

# GitHub and Git

## An Overview

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# What is version control?

- ▶ A system that records changes to a file so that you can recall specific versions later.
- ▶ Source code versions are controlled in the industry.
- ▶ Helps revert a file to a previous change, even an entire project.
- ▶ Helps compare changes to the file.
- ▶ See who has made changes to the file, who introduced an issue in the code and so on.
- ▶ Helps recover projects or files to a stable state with very little overhead.
- ▶ Git, Mercurial, SVN are a few version control tools that are commonly used.

# How it works?

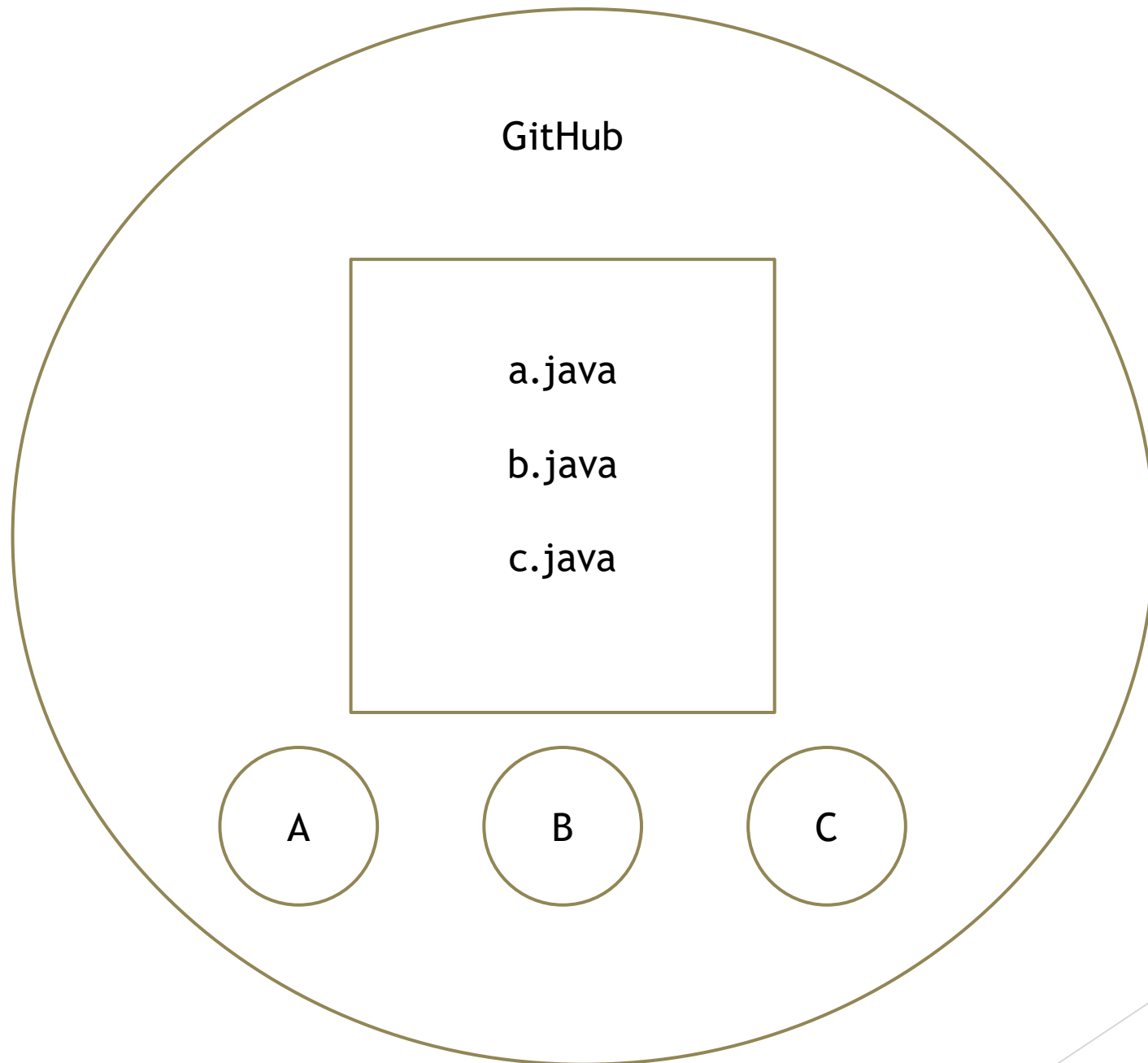
- ▶ It helps pull a repository into your local machine on which you can work.
- ▶ This just means that you have a local copy of the entire repository or a file that you have chosen to be on your machine.
- ▶ Any changes that you make will be local to your machine till you publish it.
- ▶ Once it is published the changes that you have made will be present in the centralized repository.
- ▶ Anyone who has access to the repository will be able to view your changes.
- ▶ In case you have made some mistakes you can easily revert the changes you made and move it back to the previous version before your changes.

# Why is it needed?

- ▶ Many engineers will be working on a single project. Version controls maintain the access to files for different users.
- ▶ It can also limit control of a file to a single user at a time so that multiple users do not try to modify it at the same time.
- ▶ Version Control helps maintains multiple versions of files.
- ▶ It also maintains details of the author and the timestamp of files.
- ▶ This helps identifying stable versions in the project.
- ▶ Also to revert to a previous version with very little overhead.

# Git and GitHub

- ▶ Git is the version control tool that we will be using for our coursework.
- ▶ We will be using GitHub to make our repositories.
- ▶ So every student must have a GitHub account. Those who do not have can signup for a new account at GitHub at [www.github.com](https://www.github.com)



# Setting up GIT on Windows


- ▶ Download and install the latest version of [GitHub Desktop](#). This will automatically install Git *and* keep it up-to-date for you.
- ▶ Once your installation is done you just have to login with your username and password. It will ask you for email id which you can enter. Or alternatively you can do the following steps.
- ▶ On your computer, open the **Git Shell** application.
- ▶ Tell Git your *name* so your commits will be properly labeled. Type everything after the \$ here.
  - ▶ \$ git config --global user.name "Your Name"
- ▶ Tell Git the *email address* that will be associated with your Git commits. This should be the email address that you have registered your GitHub account with. To keep your email address hidden, see "[Keeping your email address private](#)".
  - ▶ \$ git config --global user.email "Your Email Address"

# Connecting over HTTPS

- ▶ The `https://` clone URLs are available on all repositories.
- ▶ You can use SSH as well but HTTPS is the preferred method.
- ▶ When you are using the git commands like `git clone`, `git pull` etc you will be asked for your GitHub username and password.
- ▶ You can use a credential helper so Git will remember your GitHub username and password.



# Login



Sign in to GitHub

Username or email address

Password [Forgot password?](#)

[Sign in](#)

New to GitHub? [Create an account.](#)

[Terms](#) [Privacy](#) [Docs](#) [Contact GitHub Support](#)

# Main Screen

The screenshot shows the GitHub Dashboard interface. At the top is a browser window with the address bar showing 'https://github.com/dashboard'. Below the browser, the dashboard header includes the GitHub logo, the word 'Dashboard', a search bar with the placeholder 'Type / to search', and several utility icons. The main content area is divided into three columns. The left column contains 'Top repositories' with a 'New' button and a list of repository names, followed by 'Recent activity' where the repository 'SPM587FA24/SCM587FA24' is highlighted with a red box. The middle column features a 'Join GitHub Education!' banner with text about educational benefits and a 'Join GitHub Education' button. The right column contains two promotional cards: 'GitHub Models' for AI model experimentation and 'UNIVERSE'24' for a software fair. At the bottom, there are links for 'Send feedback' and a 'Filter' button, along with a 'Start writing code' button.

GitHub Dashboard

https://github.com/dashboard

Dashboard

Type / to search

Top repositories

New

Find a repository...

- SPM587SP24/SCM587SP24
- SPM587FA24/flaskapp
- SPM587FA24/SCM587FA24
- PSP24SCM04V/SCM587SP24
- VSP24SCM66C/SCM587SP24
- SSP24SCM81D/SCM587SP24
- NSP24SCM45S/SCM587SP24

Show more

Recent activity

SPM587FA24/SCM587FA24

Join GitHub Education!

GitHub Education opens doors to new skills, tools, and a collaborative community eager to drive innovation. Join us and build a foundation for your future in technology.

Free and discounted services for teachers and students.

Join GitHub Education

Copilot

Turn natural language prompts into coding suggestions

Heroku

Build, run, and operate applications entirely in the cloud.

Microsoft Azure

Access to Microsoft Azure cloud services and learning resources

GitHub Models

Join the Limited Public Beta

Try, test, and deploy a range of popular AI models with an interactive playground, for free, right on GitHub.

Learn more

UNIVERSE'24

Your GitHub Copilot questions, answered.

Learn how to ship more and context switch less at the world's fair of software. Get 20% off your tickets to GitHub Universe, only until September 3.

Get tickets

Home

Send feedback

Filter

Start writing code

# Selecting a Repository to Clone

The screenshot shows a web browser window displaying a GitHub repository page for 'SPM587FA24 / SCM587FA24'. The browser's address bar shows the URL 'https://github.com/SPM587FA24/SCM587FA24'. The repository page has a dark theme. At the top, there's a navigation bar with the repository name and a search bar. Below this is a secondary navigation bar with links for 'Code', 'Issues', 'Pull requests', 'Actions', 'Projects', 'Wiki', 'Security', 'Insights', and 'Settings'. The main content area shows the repository name 'SCM587FA24' with a 'Public' badge. Below this, there's a section for 'main' branch, showing '1 Branch' and '0 Tags'. A file list is visible, including 'Phase\_1\_Report', 'Phase\_2\_Report', '.gitignore', 'README.md', 'a.java', 'b.java', and 'c.java'. A dropdown menu is open over the 'Code' button, showing options for 'Local' and 'Codespaces'. Under 'Local', there's a 'Clone' button. Below 'Clone', there are three tabs: 'HTTPS', 'SSH', and 'GitHub CLI'. The 'HTTPS' tab is selected, showing the URL 'https://github.com/SPM587FA24/SCM587FA24.git'. A red arrow points from the text 'Copy to clone the repository' to this URL. Below the URL, it says 'Clone using the web URL.' and there are buttons for 'Open with GitHub Desktop' and 'Download ZIP'.

SPM587FA24 / SCM587FA24

SPM587FA24 / SCM587FA24

Code Issues 1 Pull requests Actions Projects Wiki Security Insights Settings

SCM587FA24 Public

main 1 Branch 0 Tags

SPM587FA24 Update README.md

Phase\_1\_Report first commit

Phase\_2\_Report first commit

.gitignore first commit

README.md Update README.md

a.java first commit

b.java first commit

c.java first commit

Local Codespaces

Clone

HTTPS SSH GitHub CLI

https://github.com/SPM587FA24/SCM587FA24.git

Clone using the web URL.

Open with GitHub Desktop

Download ZIP

About

No description, website, or topics provided.

Readme

Activity

1 star

1 watching

0 forks

Releases

No releases published

Create a new release

Packages

Copy to clone the repository

# Selecting a Repository to Clone

```
Command Prompt
C:\Users\sugip\OneDrive\Desktop\SPM>git clone https://github.com/SPM587FA24/SCM587FA24.git
Cloning into 'SCM587FA24'...
remote: Enumerating objects: 11, done.
remote: Counting objects: 100% (11/11), done.
remote: Compressing objects: 100% (7/7), done.
remote: Total 11 (delta 2), reused 7 (delta 1), pack-reused 0 (from 0)
Receiving objects: 100% (11/11), done.
Resolving deltas: 100% (2/2), done.

C:\Users\sugip\OneDrive\Desktop\SPM>
```

```
Command Prompt
C:\Users\sugip\OneDrive\Desktop\SPM>dir
Volume in drive C is OS
Volume Serial Number is 82EA-93EC

Directory of C:\Users\sugip\OneDrive\Desktop\SPM

25-08-2024  23:36    <DIR>          .
25-08-2024  23:35    <DIR>          ..
25-08-2024  23:36    <DIR>          SCM587FA24
               0 File(s)              0 bytes
               3 Dir(s)  40,899,121,152 bytes free

C:\Users\sugip\OneDrive\Desktop\SPM>cd SCM587FA24

C:\Users\sugip\OneDrive\Desktop\SPM\SCM587FA24>dir
Volume in drive C is OS
Volume Serial Number is 82EA-93EC

Directory of C:\Users\sugip\OneDrive\Desktop\SPM\SCM587FA24

25-08-2024  23:36    <DIR>          .
25-08-2024  23:36    <DIR>          ..
25-08-2024  23:36                6 .gitignore
25-08-2024  23:36                0 a.java
25-08-2024  23:36                0 b.java
25-08-2024  23:36                0 c.java
25-08-2024  23:36                0 d.java
25-08-2024  23:36                0 e.java
25-08-2024  23:36                0 f.java
25-08-2024  23:36                0 g.java
```

## Viewing and Navigating Files

### Windows Command Prompt

- View Files: ``dir``
- Change Directory: ``cd [directory_name]``

### macOS/Linux / Any IDE:

- View Files: ``ls``
- Change Directory: ``cd [directory_name]``

# Viewing a Cloned Repository

Update README.md · SPM587

+

https://github.com/SPM587FA24/SCM587FA24/commit/f521eafc8d3e5766612f43c910dc443a8eec3ef4

☆

🔒

👤

📄

☰

## Commit

Update README.md

Browse files

🔗 main

SPM587FA24 committed now Verified

1 parent [e942127](#) commit [f521eaf](#)

Showing 1 changed file with 1 addition and 0 deletions.

Whitespace

Ignore whitespace

Split

Unified

1

README.md

<>

📄

...

...

...

@@ -1 +1,2 @@

1

1

# SCM587FA24

2

+

### Assignment 4 and 5

0 comments on commit [f521eaf](#)

🔒 Lock conversation

👤

Write

Preview

H B I ≡ <> 🔗 ≡ ≡ ≡ 📎 @ 🔄 ↩

Leave a comment

# Issues and Labels

- ▶ Issues option in GitHub is a bug tracking tool for GitHub.
- ▶ Let's say you find some bugs in your code.
- ▶ You can raise an issue with labels for each bug that you find.
- ▶ Issues can be created with different labels for different phases (Requirement, Design, Coding, Testing, Documentation)
- ▶ Labels are a great way to organize different types of issues. Issues can have as many labels as you want, and you can filter by one or many labels at once.
- ▶ There are some existing labels (Bug, Enhancement) but you can also create user defined label.
- ▶ Once you fix that code and the bug is cleared you will be making a commit to your repo.
- ▶ At this time you can close that issue.

# Create Labels

Issues · SPM587FA24 / SCM587FA24

https://github.com/SPM587FA24/SCM587FA24/issues

SPM587FA24 / SCM587FA24

Type to search

<> Code Issues Pull requests Actions Projects Wiki Security Insights Settings

Label issues and pull requests for new contributors

Dismiss

Now, GitHub will help potential first-time contributors [discover issues](#) labeled with [good first issue](#)

Filters is:issue is:open

Labels 9 Milestones 0 New issue

0 Open 1 Closed

Author Label Projects Milestones Assignee Sort

There aren't any open issues.

You could search [all of GitHub](#) or try an [advanced search](#).

ProTip! Type [g](#) [p](#) on any issue or pull request to go back to the pull request listing page.

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The screenshot shows the GitHub interface for managing labels in the repository SPM587FA24. At the top, there's a navigation bar with links to Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. Below this, there's a section for 'Labels' with a search bar and a 'New label' button. The main area displays a form to create a new label, with fields for 'Label name', 'Description', and 'Color'. A red callout box points to the 'Label name' field, which contains the text 'Status: PendingReview'. Another red callout box points to the 'Create label' button. Below the form, there's a list of existing labels, each with a color-coded pill, a description, and 'Edit' and 'Delete' buttons. The labels listed are: bug, documentation, duplicate, enhancement, good first issue, help wanted, invalid, question, and wontfix.

Label name	Description	Color
bug	Something isn't working	#f9d0c4
documentation	Improvements or additions to documentation	
duplicate	This issue or pull request already exists	
enhancement	New feature or request	
good first issue	Good for newcomers	
help wanted	Extra attention is needed	
invalid	This doesn't seem right	
question	Further information is requested	
wontfix	This will not be worked on	

Select create label



# Labels

Labels · SPM587FA24/SCM587FA24

https://github.com/SPM587FA24/SCM587FA24/labels

SPM587FA24 / SCM587FA24

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

Labels Milestones Search all labels

New label

Status: PendingReview

Label name Description Color

Status: PendingReview Issue Status Pending Review #f9d0c4

Cancel Create label

9 labels

bug	Something isn't working	Edit Delete
documentation	Improvements or additions to documentation	Edit Delete
duplicate		Edit Delete
enhancement		Edit Delete
good first issue	Good for newcomers	Edit Delete
help wanted	Extra attention is needed	Edit Delete
invalid	This doesn't seem right	Edit Delete
question	Further information is requested	Edit Delete
wontfix	This will not be worked on	Edit Delete

Label colour

Label created by the user

# Multiple Labels

The screenshot shows the GitHub 'New Issue' interface. The browser address bar displays the URL `https://github.com/SPM587FA24/SCM587FA24/issues/new`. The GitHub navigation bar includes links for Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. The 'Issues' tab is selected.

On the left, the 'Add a title' section contains a text input field with the value 'TestIssue\_01'. A red box highlights this field, with a red label 'Issue Title' pointing to it.

Below the title, the 'Add a description' section features a rich text editor with a toolbar and a text area containing the placeholder 'Add your description here...'. A red box labeled 'Multiple Labels' is positioned in the center of the page.

On the right, the 'Labels' section is titled 'Apply labels to this issue'. It includes a 'Filter labels' input field and a list of labels: 'bug' (red dot), 'documentation' (blue dot), 'duplicate' (grey dot), 'enhancement' (teal dot), and 'good first issue' (purple dot). A red box highlights the entire labels section, and a green arrow points to the 'documentation' label.

At the bottom, a footer contains the text 'Markdown is supported' and 'Paste, drop, or click to add files'.

# Issues with Multiple labels

The screenshot shows a web browser window displaying the GitHub interface for a repository named SPM587FA24 / SCM587FA24. The browser's address bar shows the URL <https://github.com/SPM587FA24/SCM587FA24/issues>. The GitHub header includes the repository name, a search bar, and navigation links for Code, Issues (1), Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. A notification banner at the top states: "Label issues and pull requests for new contributors. Now, GitHub will help potential first-time contributors [discover issues](#) labeled with [good first issue](#)." Below this, a filter bar shows "is:issue is:open" and "Labels 10". The main content area displays a list of issues. The first issue, "TestIssue\_01", is highlighted with a red box labeled "Multiple Labels" pointing to its labels: "bug", "duplicate", and "good first issue". The issue is also marked as "#2 opened now by SPM587FA24". At the bottom, a "ProTip!" message says: "Click a checkbox on the left to edit multiple issues at once."

Issues · SPM587FA24/SCM587FA24

https://github.com/SPM587FA24/SCM587FA24/issues

SPM587FA24 / SCM587FA24

Type  to search

<> Code Issues 1 Pull requests Actions Projects Wiki Security Insights Settings

Label issues and pull requests for new contributors [Dismiss](#)

Now, GitHub will help potential first-time contributors [discover issues](#) labeled with [good first issue](#)

Filters  is:issue is:open Labels 10 Milestones 0 [New issue](#)

☐ 1 Open ✓ 1 Closed

☐ [TestIssue\\_01](#) [bug](#) [duplicate](#) [good first issue](#)

#2 opened now by SPM587FA24

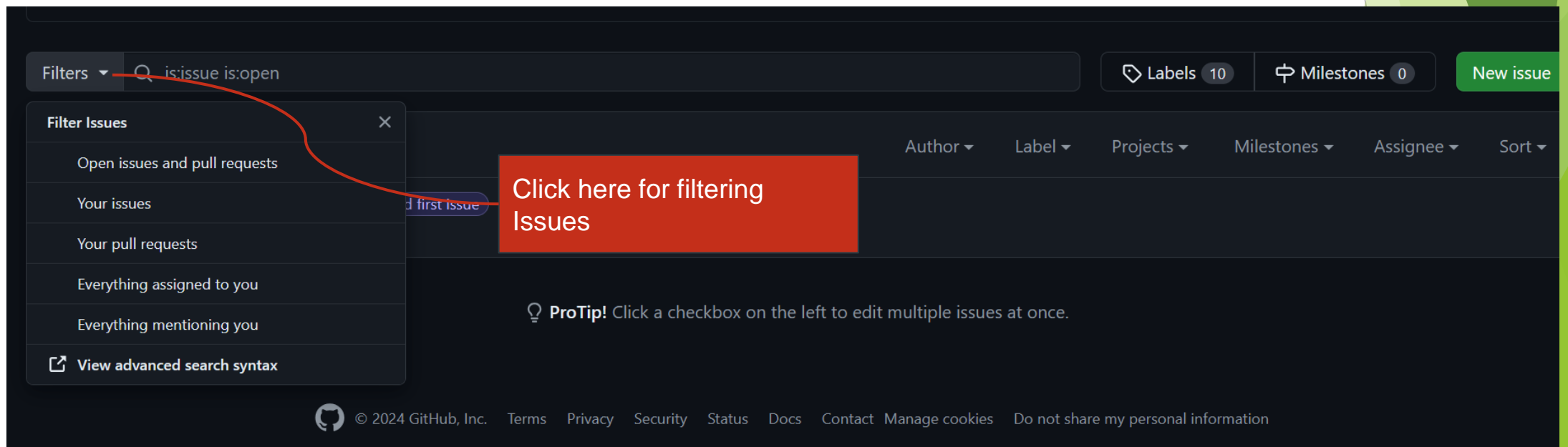
Author ▾ Label ▾ Projects ▾ Milestones ▾ Assignee ▾ Sort ▾

💡 **ProTip!** Click a checkbox on the left to edit multiple issues at once.

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# Filter Issues

- ▶ You can filter issues and pull requests to find:
  - All open issues and pull requests
  - Issues and pull requests that you've created
  - Issues and pull requests that are assigned to you
  - Issues and pull requests where you're @mentioned
- ▶ You can also Filtering issues and pull requests by labels.



# Filter Issues

Filters ▾

is:issue is:open

Labels 10

Milestones 0

New issue

☐

1 Open

✓ 1 Closed

Author ▾

Label ▾

Projects ▾

Milestones ▾

Assignee ▾

Sort ▾

☐

TestIssue\_01

bug

duplicate

good first issue

#2 opened 1 minute ago by SPM587FA24

Filter by label

Filter labels

Unlabeled

bug

Something isn't working

documentation

Improvements or additions to documenta

duplicate

This issue or pull request already exists

enhancement

New feature or request

good first issue

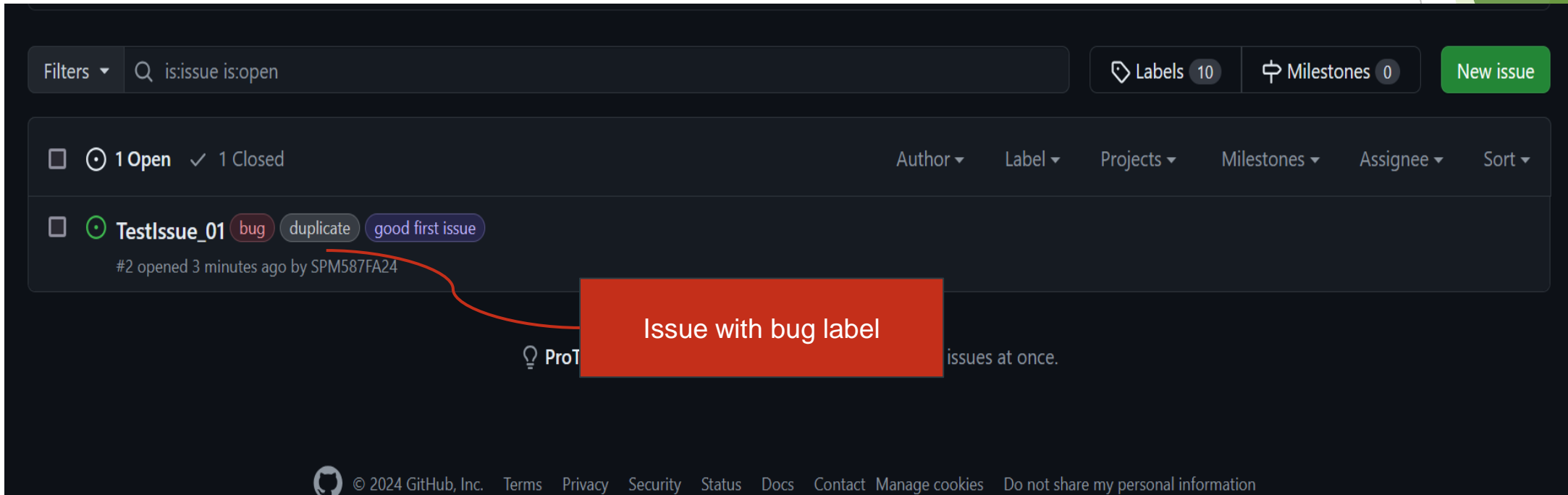
Good for newcomers

Click on bug

ProTip! Click a check


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# Filter issues




Filters ▾  Labels 10 Milestones 0 [New issue](#)

☐ 1 Open ✓ 1 Closed Author ▾ Label ▾ Projects ▾ Milestones ▾ Assignee ▾ Sort ▾

☐  **TestIssue\_01** bug duplicate good first issue

#2 opened 3 minutes ago by SPM587FA24

 ProT issues at once.

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# List issues for a Repository

```
GET /repos/:owner/:repo/issues
```

## Parameters

Name	Type	Description
milestone	integer or string	If an integer is passed, it should refer to a milestone by its number field. If the string * is passed, issues with any milestone are accepted. If the string none is passed, issues without milestones are returned.
state	string	Indicates the state of the issues to return. Can be either open, closed, or all. Default: open
assignee	string	Can be the name of a user. Pass in none for issues with no assigned user, and * for issues assigned to any user.
creator	string	The user that created the issue.
mentioned	string	A user that's mentioned in the issue.
labels	string	A list of comma separated label names. Example: bug,ui,@high
sort	string	What to sort results by. Can be either created, updated, comments. Default: created
direction	string	The direction of the sort. Can be either asc or desc. Default: desc
since	string	Only issues updated at or after this time are returned. This is a timestamp in ISO 8601 format: YYYY-MM-DDTHH:MM:SSZ.

# List issues for a Repository

The screenshot shows the Postman interface with a GET request to `https://api.github.com/repos/SPM587FA24/SCM587FA24/issues`. The request is configured with the method `GET` and the URL. The response is a JSON array of issue objects, with the first object highlighted. A red arrow points to the `"title": "TestIssue_01"` field in the response.

**Request:**

```
GET https://api.github.com/repos/SPM587FA24/SCM587FA24/issues
```

**Response:**

```
[
  {
    "url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2",
    "repository_url": "https://api.github.com/repos/SPM587FA24/SCM587FA24",
    "labels_url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2/labels{/name}",
    "comments_url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2/comments",
    "events_url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2/events",
    "html_url": "https://github.com/SPM587FA24/SCM587FA24/issues/2",
    "id": 2485894556,
    "node_id": "I_kwDOMoRZTc6UK72c",
    "number": 2,
    "title": "TestIssue_01",
    "user": {
      "login": "SPM587FA24",
      "id": 164765486,

```



# Get a Single issue

```
GET /repos/:owner/:repo/issues/:number
```

The screenshot shows the Postman interface with a GET request to `https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2`. The request is highlighted with a red box. The response is a JSON object representing a GitHub issue, with the `number` field highlighted by a red arrow. A notification for 'TestIssue\_01' is visible on the right.

**Request:**

```
GET https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2
```

**Response (JSON):**

```
{
  "url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2",
  "repository_url": "https://api.github.com/repos/SPM587FA24/SCM587FA24",
  "labels_url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2/labels{/name}",
  "comments_url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2/comments",
  "events_url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2/events",
  "html_url": "https://github.com/SPM587FA24/SCM587FA24/issues/2",
  "id": 2485894556,
  "node_id": "I_kwDOMoRZTc6UK72c",
  "number": 2,
  "title": "TestIssue_01",
  "user": {
    "login": "SPM587FA24",
    "id": 164765486,
    "node_id": "U_kgD0CdIflg",
  }
}
```

**Notification:** TestIssue\_01 (bug, duplicate, good first issue) #2 opened 9 minutes ago by SPM587FA24

# List Labels for an Issue

The screenshot displays the Postman interface with a REST client request configured to the GitHub API endpoint: `https://api.github.com/repos/SPM587FA24/SCM587FA24/issues/2/labels`. The request method is `GET`. The response is a JSON array of two label objects, with the `name` field highlighted in both by red arrows.

```
1 [
2   {
3     "id": 7375253950,
4     "node_id": "LA_kwDOMoRZTc8AAAABt51xvg",
5     "url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/labels/bug",
6     "name": "bug",
7     "color": "d73a4a",
8     "default": true,
9     "description": "Something isn't working"
10  },
11  {
12    "id": 7375253955,
13    "node_id": "LA_kwDOMoRZTc8AAAABt51xww",
14    "url": "https://api.github.com/repos/SPM587FA24/SCM587FA24/labels/duplicate",
15    "name": "duplicate",
16    "color": "cfd3d7",
17    "default": true,
18    "description": "This issue or pull request already exists"
19  },
20 ]
```

An inset image shows a GitHub issue interface with the following labels: `TestIssue_01`, `bug`, `duplicate`, and `good first issue`. The issue is titled `#2 opened 9 minutes ago by SPM587FA24`.

# To Do

- ▶ Sign Up on GitHub and create a new ID in the following format.
- ▶ Assume the name of the user is **John Doe** and his A-number is **A12345678**.
  - ▶ His ID would be **JFA24SCM78D**.
  - ▶ Here the first **J** is the first letter of his first name **John**.
  - ▶ The last **D** is the first letter of his last name **Doe**.
  - ▶ And **78** is the last two numbers of his A-number.
  - ▶ The term **FA24SCM** will be the same for everyone.
- ▶ Download and Install Git for Windows.
  - ▶ <https://desktop.github.com/>

Questions?