Agile Software Development Practices

SOFT2412 / COMP9412

Team Dynamics; Tools and Technologies for Teamwork

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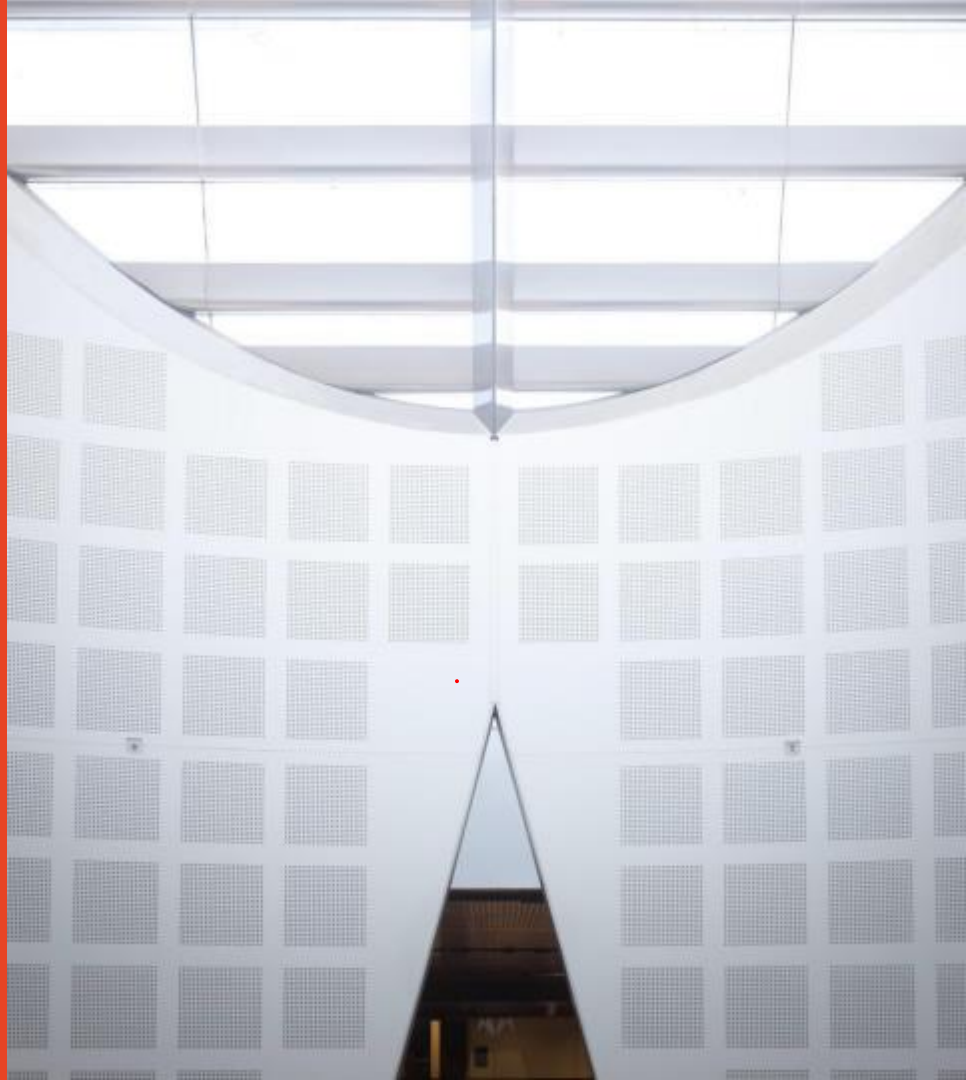
Slides based on Dr. Basem Suleiman and Dr. Farshid Hajati

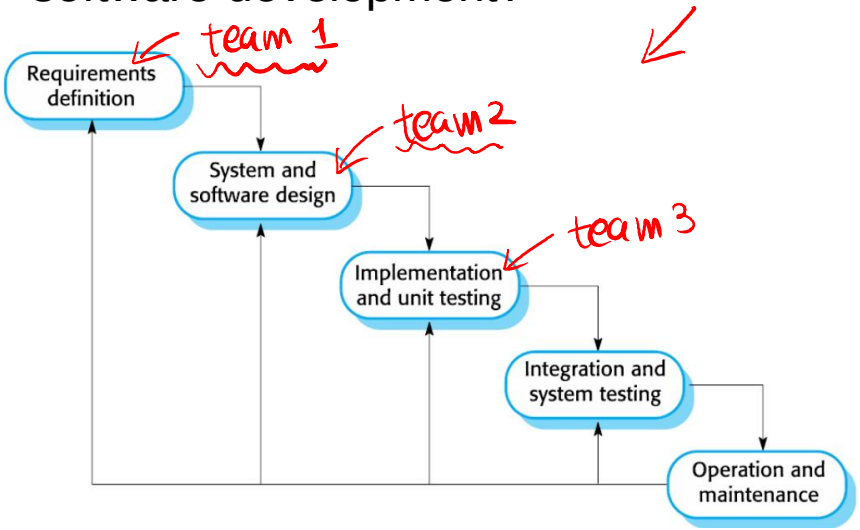


Agenda

- Teams in Software Development Models
- Teams in Agile Development
- Team Dynamics
- Effective Teams and Teamwork
- Tools and Technologies for Teamwork

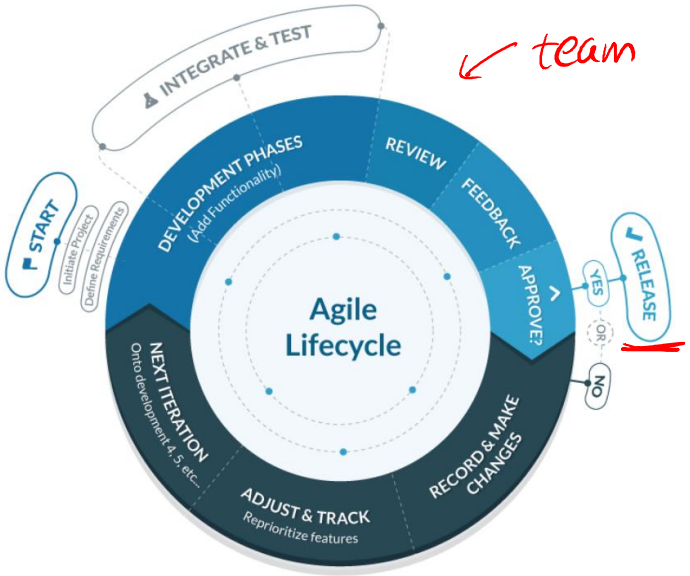
Software Development Models – Teams

Do software development models influence team structure and interactions in software development?



Waterfall model
plan-driven development

deliver the sw



Agile model
incremental & iterative development

https://blog.capterra.com/agile-vs-waterfall/

Waterfall Model – Teams

Development activities	**Teams**
Divide the work into stages	A separate team of specialists for each stage
At each stage, the work is passed from one team to another	Some coordination is required for the handoff from team to team – using "documents"
At the end of all of the stages, you have a software product ready to ship	As each team finishes, they are assigned to a new product

Teams under different SDLC models

- In a traditional structure how do teams work?
  - As work is planned and allocated, it can be divided into pieces that should be more-or-less independent
    - Specialist teams
    - Project management and resource reallocation
    - Clear authority lines, so disagreements can be resolved
  - Problems?
    - Single points of failure
    - Inflexibility
    - Lack of feedback
- And in Agile teams?

Agile Manifesto – Revisit

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

Agile Manifesto – Revisit

- **Individuals and interactions over processes and tools**

- Why Agile values individuals and interactions over processes and tools? Discuss

Agile Manifesto – Why Individuals and Interactions?

- Why Agile values individuals and interactions over processes and tools?
  - People tend to follow processes blindly, and make mistakes
  - "A great tool can sometimes help people to do the wrong thing faster"
  - Tools or best practices are not enough - people who need to use it should buy into it to realize its benefits
  - People needs to see the value of following certain practices

- It is important to recognize that you are working with a group of people who have different motivations, ideas and preferences

Agile Principles 1 – People

- 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**

- At regular intervals, the **team reflects** on how to become more **effective**, then **tunes and adjusts its behavior** accordingly

Agile Principles 1 – People

- *In-class Discussion:*
  - *Briefly discuss how the following agile principles perceive teams and teamwork in agile development?*

1 Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done

2 The most efficient and effective method of conveying information to and within a development team is face-to-face conversation

3 At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly

Agile Principles 2 – People

- Business **people** and **developers** must **work together daily** throughout the project

feedback

changes

- The best architectures, requirements, and designs emerge from **self- organizing teams**

- Our highest priority is to **satisfy the customer** through early and continuous delivery of valuable software

Agile Principles 2 – People

- *In-class discussion*
  - *briefly discuss how the following agile principles perceive teams and teamwork in agile development?*

- 4 Business people and developers must work together daily throughout the project

- 5 The best architectures, requirements, and designs emerge from self-organizing teams

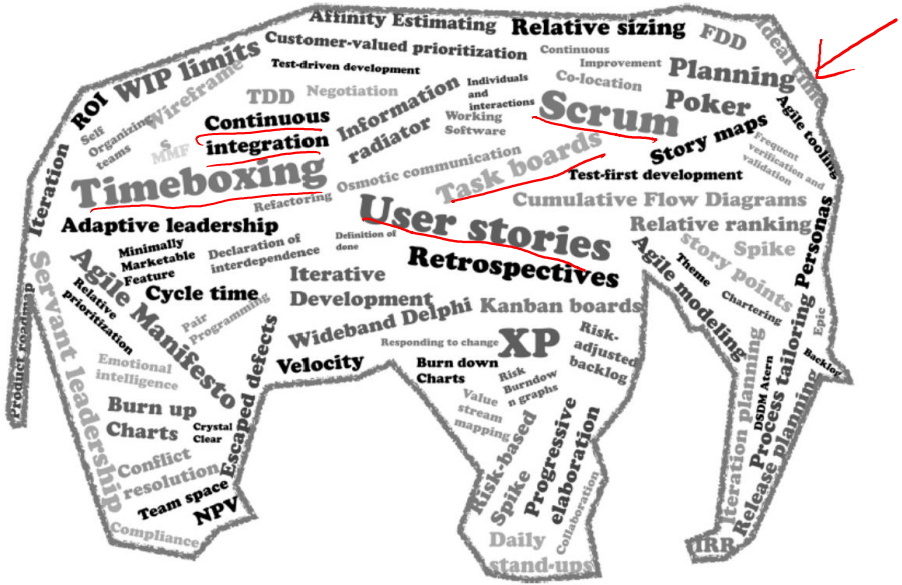
- 6 Our highest priority is to satisfy the customer through early and continuous delivery of valuable software

Teams – Individuals and Collaboration

- Common problem experienced in software development teams
  "*throw it over the wall*"
  - Team members are busy thinking about their own project work and problems
    - Different views/perspectives
  - Teams are divided, and collaboration is killed

Agile Practices – The Agile Elephant

- The agile elephant is made up of many practices



*Agile practices and Scrum method (most of these presented in this figure) will be discussed in more details in future lectures. The focus of the discussion here is on teams and the adoption of Agile practice

Agile Teams – Individual Practices

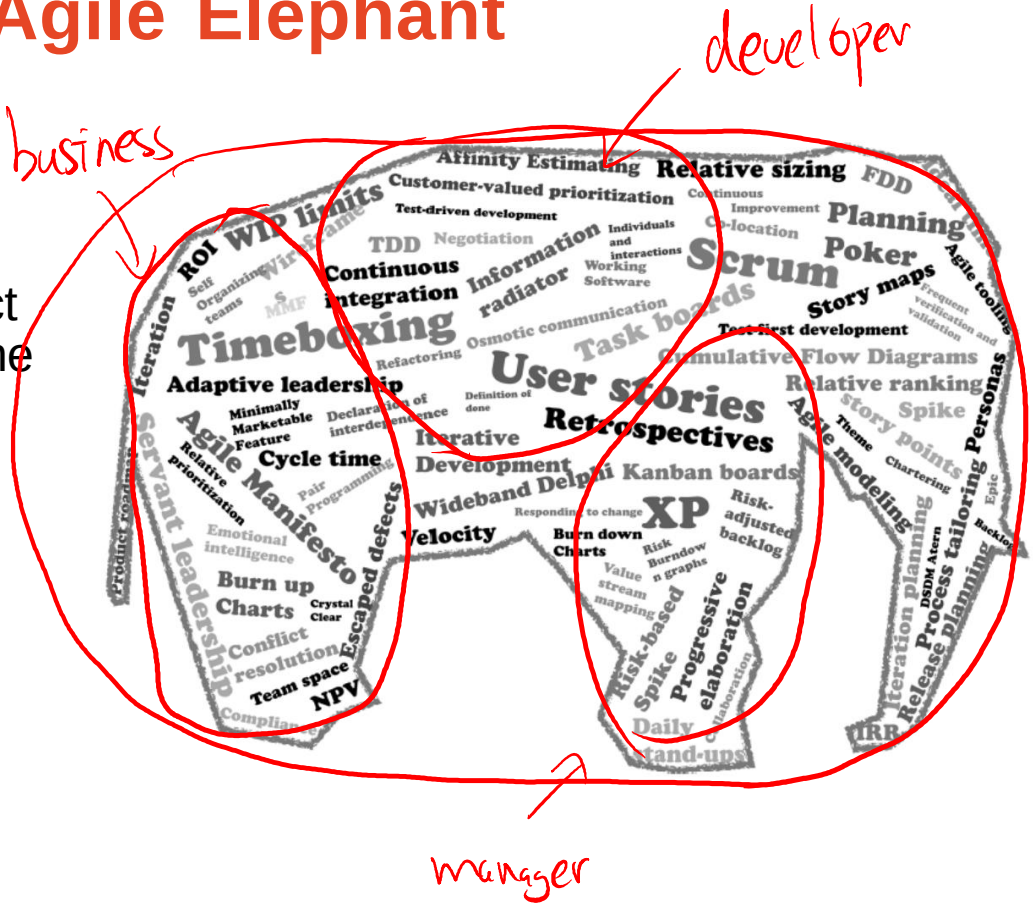
- When adopting agile practices, team members may adopt practices individually:
  - Each person uses only the practices that impact their work; developers focus on automated tests and build, team leads on task boards, project velocity and burn-down charts, business users on user stories
  - Adopting practices individually will improve things, but this may lead to a self-contradictory effect

Teams – Individual Practices

- When adopting agile practices, team members may follow the same thinking:
  - Each person uses only the practices that impact their work; developers focus on automated tests and build, team leads on task boards, project velocity and burn-down charts, business users on user stories
  - Adopting practices individually will improve things, but this may lead to a self-contradictory effect
    - Each person sees the part of agile that affects their specific work – (attitudes: “see! I was right all along”)
    - Agile is made up of day-to-day practices, but it’s much bigger than those practices

Understanding the Agile Elephant

- If you only sees the practices that directly affect your project work, then you will see the one small piece of agile



Team Dynamics

Team Dynamics

- "*Team dynamics are the unconscious, psychological forces that influence the direction of a team's behaviour and performance*"

- Factors that lead to team dynamics:
  - Personalities and work styles
  - Knowledge and skills
  - Organization culture and structure
  - Cultural differences, background

S. P. Myers, 2013 https://www.teamtechnology.co.uk/team/dynamics/definition/

Team Dynamics – Good or Bad?

In Agile development, is team dynamics a good or bad thing?

- Discuss

Team Dynamics – Pros and Cons

- Can be good
  - E.g., Improve overall team performance (productive conflict, different perspectives)

- Can be bad
  - Can lead to unproductive conflict can demotivate and prevent team from achieving its goals

S. P. Myers, 2013 https://www.teamtechnology.co.uk/team/dynamics/definition/

Team Dynamics – Tuckman Team Development Model

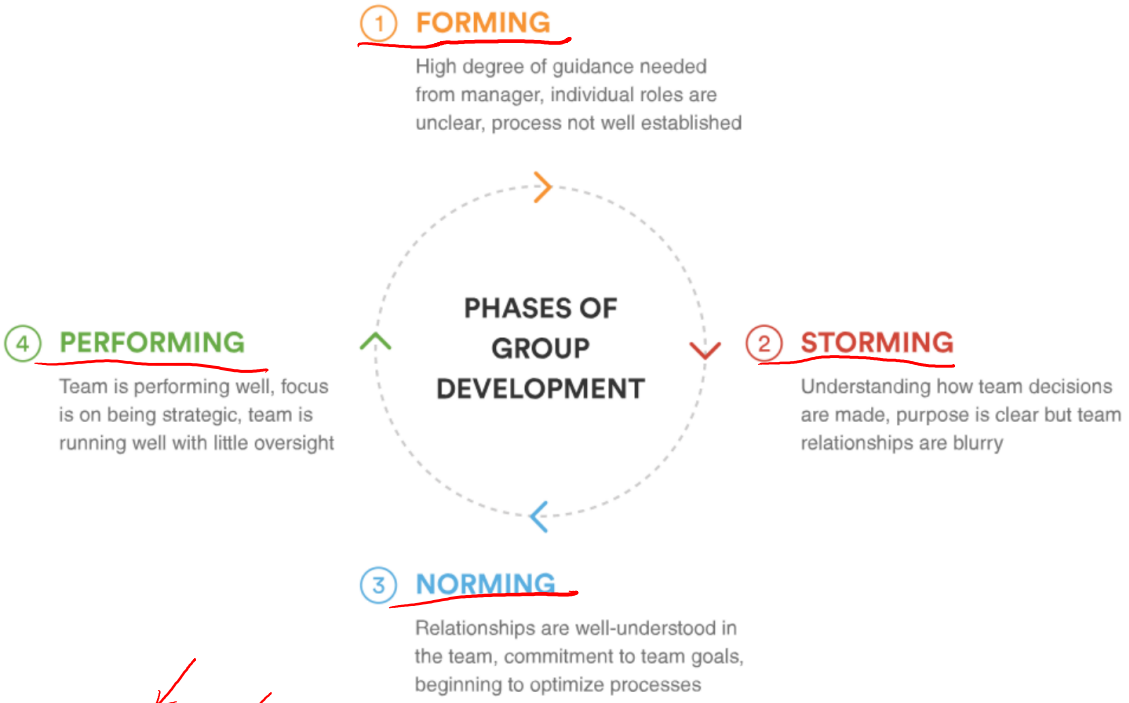


Image: https://www.atlassian.com/agile/teams
Tuckman's stages of group development - https://en.wikipedia.org/wiki/Tuckman%27s_stages_of_group_development

Team Dynamics – Identification and Resolution

- Result from the interaction of many factors
  - E.g., Personalities, work style, roles, culture, organizational structure

- Investigate the root causes of conflict or poor team performance
  - Structured interviews or informal chats in a private and confidential

- Identify potential improvements
  - E.g., change in office layout, team development workshops (practices, personality dynamics, cultural change programs)

Source: https://mysoftwarequality.wordpress.com/2014/09/04/cross-dysfunctional-teams

Agile Teams – Skills

- It's claimed that agile teams work with the best developers. However, this is not necessary the case;
  - Every project needs at least one experienced and competent lead person (Critical Success Factor)
  - Each experienced and competent person on the team permits the presence of 4-5 "average" or learning people
  - With that skill mix, agile techniques have been shown to work many times

Teams Culture

- Consider the following scenarios:
  - *Developer*: “It works in our environments, it’s operations responsibility to make it work in production”
  - *Tester*: ”Listen, it worked in User Acceptance Testing, it must be a configuration issue, or a missing firewall hole and nothing I could have spotted during testing…”
  - *Customer*: “Hello! Nothing works here…”

- Are these statements signs of team dynamics?
- Should this kind of culture exist in agile teams?

Source: https://mysoftwarequality.wordpress.com/2014/09/04/cross-dysfunctional-teams

Effective Teamwork

- Teamwork comprises of the right tools, the right people and the right practices
- Effective teamwork is everyone's shared responsibility
- Large software organizations, teams involve many roles across different departments (engineering, design, sales/marking, legal)
- Use *team building activities* to build effective teams

Team Building

- “*V*arious types of activities used to enhance social relations and define roles within teams, often involving collaborative tasks”

- There is an evidence how team building affect positively team effectiveness

https://en.wikipedia.org/wiki/Team_building

Team Building Activities

- **Goal setting:** emphasizes the importance of clear objectives and individual and team goals
  - E.g., objectives and key results (Atlassian)
- **Interpersonal relations:** focus on teamwork skills such as giving and receiving support, communication and sharing information
- **Standup meetings**
- **Roles and responsibilities** (Atlassian)

https://en.wikipedia.org/wiki/Team_building

Team Building – Roles and Responsibilities

- Define the roles and responsibilities that will make your team successful
- Clarify expectations as a team
- Helps to move a team from “storming” to “norming”,or help “performing” teams to get back on track

Roles and Responsibilities – How?

- Create a table of roles and responsibilities
  - Responsibilities from own perspective
  - Responsibilities from team member's perspective

Name	Role	Responsibility (own)	Responsibility (other's)

Roles and Responsibilities – How?

- Identify roles
  - E.g., team lead, developers, designers
  - Coarse-grained
  - Add to the role's column
- Clarify own responsibility
  - Think of top 3-5 tasks in priority order
  - Write on sticky notes
- Think of teammate’s responsibilities
  - Write 1-2 responsibilities for each role from your perspective
  - Write responsibilities you may think that don’t have a clear owner

Roles and Responsibilities – How?

- Refine and consolidate (optional)
  - Talk teammates with similar roles and refine responsibilities
- Discuss all roles
  - Role owner(s) describe their role and place their sticky notes in own responsibility column
  - Other teammate's role description in the other column
  - Owner to accept/decline the responsibilities by other teammates (suggest role to own it). Define primary owner for overlapping roles
  - Add "unassigned responsibilities" to
- Summarize roles and responsibilities
  - All to agree
  - Owner to document it and how to fill skill gaps

High-Performing Agile Teams

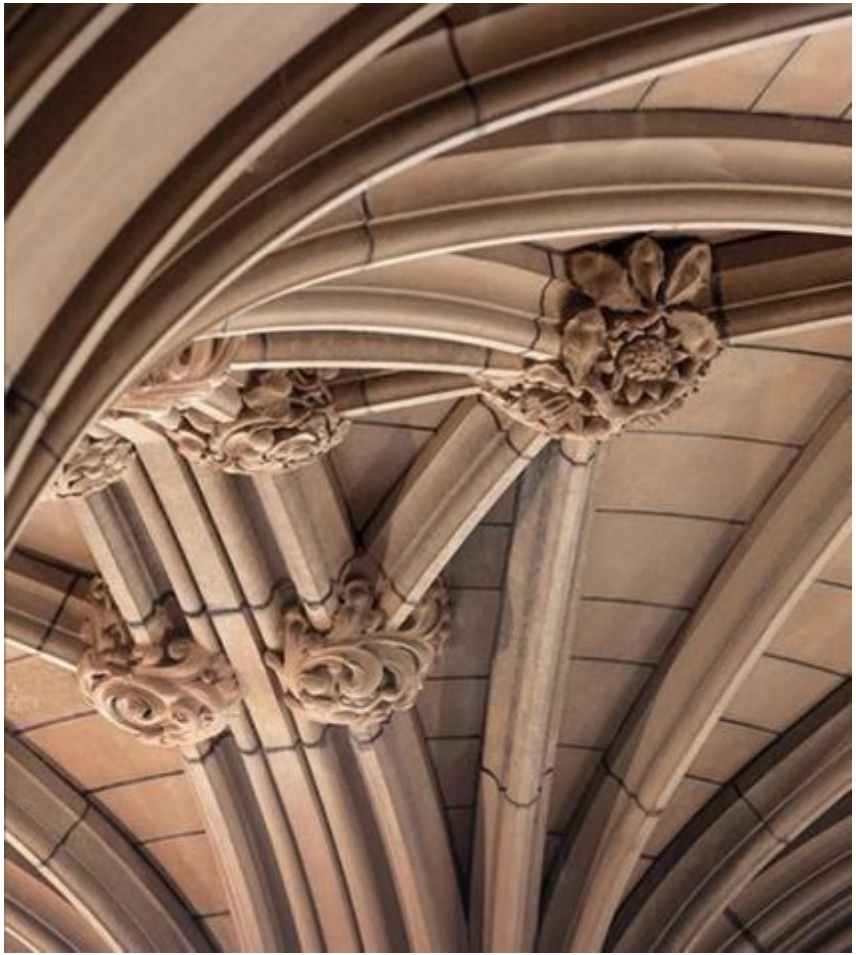
- Cross-functional; engineers, designers, architects, sales
- Mutual respect and mutual responsibility
  - Not blaming culture, and/or “throw it over the wall”
- Sound engineering practices (tools and automation)
- Value and belief of agile practices and principles
- Apply agile practices effectively as individuals and as a team
- Receive continuous training (technical and non-technical) and team monitoring/coaching

How much can you find out?

- Search for:
  - Team effectiveness
  - Self-managed teams
  - Group conflict
  - Team efficacy…

- Learn about the theory of teams!

Tools and Technologies for Teamwork



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Issue Tracking Systems

- A software that manages and maintains lists of issues
- Used to create, update and resolve reported issues internally or externally
- **Bug (defect) Tracking System**: keeps track of reported software bugs in software development projects
  - Centralized overview of development requests and their states
  - May assigned a priority, status, severity and/or complexity
  - Prioritized list of pending items (Backlog)
  - Typically integrated with other tools or software management systems

https://en.wikipedia.org/wiki/Issue_tracking_system
https://en.wikipedia.org/wiki/Bug_tracking_system

Bug/Issue Tracking Part of other Systems

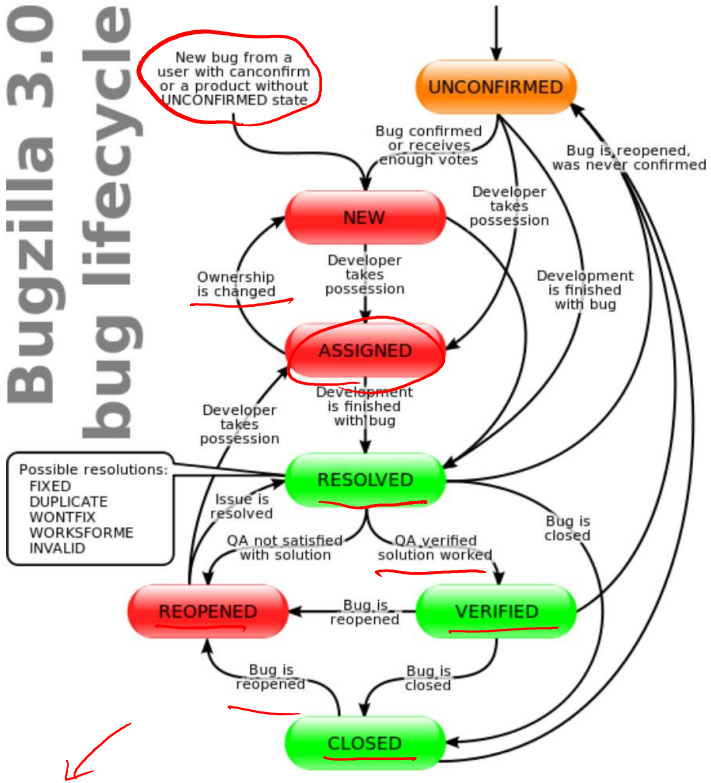
- Part of integrated project/software development management systems
- It helps integrating issue/bug tracking with other activities
- Distributed bug tracking tools are designed to be used with distributed revision control software

Bugzilla – Bug Tracking Tool

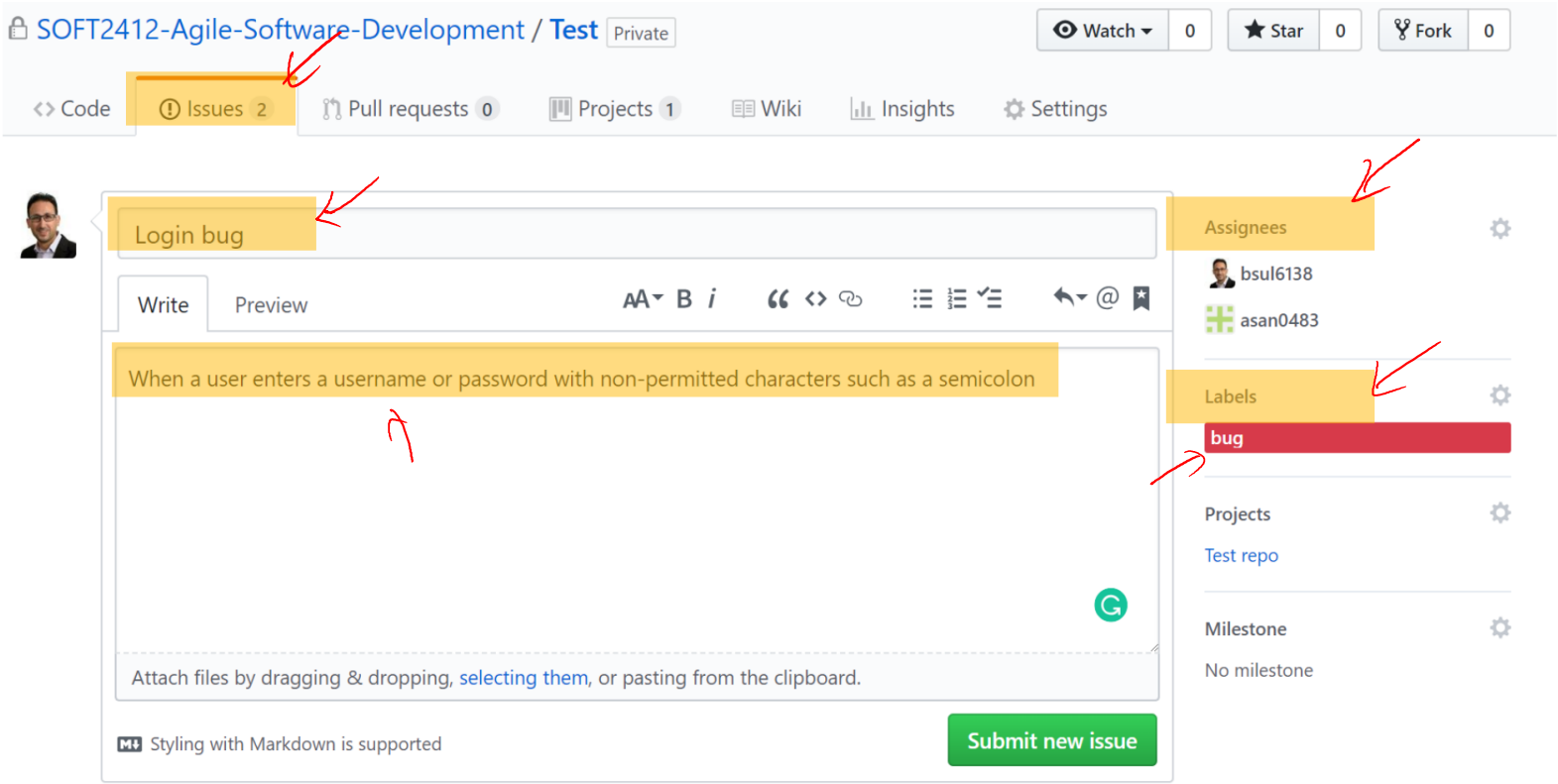
- Open-source web-based bug tracker and testing tool by Mozilla project
- Bug (or feature) requests can be submitted by anyone and will be assigned to a particular developer
- Various status updates for each bug
  - E.g., Bugzilla itself allows the public to file bugs – it assigns all bugs to a gatekeeper whose job is to assign responsibility and priority level

https://en.wikipedia.org/wiki/Bugzilla

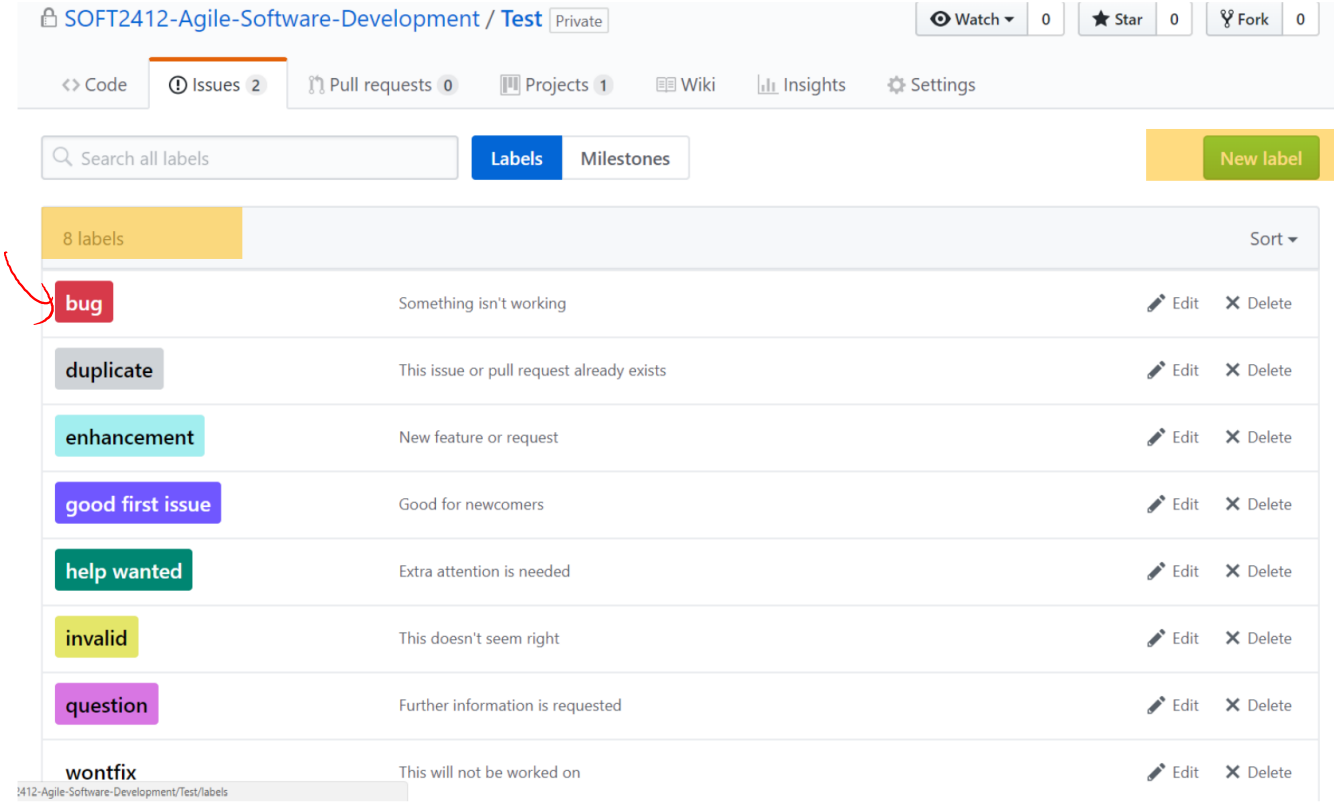
Bugzilla – Bug Lifecycle



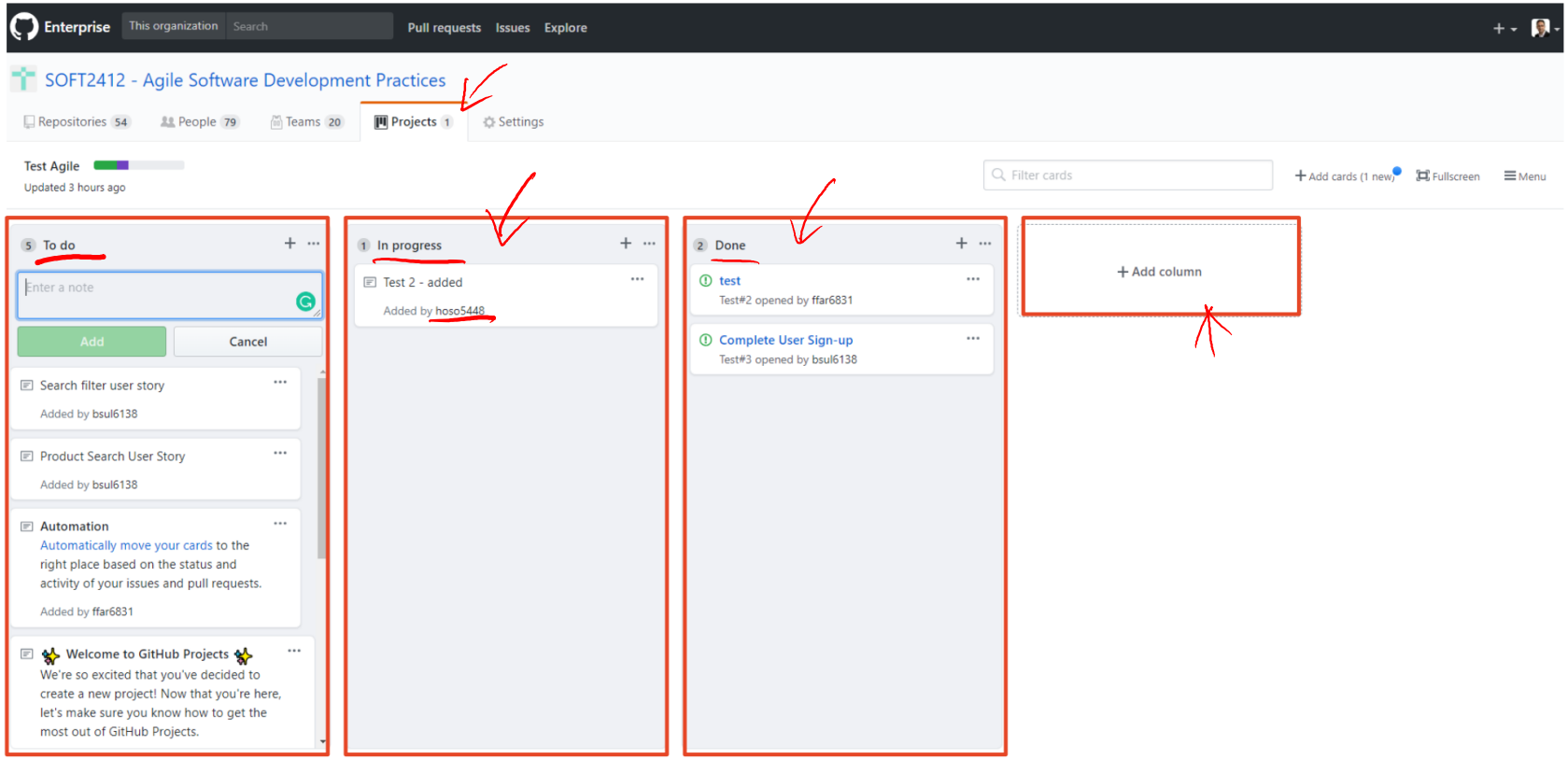
Issue Tracking – GitHub



GitHub Issue Tracking – Edit Labels



GitHub Issue Tracking – Project Management



Version Control Systems – GitHub Revisit

- GitHub allows groups of people to collaborate across many projects at the same time in organizations account

- Organization's members can be:
  - **Owner**: complete administrative access to the organization
  - **Member**: default role for everyone else

- Owners can manage members' access to the organization's repos. and projects with fine-grained permission controls

- Can add collaborators from outside of the organization (consultant) to have access to one or more organization repos. without bring a member of the organization

GitHub – Organization Access Control (Revisit)

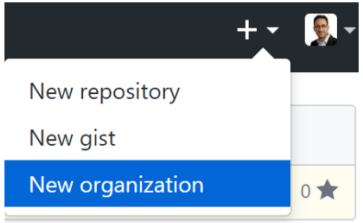
Organization action	Owners	Members
Invite people to join the organization	X	
Edit and cancel invitations to join the organization	X	
Remove members from the organization	X	
Reinstate former members to the organization	X	
Add and remove people from **all teams**	X	
Promote organization members to *team maintainer*	X	
Add collaborators to **all repositories**	X	
Access the organization audit log	X	
Delete **all teams**	X	
Delete the organization account, including all repositories	X	

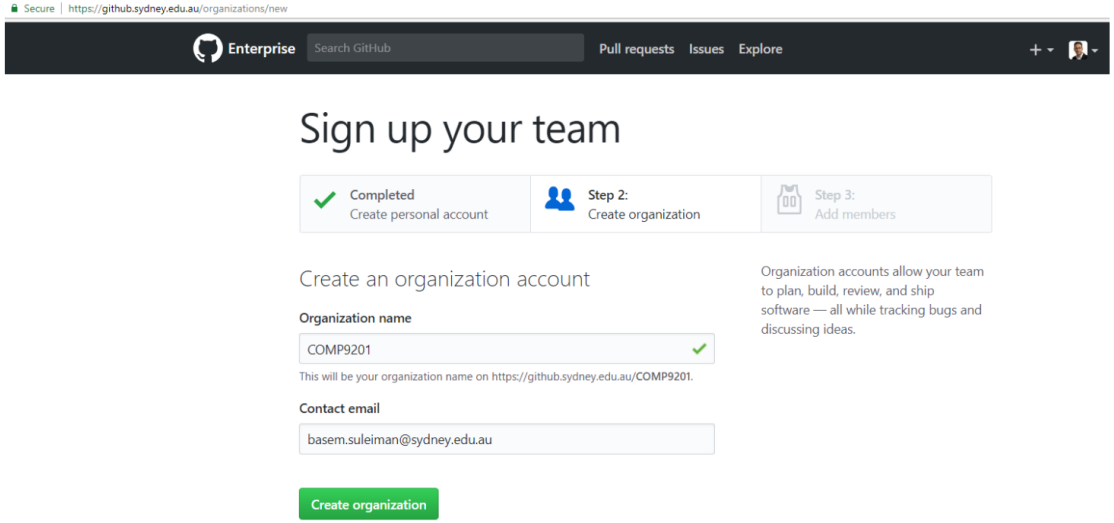
Organization action	Owners	Members
Create teams	X	X
See all organization members and teams	X	X
@mention any visible team	X	X
Can be made a *team maintainer*	X	X
Transfer repositories	X	
View a project board and add or reorganize its cards and columns	X	X
Create or delete a project board and edit its description	X	X
Automate actions for project boards	X	X
View and post private team discussions to **all teams** (see "About team discussions" for details)	X	
Edit and delete team discussions in **all teams** (for more information, see "Managing disruptive comments	X	

- Examples of access permissions for organization's owners and members

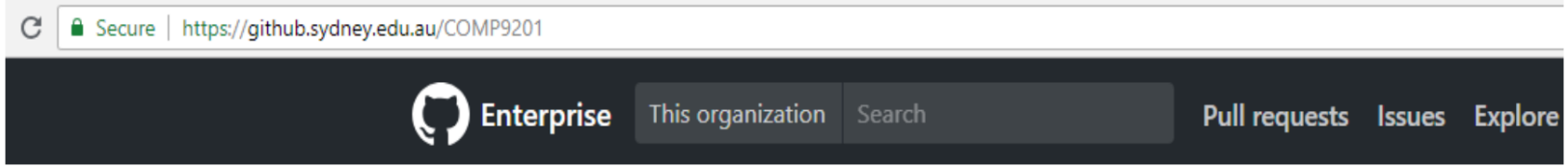
https://help.github.com/enterprise/2.13/user/articles/permission-levels-for-an-organization/

GitHub – Creating Organization (Revisit)

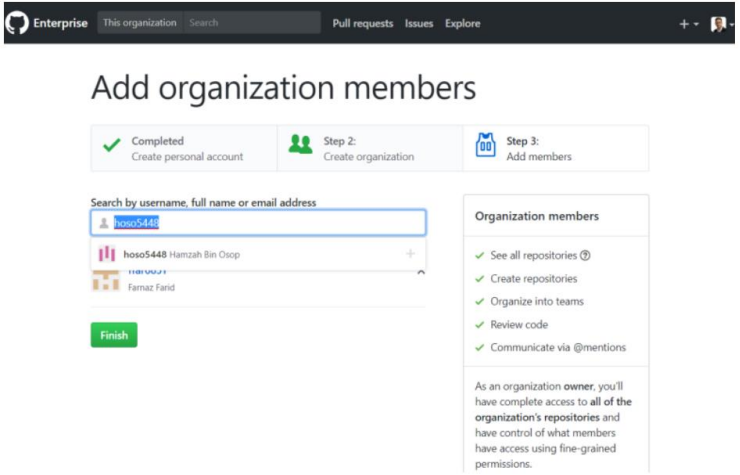




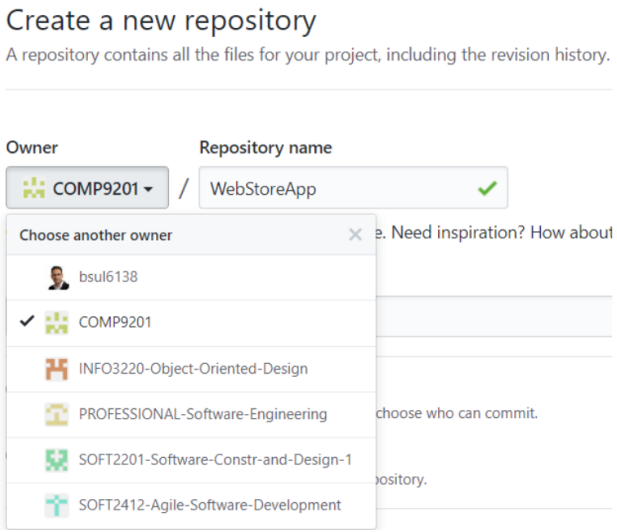
Organizational accounts have a namespace where all their projects exist



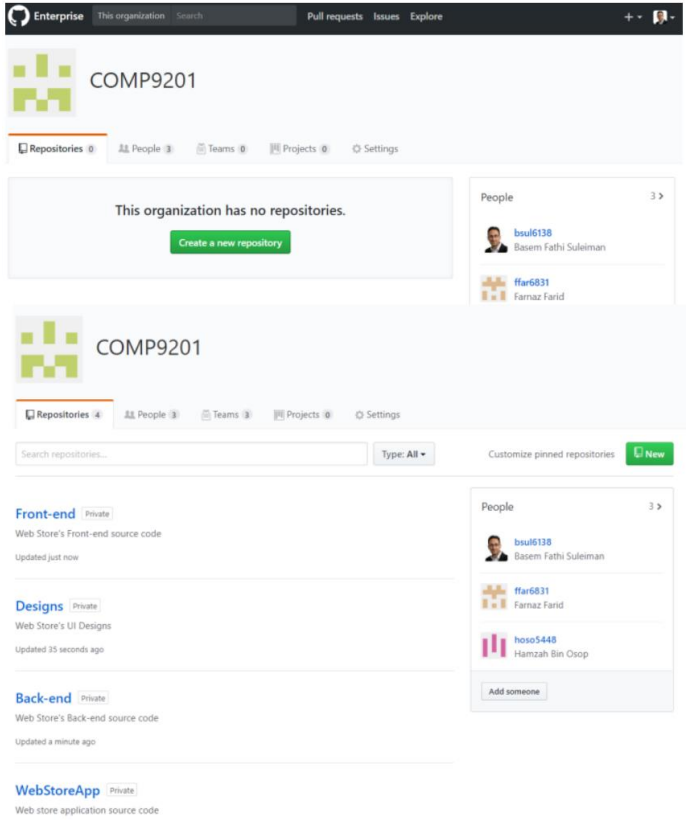
GitHub – Add Members to Organization (Revisit)

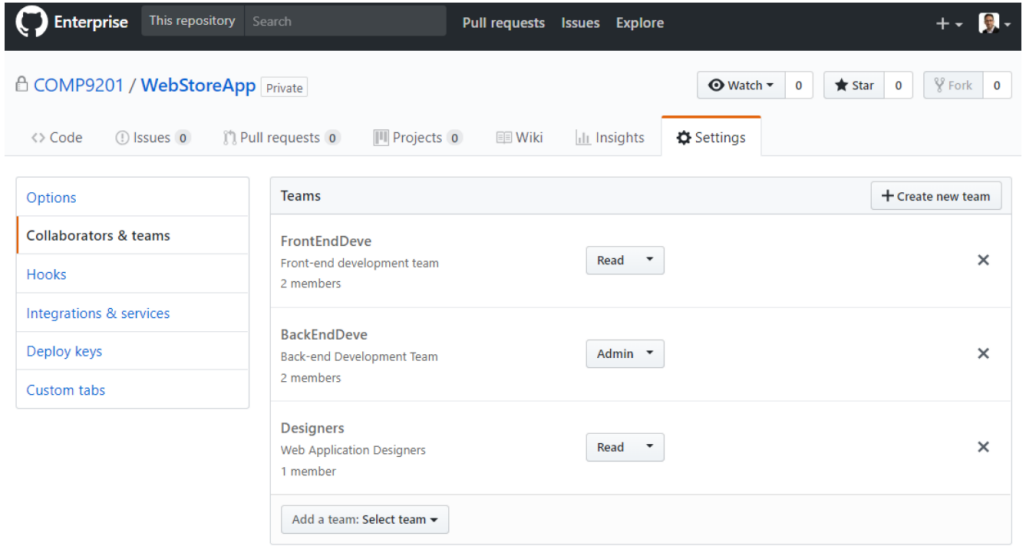


- Note: when you create a new repo you can create them under your personal account or under any of the organizations that you're owner in

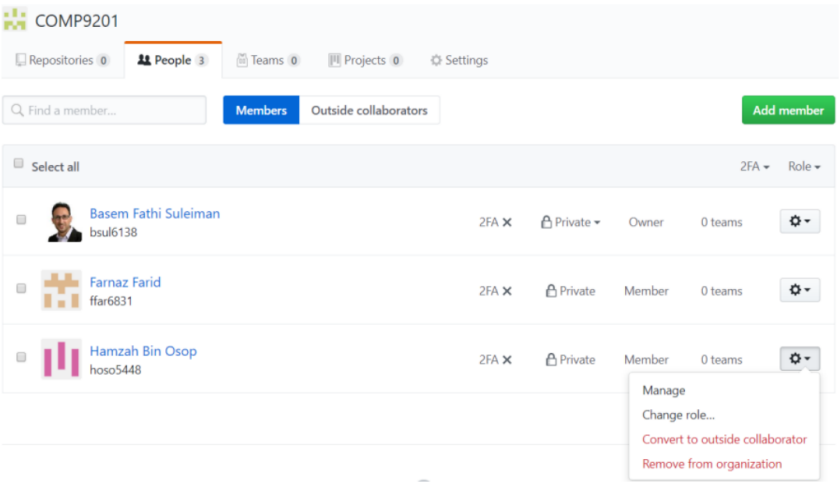


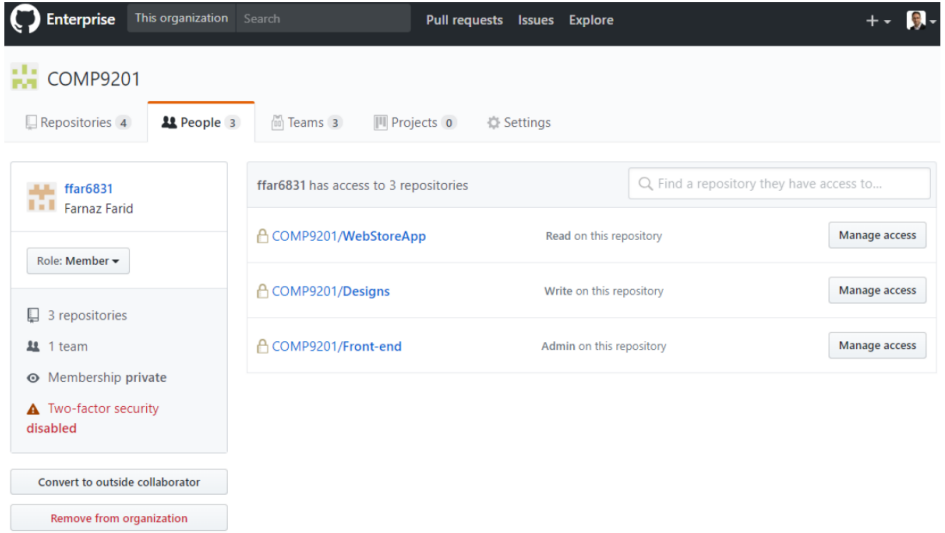
GitHub Organization – Manage Repos. (Revisit)



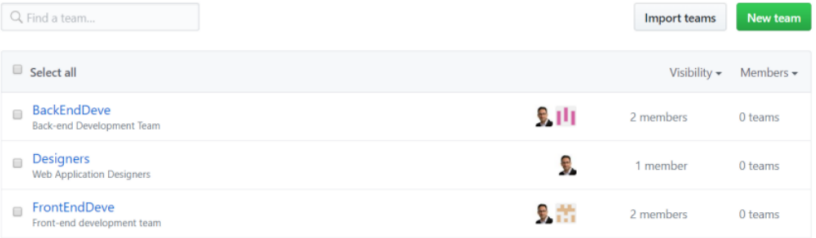


GitHub Organization – Manage People (Revisit)

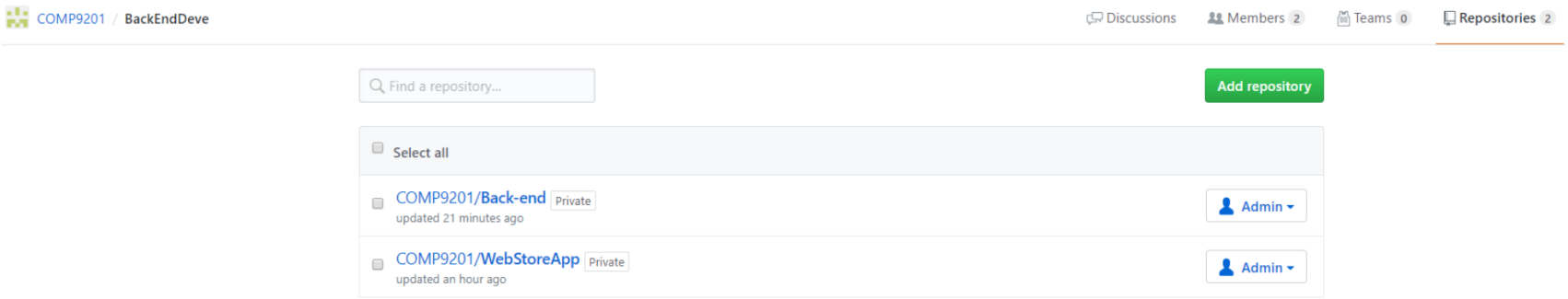




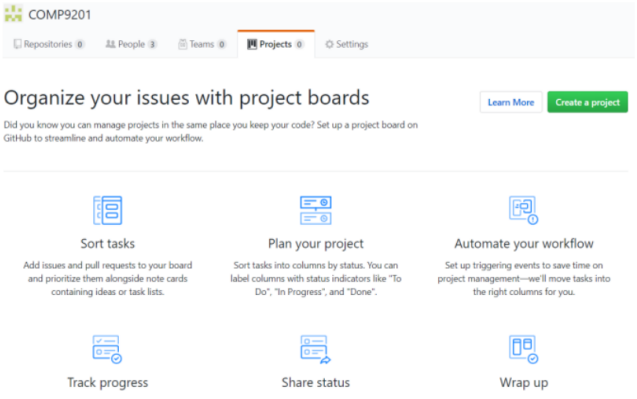
GitHub Organization – Manage Teams (Revisit)

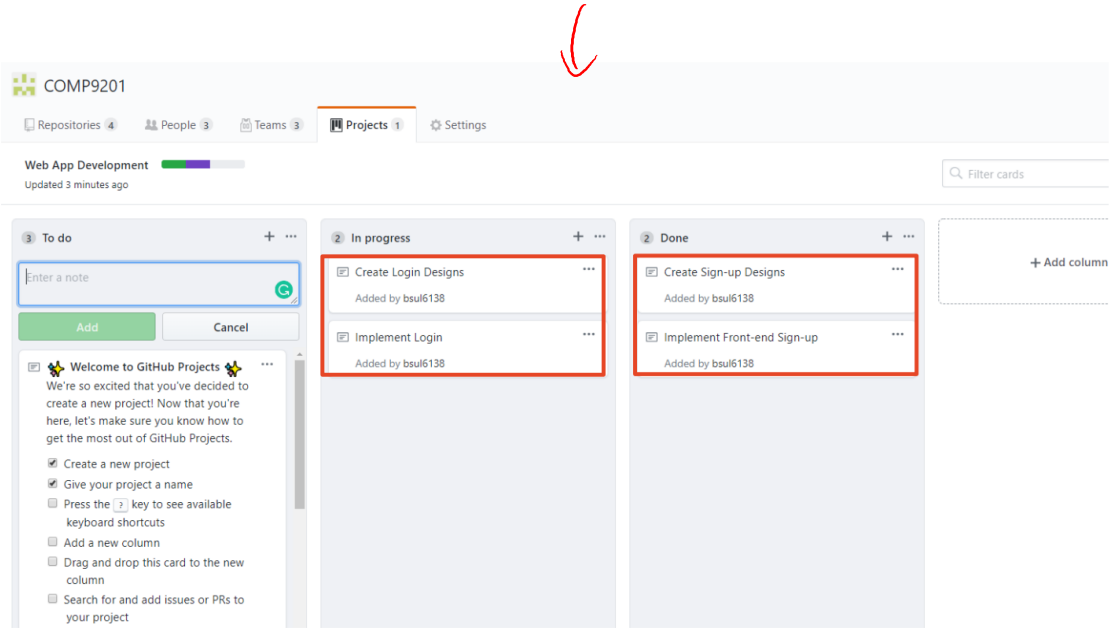


You may have 3 repos; Designs, Front-end and Back- end. You want FrontEndDeve to work on the Front-end and Designs repos, Designers team to work on Designs repo and BackEndDeve to work on Back-end repo



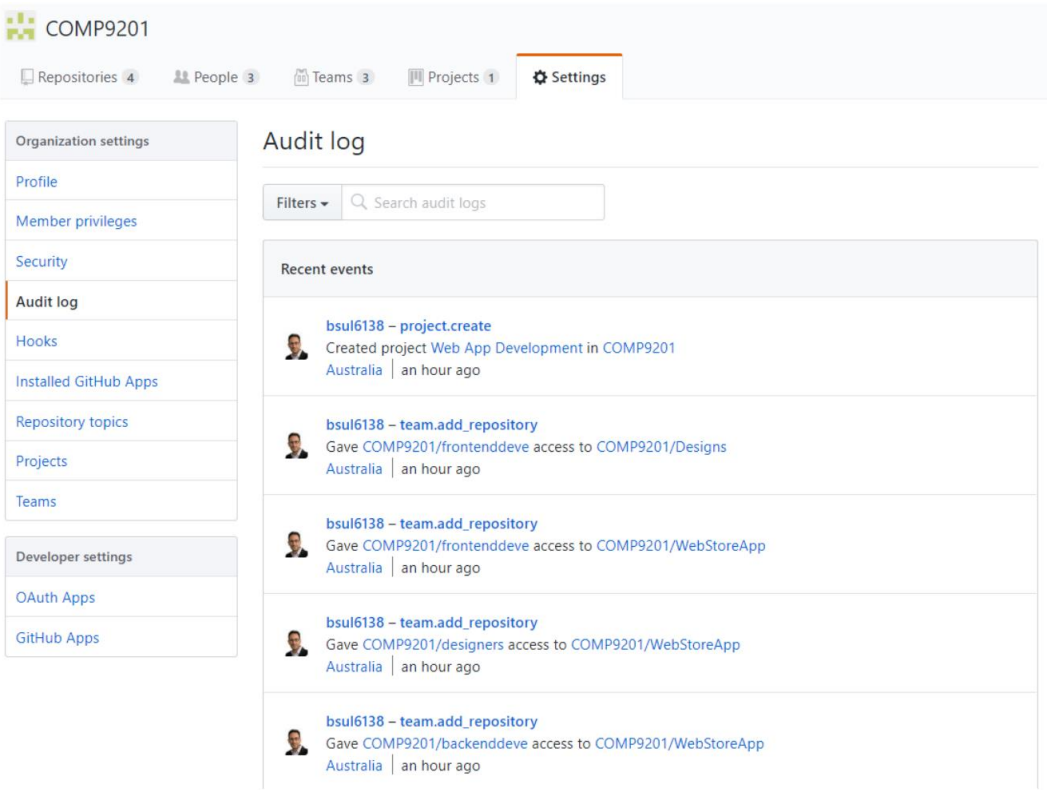
GitHub Organization – Manage Projects (Revisit)



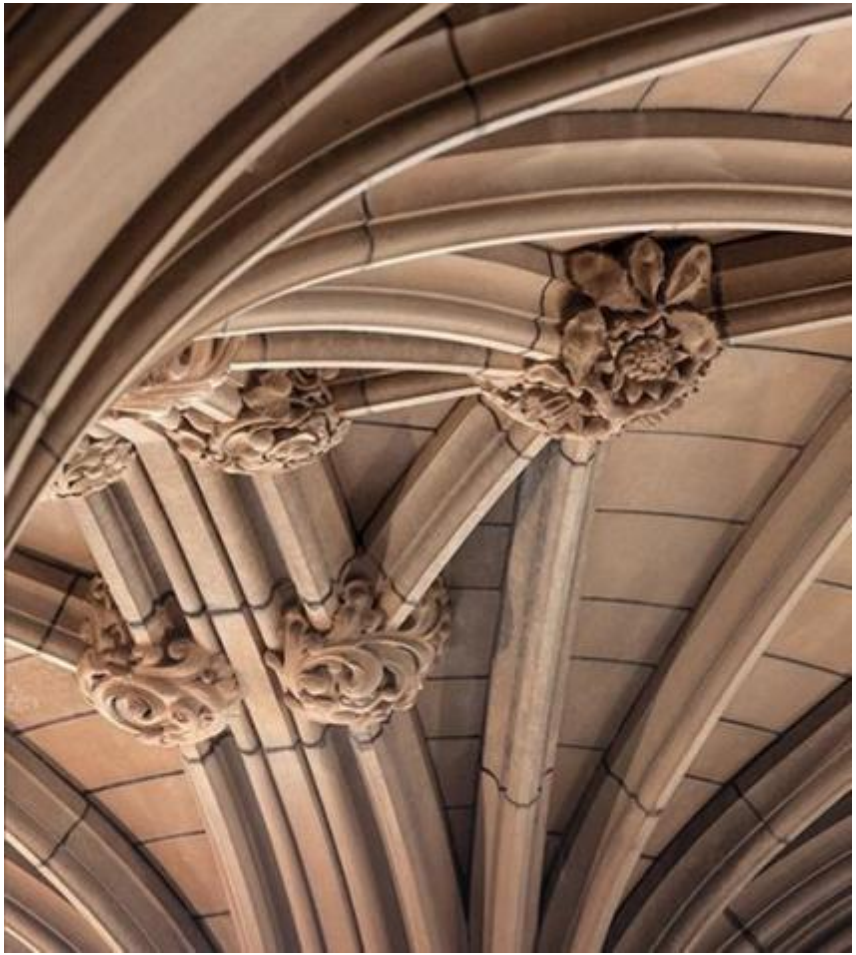


GitHub Organization – Audit Log (Revisit)

- Audit log records all events that have happened at the organization level, who did them and where in the world they were done



Jenkins



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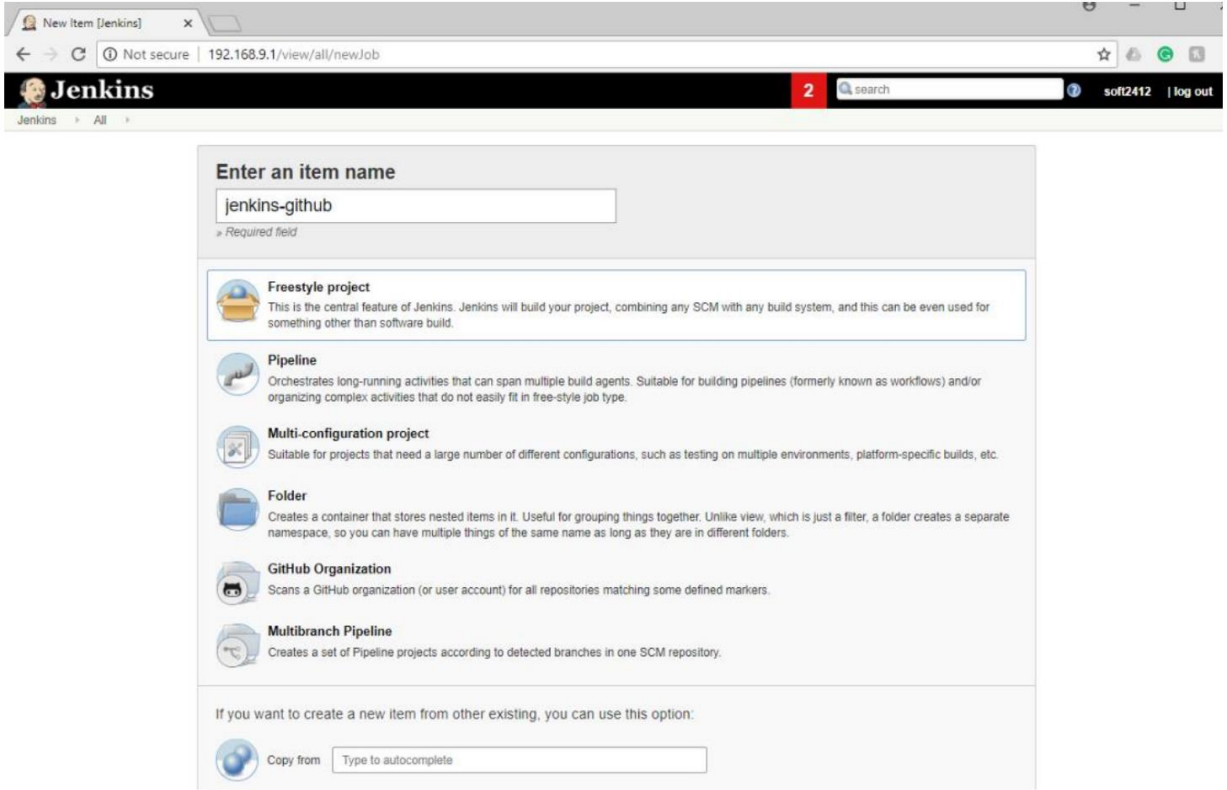
Jenkins – CI /CD

- "Jenkins is aself-contained, opensource automation server which can be used to automate all sorts of tasks related to building, testing, and delivering or deploying software."

- *Jenkins pipeline* is a suite of plugins which supports implementing and integrating *continuous delivery pipelines* into Jenkins
  - A *continuous delivery pipeline* is an automated expression of your process for getting software from version control right through to end users/customers
  - Typically written in *Jenkinsfile* which is checked in a project's source code repository

https://jenkins.io/

Jenkins – Integration with GitHub (1)



Jenkins – Integration with GitHub (2)

Source Code Management

- None
- Git

Repositories

Repository URL: https://github.sydney.edu.au/SOFT2412-Agile-Software-Development/git-local5.git

Credentials: hoso5448/****** Add

Advanced...

Add Repository

Branches to build

Branch Specifier (blank for 'any'): */master

Add Branch

Repository browser: (Auto)

Additional Behaviours: Add

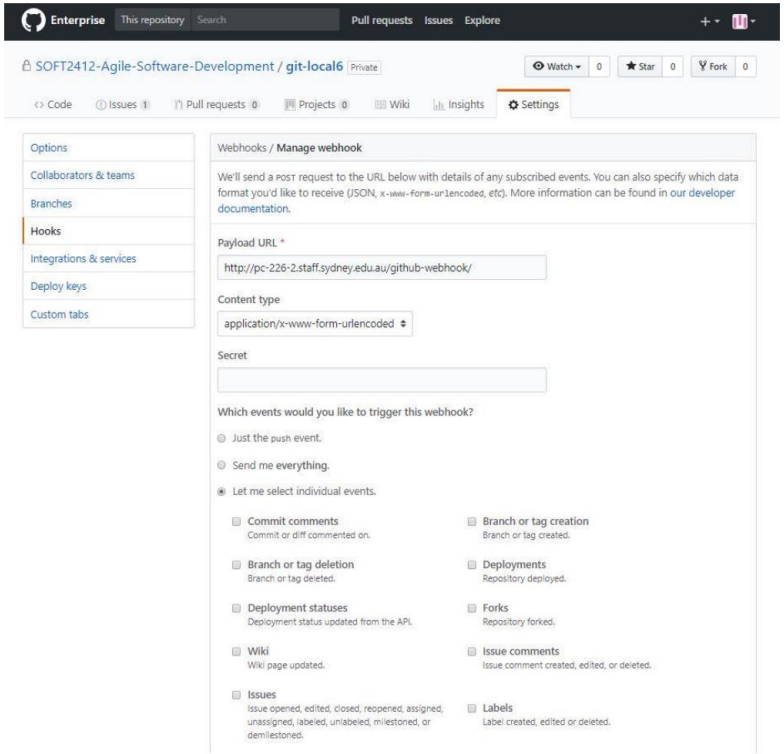
- Subversion

Build Triggers

- [ ] Trigger builds remotely (e.g., from scripts)
- [ ] Build after other projects are built
- [ ] Build periodically
- [ ] GitHub Branches
- [ ] GitHub Pull Requests
- [x] GitHub hook trigger for GITScm polling
- [ ] Poll SCM

Jenkins – Integration with GitHub (3)

- Webhooks to set up GitHub applications to subscribe to certain events on GitHub
- Events is triggered, HTTP POST payload will be sent to the webhook's configured URL
- Webhooks can be used to update an external issue tracker, trigger CI builds, update a backup mirror

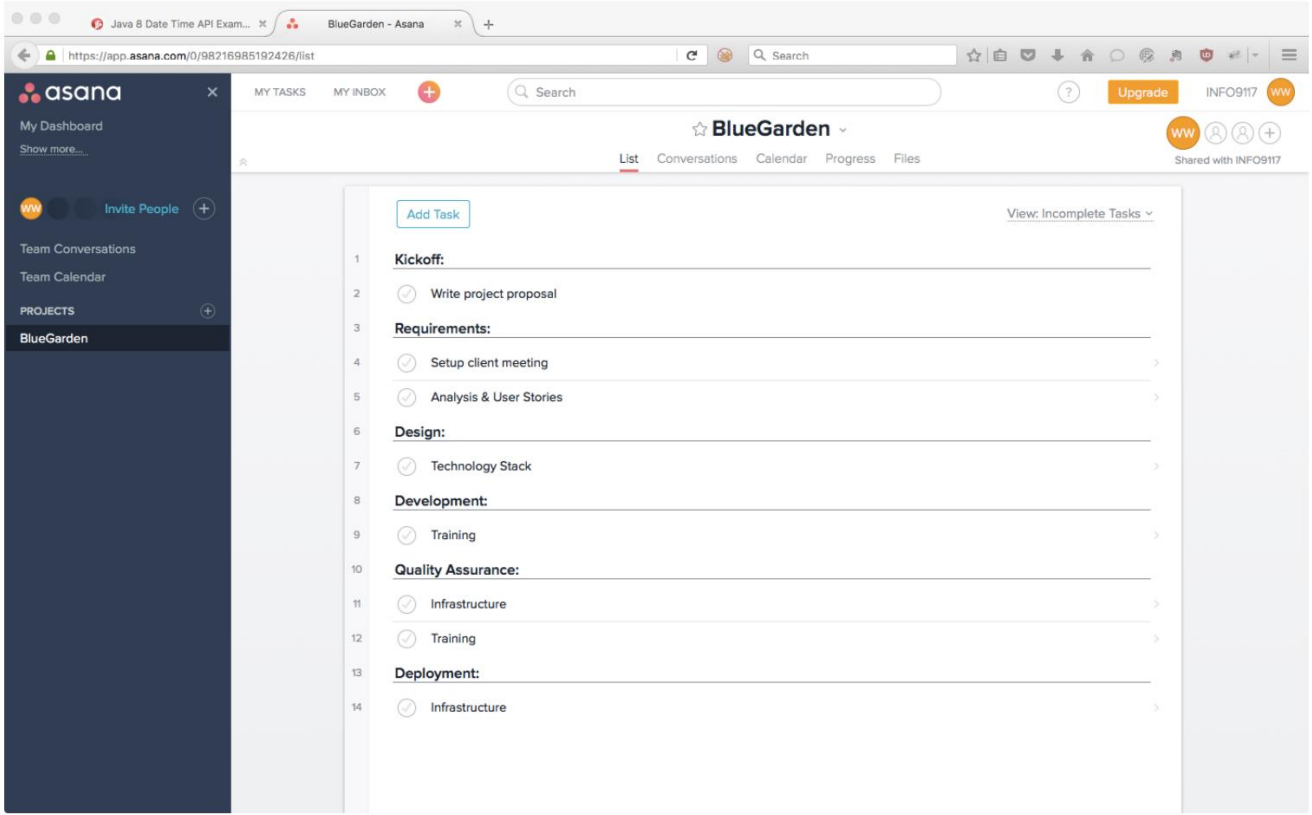


https://developer.github.com/webhooks/

Teamwork Collaboration Tools

- What tools would you use to help support your team?
- Examples:
  - Dropbox
  - Google Docs
  - Skype
  - Trello
  - Slack
  - Basecamp
  - Asana
  - … other

Other Tools – Asana – Project Management



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- Issue tracking system. [https://en.wikipedia.org/wiki/Issue_tracking_system]
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- Further Readings:
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Tutorial: Continuous Integration with Jenkins / Docker
Team Dynamics – Team Building Activities

Next Week: Agile Methods, Scrum

- Scrum team
- Scrum events
- Scrum artifacts
- Scrum estimation