

Programming with GitHub Copilot

Nicholas Gardella, Riggs Lab

Purpose: learn about GitHub Copilot

- What is it
- Why
 - to use it
 - not to use it
- How
 - to get it
 - to use it

Audience: anyone who codes

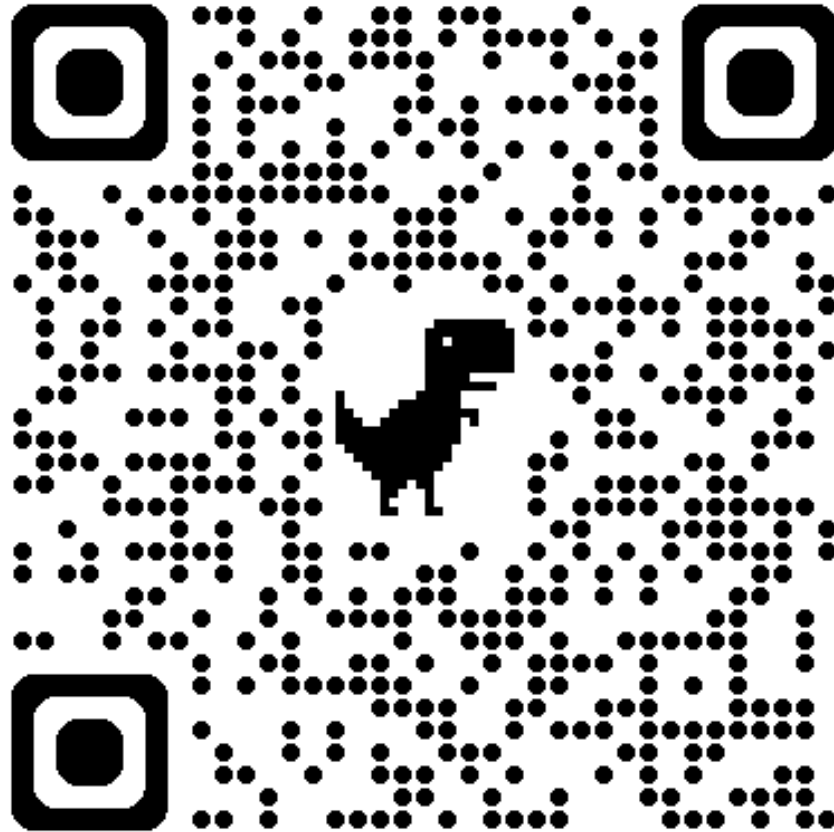
- Novice, intermediate or advanced
- Any language, focused on Python
- Many editors, focused on Visual Studio Code
- Here for
 - Personal enrichment
 - Possible UVA IRB-SBS 7557 eligibility
 - Both

UVA IRB-SBS 7557 (PI: Sara Riggs)

- Study on human-AI v. human-human teams
- Two paid sessions @ \$7 per half hour
- More information at <https://7557.gardella.cc/>
- Scan for link:



<https://7557.gardella.cc/workshop/materials>



Outline

Background
Access
Benefits
Risks
Alternatives
Tutorial

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AI is good with code

- GenAI is good at predicting what
- GenAI is good at predicting what comes next
- `for i in range(10`
- `for i in range(10):`

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Systems Engineering: define goals

1. Solve real world problems with code
2. ↑ Speed & Quality
3. ↑ Programmer well-being
4. ↓ Bad externalities

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Positionality Statement

- Trust me so we can get to the fun part
- You should use AI to code
- ChatGPT is not enough
- You should stay involved
- Customization is key

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Copilot is probably free to you!

Free

A fast way to get started with GitHub Copilot.

\$0^{USD}

[Get started](#)

[Open in VS Code](#)

^ **What's included:**

- ✓ 50 agent mode or chat requests per month
- ✓ 2,000 completions per month
- ✓ Access to Claude 3.5 Sonnet, GPT-4.1, and more

Pro Most popular

Unlimited completions and chats with access to more models.

\$10^{USD}
per month or \$100 per year

[Try for 30 days free](#)

^ **Everything in Free and:**

- ✓ Unlimited agent mode and chats with GPT-4.1¹
- ✓ Unlimited code completions
- ✓ Access to code review, Claude 3.7/4 Sonnet, Gemini 2.5 Pro, and more
- ✓ 6x more premium requests than Copilot Free to use the latest models, with the option to buy more²
- ✓ Coding agent (preview)

Free for verified students, teachers, and maintainers of popular open source projects. [Learn more](#)

Pro+

Maximum flexibility and model choice.

\$39^{USD}
per month or \$390 per year

[Get started](#)

^ **Everything in Pro and:**

- ✓ Access to all models, including Claude Opus 4, o3, and more
- ✓ 30x more premium requests than Copilot Free to use the latest models, with the option to buy more²
- ◆ Access to [GitHub Spark](#)

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1) Have a GitHub account

Sign up to GitHub

Email*

id@virginia.edu

Password*

Password

Password should be at least 15 characters OR at least 8 characters including a number and a lowercase letter.

Username*

Username

Username may only contain alphanumeric characters or single hyphens, and cannot begin or end with a hyphen.

Your Country/Region*

United States of America

For compliance reasons, we're required to collect country information to send you occasional updates and announcements.

Email preferences

☐ Receive occasional product updates and announcements

Create account >

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2) Associate & verify .edu email

The screenshot shows the GitHub Settings page for user Nicholas (njg4ne). The browser address bar is highlighted with a red box, showing the URL `github.com/settings/emails`. The left sidebar contains navigation links: Public profile, Account, Appearance, Accessibility, Notifications, Access, Billing and licensing, Emails (selected), Password and authentication, and Sessions. The main content area is titled "Emails" and features a warning message: "You have a single verified email associated with your GitHub account. Add an additional verified email address in case you lose access to your primary email." Below this, a text block explains that emails are used for signing in and web-based Git operations. A table lists the associated email addresses, with `njg4ne@virginia.edu` marked as Primary, Verified, and Private.

Email Address	Primary	Verified	Private	More
<code>njg4ne@virginia.edu</code>	Yes	Yes	Yes	...

Background

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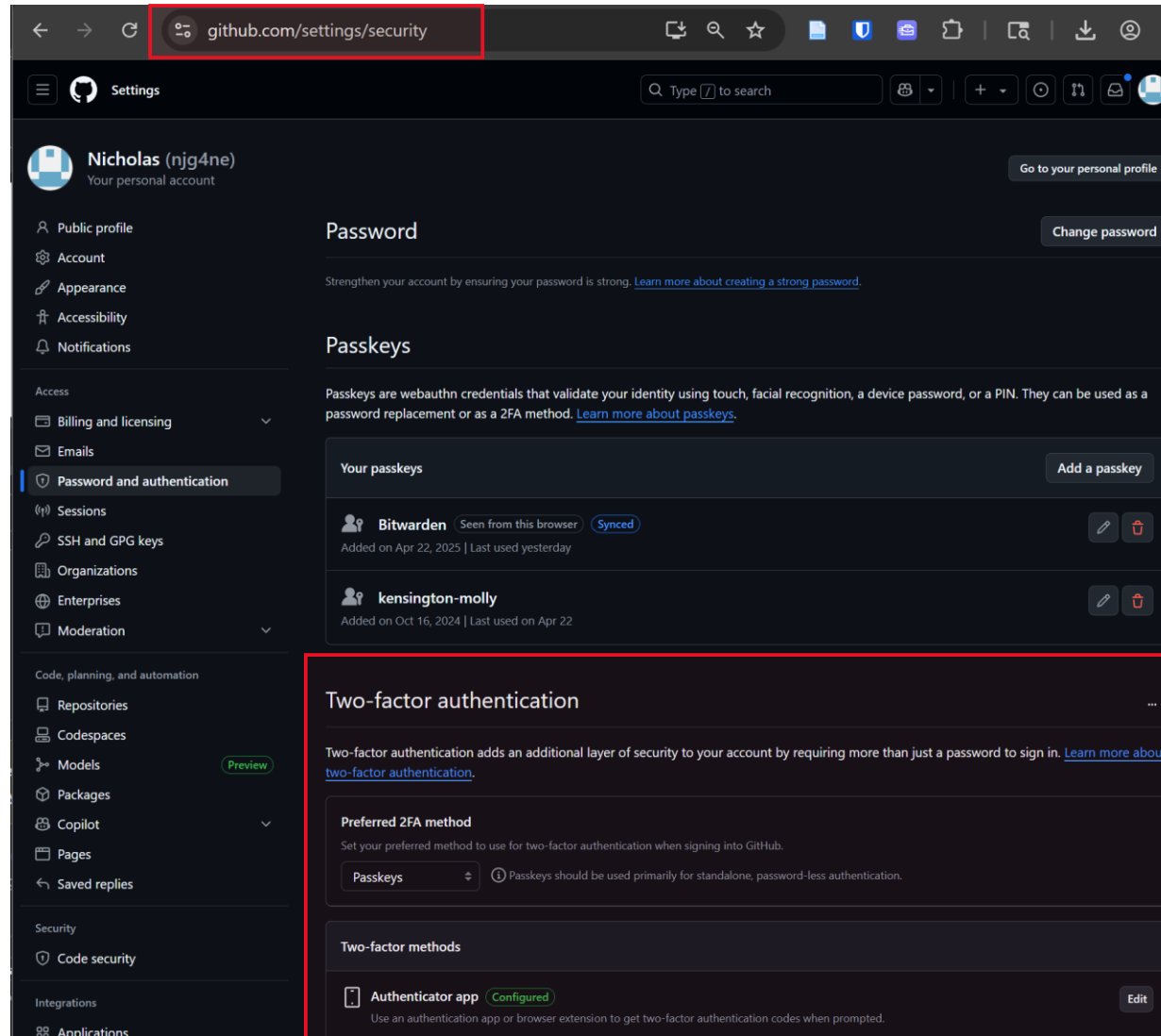
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3) Setup 2FA



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4a) Prepare dated proof (student)

UNIVERSITY of VIRGINIA

Dashboard

Find Classes

Build My Schedule

My Schedule

Enrollment

Academics

Grades

Advisor Information

Programs

Course List

Degree Progress

What-If

Unofficial Transcript

Official Transcript

Transfer Credit

Nicholas Gardella

Programs

Graduate

PROGRAM	ADMIT TERM	EXPECTED GRAD TERM	STATUS
Engineering Graduate Requirement Term 2021 Fall	2021 Fall	2028 Summer	Active in Program

Plan: Systems Engineering (PhD)
Requirement Term 2021 Fall

Sub Plan: -

Plan: Cyber-Physical Systems (Cert)
Requirement Term 2023 Spring


Engineering Graduate Requirement Term

Plan: Systems Engineering (ME)
Requirement Term 2021 Fall


Undergraduate

UNIVERSITY of VIRGINIA

STUDENT



N J GARDELLA



Valid only when registered at UVa. Non-transferable. Replacement charge.

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4b) Prepare dated proof (teacher)

Faculty Advisors

My Schedule

Class Roster

Grade Roster

Navigate

Canvas

Schedule and Rosters

Nicholas Gardella

Faculty Center

My Schedule

Class Roster

Grade Roster

My Schedule

2025 Spring | New River Community College

Change Term

My Exam Schedule

Select display option

Show All Classes

Show Enrolled Classes Only

Icon Legend

Class Roster

Grade Roster

Learning Management

My Teaching Schedule > 2025 Spring > New River Community College

Personalize

View All

	Class	Class Title	Enrolled	Days & Times	Room	Class Dates
	ITP 140-35 (29367)	Client Side Scripting (Lecture)	16	TBA	Online	Jan 22, 2025-May 13, 2025
	ITP 225-35 (29401)	Web Scripting Languages (Lecture)	11	TBA	Online	Jan 22, 2025-May 13, 2025

View Weekly Teaching Schedule

Go to top

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5) Ready a webcam or phone

A screenshot of a web application interface titled 'Schedule and Rosters'. The interface is for a user named Nicholas Gardella. It features a sidebar with navigation options: 'My Schedule' (highlighted), 'Class Roster', 'Grade Roster', 'Navigate', and 'Canvas'. The main content area shows the 'My Schedule' page for the '2025 Spring | New River Community College' term. It includes a 'Change Term' button and a 'My Exam Schedule' link. Below this, there's a section for 'Select display option' with radio buttons for 'Show All Classes' (selected) and 'Show Enrolled Classes Only'. An 'Icon Legend' shows icons for 'Class Roster', 'Grade Roster', and 'Learning Management'. The 'My Teaching Schedule > 2025 Spring > New River Community College' section contains a table with class details.

Class	Class Title	Enrolled	Days & Times	Room	Class Dates
ITP 140-35 (29367)	Client Side Scripting (Lecture)	16	TBA	Online	Jan 22, 2025-May 13, 2025
ITP 225-35 (29401)	Web Scripting Languages (Lecture)	11	TBA	Online	Jan 22, 2025-May 13, 2025

At the bottom of the table, there are two buttons: 'View Weekly Teaching Schedule' and 'Go to top'.

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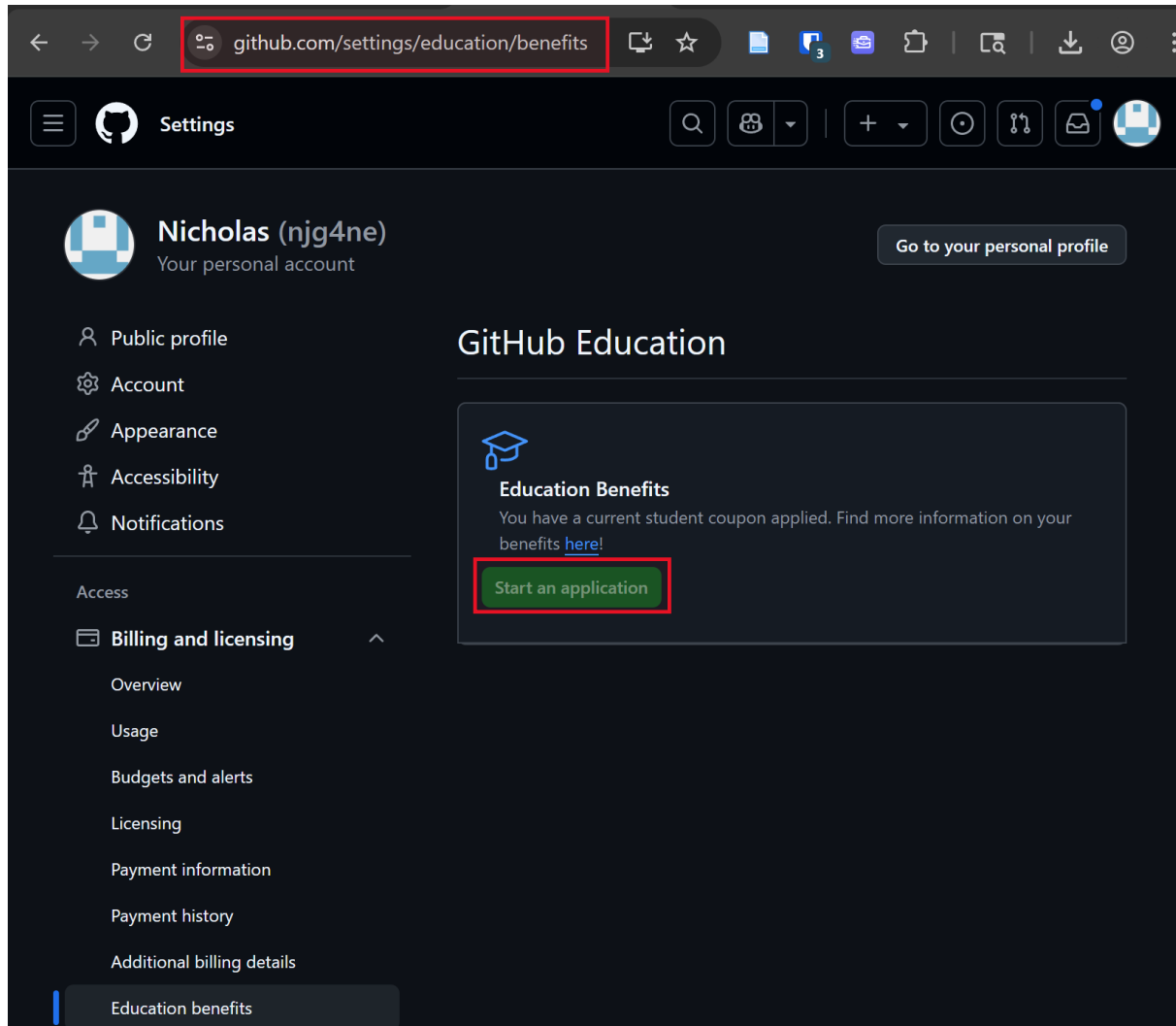
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6) Apply for discount & wait



Background

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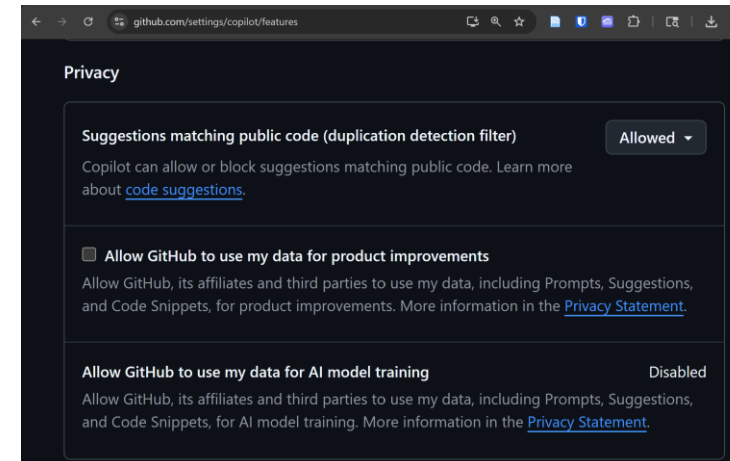
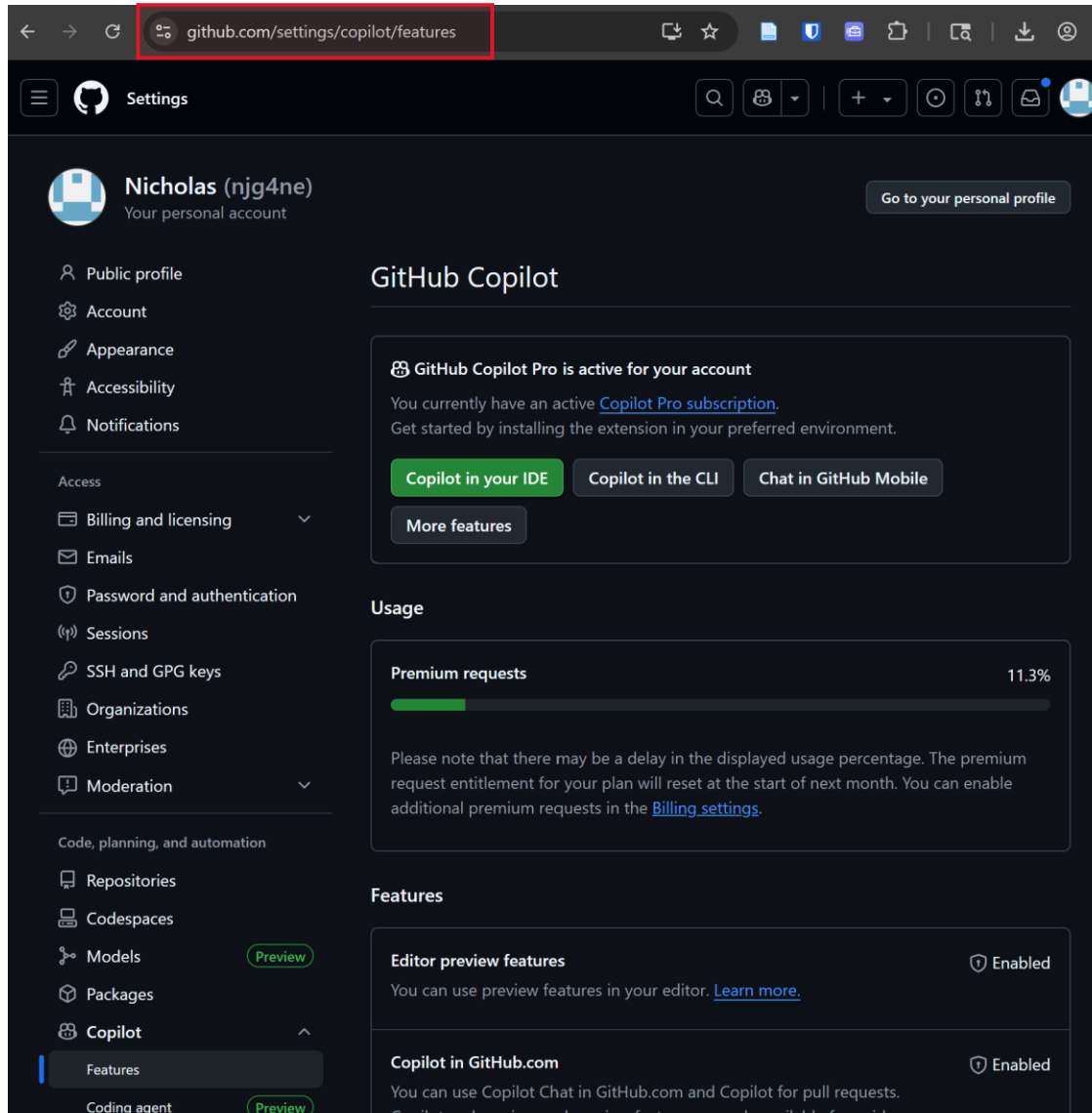
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7) Enable & configure Copilot



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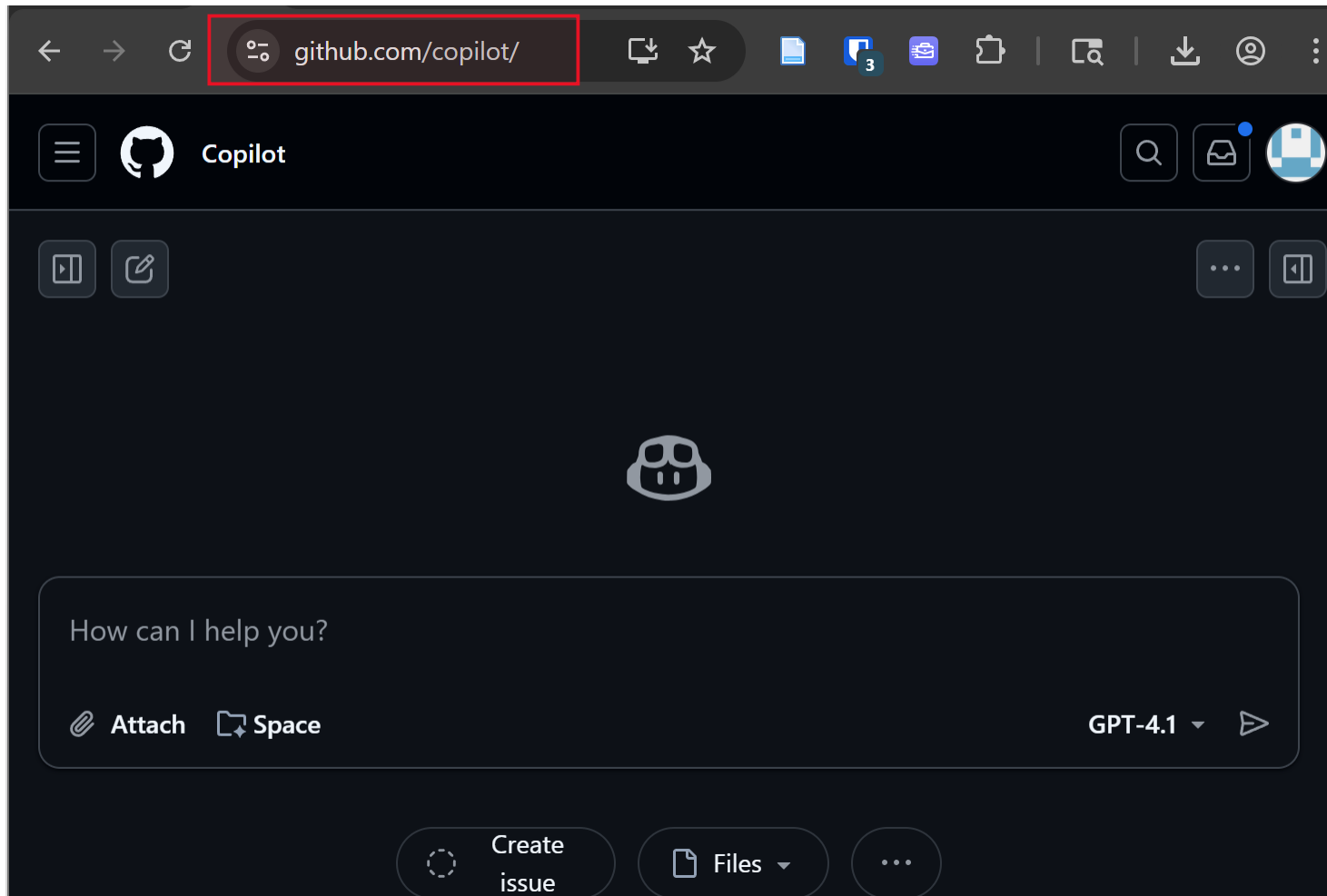
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8a) Use: web or mobile



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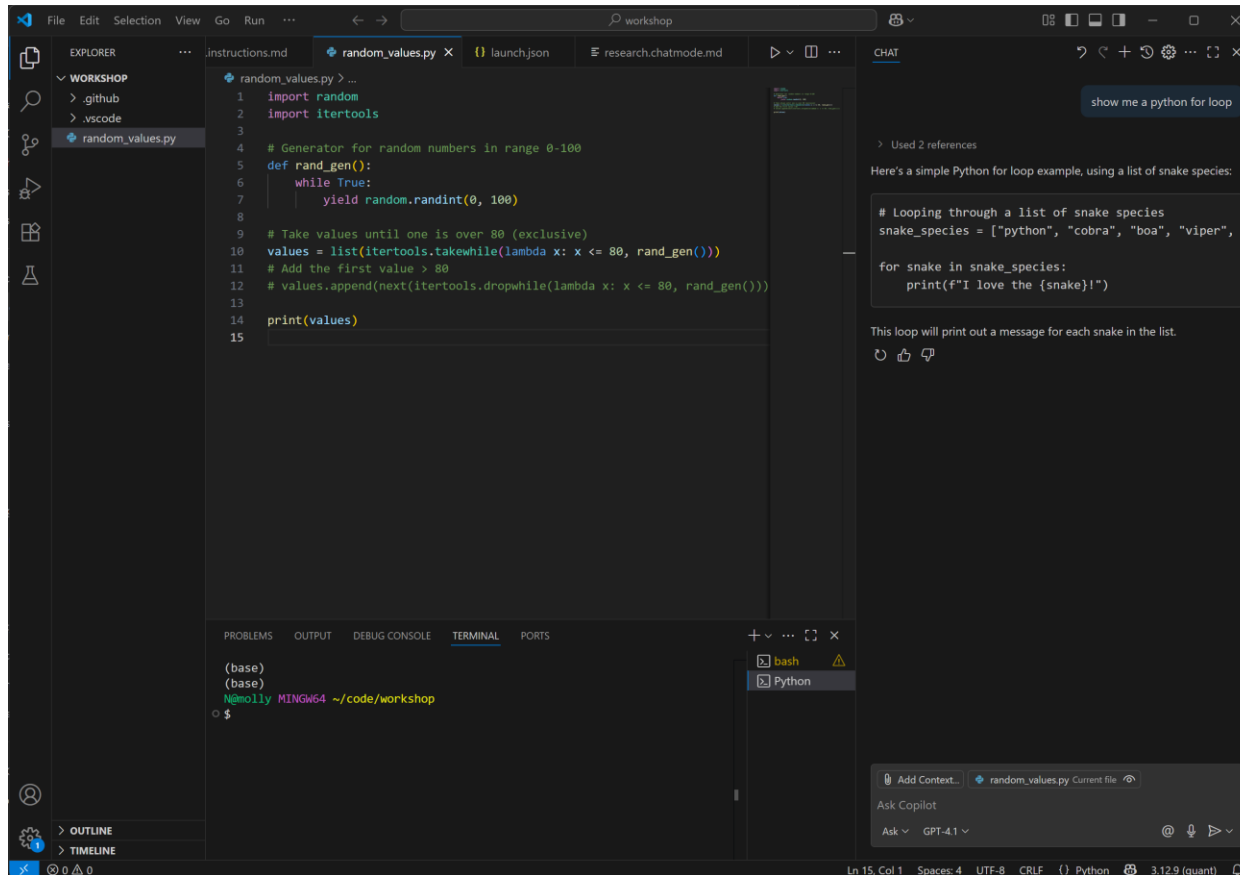
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8b) Use: in-IDE



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Using ChatGPT to code but not Copilot?
You are missing out.

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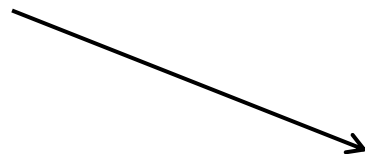
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AI is better than you.



1,047,576 token
context window

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Copilot is more than chat.

- Inline suggestions
- Interactive editing
- Action-taking
- More features all the time
- Context-specificity

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Copilot is great at what is most likely.

- What code comes next
- What edit comes next
- What answer fits your question
- What action is most likely to be needed
- What rules probably apply to some code

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Copilot is not a flawless expert.

- Innovation is not predictable
- Most likely does not mean best
- Randomness causes mistakes
- Training data can be wrong or outdated
- Correctness may be subjective
- “Garbage in, garbage out”

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Copilot doesn't know what you want.

- You must share your goals
- You must scope context
- You must make rules
- You must give tools

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Alternatives exist.



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Self-hosting is an option.



Ollama



easy private LLMs



Continue



use Ollama in-IDE

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Let's use Copilot!

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