Lecture 1: August 30

Introduction to Senior Design (CS 4243W)

Agenda / Topics

Instructional Team Introductions

Course Review

Setting up Slack and Trello

Project Management Methodologies

- Top Methodologies
- Our Application of Agile for the Course
- Industry Breakdown
- Team Role: Who is the Project Manager and Scrum Owner
- Project Management tooling

Instructor

Josh Shapiro

Professor Wood

Professor Qu

Industry Mentors

Billy Miller	GWU '21	MITRE
Brannon McGraw	GWU '15	Domino's
Dennis Afanasev	GWU '20	NASA
Ellen Louie	GWU '16	Linked Senior
Grace Huang	GWU '16	Raytheon
Katie Stasaski	GWU '16	Salesforce
Lucas Chaufournier	GWU '15	Square
Rian Shambaugh	GWU '15	FINRA

Course Review

- Wednesday night will be a mix of:
    - Lectures
    - Industry presentations/alumni panels
    - Interview prep
    - Team presentations/demos

- The last hour of the Wednesday night lab is reserved for meeting w/ mentors

Course Topics

- **Project Management**
    - Methodologies
    - Planning & scoping
    - Development & delivery
- Industry Software development
    - CI/CD setup
    - Git workflows for teams
    - PR Reviews
- Interview skills
    - Coding questions
    - System design
- Employment
    - What to do with a CS degree
    - Academia vs industry
    - Startups vs established companies
    - How to value compensation packages & equity

Joining Slack

1. Download Slack app to Desktop or Phone ([Mac](), [Windows](), [iPhone](), [Android]())

Follow steps in email invite or continue on...

2. Use this link: [https://bit.ly/gwsd2324-slack]()
3. Finish signing in
4. Confirm that you can see the GWU Senior Design 2023 Channels: #announcements, #random, and #senior-design-class-23-24

Setting up Trello

Create / login to Trello Account at https://trello.com/

Methodologies

In Project Management

Project Management

Project management is the use of specific knowledge, skills, tools and techniques to deliver something of value to people.

Generally,

- No 2 projects are identical
- No 2 teams are identical

Therefore, methodologies must work to provide the best way to deliver on that value with the team at hand

Top Project Management Methodologies

1. Waterfall
2. Agile
3. Scrum
4. Kanban
5. Scrumban
6. eXtreme programming
7. Adaptive Project Framework
8. Lean

Waterfall

Traditional approach where tasks and phases are completed in a linear, sequential manner, and each stage of the project must be completed before the next begins

Works well if…

- End goal is clear
- Stakeholders know exact needs
- Project is consistent
- Working in well-regulated industry

Doesn't work well if…

- Project is liable to change
- You don't have full requirements
- You need continuous feedback

Waterfall Methods

- Kick off meeting to collect requirements
- No more customer touch points after this meeting
- Design, Implement, Verify, and Maintain to completion
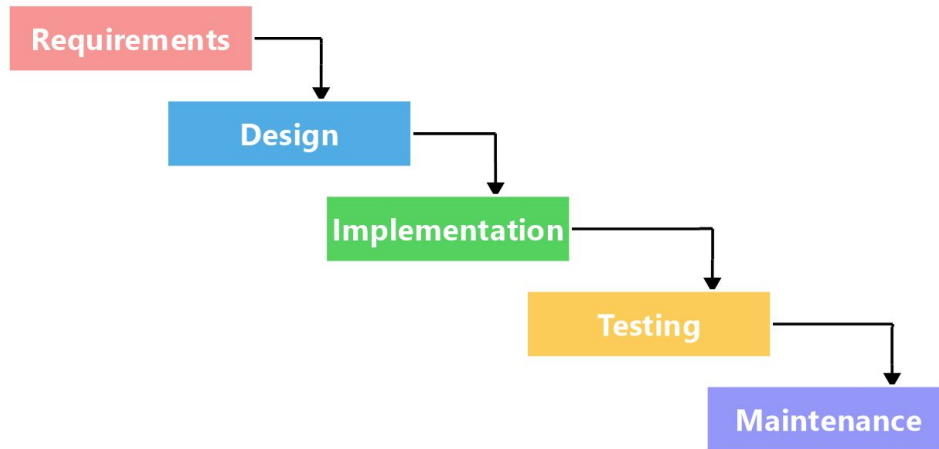
Agile

The agile project management methodologies usually involve short phases of work with frequent testing, reassessment, and adaptation throughout

Works well if...

- Your project is liable to change.
- You're not sure at the outset what the solution will look like.
- You need to work quickly, and it's more important that you see speedy progress than perfect results.
- Your stakeholders or client needs (or wants) to be involved at every stage.

Doesn't work well if...

- You need a predictable deliverable, and you need to be crystal clear about what that looks like from the outset.
- Your project can't afford to change during its course.

Agile

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:

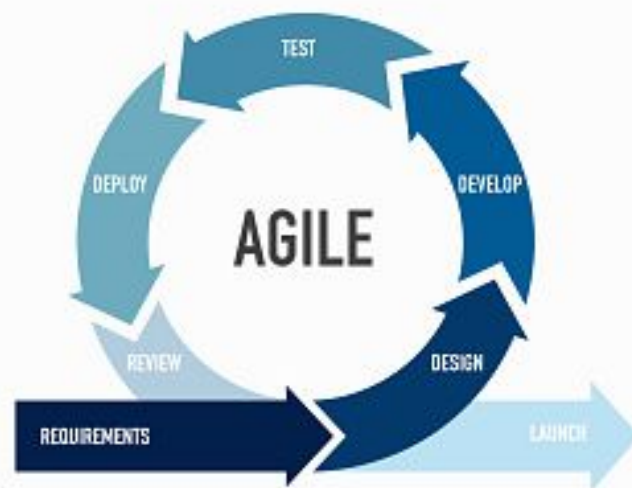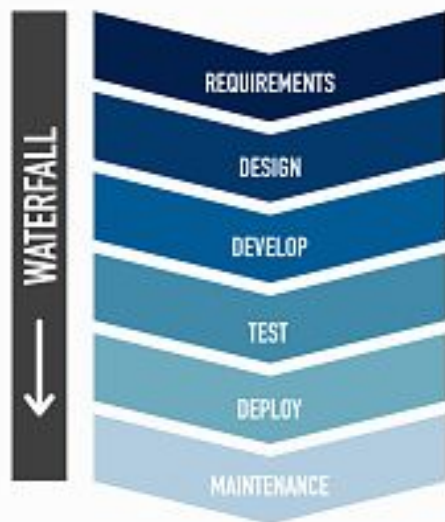Individuals and interactions over processes and tools

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.

AGILE vs WATERFALL

WATERFALL

- REQUIREMENTS
- DESIGN
- DEVELOP
- TEST
- DEPLOY
- MAINTENANCE

VS

AGILE

- TEST
- DEVELOP
- DESIGN
- REVIEW
- DEPLOY
- REQUIREMENTS
- LAUNCH

Agile Concepts

Sprint:

Short, repetitive period of time in which the team commits to a certain amount of work (in some cases points) to be completed in that time.

Backlog:

List of all tasks that are required for the project completion (project backlog) or other goals (eg. PQ Backlog, Tech Debt Backlog)

Sprint Board:

Place to track the tasks being worked on for the sprint

Agile Processes and Rituals

One 2-week Sprint Includes...

1 Sprint Planning Meeting: Bring backlog items into sprint board

Daily Standups: Checkin everyday to unblock each other

1 Backlog Refinement: Clean up backlog to prep for next sprint(s)

1 Sprint Review "Demo": Demo work done in the sprint

1 Sprint Retrospective: Honest conversation about what went right, wrong, and action items to improve

**this is not a perfect recipe, many teams will adjust to what works best

A Typical Monthly Sprint Schedule

Week 1

Day 1   *Days 2-7*

Sprint Planning Meeting		Standup Meeting	Work on project: update cards, use slack to unblock and questions

Week 2

Days 1-7

Standup Meeting	Work on project: update cards, use slack to unblock and questions, etc

Week 3

Days 1-7   *Any day this week*

Standup Meeting	Work on project: update cards, use slack to unblock and questions, etc	Backlog Refinement

Week 4

Days 1-7   *Day 7*

| Standup Meeting	Work on project: update cards, use slack to unblock and questions, etc	Demo, Retrospective

Using Agile for our Projects

Why?

- Not all requirements are known
- Stakeholders are flexible on product-specific requirements
- Project duration requires iterative sprints of work
- Enabling a wide variety of projects against the same course goals

How?

- Trello as the source of truth
- Mentors as Scrum Owners and "Technical Consultants"

Agile Mapping
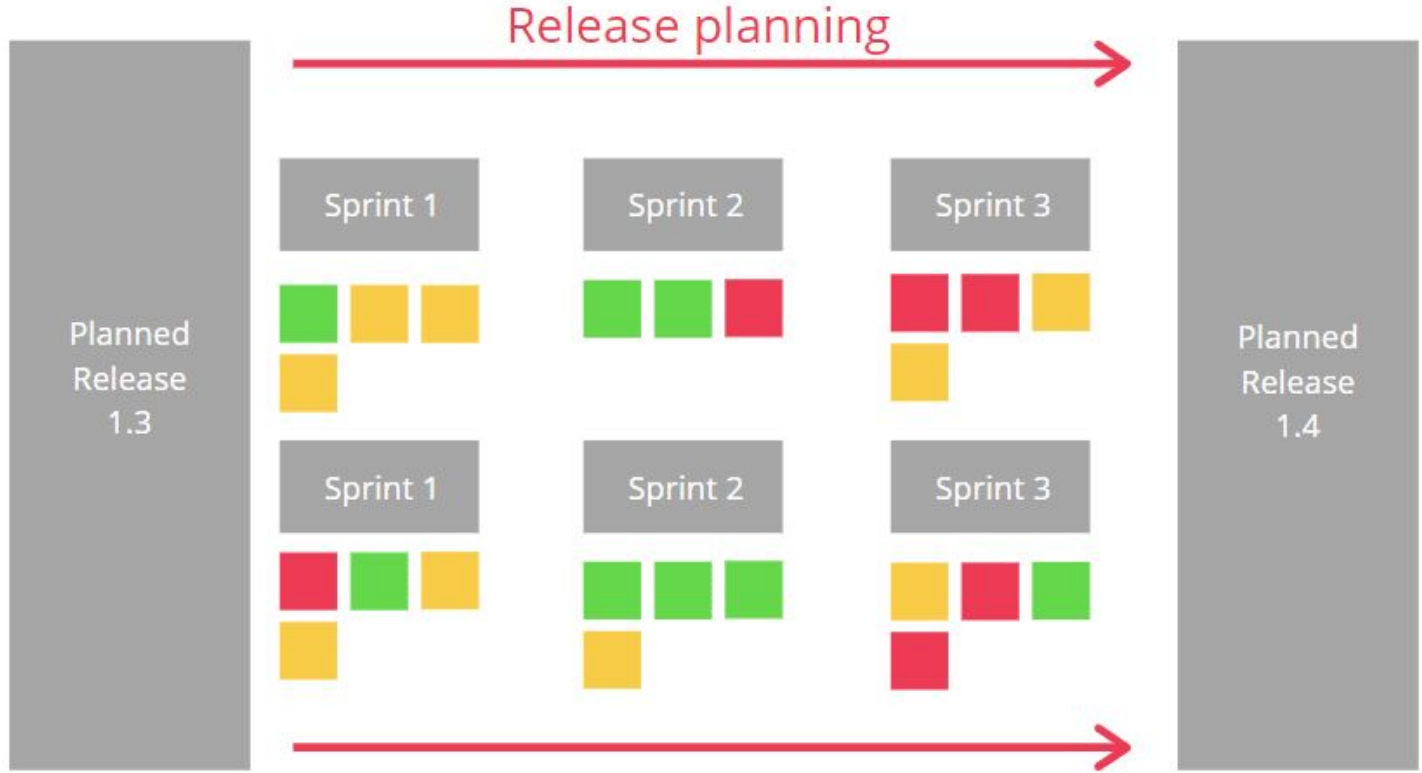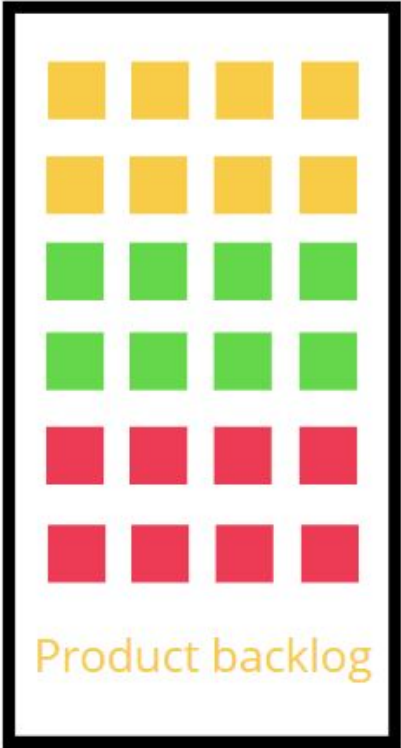
Scrum, Kanban, and Scrumban

Scrum

Work is split into short cycles known as "sprints", which usually last about 1-2 weeks.

Focus: Deliver potentially shippable increments of progress at the end of each sprint

Kanban

Tasks are visually represented as they progress through columns on a kanban board. Work is pulled continuously from the backlog.
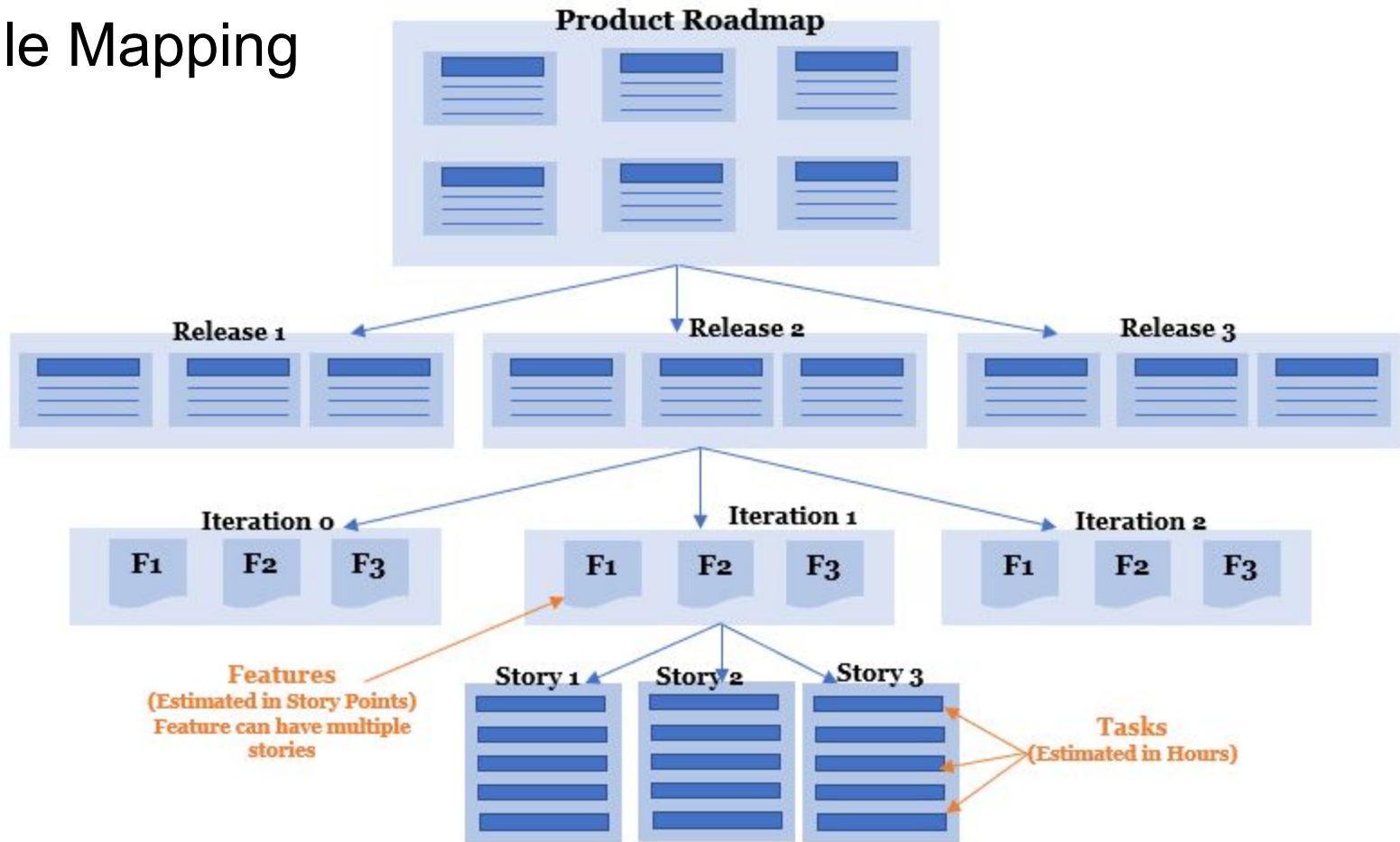
Focus: Improve efficiency and throughput by limiting WIP.

Scrumban

Work is split into short cycles known as "sprints", which usually last about 1-2 weeks. Work is pulled continuously from the backlog.

Focus: Adaptable to changing priorities & continuous improvement.

Agile Mapping

Project Manager

Who?

- A Project Manager is responsible for the planning, procurement, execution and completion of a project
- In charge of the entire project and handles everything involved, such as the project scope, managing the project team, as well as the resources assigned to the project.

Roles and Responsibilities?

- Responsible for Success or Failure of project
- Trello as the source of truth
- Mentors as Scrum Owners and "Technical Consultants"

Scrum Owner

Who?

- Lead for the duration of the sprint, after which they review their performance in a "sprint retrospective" and make any necessary changes before starting the next sprint.

Roles and Responsibilities?

- Trello as the source of truth
- Mentors as Scrum Owners and "Technical Consultants"

"Agile-ish. We have daily stand ups and weekly planning meetings and we iterate over requirements, but we don't work in sprints."
Rian, FINRA

"We do planning every 2 weeks but don't really follow any methodology besides that"
Aaron, Meta

"We use agile with two week sprints, and quarterly planning based around OKR's"
Lucas, Square

Quick Poll:

"It's complicated (ranges from sprintish planning, to 6 month roadmaps, to nothing at all)"
Phil, Meta

@Mentors, what method does your team use?

"Strictly Agile, more specifically scrum flavored: biweekly sprint planning coupled with demo-able "stuff" we completed the past sprint. "If it goes into the sprint it should be completed, otherwise, you've overestimated"
John, Toyota

"For my team specifically, we don't really have any structure beyond a 6 month roadmap, it's up to the individual and how they want to break up the work."
Pat, Meta

Project Management: Basic Tools

Project Management Tools

For tracking tasks...

- Trello (very small teams)
- Jira (established, large teams)

For collaborating on documents...

- Confluence
- Notion
- Google Drive Suite: Docs, Sheets, Slides, etc.

Quick Poll:

@Mentors, what project management tool does your team use?

"Jira and confluence"
Rian, FINRA

"We use google docs/sheets"
Aaron, Meta

"Jira for story management and coda for docs/wikis/planning"
Lucas, Square

"Custom tasks tool (works like jira, but better) and gdocs for most of it"
Phil, Meta

"Jira for all project tracking and logistics. Confluence for any docs (although in research docs are a rare luxury)"
John, Toyota

"Custom task tools plus GDocs (RIP quip)"
Pat, Meta

Major Takeaways

- Two most common methods: Waterfall and Agile

- Software mainly uses Agile

- Methodologies are not mutually exclusive (eg. you can be "agile" in a waterfall process)

- A Project Manager, Scrum Owner, or Product Manager owns this process

- Trello, Jira, Confluence, and other "Atlassian" projects are industry standard for tooling in this space

How this applies to Senior Design

- We will be using a "flavor" of Agile and Scrum for our projects

- Trello is our source of truth – mentors & faculty will use this to measure team progress

- Sprints will be 1 month long

- Use slack for weekly status updates, meetings with mentors as standup + technical discussion

For Next Week

- Confirm access to slack

- Create trello accounts

- Be prepared to meet with your mentors after Wednesday lab