

Implementing Agile Software Development with Github Projects

– A tutorial –

Lucas Sawade

Research Computing Group Meeting, June 11

Goals

1. Streamline communication

a. Manager <-> RSE

b. Manager <-> PI

c. PI <-> RSE

d. RSE <-> RSE

2. Milestone/Goal tracking

a. Release/Feature based development

Task Management Software Options

1. Emacs Org-mode (personal task management)
2. Asana
3. ClickUp
4. Jira
5. Trello
6. Monday
7. . . . so many more very professional PM tools.
8. So, why Github Projects?

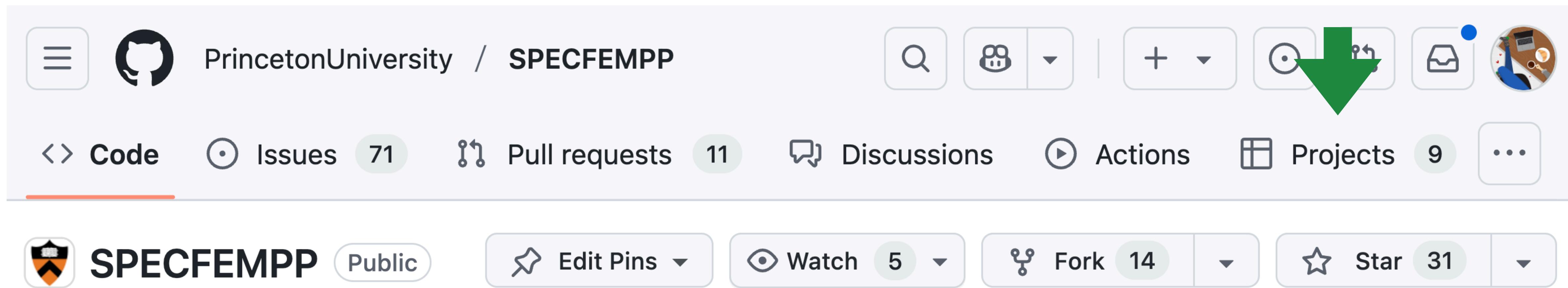
Why Github Projects?

1. No separation between a
 - a. “Task” in a separate software and
 - b. “Issue” on Github
2. Simple removal (or omission of addition) of another software
3. For us it seems “good enough”

Outline

1. Create Project
2. Create Task
3. Create/Edit Fields
4. Add/update Views (Table->Kanban/Scrum/Scrumban)
5. Create Goal/Milestone & Setting up a roadmap
6. Two-Week Schedule
7. Effort
8. Insights
9. Automatic Workflows
10. The Issue as central control element
11. Improvements?

Create Github Project



Create Github Project

PrincetonUniversity / SPECFEMPP

Code Issues 71 Pull requests 11 Discussions Actions Projects 9 ...

Projects ▾

Q is:open × Link a project + New project

9 Open 2 Closed Sort ▾

SPECFEM++
Private
#31 updated yesterday

This project tracks ideas and discusses potential solutions to be implemented before making them into issues.

...

Create Github Project

Create project

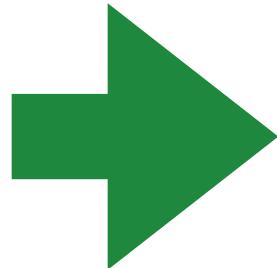
X

Project templates

All templates

Featured

From your organization



Start from scratch

Table

Board

Roadmap

Q Search templates

Featured

[View all](#)

This screenshot shows the 'Team planning' template interface. It features a backlog board with three columns: 'Todo', 'In Progress', and 'Done'. Each column contains several items with titles like 'Planning tracking demo #802', 'Updates to velocity of the ship and alien movements', and 'Finalize upskill model'. The interface includes navigation tabs for Backlog, Team capacity, Current iteration, Roadmap, My items, and New view.

Team planning • GitHub
Manage your team's work items, plan upcoming cycles, and understand team capacity

This screenshot shows the 'Feature release' template interface. It features a prioritized backlog board with items categorized by priority: P0, P1, and P2. The P0 category has one item: 'Updates to velocity of the ship and alien movements #802'. The P1 category has four items: 'Create user account and subscription #830', 'Finalize upskill model #1323', 'Add a leaderboard for Europe #1378', and 'Review engagement metrics once posts are live #26'. The P2 category has two items: 'Save score across levels #800' and 'Update to velocity of the ship and alien movements #802'. The interface includes navigation tabs for Prioritized backlog, Status board, Roadmap, Bugs, In review, and New view.

Feature release • GitHub
Manage your team's prioritized work items when planning for a feature release

Create Github Project

Create project

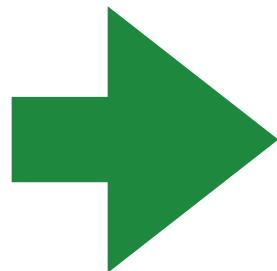
X

Project templates

All templates

Featured

From your organization



Start from scratch

Table

Board

Roadmap

Q Search templates

Featured

[View all](#)

A screenshot of the 'Team planning' template interface. It shows a backlog of work items categorized into Todo, In Progress, and Done. Each item has a title, a brief description, and an estimate value. Buttons for 'Add Item' are visible at the bottom of each column.

Team planning • GitHub
Manage your team's work items, plan upcoming cycles, and understand team capacity

A screenshot of the 'Feature release' template interface. It shows a prioritized backlog of work items categorized into P1, P2, and P3. Each item has a title, a brief description, an estimate value, and a status (e.g., To-do, In progress, Done). Buttons for 'Add Item' are visible at the bottom of each column.

Feature release • GitHub
Manage your team's prioritized work items when planning for a feature release



It does not really matter which one you choose, since each is just a “View” of tasks.

Create Github Project

[← Create project](#)

X

New table

Start with a powerful spreadsheet style table to filter, sort and group your issues and pull requests. Easily switch to a board or roadmap layout at any time.

Project name

RSE Presentation Project

Table

Table + New view

Filter by keyword or by field

Title	Assignees	Status
1 Updates and bug fixes to sprites #827	cmwinters	Review ➡
2 Updates and bug fixes to engine from Beta #823	keisaacson	Planning 📈
3 Updates to collision logic #814	ohiosveryown	Done ✅
4 Create user account and subscription #820	j0siepy	Building 🚧
5 Update ProjectsSLOs.md #374	mariorod	Building 🚧
6 Save score across levels #800	Mattamorphic	Planning 📈
7 Explore a bug #1366		Planning 📈
8 If the beam leaves the window reset it #805	some-natalie	Review ➡
9 Updates to alien, beam, bomb and cannon sprites #821	mkwng	Review ➡
10 Develop an amazing website #43	j0siepy	Review ➡
11 Integrate new payments support #1099		Review ➡
12 General bug fixes from Alpha feedback #808	rileybroughten	Review ➡
13 Integrate with Leaderboard Service #811	dusave and jclem	Review ➡

Create project

Github Project

RSE Presentation Project

View 1 **+ New view**

Add status update **L** **S** **...**

Filter by keyword or by field **Discard** **Save**

Title	...	Assignees
+ You can use Control + Space to add an item		

Add your first item
Click "Add Item" to get started or use
the shortcut **Control + Space**.

Add item **OK, dismiss**

Github Project – Task

RSE Presentation Project

Add status update 

View 1  **+ New view**

Filter by keyword or by field **Discard** **Save**

Title	...	Assignees
+ Write down notes for the presentation	...	
<input checked="" type="radio"/> Create new issue		
<input type="radio"/> Create a draft		
<input type="checkbox"/> Add item from repository	-> This is basically adding an existing issue	

Github Project – Task

Create new issue



Repository *



PrincetonUniversity/SPECFEMPP ▾

Templates and forms

Bug report



Create a report to help us improve

Feature request



Suggest an idea for this project

Project task



Create a task within the SPECFEM++ project

Blank issue



Create a new issue from scratch

Github Project – Task

Create new issue in PrincetonUniversity/SPECFEMPP: Project task X

Add a title *

Write down notes for the presentation

Add a description

Write

Preview



Task description

Take some time to think about what to show for the Github Projects presentation

- [] What to show?
- [] How detailed?

Acceptance criteria

- [] Lucas knows what to show

Paste, drop, or click to add files

Assignee  Isawade

Label

Issue Type  Task

RSE Presentation Project

Milestone

Create more

Cancel

Create 

Github Project – Task

RSE Presentation Project Add status update ...

View 1 + New view

Q Filter by keyword or by field Discard Save

Title	Assignees	Status
1 Write down notes for the presentation #890	lsawade	

+ You can use Control + Space to add an item

Github Project – Fields/Status

RSE Presentation Project

View 1 **+ New view**

Filter by keyword or by field

Add status update **L** **S** **...**

Title	Assignees	Status
1 Write down notes for the presentation #890	lsawade	

Discard **Save**

Title **Assignees** **Status**

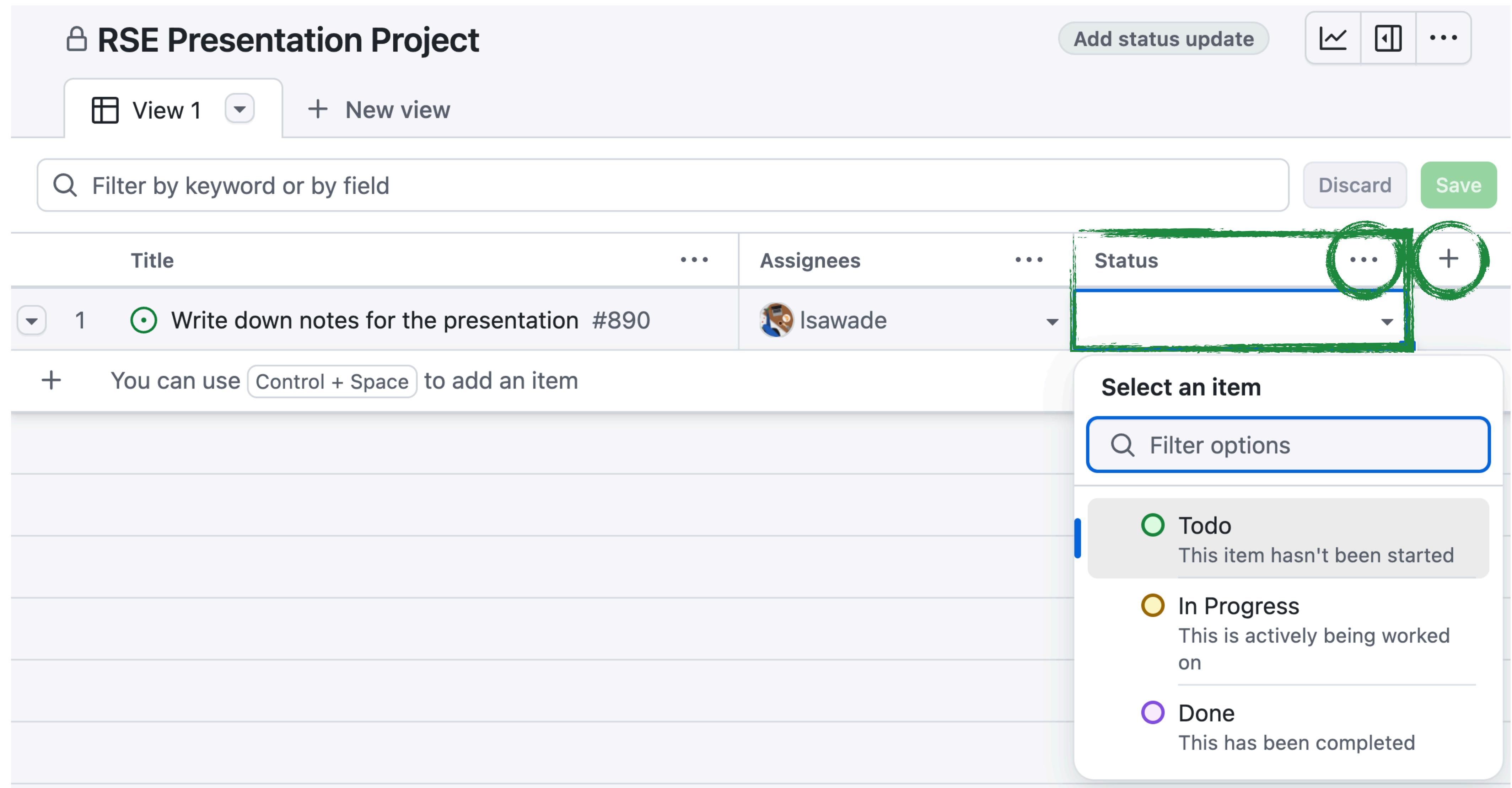
1 Write down notes for the presentation #890 lsawade

Select an item

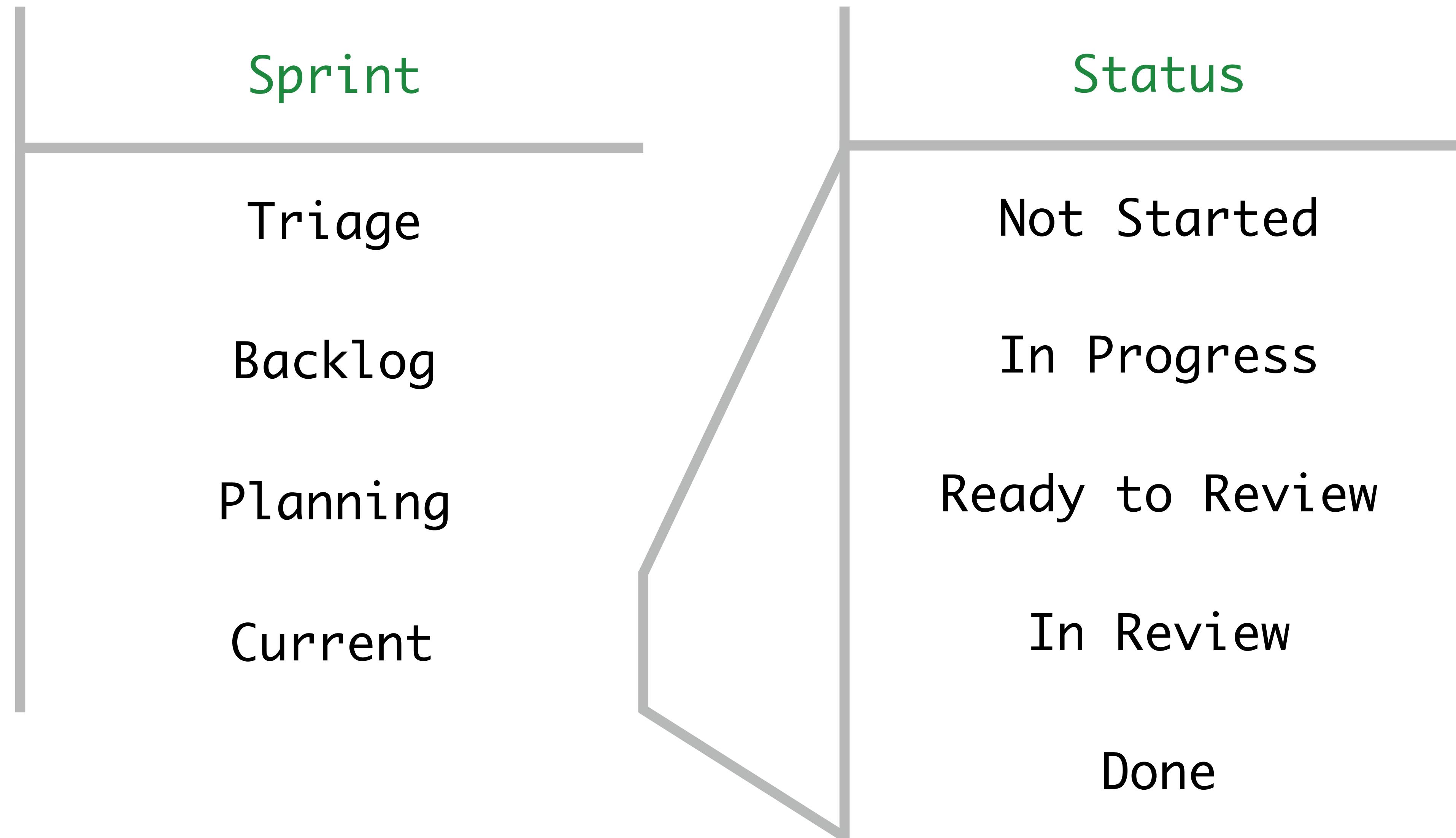
Filter options

- Todo**
This item hasn't been started
- In Progress**
This is actively being worked on
- Done**
This has been completed

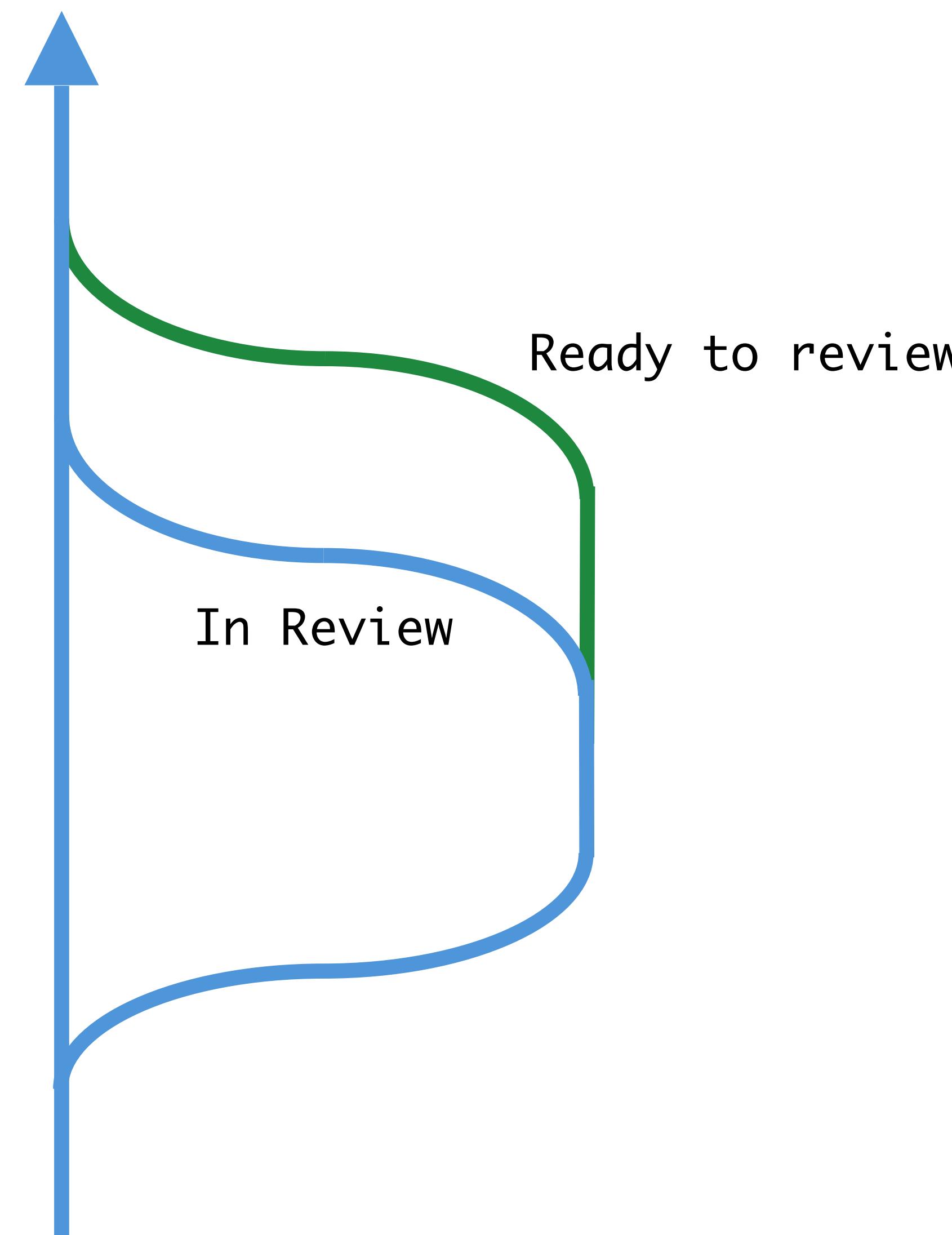
+ You can use **Control + Space** to add an item



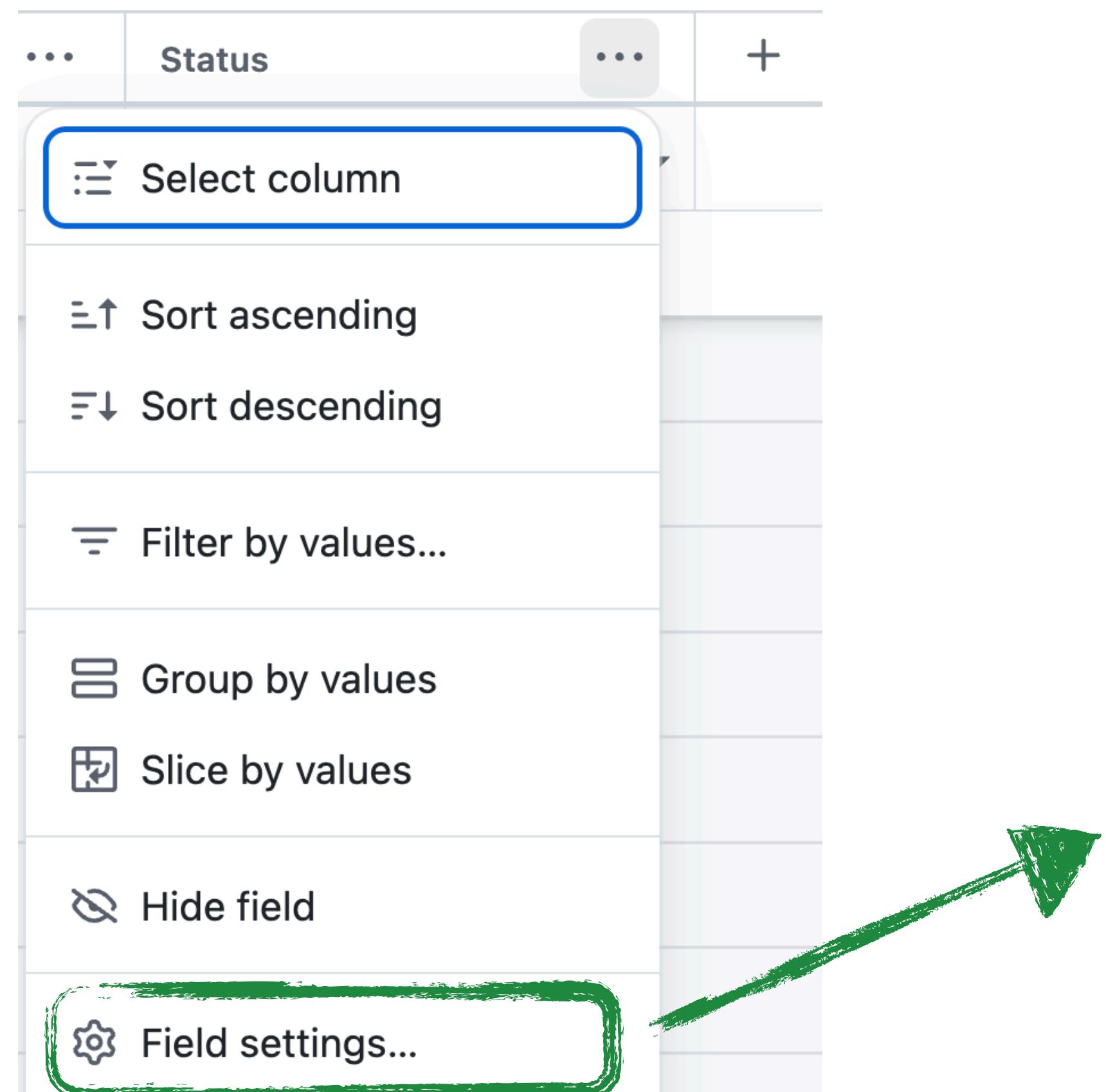
Github Project – Fields/Status – Agile PM



Github Project – Fields/Status – Why Ready to/In Review



Github Project – Fields/Status



Status field settings

Field name

Status

Status fields are created by GitHub and cannot be renamed.

Field type

Single select

Options

⋮ Not Started This item hasn't been started ⋮

⋮ In Progress 🚧 This is actively being worked on ⋮

⋮ Ready to Review 💡 ⋮

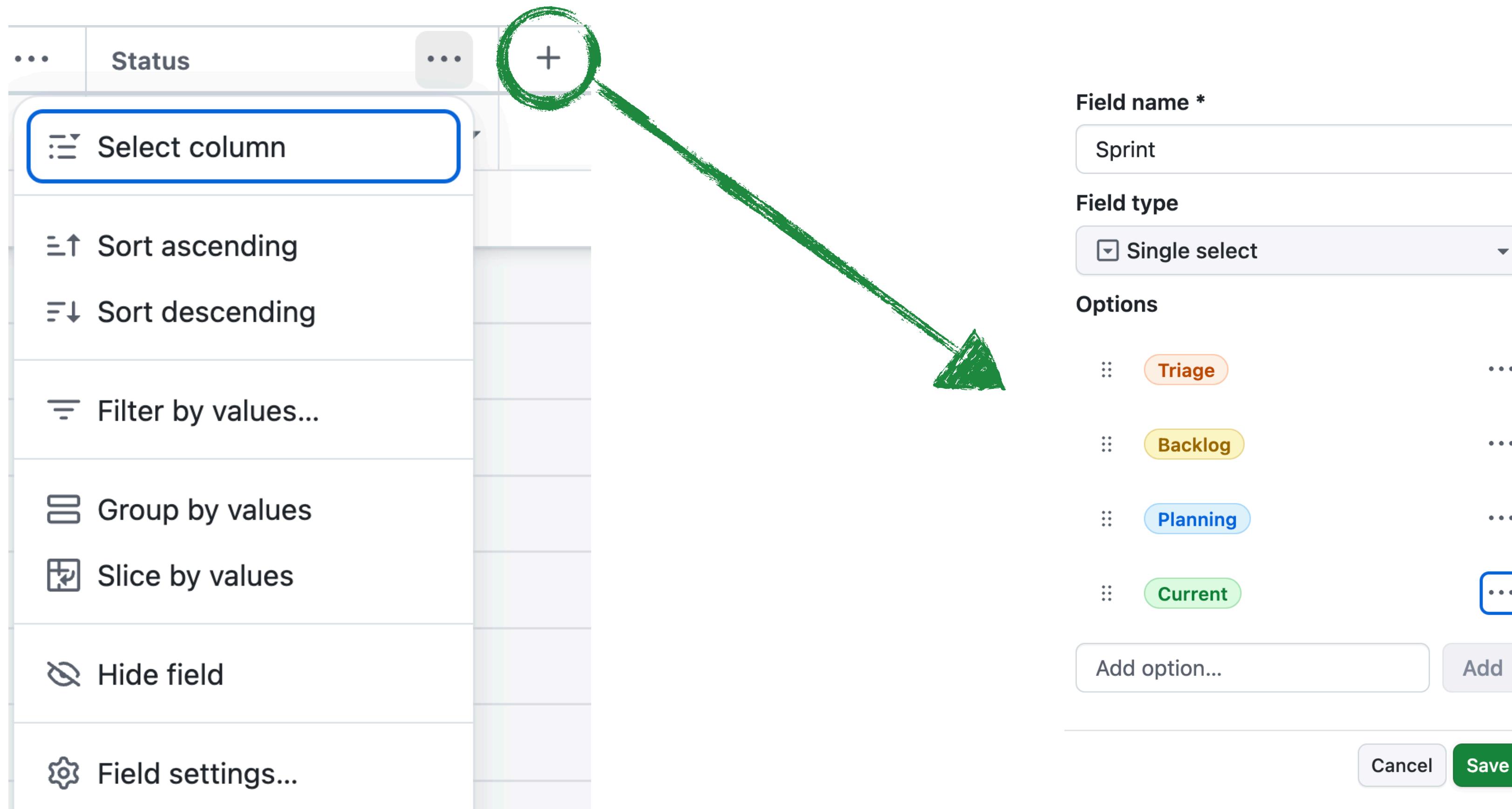
⋮ In Review 😊 ⋮

⋮ Done ✅ This has been completed ⋮

Add option...

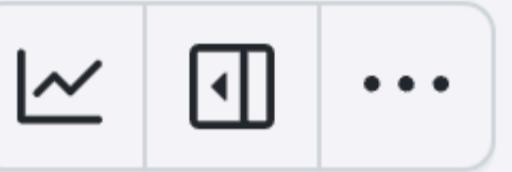
Add

Github Project – Fields/Status



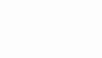
Creating and Updating Views

RSE Presentation Project

Add status update  

Tasks  + New view

Filter by keyword or by field  

Title	...	Assignees	...	Status	...	Sprint	...
1  Write down notes for the presentation #890		 Isawade 		 In Progress 		 Current 	
2  Triage Task #11		 Isawade 		 Not Started 		 Triage 	
3  Backlog Task #12		 Isawade 		 Not Started 		 Backlog 	
4  Planning Task #13		 Isawade 		 Not Started 		 Planning 	
5  Make slides #14		 Isawade 		 In Progress 		 Current 	

+ You can use  to add an item

Creating and Updating Views – Scrum

RSE Presentation Project

Tasks Scrum + New view

Filter by keyword or by field

Title

Current (2)

- 1 Write down notes for presentation
- 2 Make slides #14

+ Add item

Planning (1)

- 3 Planning Task #13

+ Add item

Backlog (1)

- 4 Backlog Task #12

+ Add item

Triage (1)

- 5 Triage Task #11

+ Add item

Layout

Table (selected) Board Roadmap

Configuration

- Fields: Title, Status, Sprint, ... >
- Group by: Sprint >
- Sort by: Sprint >
- Field sum: Count >
- Slice by: none >

Generate chart

Rename view

Move view

Save changes to new view

Delete view

Export view data

Add status update ...

Discard Save

Status	Sprint	Assignees
In Progress	Current	Isawade
In Progress	Current	Isawade
Not Started	Planning	Isawade
Not Started	Backlog	Isawade
Not Started	Triage	Isawade

Creating and Updating Views – Current Sprint

RSE Presentation Project

Tasks | Scrum | Current Sprint | + New view

-sprint:Triage -no:sprint -sprint:Triage

Not Started (2) | In Progress (2) | Ready to Review (0) | In Review (0) | Done (0)

Current (2)

SPECFEMPP #890: Write down notes for the presentation

specfempp-notes #14: Make slides

+ Add item

Planning (1)

specfempp-notes #13: Planning Task

+ Add item

Backlog (1)

specfempp-notes #12: Backlog Task

+ Add item

+ New view

Add status update | Discard | Save

Layout: Board

Configuration:

- Fields: Title, Assignees, and ... >
- Column by: Status >
- Group by: Sprint >
- Sort by: manual >
- Field sum: Count >
- Slice by: none >

Generate chart

Rename view

Move view

Duplicate view

Delete view

Export view data

Creating and Updating Views – Current Sprint

🔒 RSE Presentation Project

Add status update   

Tasks | Scrum **Current Sprint**  + New view

🔍 -sprint:Triage -no:sprint -sprint:Triage 4  Discard Save

Not Started (2)	In Progress (1)	Ready to Review (0)	In Review (0)	Done (1)
This item hasn't been started	This is actively being worked on			This has been completed

Current (2)  

+ Add item	 specfempp-notes #14  Make slides 	+ Add item	+ Add item	 SPECFEMPP #890  Write down notes for the presentation 
------------	--	------------	------------	---

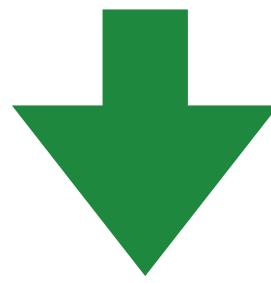
Planning (1)  

 specfempp-notes #13  Planning Task 	+ Add item	+ Add item	+ Add item	+ Add item
---	------------	------------	------------	------------

Backlog (1)  

 specfempp-notes #12  Backlog Task 	+ Add item	+ Add item	+ Add item	+ Add item
--	------------	------------	------------	------------

Goal/Milestone



is:issue state:open

Open 71 Closed 418 Author ▾ Labels ▾ ...

● Remove numbering from the
displacement_tests

Goal/Milestone

Milestones

[New milestone](#)

Open 13 Closed 0

Sort ▾

Release 0.4.0

This milestone tracks issue related to the planned release.

Due by June 20, 2025

9/25 issues closed

 36% complete

16 open 9 closed

Goal/Milestone

Title

RSE Group Meeting Presentation (Lucas)

Due date (optional)

 Jun 11, 2025

Description (optional)

Make slides for the RSE Group Meeting

Cancel

Create milestone

Goal/Milestone

RSE Presentation Project

Add status update   

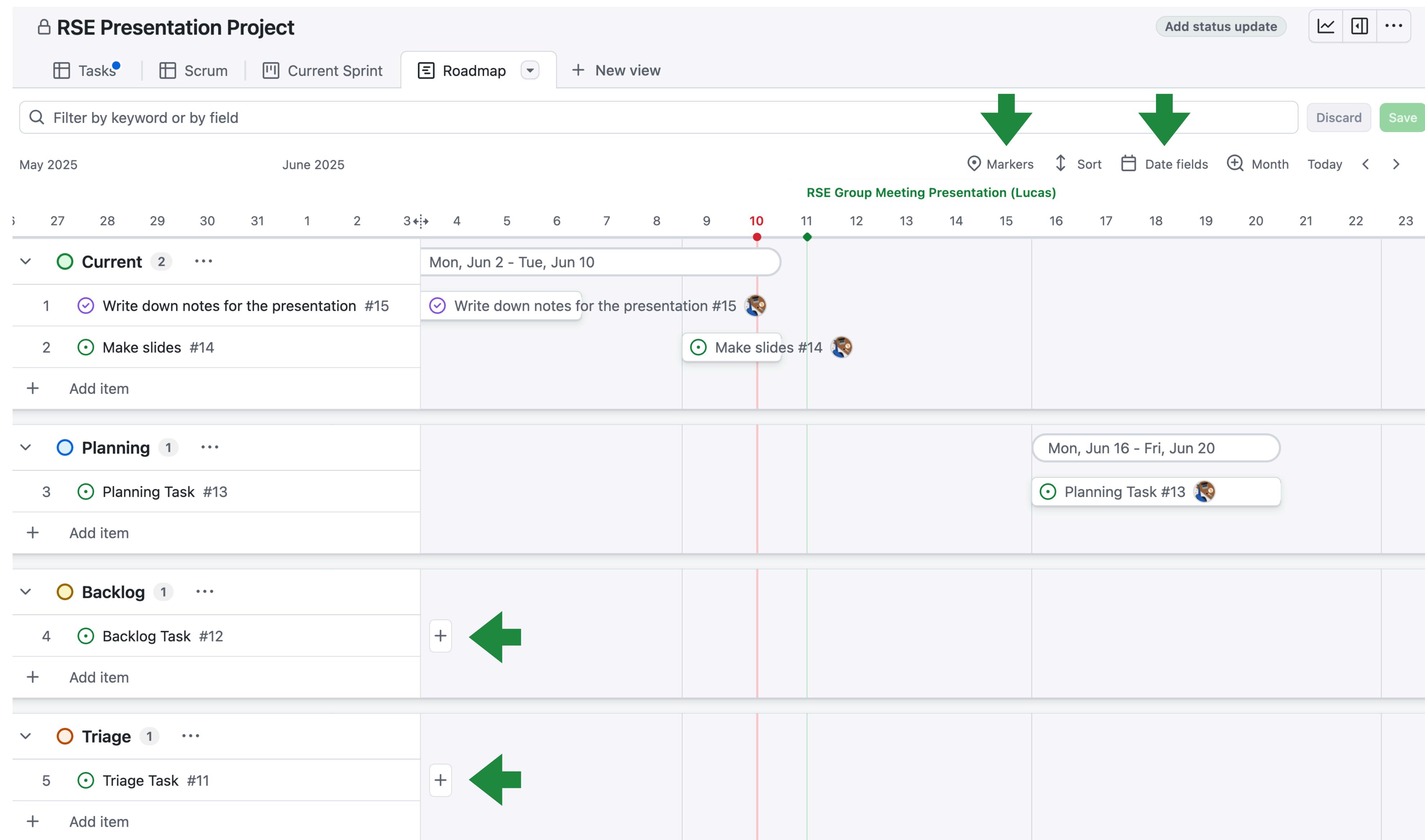
Tasks  Scrum | Current Sprint | Roadmap + New view

Filter by keyword or by field  Discard Save

Title	Assignees	Status	Sprint	Milestone
1 Write down notes for the presentation #15	Isawade	Done ✓	Current	RSE Group Meeting Pre...
2 Make slides #14	Isawade	In Progress 🚧	Current	RSE Group Meeting Pre...
3 Triage Task #11	Isawade	Not Started	Triage	
4 Backlog Task #12	Isawade	Not Started	Backlog	
5 Planning Task #13	Isawade	Not Started	Planning	

+ You can use Control + Space to add an item

Goal/Milestone



Two Week Meeting Schedule

Week 1	Monday	Tuesday	Wednesday	Thursday	Friday
	Short Daily	Short Daily	Short Daily	Short Daily	Short Daily
					Pruning
Week 2	Monday	Tuesday	Wednesday	Thursday	Friday
	Short Daily	Short Daily	Short Daily	Short Daily	Short Daily
					Planning w/ Manager
				Pre-planning w\ Manager	

Pruning: Go through tasks in triage

Pre-planning: Make sure our tasks have clear “stories”

Planning: Assign tasks if not already assigned

Effort field

Effort field settings

[Delete field](#)

Field name
Effort

Field type
 Single select

Options

- ⋮ 1 Less than half a day ⋮
- ⋮ 2 One Day ⋮
- ⋮ 3 More than a day ⋮
- ⋮ 5 One week ⋮
- ⋮ 8 Full Sprint ⋮

Add option... Add

Effort field

RSE Presentation Project Add status update 

Tasks  Scrum | Current Sprint | Roadmap + New view

Filter by keyword or by field Discard Save

Title	Assignees	Status	Sprint	Priority	Effort	N
1 Write down ... #15	Isawade	Done ✓	Current	High !!	3	R
2 Make slides #14	Isawade	In Progress 🧑	Current	High !!	2	R
3 Triage Task #11	Isawade	Not Started	Triage			
4 Backlog Task #12	Isawade	Not Started	Backlog			
5 Planning Task #13	Isawade	Not Started	Planning			

+ You can use Control + Space to add an item

Insights

RSE Presentation Project

Add status update 

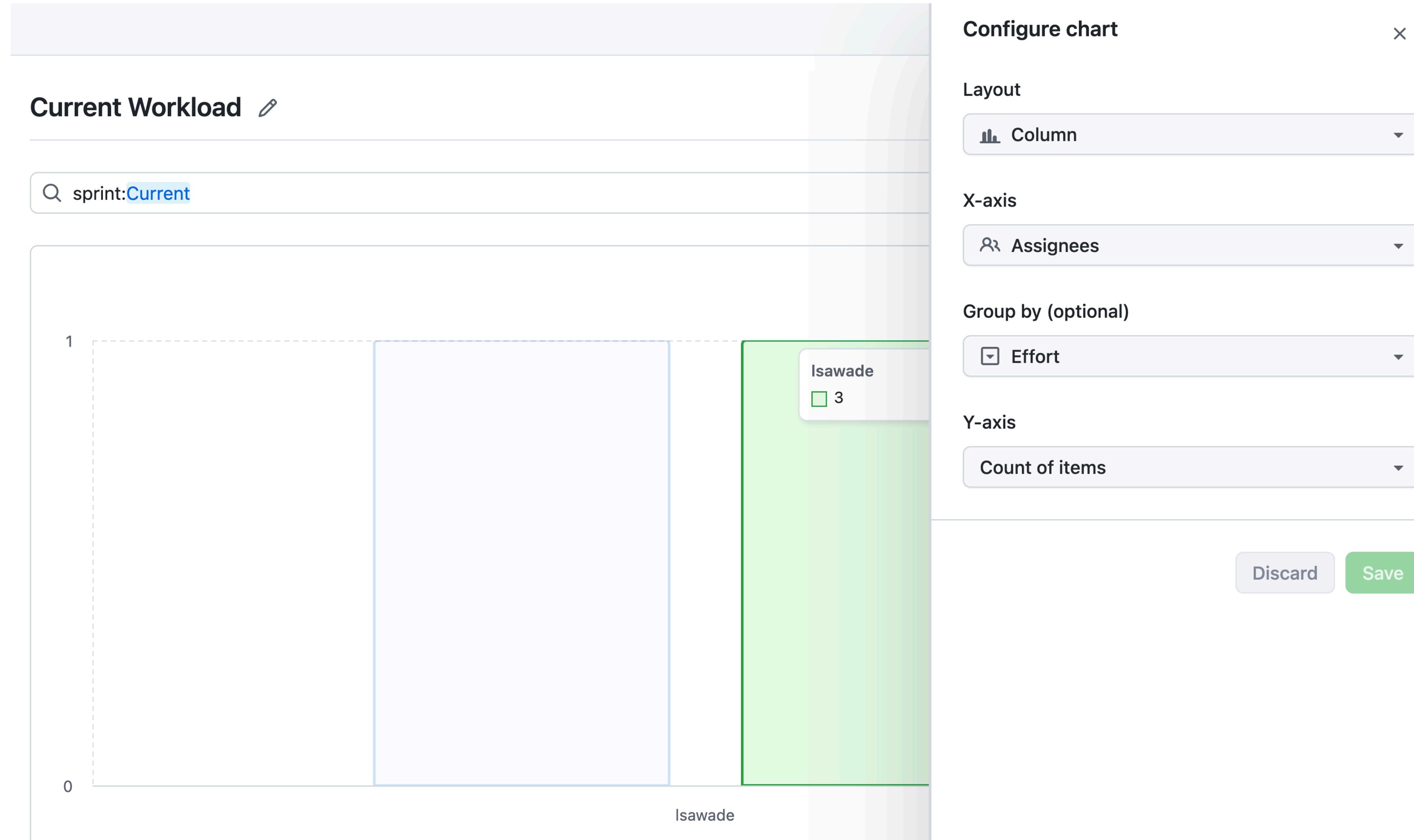
Tasks | Scrum | Current Sprint | Roadmap | + New view

Filter by keyword or by field Discard Save

	Title	Assignees	Status	Sprint	Priority	Effort	
1	Write down ... #15	Isawade	Done ✓	Current	High !!	3	R
2	Make slides #14	Isawade	In Progress 🧑	Current	High !!	2	R
3	Triage Task #11	Isawade	Not Started	Triage			
4	Backlog Task #12	Isawade	Not Started	Backlog			
5	Planning Task #13	Isawade	Not Started	Planning			

+ You can use Control + Space to add an item

Insights



Insights



Automatic Workflows

← **Workflows**

Item closed 

On  Edit

Default workflows

- Item added to project
- Item reopened
- Item closed
- Code changes requested
- Code review approved
- Pull request merged
- Auto-archive items
- Auto-add to project
- Auto-close issue
- Auto-add sub-issues to project

Viewing mode. Click edit to make changes to this workflow.

 When an item is closed

issue, pull request ▾



```
graph TD; A[When an item is closed] --> B[Set value]; B --> C["Status: Done ✓"]
```

 Set value

Status: Done ✓ ▾

Issue as Central Control element/Conclusion

New Issue #16

Open | Parent: Make slides | PrincetonUniversity/specfempp-notes Public

Isawade opened 2 minutes ago

Description

Here is what is wrong

Tasks

First thing
 Second thing

Acceptance criteria

Needs to look better
 Needs to pass tests

Create sub-issue ▾

Isawade added this to RSE Presentation Project 2 minutes ago

Isawade moved this to Not Started in RSE Presentation Project 1 minute ago

Isawade added this to the RSE Group Meeting Presentation (Lucas) milestone 1 minute ago

Isawade self-assigned this 1 minute ago

Isawade added a parent issue 1 minute ago

Make slides #14

Isawade added enhancement good first issue now

Edit

Assignees Isawade

Labels enhancement good first issue

Type No type

Projects RSE Presentation Project

Status Not Started

Sprint Current

Start Date Jun 10, 2025

Target Date Jun 11, 2025

Priority High !!

Effort 5

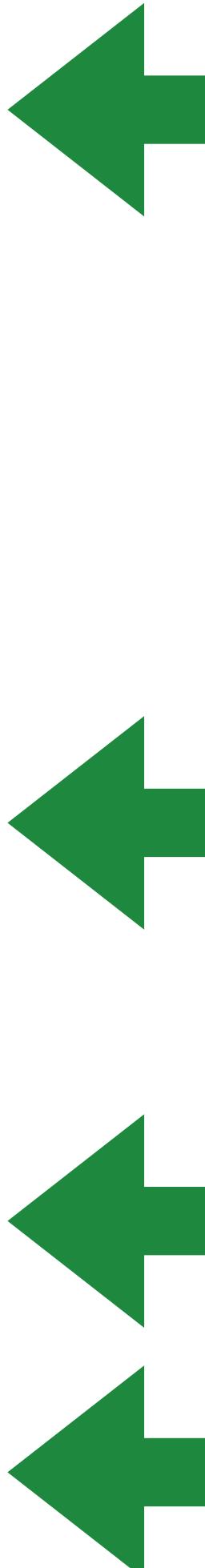
Milestone RSE Group Meeting Presentation (Lucas)

Due by June 10, 2025, 33% complete

Relationships Parent issue

Make slides 0 / 1

PrincetonUniversity/specfempp-notes#14



Improvements?

Extra Slides

.github/release.yaml

```
changelog:  
  exclude:  
    labels:  
      - ignore-for-release  
      - dependencies  
      - dependency  
  categories:  
    - title: 🚨 Breaking Changes  
      labels:  
        - breaking-change  
    - title: 🎉 New Feature  
      labels:  
        - feature  
    - title: 🧑 New physics  
      labels:  
        - new physics  
    - title: 🚀 Performance enhancement  
      labels:  
        - performance enhancement  
    - title: + Enhancement  
      labels:  
        - enhancement  
    - title: 📚 Documentation  
      labels:  
        - documentation  
        - docs  
  
    - title: Code Style Updates  
      labels:  
        - style  
    - title: Fortran Meshfem2D/3D updates  
      labels:  
        - fortran  
    - title: Refactor  
      labels:  
        - refactor  
    - title: 🐛 Bug Fixes  
      labels:  
        - bug  
        - fix  
    - title: Configuration/CMake  
      labels:  
        - configuration  
    - title: 🔧 Maintenance  
      labels:  
        - maintenance  
    - title: 📃 New tests  
      labels:  
        - tests  
    - title: Other Changes  
      labels:  
        - "*"
```

.github/release.md



🚀 Performance enhancement

- Sets SIMD flag to false for device code by @Rohit-Kakodkar in <https://github.com/PrincetonUniversity/SPECFEMPP/pull/814>
- Final set of optimizations by @Rohit-Kakodkar in <https://github.com/PrincetonUniversity/SPECFEMPP/pull/828>
- Implements chunked domain and assembly view layouts by @Rohit-Kakodkar in <https://github.com/PrincetonUniversity/SPECFEMPP/pull/801>

✚ Enhancement

- Issue 472 -- Implement templated array reading for multidimensional fortran arrays. Reading `ibool`, coordinates, partials by @lsawade in <https://github.com/PrincetonUniversity/SPECFEMPP/pull/475>
- Add function to access field of a medium by @icui in <https://github.com/PrincetonUniversity/SPECFEMPP/pull/459>
- Issue 484/498/499/500 -- Implements reading of `ispec_is_<medium>`, materials, and mass matrices. by @lsawade in <https://github.com/PrincetonUniversity/SPECFEMPP/pull/501>
- Issue 502 - Implements new `read_array` templates dim3 absorbing boundaries write/read by @lsawade in <https://github.com/PrincetonUniversity/SPECFEMPP/pull/503>
- Issue 504 - Implement the reading of coupled interfaces. by @lsawade in <https://github.com/PrincetonUniversity/SPECFEMPP/pull/505>
- Issue 508 -- Implement final bout of `structus` to read in the 3D mesh by @lsawade in <https://github.com/PrincetonUniversity/SPECFEMPP/pull/519>

Github Issue Templates

The screenshot shows a GitHub repository interface with the following structure:

- EXPLORER** sidebar:
 - SPECFEMPP
 - .devcontainer
 - .github
 - ISSUE_TEMPLATE
 - bug_report.md
 - feature_request.md
 - project_task.md
 - workflows
 - pull_request_template.md
 - .jenkins
 - .ruff_cache
 - .venv
 - .vscode
 - archive
 - benchmarks
 - bin
 - build
 - core
 - docs
 - examples
- bug_report.md** editor:
 - Path: .github > ISSUE_TEMPLATE > bug_report.md
 - Author: You, 4 months ago | 2 authors (You and one other)
 - Content:

```
1 --- Rohit-Kakodkar, 19 months ago
2 name: Bug report
3 about: Create a report to help us
4 title: ''
5 labels: ''
6 assignees: ''
7 ---
8
9 ## Expected behavior
10 A clear and concise description of what you expected to happen.
11
12 ## Actual (buggy) behavior
13 A clear and concise description of what is happening instead.
14
15 ## Screenshots
```
- feature_request.md** editor:
 - Path: .github > ISSUE_TEMPLATE > feature_request.md
 - Author: You, 4 months ago | 2 authors (Rohit-Kakodkar and one other)
 - Content:

```
1 ---
2 name: Feature request
3 about: Suggest an idea for this project
4 title: ''
5 labels: ''
6 assignees: ''
7 ---
8 ---
```
- project_task.md** editor:
 - Path: .github > ISSUE_TEMPLATE > project_task.md
 - Author: Rohit Kakodkar, 3 months ago | 1 author (Rohit Kakodkar)
 - Content:

```
1 ---
2 name: Project task
3 about: Create a task within the SPECFEM++ project
4 title: ''
5 labels: ''
6 assignees: ''
7 ---
8 ---
```

Needs to be on default branch! (`main` in most cases)