”
  - When: Depends on the priority
- Behavior Driven Design
  - As A – I Want – So That = narrative notation for user stories
  - Given – When – Then = notation to develop acceptance criteria
  - Cucumber – executable specifications (https://cucumber.io/tools/cucumber-open/)

Planning Poker

- Part of Sprint Planning
- Use Story Points that fit your available time
  - For each team member, you shouldn't schedule more than 20 hours work in a two week sprint
    - (Shift this to 30 hours in 2nd semester)
  - Use a set of story points you agree on: Typical: 0, .5, 1, 2, 3, 5, 8, 13, 20
- For planning poker, review each task in the sprint, have team each provide their estimate
  - Often team will have cards for estimates, and will hold them up
  - Using the cards with all team members prevents bias

The Best Scrum Masters

1. Don’t commit the Team without consulting the Team
2. Make the Team look good
3. Don’t be overly tied to agile rules
4. Nothing is permanent, experiment with the process
5. Ensure everyone is seen as a peer
6. Protect the team from demanding or aggressive people
7. No failures, just a miss in an attempt
8. Praise often and sincerely
9. Encourage the Team to take your job
10. Listen for problems, let the Team talk

https://www.mountaingoatsoftware.com/blog/ten-sentences-with-all-the-scrum-master-advice-youll-ever-need

Expectations for your Scrums

- Use your WBS and Requirements to create your initial Product Backlog (identify epics, broken down into stories)
- Someone on the team gets the role of ScrumMaster
- Sprint planning at start of sprint to establish sprint backlog and story assignments and estimates (planning poker)
  - At least review with or send to Product Owner (Sponsor) if they don't directly participate
- Clearly defined, assigned, estimated stories for each Sprint, tracked in a tool
- Status of each story in the Sprint: To Do, In Progress, Done, Reviewed
  - You can modify the status categories your team uses
- (At least every other day) 15-minute Scrum stand-up for team
- Sprint Review each sprint with Sponsor
  - Show elements that are done, share the good and not good from the sprint
- Sprint Retrospective each sprint with Team
- Turn in Sprint Summary Report Form (every sprint, no firm deadline)

Sprint Summary Report Form

- Artifact for grading each sprint
- Provide ASAP after each sprint ends
- Graded based on thoroughness of report and clear effort on work items, not on any particular misses or deliveries
- Like anything in your team's Sprint processes, if you need to change the format of the report, please do, as long as the basics are shared

CSCI 5040 PMP Project | Sprint Summary Report | Bruce Montgomery

Sprint Description

Sprint Start Date: Sprint End Date:

Project:

Team Members:

Sprint #:

Focus of Sprint:

Burndown Summary

Story points planned to complete:

Story points completed:

Story points added:

Sprint Backlog (stories list): (Story – Owner – Estimate – Actual – Status)

- Code review for Preethi's card sorting module – Bruce – 3 – 2 – Done
- Code review for Bruce's card ordering module – Preethi - 1 – 3 - Done

Comments on Sprint Review (from Team and/or Sponsor): Sponsor Reviewed: Yes / No

-

-

-

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Top 4 Sprint Retrospective Comments/Actions (Good or bad)

1

2

3

4

Task Tracking Tools

- Whatever your sponsor would like you to use (and share)
- Potential tools
  - Trello – I have a Trello environment set up and can create a task board for your team (https://trello.com/en-US)
  - Asana – free for basic use (https://asana.com/)
  - Freedcamp – free for basic use (https://freedcamp.com)
  - Github Issues Tracking
  - Others…

Scrum References

- Atlassian's Agile Coach: https://www.atlassian.com/agile
- Scrum.org Resources: https://www.scrum.org/
- Scrum Alliance: https://www.scrumalliance.org/
- Video on Agile Product and Project management:
  - Favorite video for explaining Agile best practices and key elements in 15 minutes
  - https://www.youtube.com/watch?v=502ILHjX9EE
- Visual Paradigm Guide to Scrum: https://www.visual-paradigm.com/scrum/what-is-scrum/
- Nice set of scrum reporting/guidance templates: https://www.scrumdesk.com/Download/Documents/AgileResources/ScrumGuidelines.pdf

Overall PMP Schedule

- Week 3: 9/7
  - Initial and final team assignments
  - Bruce will notify sponsors of team assignments
  - Bruce will send out NDAs for signatures – Due Wed 9/16
  - Teams should hold an initial meeting and discuss team roles
  - Charter and project briefs assigned/initial development
  - Thursday speaker (attendance tracked) – Amy & Rae
  - Request an introductory meeting for your team and the sponsor
- Week 4: 9/14
  - First meetings with sponsors – if you can share initial charters/project briefs all the better
    - Review any process, deliverables, or tool requirements they may have
  - First meetings with Bruce/Preethi for project status updates
    - Begin using status update forms, share with sponsors
  - Charter and project brief due, charter submitted for sign off by sponsors
    - Interim by 9/18, Final signed by 9/23

Overall PMP Schedule

- Week 5: 9/21
  - Start development of WBS & Requirements
- Week 6: 9/28
  - WBS & Requirements – pass 1 reviewed by sponsor
- Week 7: 10/5
  - WBS & Requirements
  - Start to build out your Product Backlog (review with Sponsor when able)
  - Start at least a practice Scrum sprint
- Week 8: 10/12
  - WBS & Requirements – (if needed) pass 2 reviewed by sponsor
  - Submit first Sprint Summary Report Form
  - Midterm exam (take home)

Overall PMP Schedule

- Week 9: 10/19
  - Begin full 2 week Scrum sprint – Architectural/System Design?
- Week 10: 10/26
  - Scrum ends – Submit Sprint Summary Report Form
- Week 11: 11/2
  - Begin sprint – Design/Prototyping?
- Week 12: 11/9
  - Scrum ends – Submit Sprint Summary Report Form
- Week 13: 11/16
  - Begin sprint – Design/Prototyping?
- Week 14: 11/24 (off 11/26-11/27)
  - Sprint ends – Submit Sprint Summary Report Form
- Week 15: 11/30
  - Final sponsor and in-class presentations
  - Assessments: Instructor, GSS, sponsors, peer
- Week 16: 12/7
  - Final exam (take home)

Midterm Exam

- Opens on Friday 10/16
- Three Essay Questions related to class topics and experiences
  - May ask for citations to support answers
  - Use good sources; Do not use Wikipedia as a primary citation
- 100 Points
- You may use any resources (other than your fellow students) – the work must be your own
- Take care not to plagiarize sources or other students – do not cut and paste from web sources – work must be original
- Submit as a PDF, due Wednesday 10/21 at 7 PM

Next Steps

- Regular weekly status updates
- Speaker 10/8 – Rich Sheridan
  - New Discussion Topics up on Piazza to ask Rich questions, you can submit questions during the interview as well
- Please try to visit Discussion Topics weekly for comments (and participation grades)
- Teams should be finishing WBS and Requirements, begin first Scrum rhythms this week, begin building Product Backlog list
- Regular meetings with sponsor and me/Preethi should be set
  - Project Status Forms, review and turn in weekly!
- Aligned with sponsors on tools, project processes, deliverables
- Always cc Bruce & Preethi on sponsor e-mails
- Preethi and I are available for questions or ANY other support