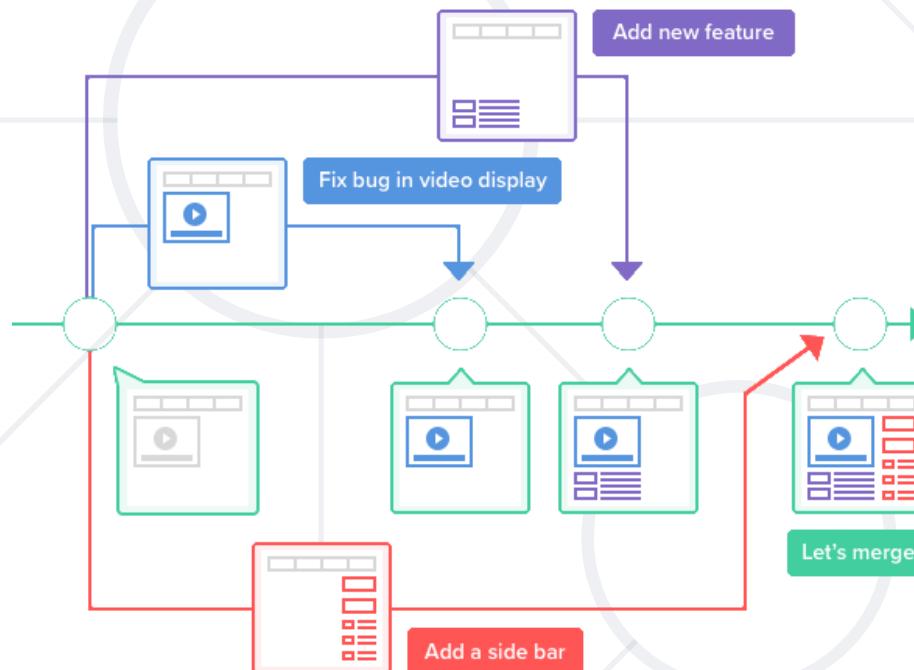


# Development Workflow

Issues, Workflow, Branches, Environments



SoftUni

SoftUni Team  
Technical Trainers

 Software University



Software University  
<https://softuni.bg>

Have a Question?



sli.do

#Dev-Ops

A network diagram is centered on the slide. It features a large, light-gray circle at the bottom containing the text "#Dev-Ops" in a bold, dark blue sans-serif font. Above it, a smaller circle contains the text "sli.do" in a bright orange sans-serif font. Both the main text and the URL are positioned within these circles. The entire diagram is set against a dark blue background and is surrounded by a network of thin gray lines connecting various small, empty circles arranged in a roughly circular pattern around the central elements.

# Table of Contents

1. Issues, Branches and Environments
2. Software Development Workflow
3. Development Workflow in Action





# Issues, Branches and Environments

## In the Software Development Workflow

# Development Workflow Introduction

- Set of **processes** that a software development team uses to convert a user story into a working software
- Includes **coding**, **build** processes and automation, **testing** and **running** the application in **different environments**
- **Optimizes** work processes
- Ensures easy navigating the complexities of a software project
  - Aims for quality, reducing delays and agile development

- Development workflow includes **various stages** for addressing issues
  - Help maintain a **structured** and **organized approach** to software development
- **Issues** are usually **visualized** on a Trello board / GitHub Project Board / Jira Board / other board
  - Issues are systematically addressed in a controlled manner
- Promotes collaboration among team member, transparency and enable efficient delivery

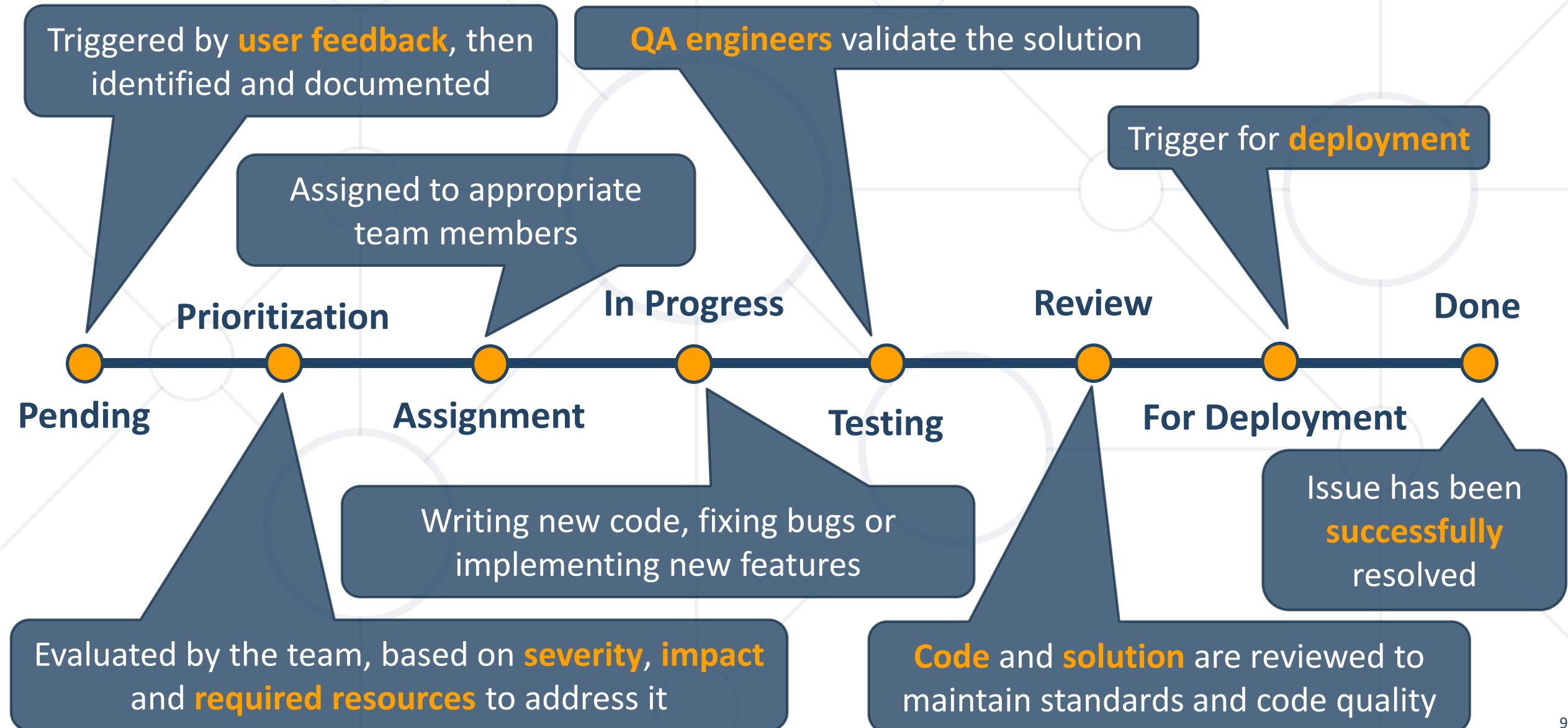
# Types of Issues (1)

- **Pending**
  - Issues are waiting to be **addressed** and **prioritized**
- **Sprint TODO**
  - **Selected issues** to be worked on during the **current sprint**
    - **Agile** development environment
- **In Progress**
  - Issues that are **actively** being worked on
  - Developers implement the required features to address the issues

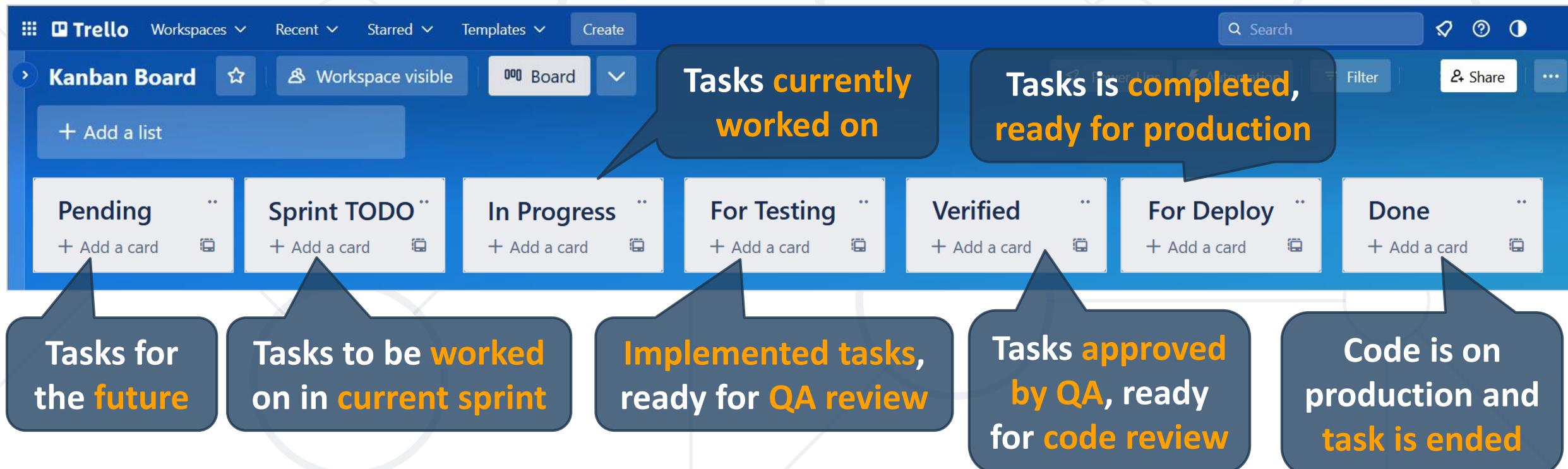
# Types of Issues (2)

- **For Testing**
  - Ready for **QA** testing
- **Verified**
  - Testing is **complete** and ready for further actions
- **For Deploy**
  - **Verified** and approved
- **Done**
  - Successful **deployment**

# Issue Lifecycle



# Issues – Example



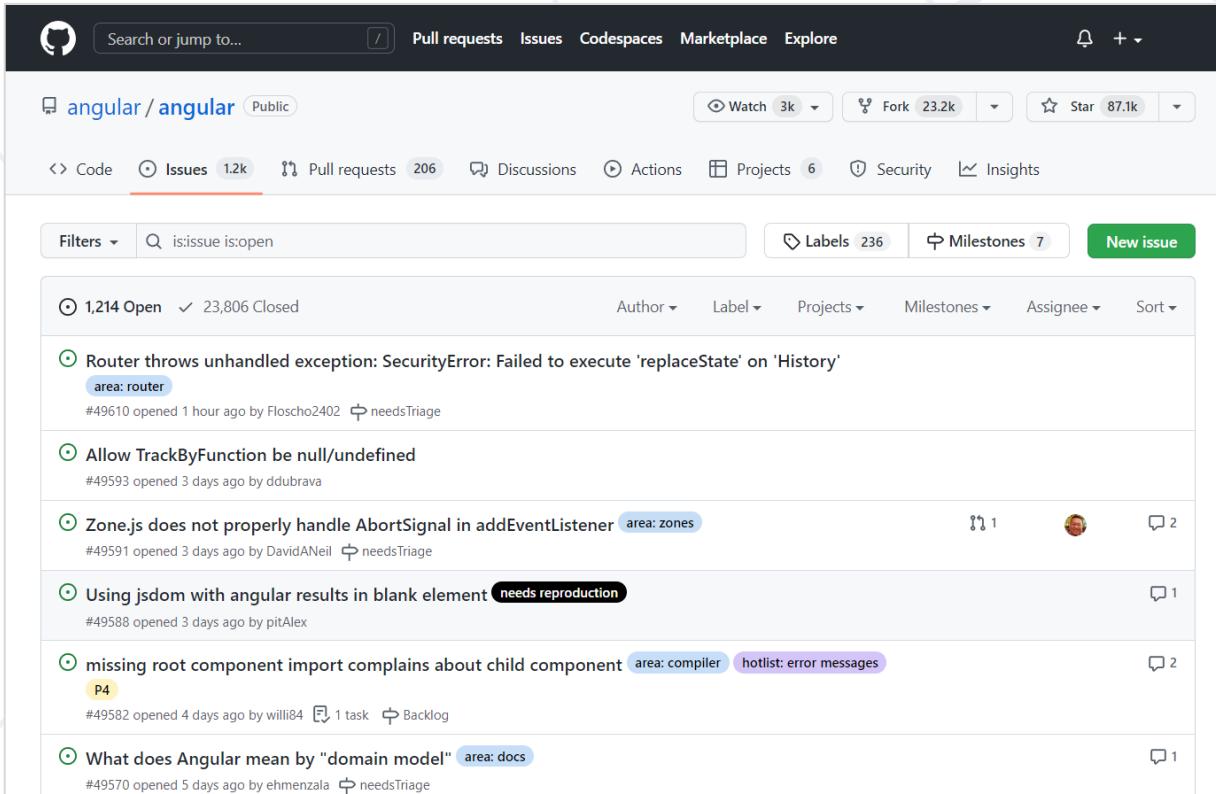
## ■ GitHub Issues

- Built-in feature of GitHub
- Holds **all project issues** (requirements + bugs)
- Bug reports
- Feature requests
- [GitHub Issues example](#)

## ■ GitHub Projects

- Project management feature of GitHub
- Enables planning, organizing and tracking the progress of a software development project
- Visualizes the issues (tasks) workflow as a Kanban board
- [GitHub Projects example](#)

# Issue Trackers – Example



Search or jump to... Pull requests Issues Codespaces Marketplace Explore

angular / angular Public Watch 3k Fork 23.2k Star 87.1k

Code Issues 1.2k Pull requests 206 Discussions Actions Projects 6 Security Insights

Filters  Labels 236 Milestones 7 New issue

1,214 Open ✓ 23,806 Closed

Router throws unhandled exception: SecurityError: Failed to execute 'replaceState' on 'History'  
area:router  
#49610 opened 1 hour ago by Floscho2402 needsTriage

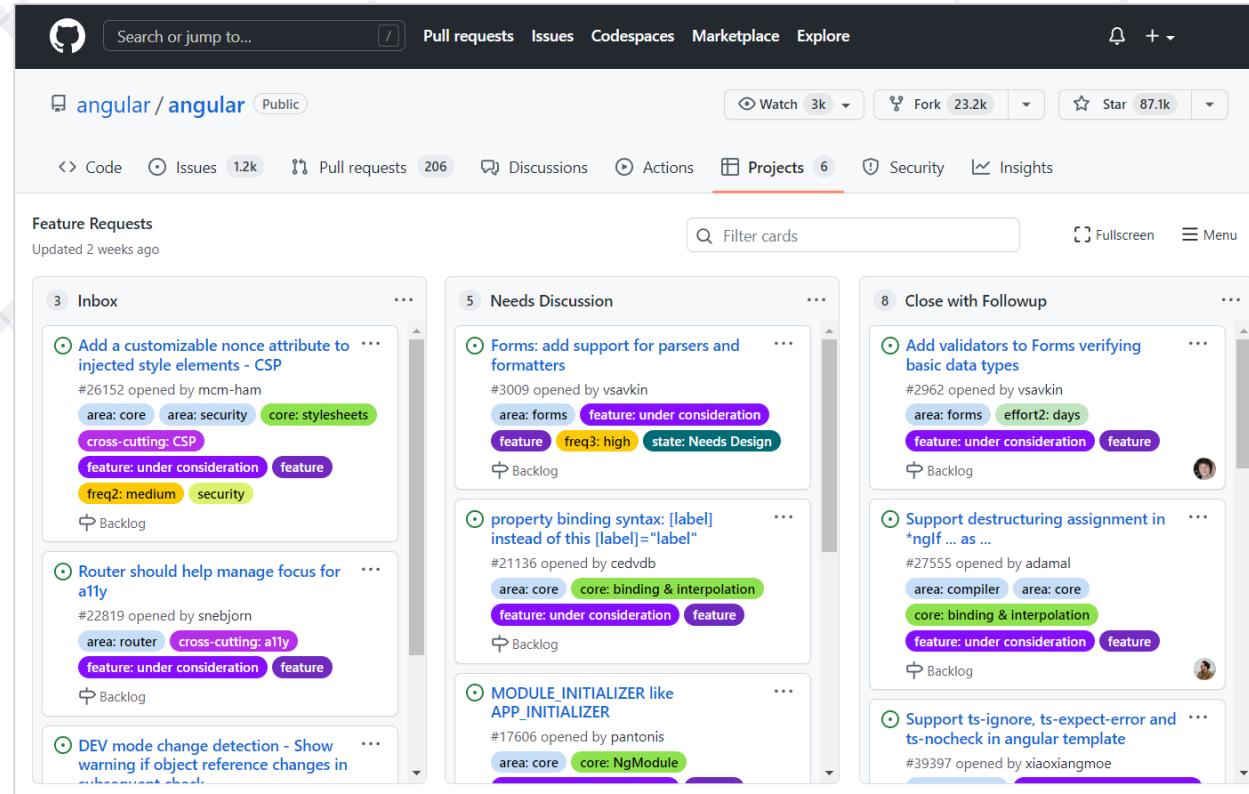
Allow TrackByFunction be null/undefined  
#49593 opened 3 days ago by ddubrava

Zone.js does not properly handle AbortSignal in addEventListener area: zones  
#49591 opened 3 days ago by DavidANeil needsTriage

Using jsdom with angular results in blank element needs reproduction  
#49588 opened 3 days ago by pitAlex

missing root component import complains about child component area: compiler hotlist: error messages P4  
#49582 opened 4 days ago by willi84 1 task Backlog

What does Angular mean by "domain model" area: docs  
#49570 opened 5 days ago by ehmenzala needsTriage



Search or jump to... Pull requests Issues Codespaces Marketplace Explore

angular / angular Public Watch 3k Fork 23.2k Star 87.1k

Code Issues 1.2k Pull requests 206 Discussions Actions Projects 6 Security Insights

Feature Requests Updated 2 weeks ago Filter cards Fullscreen Menu

3 Inbox ...

- Add a customizable nonce attribute to injected style elements - CSP  
#26152 opened by mcm-ham area: core area: security core: stylesheets cross-cutting: CSP feature: under consideration freq: medium security Backlog
- Router should help manage focus for a11y  
#22819 opened by snebjorn area: router cross-cutting: a11y feature: under consideration feature Backlog
- DEV mode change detection - Show warning if object reference changes in ...  
#17606 opened by pantonis area: core core: NgModule Backlog

5 Needs Discussion ...

- Forms: add support for parsers and formatters  
#3009 opened by vsavkin area: forms feature: under consideration freq: high state: Needs Design Backlog
- property binding syntax: [label] instead of this [label]= "label"  
#21136 opened by cedvdb area: core core: binding & interpolation feature: under consideration feature Backlog
- MODULE\_INITIALIZER like APP\_INITIALIZER  
#17606 opened by pantonis area: core core: NgModule Backlog
- Support destructuring assignment in \*ngIf ... as ...  
#27555 opened by adamal area: compiler area: core core: binding & interpolation feature: under consideration feature Backlog
- Support ts-ignore, ts-expect-error and ts-nocheck in angular template  
#39397 opened by xiaoxiangmoe area: core core: NgModule Backlog

8 Close with Followup ...

# Inside an Issue (1)

- **Title**
- **Main body**
  - Requirements
    - Outline of the desired functionality and its use case
  - Bug description
    - Steps to reproduce the issue, expected and actual behavior

# Inside an Issue (2)

- **Labels**
  - Categorize for easy organization
- **Discussion**
  - Comments from team members
- **History**
  - Changes over time

# Inside an Issue – Example

fix(core): ComponentRef.setInput only sets input when not equal to pr... #49607

[Open](#) atscott wants to merge 1 commit into `angular:main` from `atscott:setInputTracking`

Conversation 1 · Commits 1 · Checks 7 · Files changed 2 · +33 -0

atscott commented 6 hours ago

...evious

ComponentRef.setInput currently sets the input on the component regardless of the previous value the method was called with. This results in different behavior from bindings in templates, which only set inputs when the value differs in the Object.is check from its previous value.

BREAKING CHANGE: ComponentRef.setInput will only set the input on the component if it is different from the previous value (based on Object.is equality). If code relies on the input always being set, it should be updated to copy objects or wrap primitives in order to ensure the input value differs from the previous call to setInput.

atscott added `area: core` `target: major` labels 6 hours ago

atscott added this to the `v16-candidates` milestone 6 hours ago

atscott requested review from `pkozlowski.opensource` and `alxhub` 6 hours ago

angular-robot bot added the `detected: breaking change` label 6 hours ago

fix(core): ComponentRef.setInput only sets input when not equal to pr... 56f3a89

atscott force-pushed the `setInputTracking` branch from `b3bee60` to `56f3a89` 6 hours ago

ajafff reviewed 2 hours ago

View changes

```
packages/core/src/render3/component_ref.ts
...
    ...
    @@ -270,8 +271,17 @@ export class ComponentRef<T> extends AbstractComponentRef<T> {
    270   271     const inputData = this._tNode.inputs;
    271   272     let dataValue: PropertyAliasValue|undefined;
    272   273     if (inputData !== null && (dataValue = inputData[name])) {
    274     +       this.setInputHistory ??= {};
    ...
    ...
    consider using Object.create(null) and Object.prototype.hasOwnProperty.call(this.setInputHistory, name)
    to avoid issues with special names like __proto__ or hasOwnProperty
```

ajafff 2 hours ago

...

...

Code

Reviewers

- ajafff
- pkozlowski.opensource
- alxhub

At least 1 approving review is required to merge this pull request.

Still in progress? Learn about draft PRs

Assignees

No one assigned

Labels

- area: core
- detected: breaking change
- target: major

Projects

None yet

Milestone

v16-candidates

Development

Successfully merging this pull request may close these issues.

None yet

Notifications

Customize

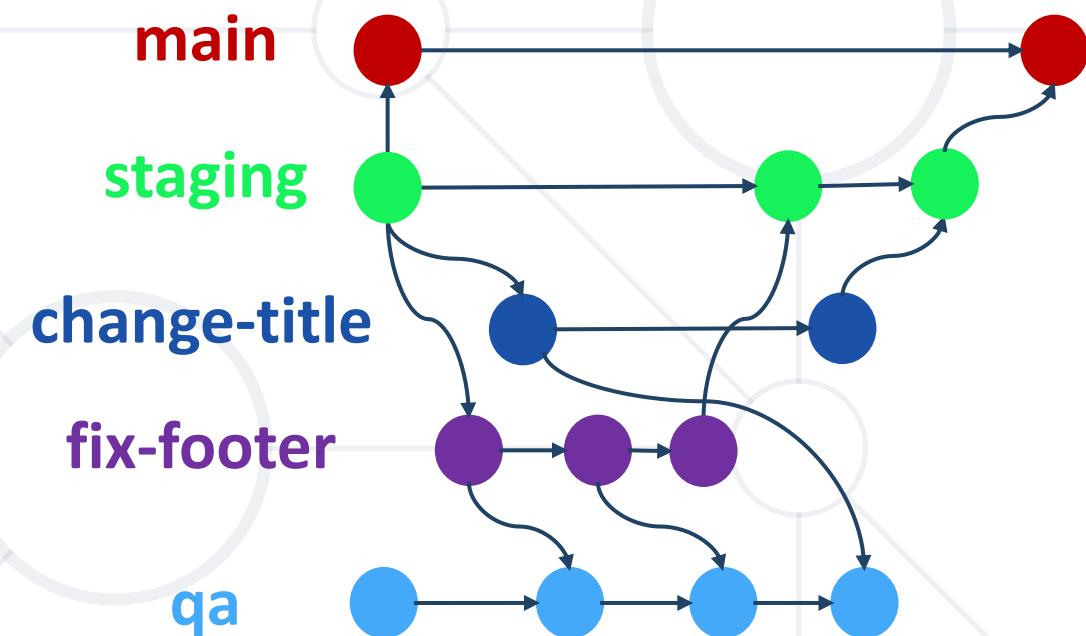
Subscribe

You're not receiving notifications from this thread.

2 participants

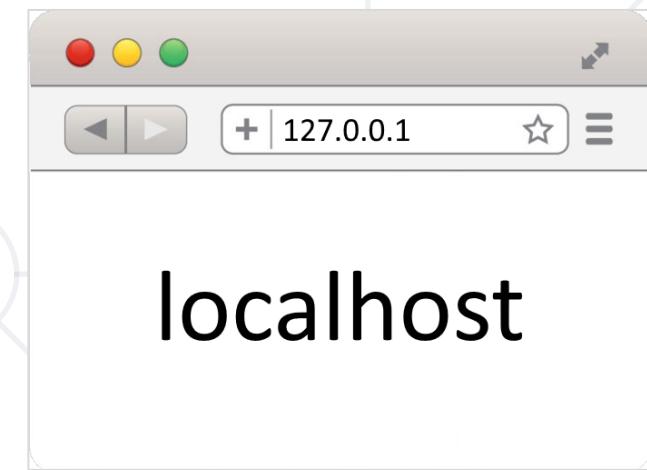
# Branches

- **Feature** branch, e.g. *change-title, fix-footer*
  - Holds feature / bug fix under development
- **QA** branch: *qa*
  - Holds completed features, ready for testing by QAs
- **Staging** branch: *staging*
  - Holds completed and approved features, ready for production
- **Production** branch: *main*
  - Holds the production code (already deployed)



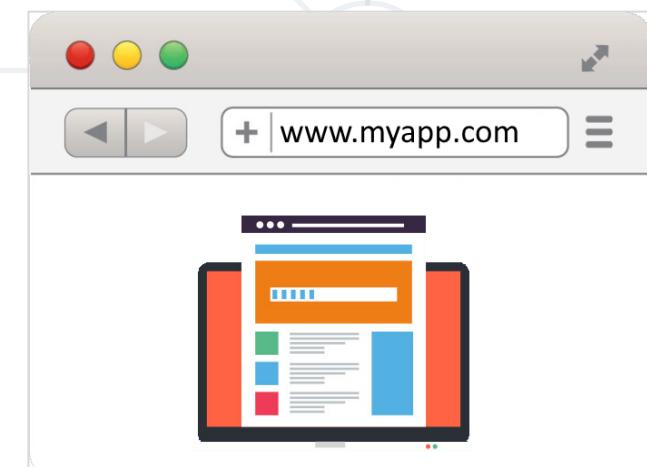
# Environments (1)

- **Local environment** (developer's laptop, localhost)
  - Where developers write code and do updates (add features, fix bugs, etc.)
  
- **QA environment** (testing)
  - Where QAs perform tests (automated or manual) on new or changed code



# Environments (2)

- **Staging environment** (pre-production)
  - Nearly exact replica of the production environment
  - The purpose is to test on a near-production level but in a non-production environment to verify the app will behave correctly after deployment
- **Production environment**
  - Software is running on production server; it's live for real users





# Software Development Workflow

## What Happens at Each Step?

# Software Development Workflow

- Feature branch code is available only on local environment
- QA branch code is deployed to the QA environment
- Staging branch → staging env.
- Main branch → production env.

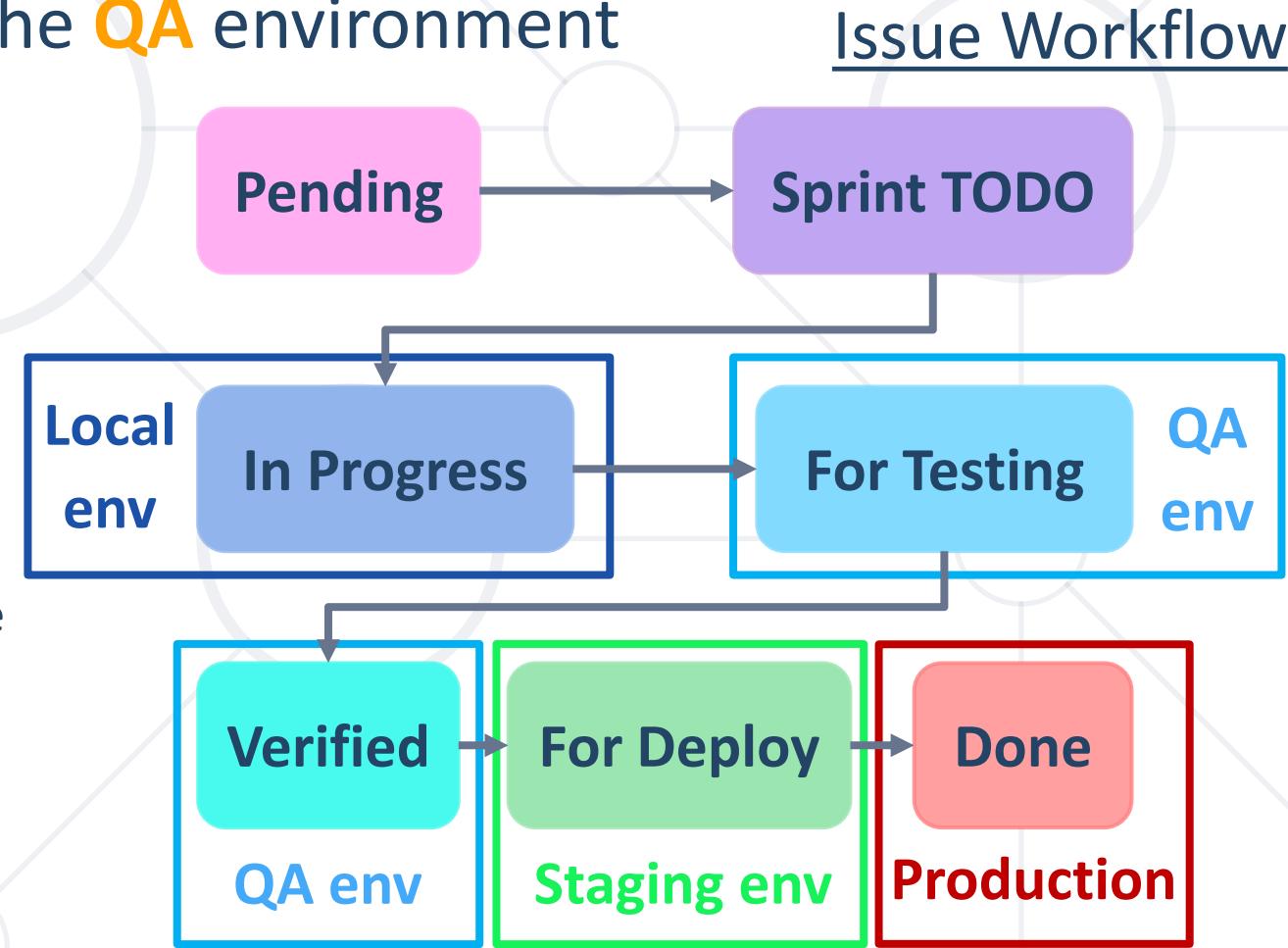
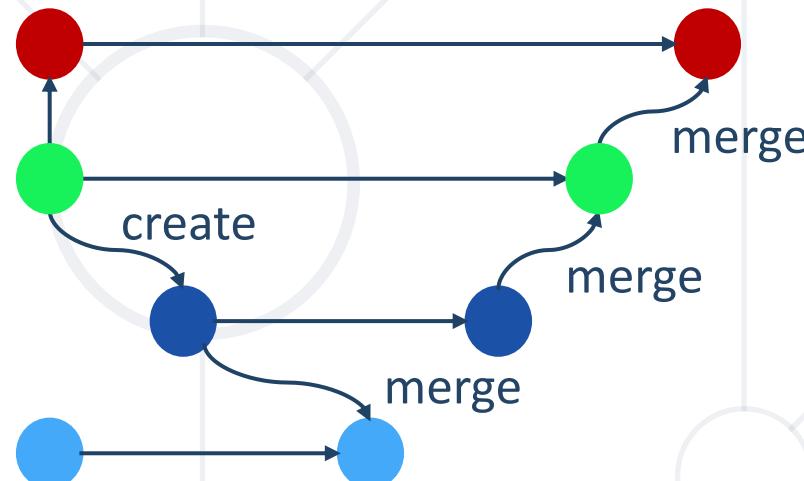
## Branches

main

staging

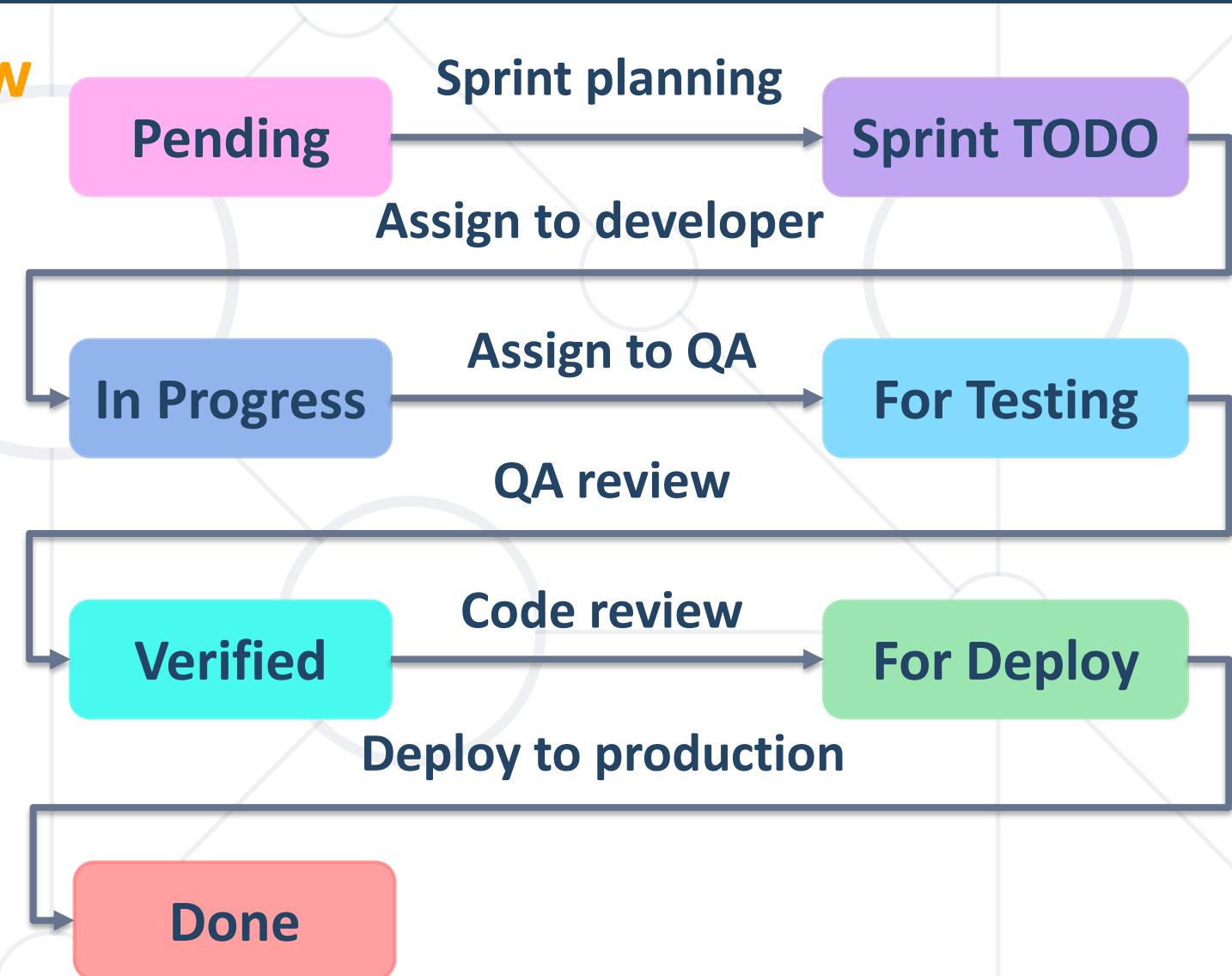
feature 1

qa



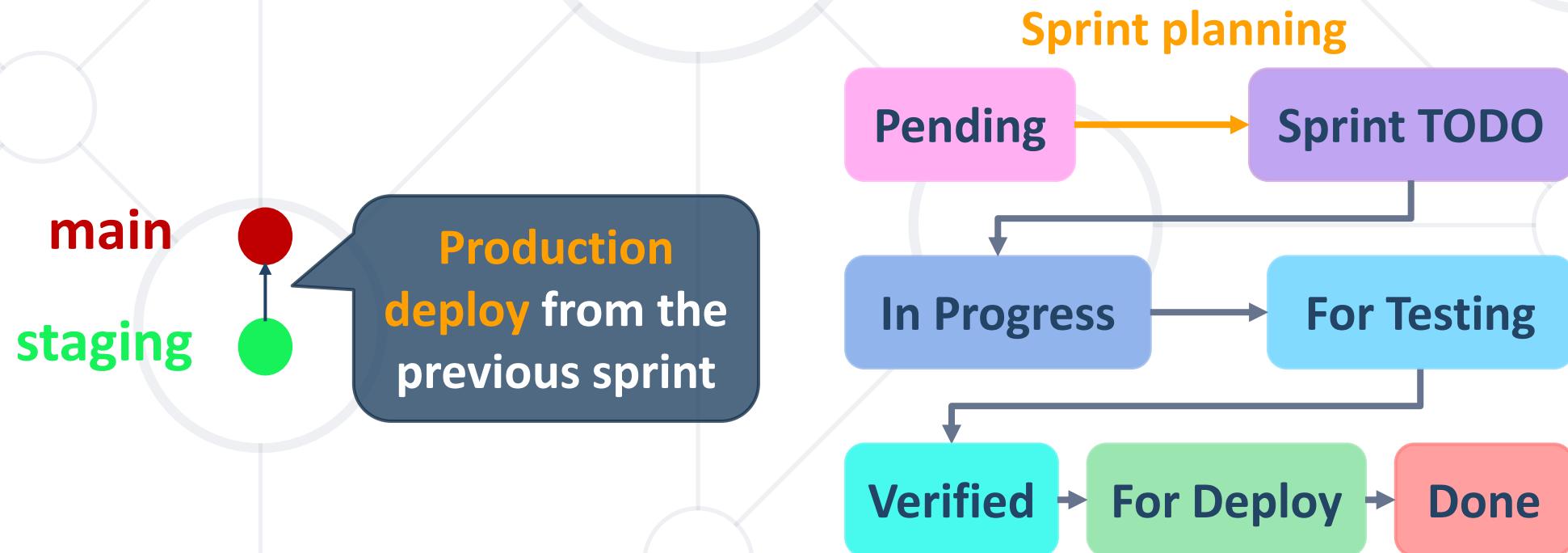
# Development Workflow Steps

- The **development workflow** consists of **several steps**
- They define
  - When **issues are moved**
  - When **branches** are **created** and **merged**
  - In which **environment** dev's last changes are



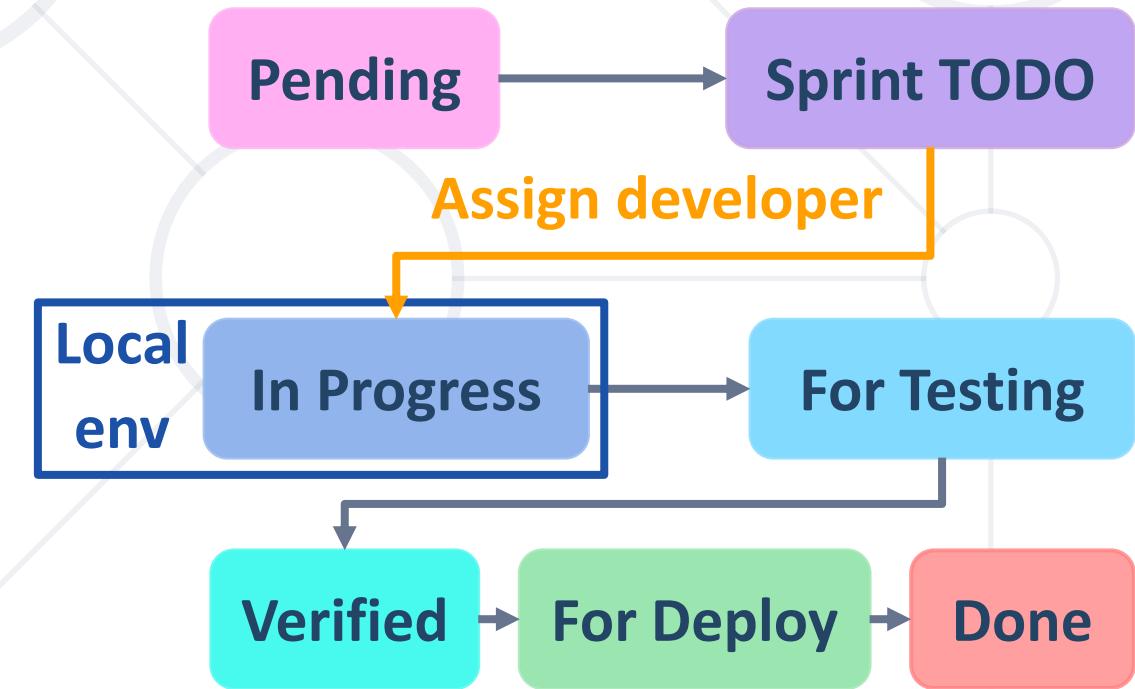
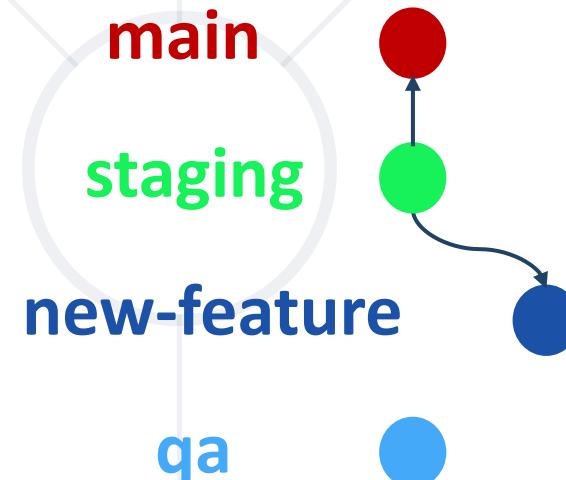
# Step 1: Sprint Planning

- The most **high-priority issues** (tasks) are selected **to be implemented** during the **following sprint** (e.g., this week)
- Issues are moved from "**Pending**" to "**Sprint TODO**" column



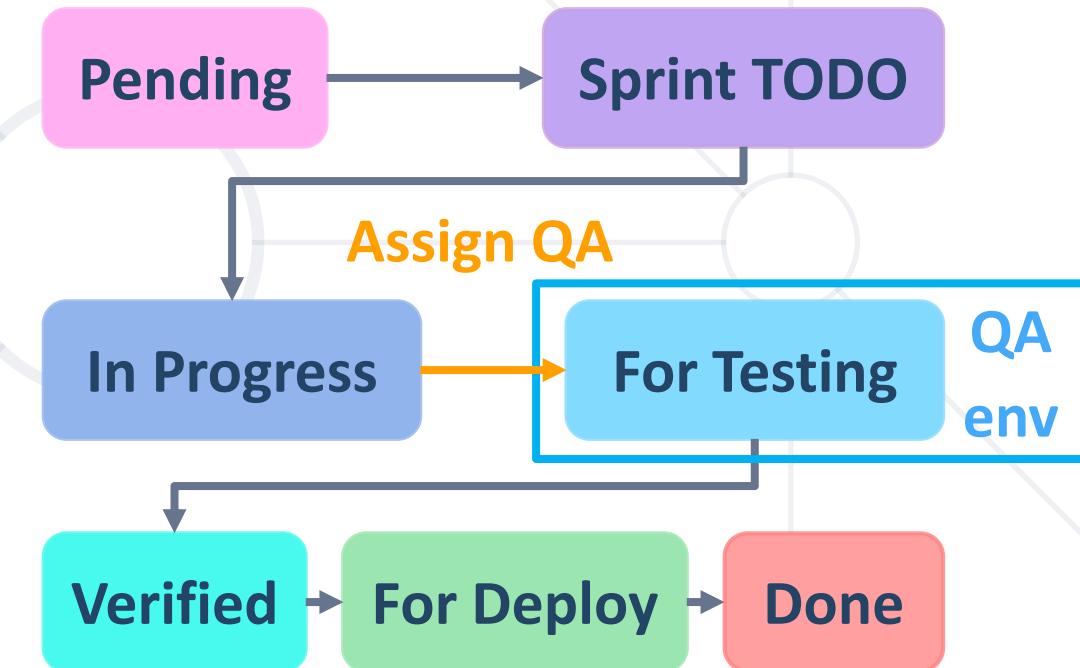
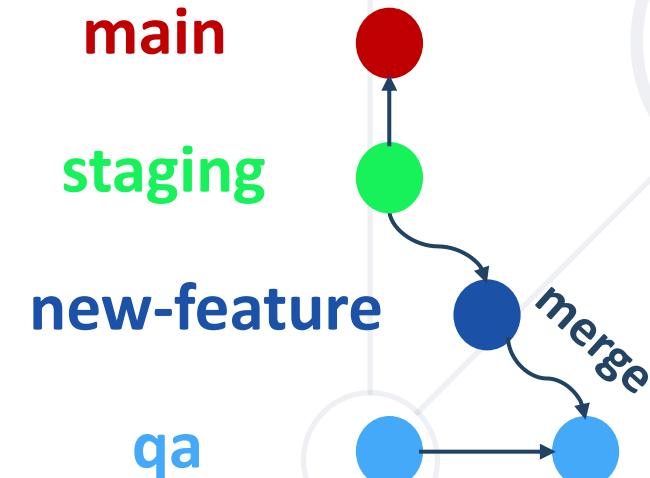
## Step 2: Assign a Developer to Work on an Issue

- First, each **issue** is assigned to a developer to work on
- When developer **starts working** on it: "**Sprint TODO**" → "**In Progress**"
- Dev creates a **feature branch**
- Issue label: "**In Progress**"
- Environment: **local** (localhost)



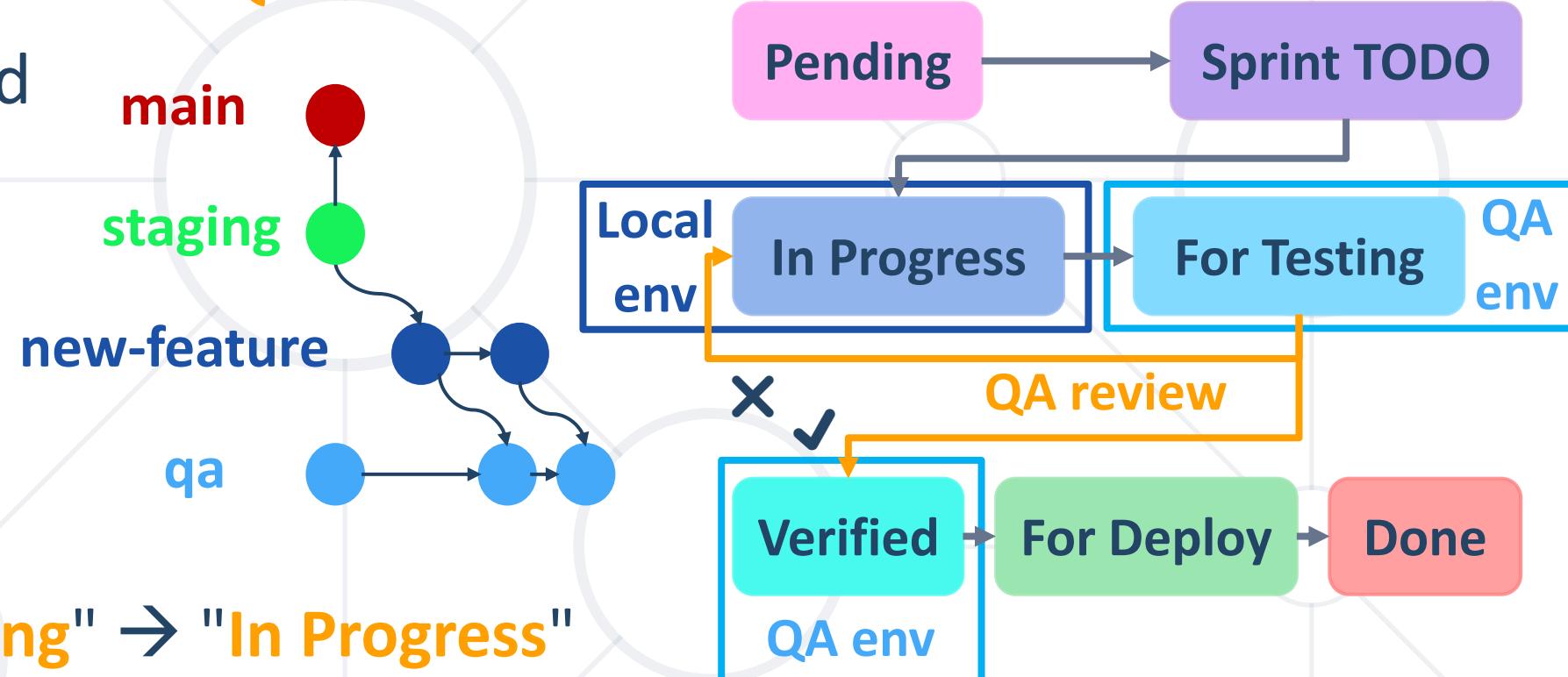
# Step 3: Assign Completed Task to QA

- Developer has **completed their task** in their **feature branch**
- Issue: "In Progress" → "For Testing" and **assigned to a QA** for testing
- Feature branch** is merged into the **QA branch**
- Issue label: "**For Testing**"
- Code is deployed to **QA environment**
  - Automated tests should pass
  - Often done automatically



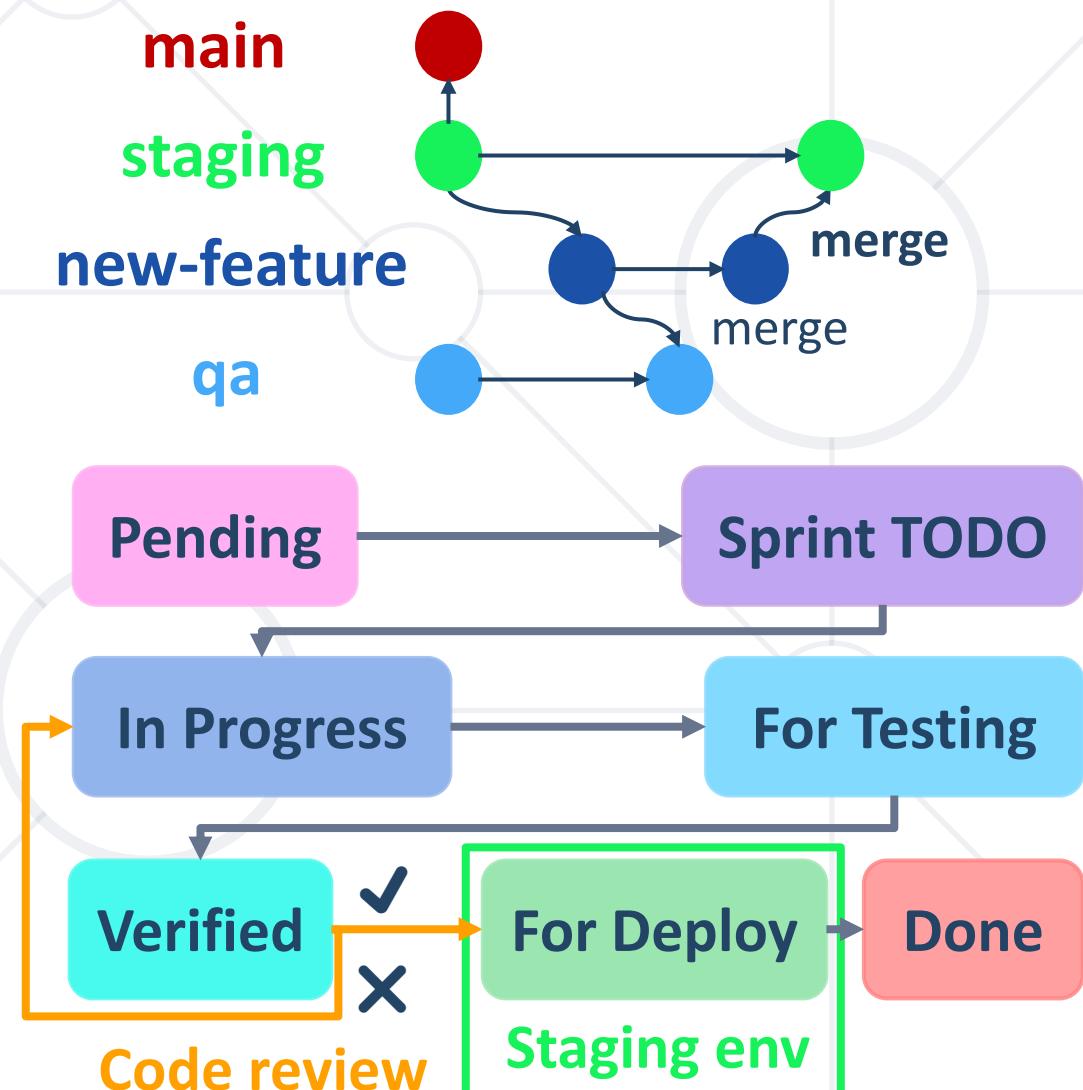
# Step 4: QA Review

- QA tests the app on the **QA environment**
- No bugs are found
  - "For testing" → "Verified"
  - Issue label: "**QA Verified**"
- If a **bug is found**
  - Issue: "**For Testing**" → "**In Progress**"
  - Issue label: "**QA Failed**"
  - Developer should make changes in their **feature branch**, then create a **new merge** into the **QA branch**, so that tests are performed again



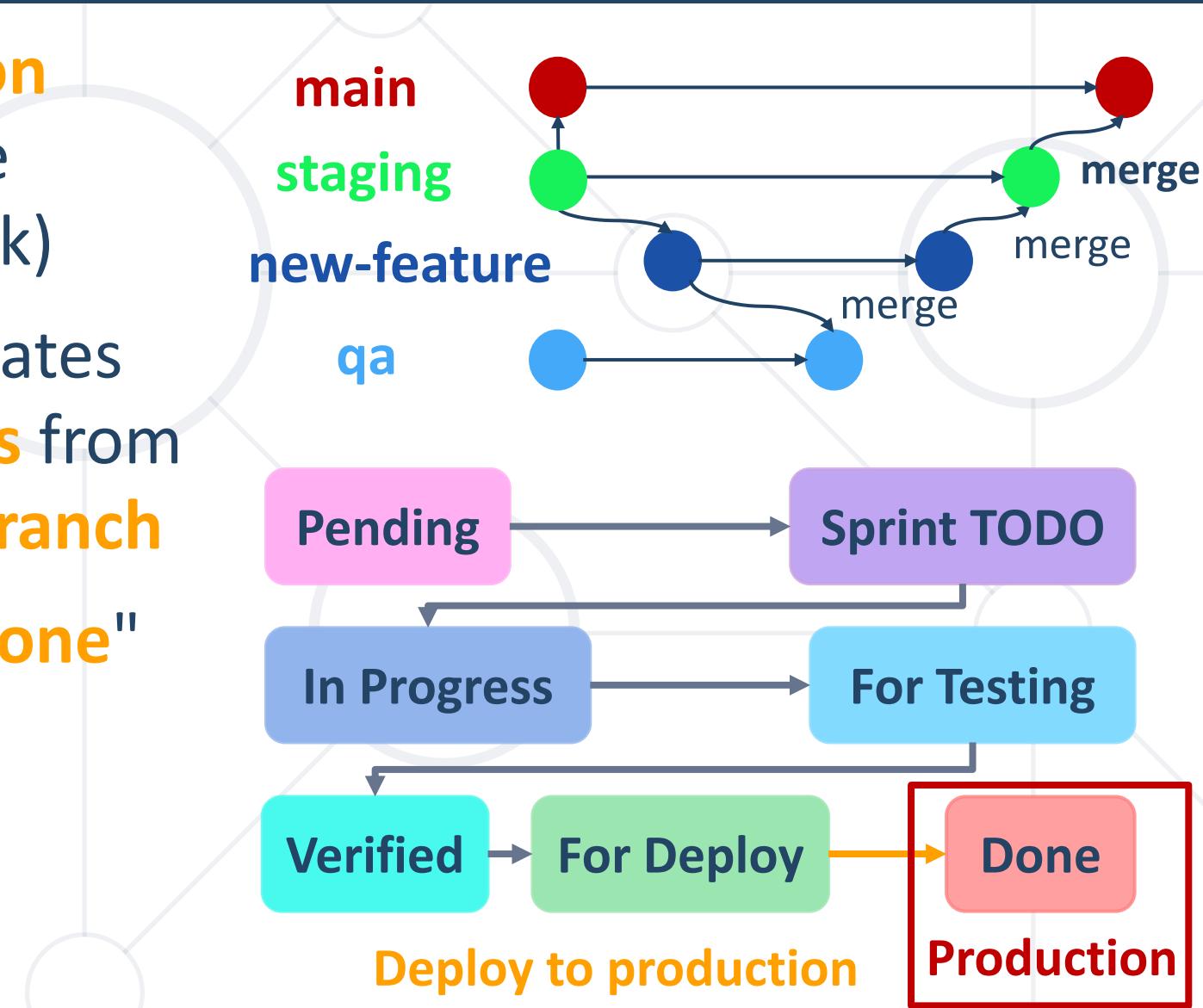
# Step 5: Code Review

- Dev creates a **pull request to merge from the feature to staging branch**
- Other devs conduct a **code review**
- Code review **failed**
  - Issue is moved to "**In Progress**"
  - Label: "**Code Review Failed**"
- Code review **passed**
  - Label and column: "**For Deploy**"
  - Code is merged to the **staging branch** and deployed to **staging env.**
  - **Close** the issue & delete the branch



# Step 6: Deploy to Production

- **Deployment to production** happens at the end of the sprint (e.g., once per week)
- Person from the team creates a **pull request** and **merges** from the **staging** to the **main branch**
- Issue: "**For Deploy**" → "**Done**"
- Code is deployed to the **production environment**
  - Often done manually



# Development Workflow – Overview

- **Issues flow** describes the **issue progress** over the time

Pending → Sprint TODO → In Progress → For Testing → Verified → For Deploy → Done

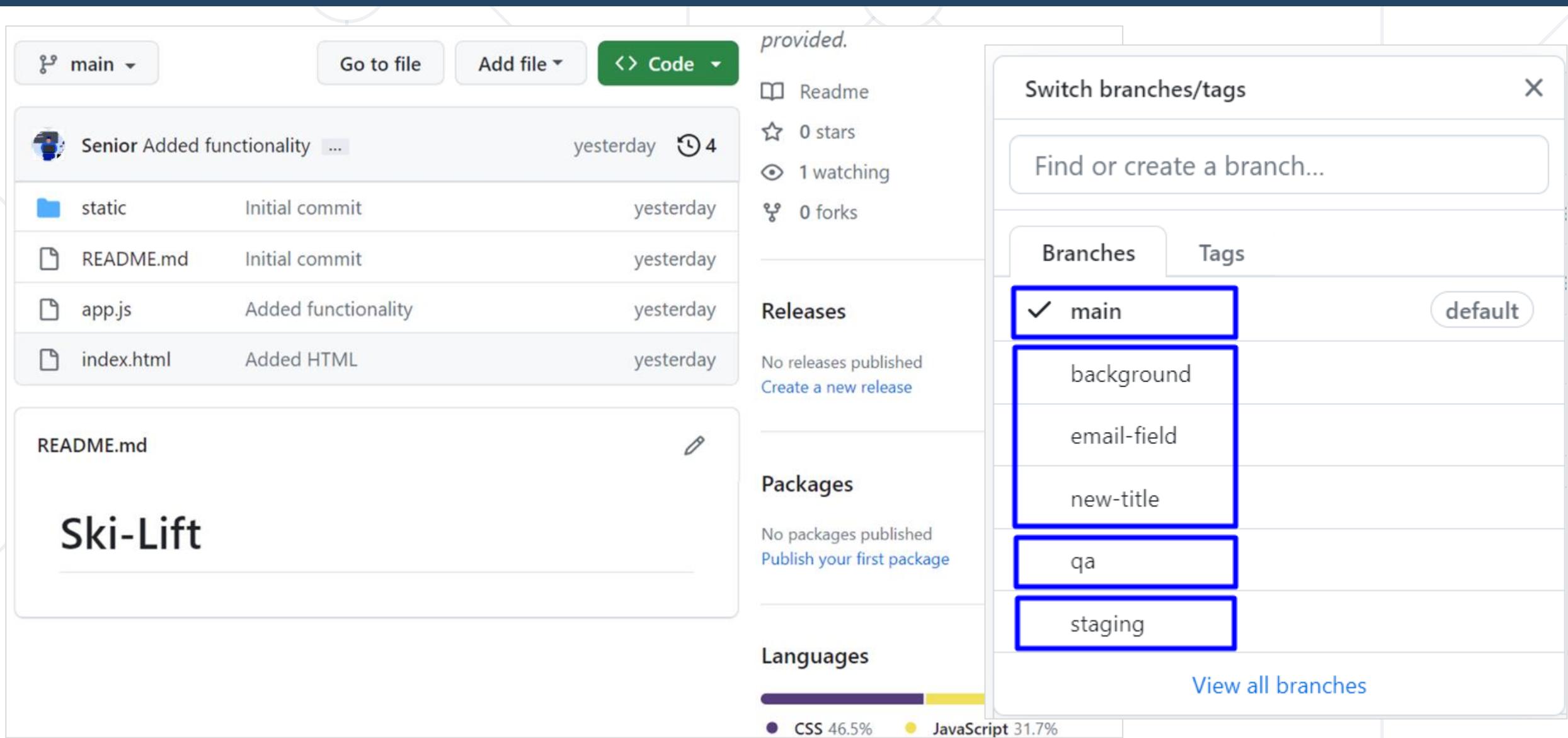
- **GitHub branches flow**
  - Feature branch → QA branch (*qa*)
  - Feature branch → **staging** branch (*staging*) → **production** branch (*main*)
- **Dev environments flow**
  - Feature branch → **local** laptop (localhost)
  - QA branch → **QA** environment (qa.myapp.com) – auto deploy by CI/CD
  - Staging branch → **staging** environment (staging.myapp.com)
  - Main branch → **production** environment (myapp.com) – manual deploy



# Development Workflow in Action

## Sample GitHub Project

# Development Workflow in Action (1)



The screenshot shows a GitHub repository interface with a pull request and a branch selection dialog.

**Pull Request:** Senior Added functionality ... (yesterday) 4

**Files:**

- static Initial commit (yesterday)
- README.md Initial commit (yesterday)
- app.js Added functionality (yesterday)
- index.html Added HTML (yesterday)

**Branch Selection Dialog:** Switch branches/tags

Find or create a branch...

Branches Tags default

- ✓ main
- background
- email-field
- new-title
- qa
- staging

[View all branches](#)

**Repository Summary:**

- provided.
- Readme
- 0 stars
- 1 watching
- 0 forks

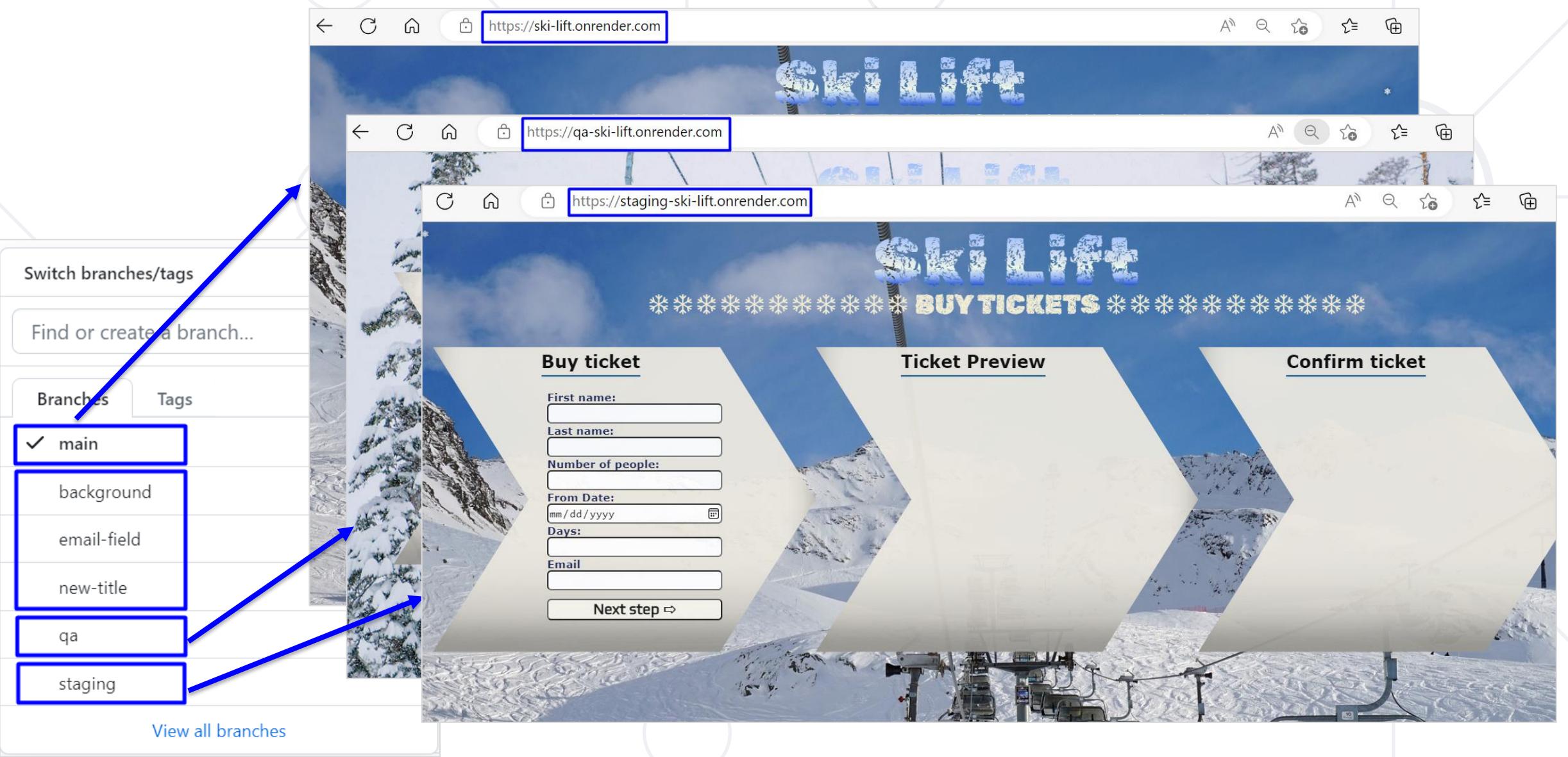
**Releases:**  
No releases published  
[Create a new release](#)

**Packages:**  
No packages published  
[Publish your first package](#)

**Languages:**

- CSS 46.5%
- JavaScript 31.7%

# Development Workflow in Action (2)



Switch branches/tags

Find or create a branch...

Branches Tags

- ✓ main
- background
- email-field
- new-title
- qa
- staging

[View all branches](#)

https://ski-lift.onrender.com

Ski Lift

https://qa-ski-lift.onrender.com

https://staging-ski-lift.onrender.com

Ski Lift BUY TICKETS

Buy ticket

First name:

Last name:

Number of people:

From Date:  mm/dd/yyyy

Days:

Email:

Next step ➡

Ticket Preview

Confirm ticket

# Development Workflow in Action



**Ski Lift**

View 1 + New view

Filter by keyword or by field

Save changes

Pending 3

This item hasn't been started

Ski-Lift #6  
Room Type Field  
[new field](#)

Sprint TODO 1

Ski-Lift #4  
Added new color

In Progress 0

This is actively being worked on

Ski-Lift #5  
Price Field  
[duplicate](#) [new field](#)

For Testing 1

Ski-Lift #3  
New Title  
[new](#)

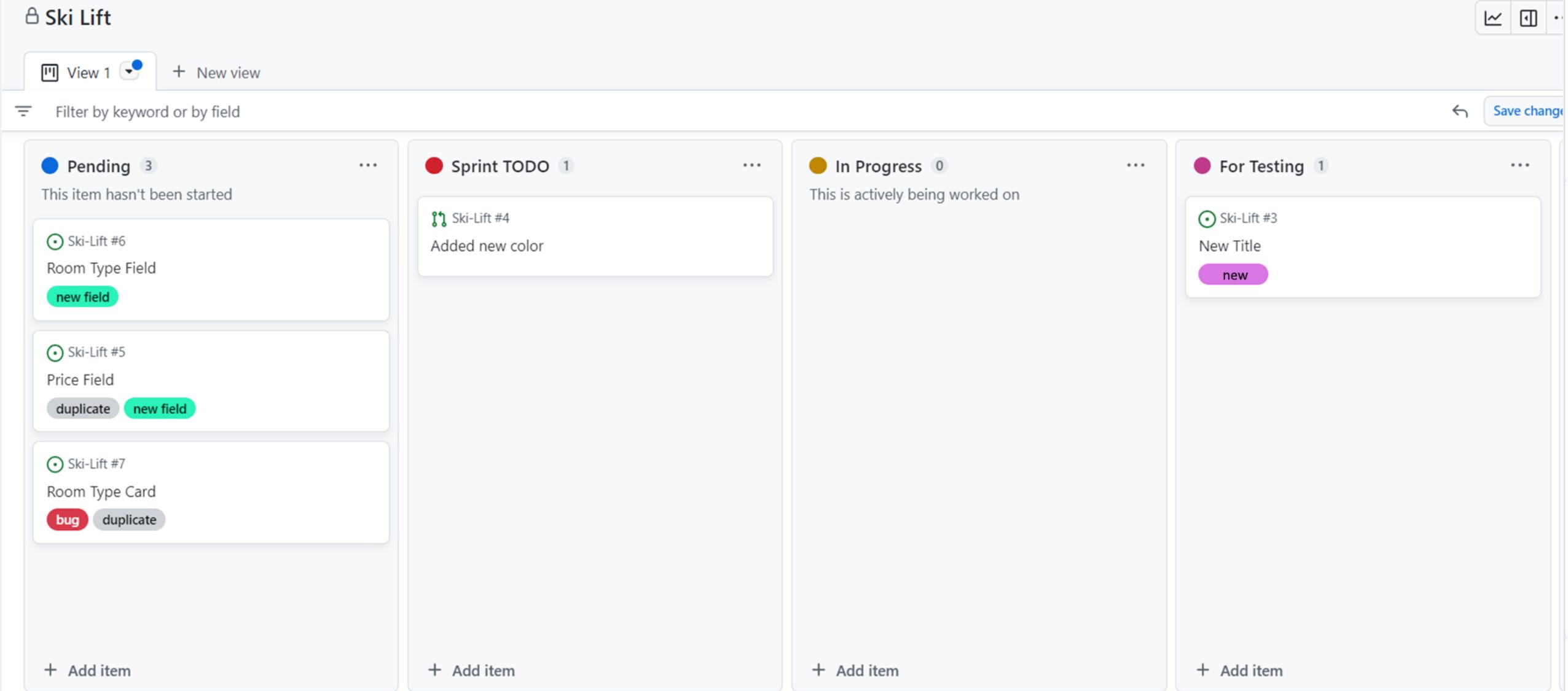
Ski-Lift #7  
Room Type Card  
[bug](#) [duplicate](#)

+ Add item

+ Add item

+ Add item

+ Add item



# We have GitHub Projects Board with Issues



Ski Lift

View 1 + New view

Filter by keyword or by field

Save changes

For Testing 1

Verified 0

For Deploy 1

Done 1

This has been completed

Ski-Lift #3  
New Title  
new

Ski-Lift #2  
New Background  
background QA Verified

Ski-Lift #1  
Email Field  
new field QA Verified

"New Title" is on the qa branch, qa env.

"New Background" is on the staging branch, staging env.

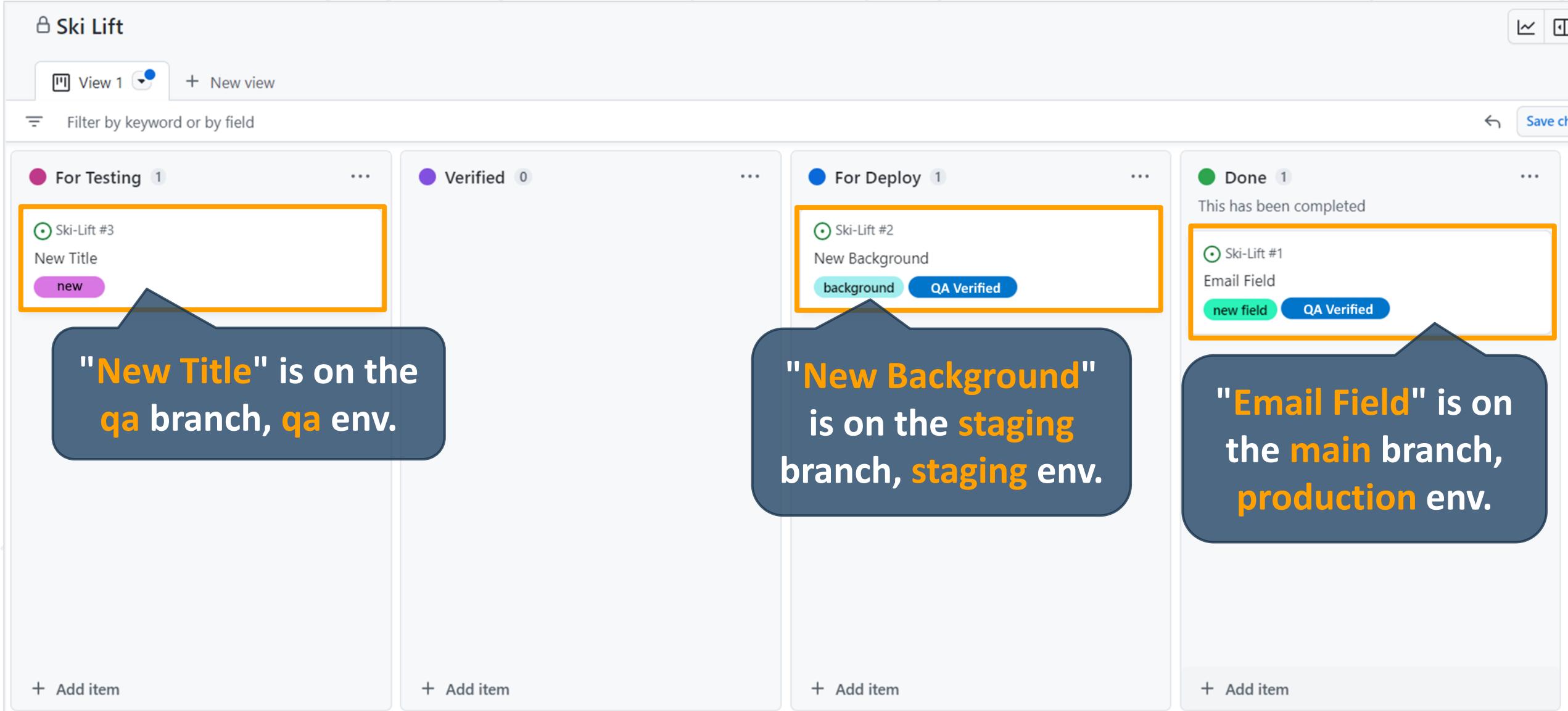
"Email Field" is on the main branch, production env.

+ Add item

+ Add item

+ Add item

+ Add item



A screenshot of a GitHub Projects board titled "Ski Lift". The board is divided into four columns based on status: "For Testing" (1 item), "Verified" (0 items), "For Deploy" (1 item), and "Done" (1 item). The "For Testing" column contains an item titled "Ski-Lift #3" with the note "New Title" and a pink "new" button. The "For Deploy" column contains an item titled "Ski-Lift #2" with the note "New Background", a green "background" button, and a blue "QA Verified" button. The "Done" column contains an item titled "Ski-Lift #1" with the note "Email Field", a green "new field" button, and a blue "QA Verified" button. Three callout boxes with orange borders highlight specific items: one for "New Title" in the testing column, one for "New Background" in the deploy column, and one for "Email Field" in the done column. Each callout box contains text explaining its status: "New Title" is on the qa branch, qa env.; "New Background" is on the staging branch, staging env.; and "Email Field" is on the main branch, production env.

# Email Field Issue (1)



## Email Field #1

Closed Senior opened this issue 1 hour ago · 0 comments · Fixed by #2

 Senior commented 1 hour ago · edited

Owner ...

TODO: add an email field in form.  
As an end user, I want to be able to provide my email address when submitting a form so that I can receive email notifications and updates related to my form submission.  
Overall, the addition of an email field to the form will enhance the user experience by providing them with a way to receive important notifications related to their form submission, and will also improve the functionality of the application by allowing for better communication with users.



 Senior added the **new field** label 1 hour ago

 Senior added this to **Ski Lift** 1 hour ago

 Senior linked a pull request 59 minutes ago that will close this issue

**Email field #2** Merged

 Senior moved this from Pending to Sprint TODO in **Ski Lift** 58 minutes ago

Assignees  
No one—assign yourself

Labels  
**new field** **QA Verified**

Projects  
 **Ski Lift**  
Status: Done

Milestone  
No milestone

Development  
Successfully merging a pull request may close this issue.

 **email-field**  
senior/Ski-Lift-Demo-Practice

 **Email field**  
senior/Ski-Lift-Demo-Practice

# Email Field Issue (2)

 **Closed** Email Field #1  
Senior opened this issue 1 hours ago · 0 comments · Fixed by #2

 Junior added 2 commits 48 minutes ago

-  Added HTML
-  Added functionality

 Junior merged commit [4a149af](#) into [qa](#) 45 minutes ago

 [Revert](#)

 Junior moved this from In Progress to For Testing in [Ski Lift](#) 43 minutes ago

 [Lock conversation](#)

 [Pin issue](#) ⓘ

 [Transfer issue](#)

 [Delete issue](#)

 Qa added the **QA Verified** label 35 minutes ago

 Qa moved this from For Testing to Verified in [Ski Lift](#) 35 minutes ago

 [Unsubscribe](#)

You're receiving notifications because you're watching this repository.

3 participants



# Email Field Issue (3)

 **Closed** Email Field #1  
Senior opened this issue 1 hours ago · 0 comments · Fixed by #2

  Junior merged commit `6a189ag` into `staging` 30 minutes ago 

  Junior moved this from **Verified** to **For Deploy** in **Ski Lift** 30 minutes ago

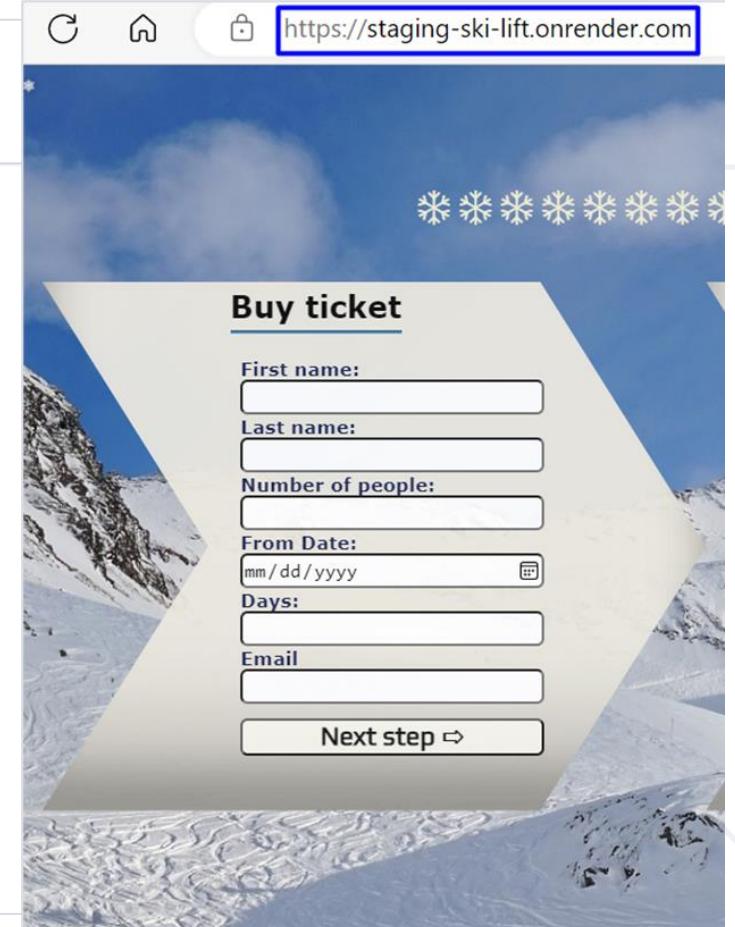
  Senior merged commit `8c246af` into `main` 15 minutes ago 

  Senior moved this from **For Deploy** to **Done** in **Ski Lift** 12 minutes ago

  Senior closed this as completed 12 minutes ago

# Email Field Issue (4)

- Closed** Email Field #1  
Senior opened this issue 1 hours ago · 0 comments · Fixed by #2
-  Junior merged commit `6a189ag` into `staging` 30 minutes ago
-  Junior moved this from Verified to For Deploy in Ski Lift 30 minutes ago
-  Senior merged commit `8c246af` into `main` 15 minutes ago
-  Senior moved this from For Deploy to Done in Ski Lift 12 minutes ago
-  Senior closed this as completed 12 minutes ago



The screenshot shows a web browser window with the URL <https://staging-ski-lift.onrender.com> in the address bar. The page has a snowy mountain background. On the right, there's a "Buy ticket" form with the following fields:

- First name:
- Last name:
- Number of people:
- From Date:  mm/dd/yyyy
- Days:
- Email:

A "Next step" button is at the bottom right of the form.

# Email Field Issue (5)

Email Field #1  
Senior opened this issue 1 hours ago · 0 comments · Fixed by #2

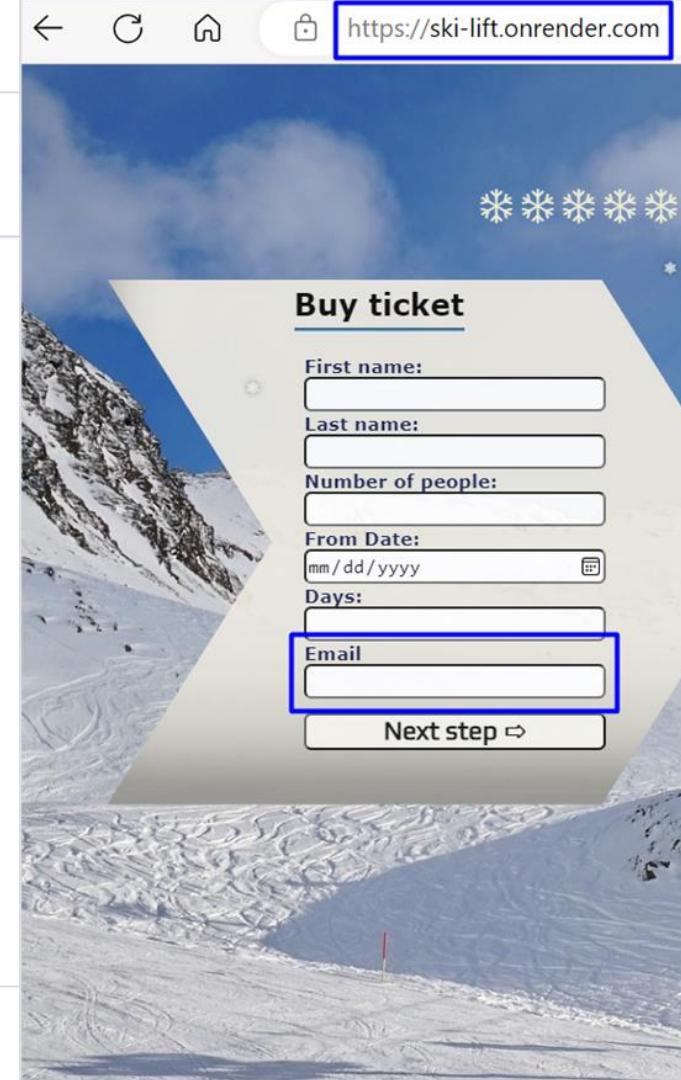
Junior merged commit `6a189ag` into `staging` 30 minutes ago

Junior moved this from **Verified** to **For Deploy** in **Ski Lift** 30 minutes ago

Senior merged commit `8c246af` into `main` 15 minutes ago

Senior moved this from **For Deploy** to **Done** in **Ski Lift** 12 minutes ago

Senior closed this as completed 12 minutes ago



# New Background Issue (1)

## New Background #2

Open Senior opened this issue 1 hours ago · 0 comments

Senior commented 1 hours ago · edited

Owner ...

**TODO: Change the background image.**  
As an end user, I want to see a visually appealing background image on the website so that it creates a pleasant and engaging experience while using the website.  
Overall, changing the background image will improve the aesthetics of the website, enhance the user experience, and make the website more engaging and visually appealing to users.

...

Senior added the **background** label 1 hours ago

Senior added this to **Ski Lift** 1 hours ago

Senior linked a pull request 1 hour ago that will close this issue  
**Background image#3**

Senior moved this from Pending to Sprint TODO in **Ski Lift** 1 hours ago

Open

Assignees  
No one—assign yourself

Labels  
**background** **QA Verified**

Projects  
**Ski Lift**  
Status: Done

Milestone  
No milestone

Development  
Successfully merging a pull request may close this issue.

**background-image**  
senior/Ski-Lift-Demo-Practice

**Background image**  
senior/Ski-Lift-Demo-Practice

# New Background Issue (2)

 Open New Background #2  
Senior opened this issue 1 hour ago · 0 comments

 Junior added 2 commits 36 minutes ago

-  Added img
-  Changes in code

 Junior merged commit [9a149af](#) into [qa](#) 36 minutes ago

 Revert

 Junior moved this from In Progress to For Testing in Ski Lift 34 minutes ago

 Qa added the [QA Verified](#) label 12 minutes ago

 Qa moved this from For Testing to Verified in Ski Lift 11 minutes ago

a1518c2  
a5b658f

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# New Background Issue (3)

**New Background #2**  
Senior opened this issue 1 hour ago · 0 comments

Junior added 2 commits 36 minutes ago

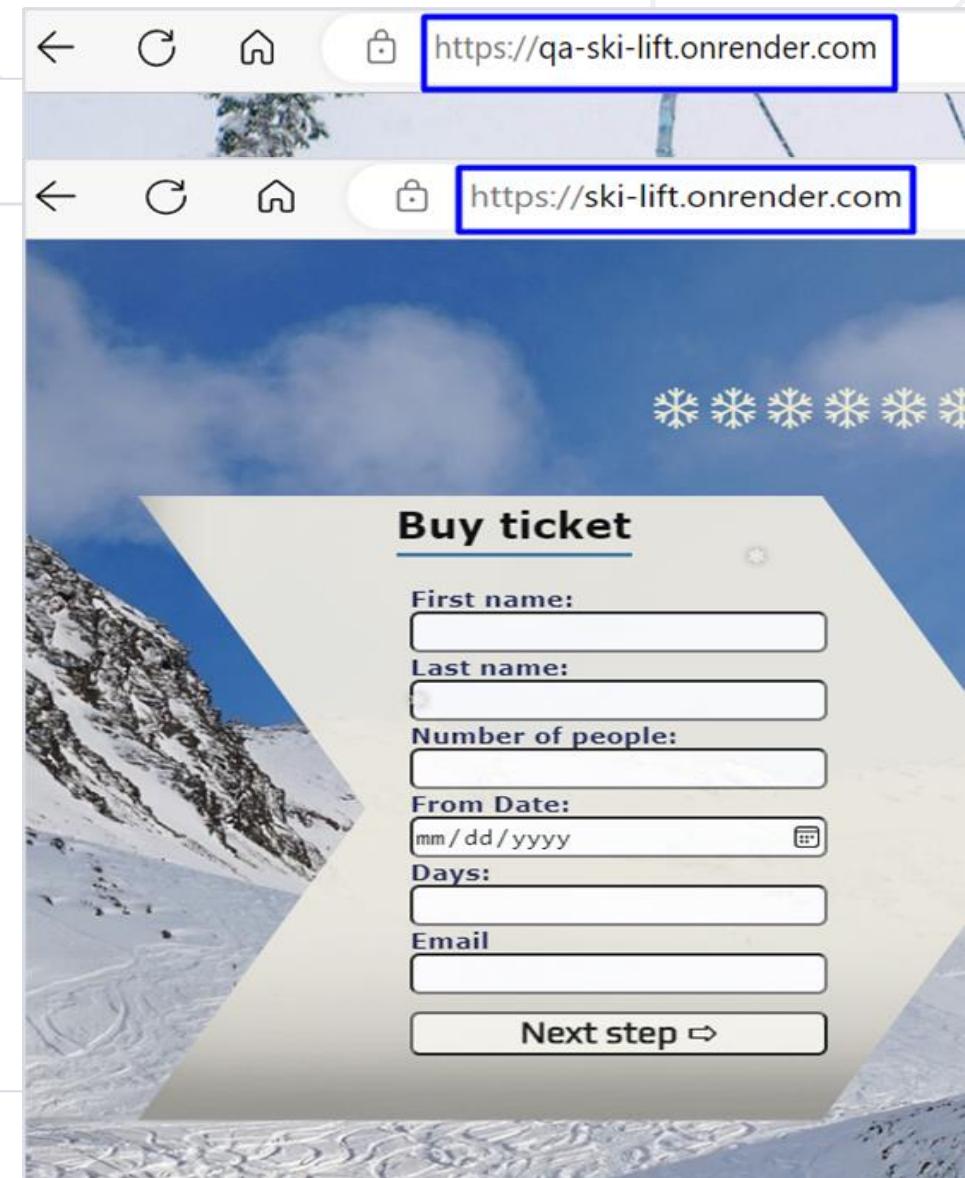
- Added img
- Changes in code

Junior merged commit `9a149af` into `qa` 36 minutes ago

Junior moved this from In Progress to For Testing in Ski Lift 34 minutes ago

Qa added the **QA Verified** label 12 minutes ago

Qa moved this from For Testing to Verified in Ski Lift 11 minutes ago



# New Title Issue (1)



## New Title #3

Open Senior opened this issue 1 hours ago · 0 comments

Senior commented 1 hours ago · edited

Owner ...

**TODO: Change the color of title.**  
As an end user, I want to be able to easily **read** and **distinguish** the **title** of the page from the rest of the content, so that I can quickly identify what the page is about.  
Overall, changing the **color** of the title will **improve** the **aesthetics** and **readability** of the website, making it easier for users to identify the main purpose of the page and navigate the website more efficiently.

Smile icon

Senior added the new label 1 hours ago

Senior added this to **Ski Lift** 1 hours ago

Senior linked a pull request 1 hour ago that will close this issue  
**New title#4**

Senior moved this from Pending to Sprint TODO in **Ski Lift** 1 hours ago

Edit New issue

Assignees  
No one—assign yourself

Labels  
new

Projects  
Ski Lift  
Status: Done

Milestone  
No milestone

Development  
Successfully merging a pull request may close this issue.

new-title  
senior/Ski-Lift-Demo-Practice

New Title  
senior/Ski-Lift-Demo-Practice

# New Title Issue (2)

**Open** New Title #3  
Senior opened this issue 1 hour ago · 0 comments

Junior added 2 commits 36 minutes ago

- Changes in HTML
- Changes in code

Junior merged commit `9a149af` into `qa` 35 minutes ago

Revert

a1518c2  
a5b658f

Junior moved this from In Progress to For Testing in Ski Lift 34 minutes ago

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 [Lock conversation](#)

# Summary

- Issues maintain an organized software development workflow
  - Moved across board columns to visualize progress
- Branches and environments feature (local env.), qa (QA env.), staging (staging env), main (production env.)
- Software development workflow steps (sprint planning, assign to developer, assign to QA, QA review, code review, deploy to production)



# Questions?



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