GitHub Expert Services

GitHub Copilot Tips, Tricks and Best practices

Agenda

- Welcome
- Introduction
- Best Practices
- Tips and Tricks
- FAQ
- Q & A
- Break
- Hands-on Lab

GitHub Copilot

Beyond code completion

It's no longer just a code completion tool in your editor—it now includes a chat interface that you can use in your IDE, a command line tool via a GitHub CLI extension, a summary tool in your pull requests, a helper tool in your terminals, and much, much more.

- Copilot

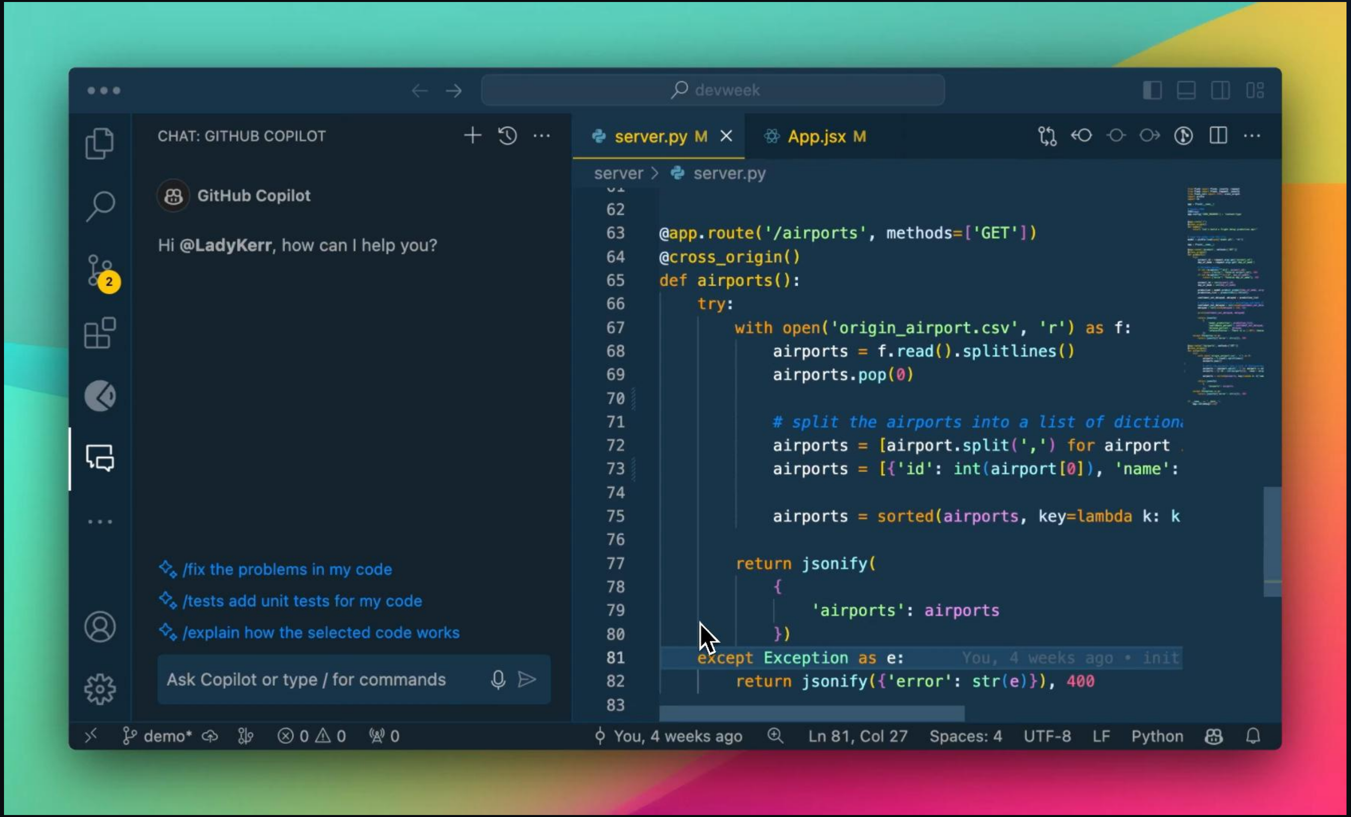
Context, Context, Context

- LLMs are designed to make prediction based on the context provided
- Provide ample context is the key
- Copilot is able to infer from the code in IDE editor
- How about adding more context?

Context, Context, Context

- Open Relevant files
- Provide Top level comment
- Set Includes and references

Context, Context, Context



CHAT: GITHUB COPILOT

GitHub Copilot

Hi **@LadyKerr**, how can I help you?

/fix the problems in my code

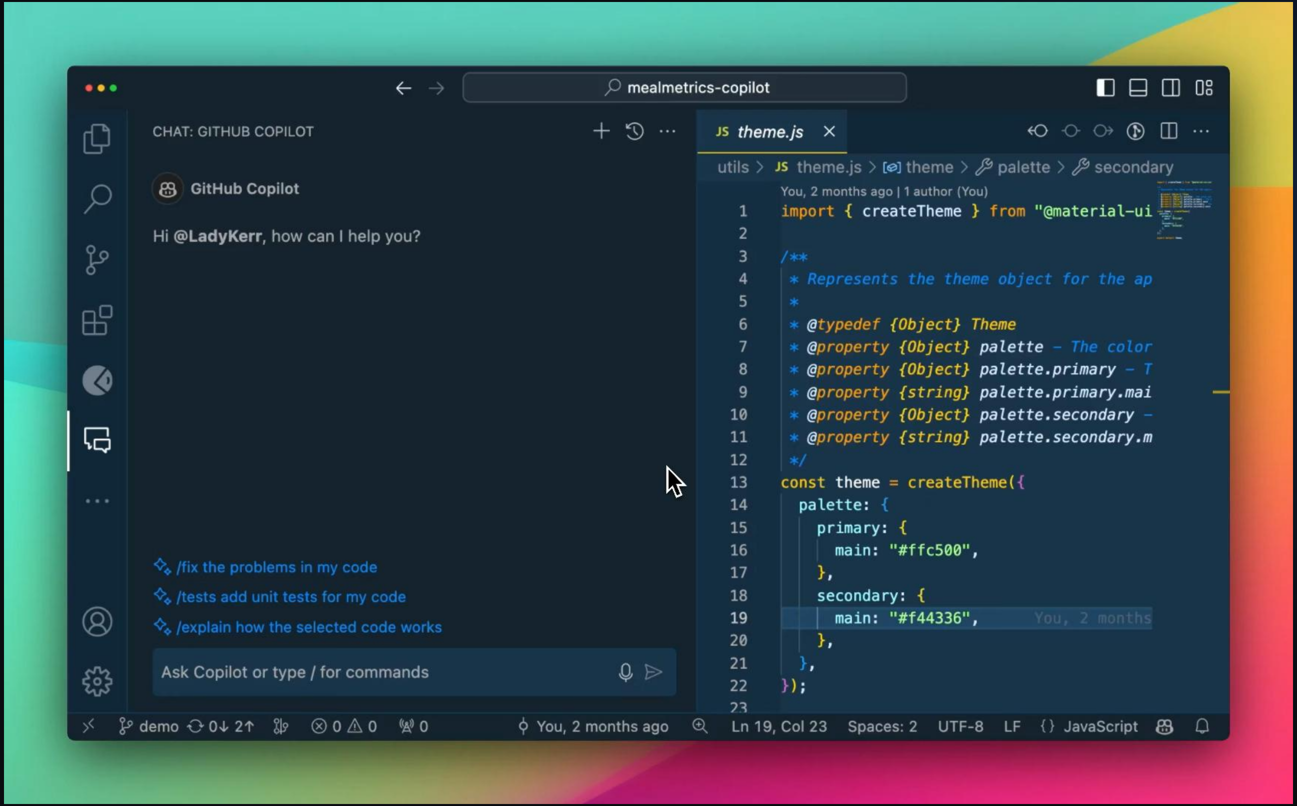
/tests add unit tests for my code

/explain how the selected code works

Ask Copilot or type / for commands

```
@app.route('/airports', methods=['GET'])
@cross_origin()
def airports():
    try:
        with open('origin_airport.csv', 'r') as f:
            airports = f.read().splitlines()
            airports.pop(0)

            # split the airports into a list of diction
            airports = [airport.split(',') for airport
            airports = [{'id': int(airport[0]), 'name':

            airports = sorted(airports, key=lambda k: k

        return jsonify(
            {
                'airports': airports
            })
    except Exception as e:        You, 4 weeks ago • init
        return jsonify({'error': str(e)}), 400
```

Context, Context, Context



CHAT: GITHUB COPILOT

GitHub Copilot

Hi **@LadyKerr**, how can I help you?

/fix the problems in my code

/tests add unit tests for my code

/explain how the selected code works

Ask Copilot or type / for commands

theme.js

utils > theme.js > theme > palette > secondary

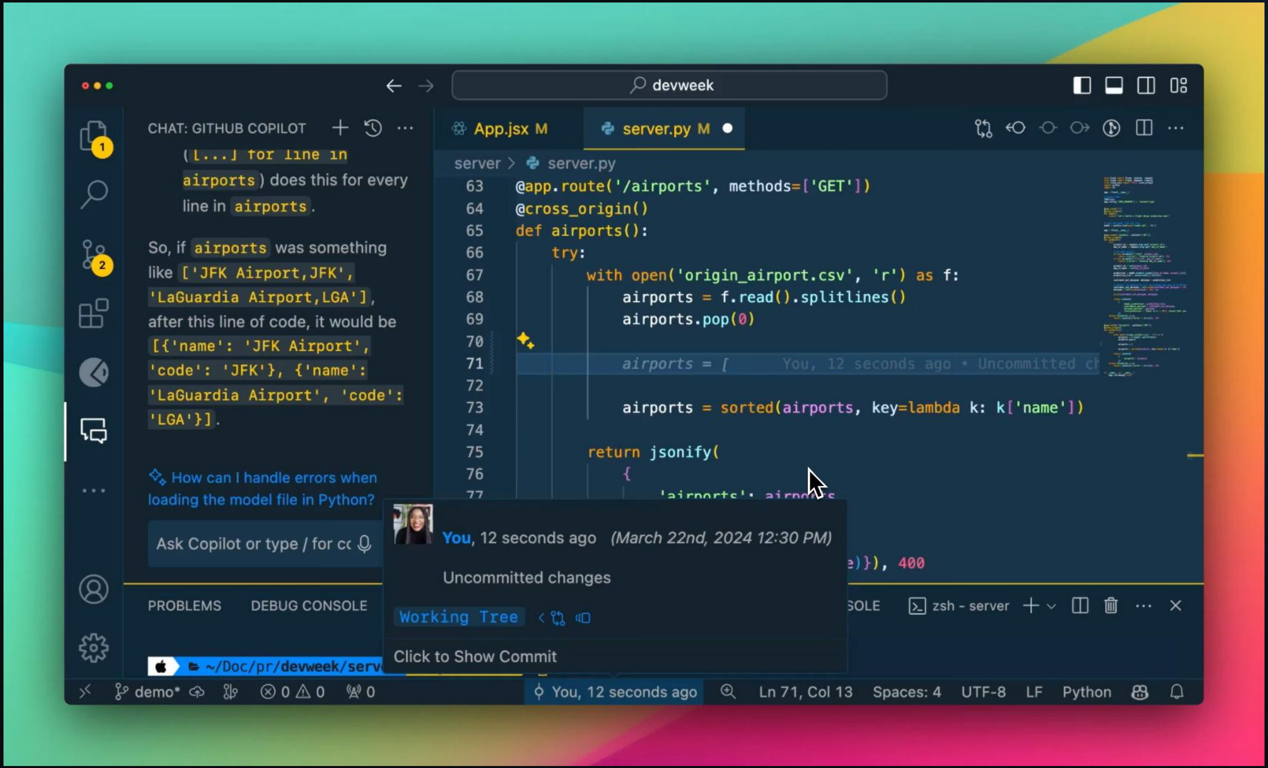
```
You, 2 months ago | 1 author (You)
import { createTheme } from "@material-ui

/**
 * Represents the theme object for the ap
 *
 * @typedef {Object} Theme
 * @property {Object} palette - The color
 * @property {Object} palette.primary - T
 * @property {string} palette.primary.mai
 * @property {Object} palette.secondary -
 * @property {string} palette.secondary.m
 */
const theme = createTheme({
  palette: {
    primary: {
      main: "#ffc500",
    },
    secondary: {
      main: "#f44336",      You, 2 months
    },
  },
});
```

demo 0↓ 2↑ ⊗ 0 ⚠ 0 0 You, 2 months ago Ln 19, Col 23 Spaces: 2 UTF-8 LF {} JavaScript

Context, Context, Context

- Meaningful names
- Specific function comments
- Provide sample code
- Let’s give them a try

Context, Context, Context



([...] for line in airports) does this for every line in airports.

So, if airports was something like ['JFK Airport,JFK', 'LaGuardia Airport,LGA'], after this line of code, it would be [{'name': 'JFK Airport', 'code': 'JFK'}, {'name': 'LaGuardia Airport', 'code': 'LGA'}].

How can I handle errors when loading the model file in Python?

Ask Copilot or type / for cc

```
@app.route('/airports', methods=['GET'])
@cross_origin()
def airports():
    try:
        with open('origin_airport.csv', 'r') as f:
            airports = f.read().splitlines()
            airports.pop(0)

            airports = [      You, 12 seconds ago • Uncommitted ch

            airports = sorted(airports, key=lambda k: k['name'])

        return jsonify(
            {
                'airports': airp
```

```
e)}), 400
```

You, 12 seconds ago *(March 22nd, 2024 12:30 PM)*

Uncommitted changes

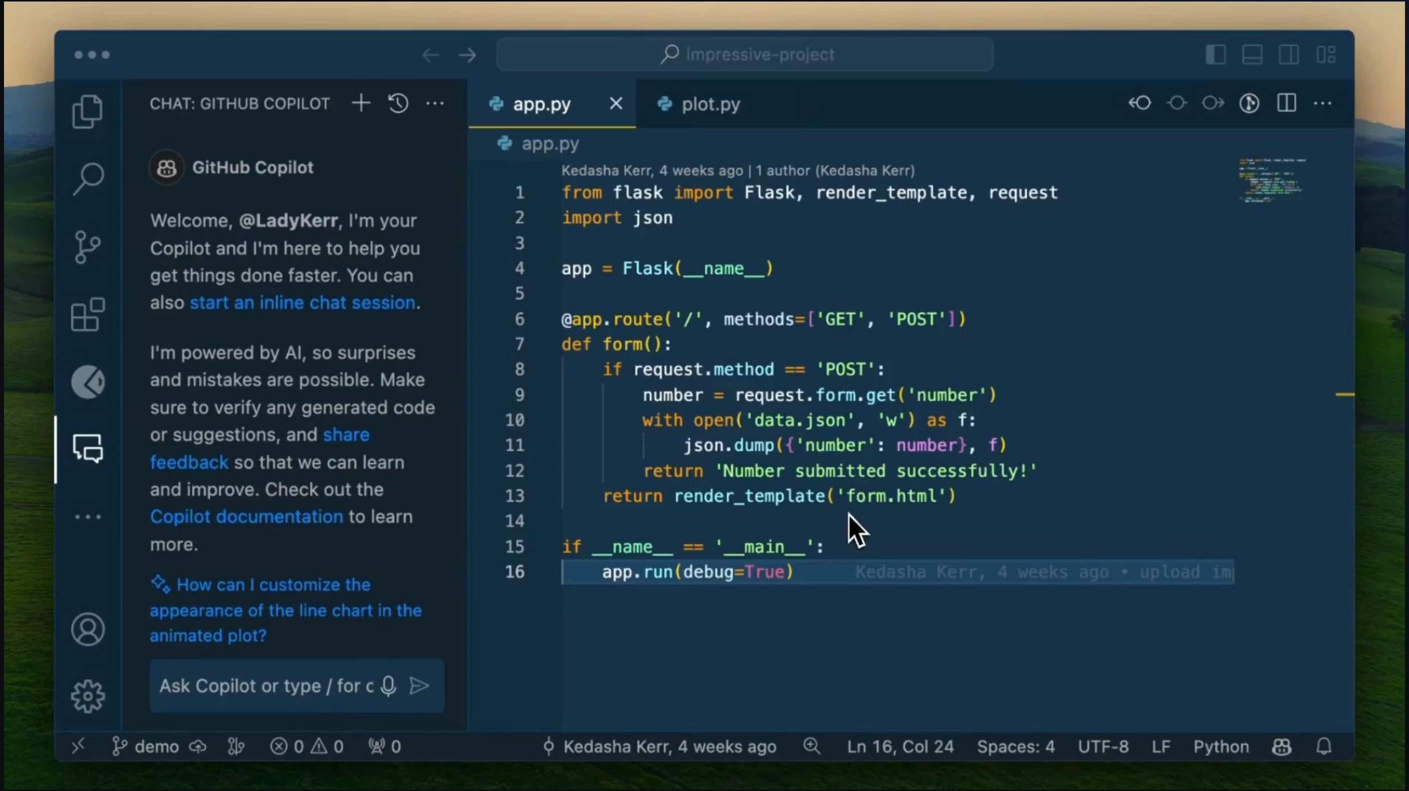
Working Tree

Click to Show Commit

Inline Chat with GitHub Copilot

- CTRL + I on Windows
- Ask specific questions
- Inline code diffs
- Slash command support
- Let’s give it a go

Inline Chat with GitHub Copilot



impressive-project
CHAT: GITHUB COPILOT
app.py
plot.py
app.py
Kedasha Kerr, 4 weeks ago | 1 author (Kedasha Kerr)
Kedasha Kerr, 4 weeks ago • upload im
demo
0 0
0
Kedasha Kerr, 4 weeks ago
Ln 16, Col 24
Spaces: 4
UTF-8
LF
Python

GitHub Copilot

Welcome, **@LadyKerr**, I'm your Copilot and I'm here to help you get things done faster. You can also start an inline chat session.

I'm powered by AI, so surprises and mistakes are possible. Make sure to verify any generated code or suggestions, and share feedback so that we can learn and improve. Check out the Copilot documentation to learn more.

How can I customize the appearance of the line chart in the animated plot?

Ask Copilot or type / for c

```python
from flask import Flask, render_template, request
import json

app = Flask(__name__)

@app.route('/', methods=['GET', 'POST'])
def form():
    if request.method == 'POST':
        number = request.form.get('number')
        with open('data.json', 'w') as f:
            json.dump({'number': number}, f)
        return 'Number submitted successfully!'
    return render_template('form.html')

if __name__ == '__main__':
    app.run(debug=True)
```

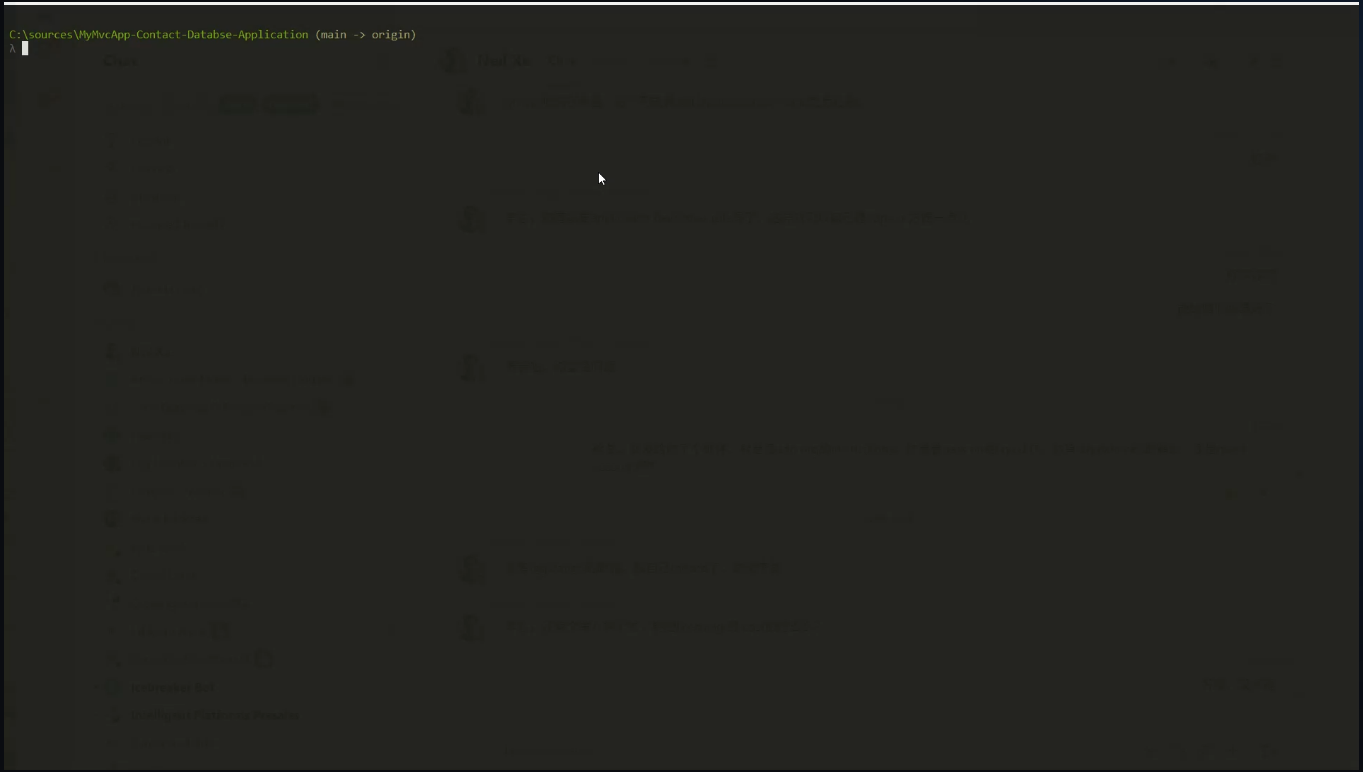
GitHub Copilot CLI

- **You can use Copilot with the GitHub CLI to get started in any codebase instantly**
  #npm install copilot

- **Bring context from your issues and pull requests directly to your environment, eliminating context switching**

- **Build, edit, debug, and refactor code from your terminal**

GitHub Copilot CLI



```
C:\sources\MyMvcApp-Contact-Databse-Application (main -> origin)
λ
```

Copilot Chat

GitHub Copilot Chat provides an experience in your editor where you can have a conversation with the AI assistant. You can improve this experience by using built-in features to make the most out of it.

- Copilot

Copilot Chat

- Remove irrelevant requests
- Navigate through your conversation
- Use the @workspace agent
- Highlight relevant code
- Organize your conversations with threads

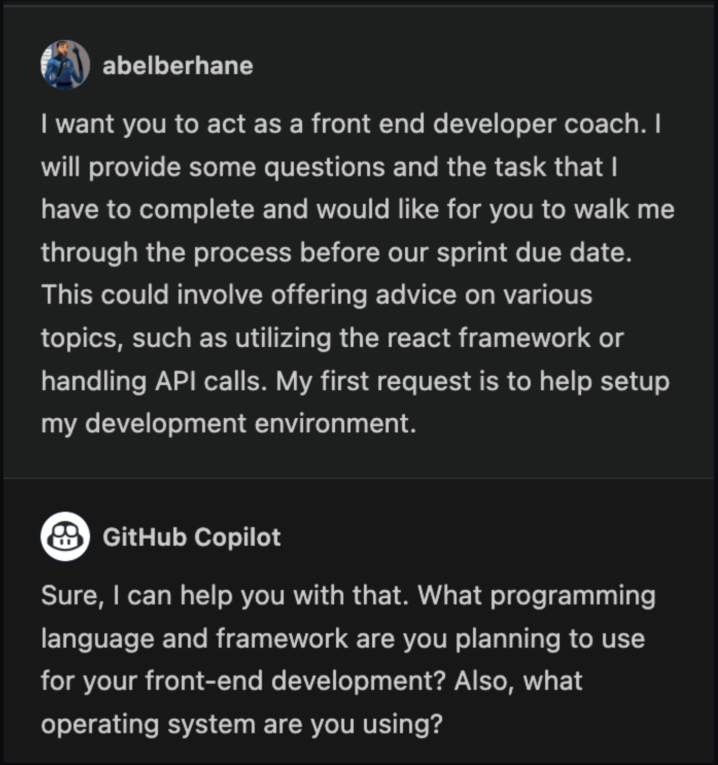
Role Prompting

Use copilot to assume a role during a task

Focus to improves results

Improves results by narrowing the AI's focus

Enhanced Results



abelberhane

I want you to act as a front end developer coach. I will provide some questions and the task that I have to complete and would like for you to walk me through the process before our sprint due date. This could involve offering advice on various topics, such as utilizing the react framework or handling API calls. My first request is to help setup my development environment.

GitHub Copilot

Sure, I can help you with that. What programming language and framework are you planning to use for your front-end development? Also, what operating system are you using?

AI Hallucinations

- Nature of the Model
- Fabricated Outputs
- Highly Creative but not always right
- Reliance on Developers
- Feedback Loop

Copilot Edits

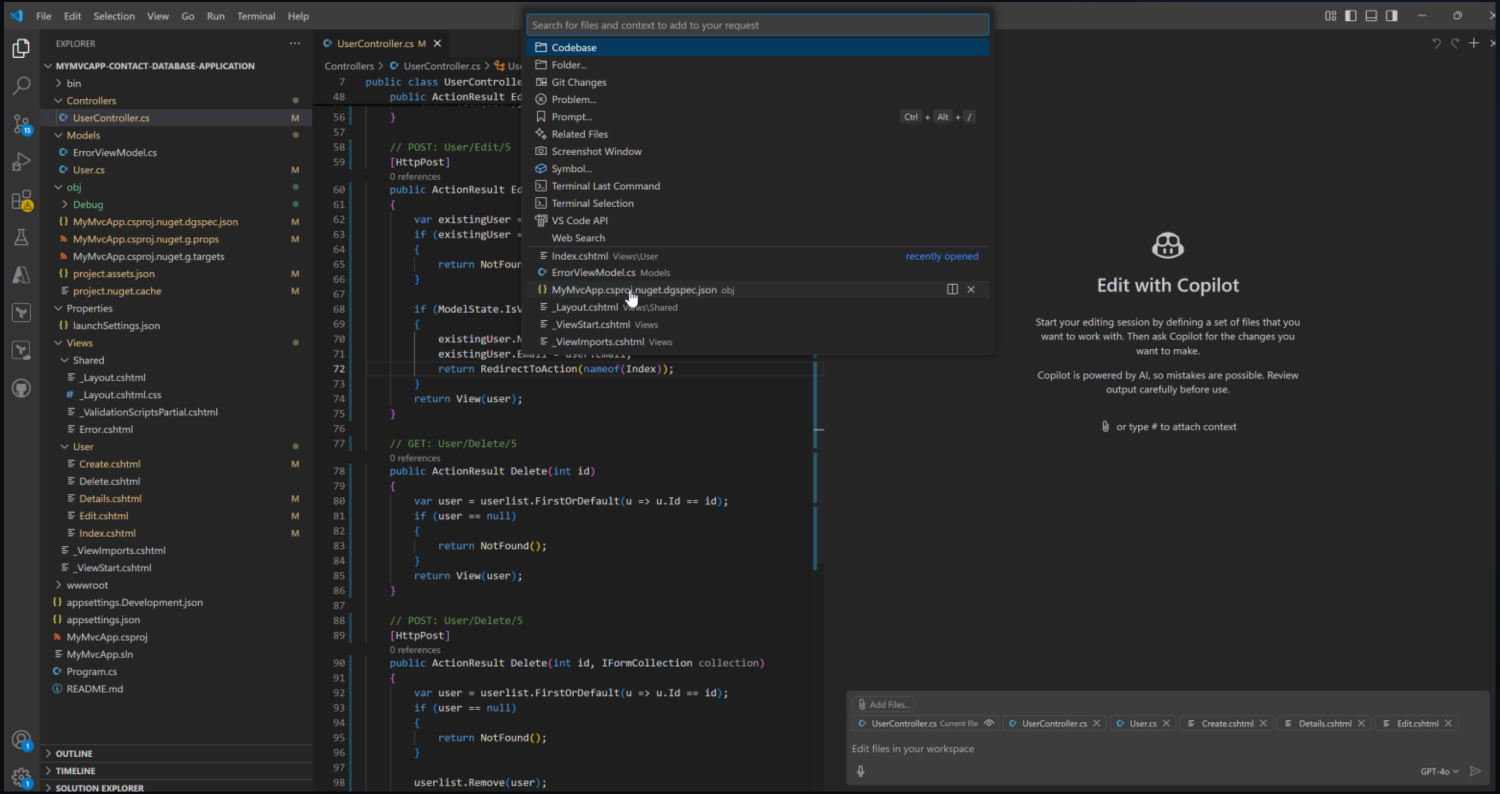
Copilot Edits start an AI-powered code editing session and iterate quickly on code changes across multiple files by using natural language. Copilot Edits applies the edits directly in the editor, where you can review them in-place, with the full context of the surrounding code.

- Copilot

Copilot Edits

- Select which files to edit
- Provide the relevant context and prompt
- Review the suggested edits
- Accept or discard the suggested edits
- Iterate on the code changes

Copilot Edits



```
public class UserControlle
    public ActionResult Ed
    }

    // POST: User/Edit/5
    [HttpPost]
    0 references
    public ActionResult Ed
    {
        var existingUser =
        if (existingUser =
        {
            return NotFoun
        }

        if (ModelState.IsV
        {
            existingUser.N
            existingUser.Email = user.Email;
            return RedirectToAction(nameof(Index));
        }
        return View(user);
    }

    // GET: User/Delete/5
    0 references
    public ActionResult Delete(int id)
    {
        var user = userlist.FirstOrDefault(u => u.Id == id);
        if (user == null)
        {
            return NotFound();
        }
        return View(user);
    }

    // POST: User/Delete/5
    [HttpPost]
    0 references
    public ActionResult Delete(int id, IFormCollection collection)
    {
        var user = userlist.FirstOrDefault(u => u.Id == id);
        if (user == null)
        {
            return NotFound();
        }

        userlist.Remove(user);
```

Edit with Copilot

Start your editing session by defining a set of files that you want to work with. Then ask Copilot for the changes you want to make.

Copilot is powered by AI, so mistakes are possible. Review output carefully before use.

or type # to attach context

How is Copilot Edits different from Copilot Chat?

- Copilot Edits puts you in the context of code editing. It can generate and apply code changes directly across multiple files
- The Chat view gives you a more general-purpose chat interface for asking questions about your code or technology topics in general.

Copilot Agent Mode

In agent mode, Copilot Edits operates in a more autonomous and dynamic manner to achieve the desired outcome. Copilot agent mode determines the relevant context, offers both code changes and terminal commands, and iterates to remediate issues.

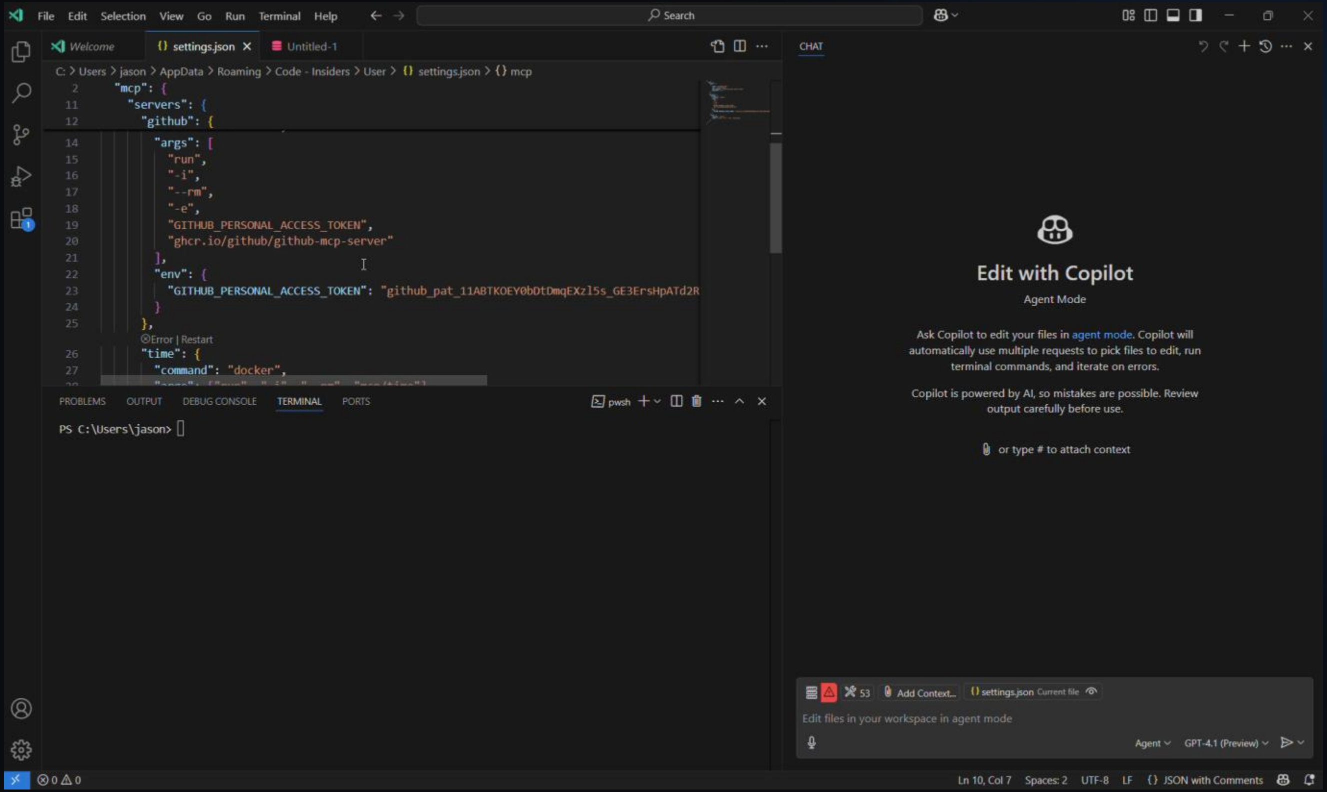
- Copilot

Copilot Agent Mode

- Copilot Edits Agent Mode uses a set of tools to accomplish the individual tasks to complete a request. E.g., listing the files in a directory, editing a file in your workspace, running a terminal command, interacting with MCP servers, and more.

- Still in Preview

Copilot Agent with MCP



```
  "mcp": {
    "servers": {
      "github": {
        "args": [
          "run",
          "-i",
          "--rm",
          "-e",
          "GITHUB_PERSONAL_ACCESS_TOKEN",
          "ghcr.io/github/github-mcp-server"
        ],
        "env": {
          "GITHUB_PERSONAL_ACCESS_TOKEN": "github_pat_11ABTKOEY0bDtDmqEXzl5s_GE3ErsHpATd2R
        }
      },
      ⓧError | Restart
      "time": {
        "command": "docker",
```

```
PS C:\Users\jason> 
```

Edit with Copilot

Agent Mode

Ask Copilot to edit your files in agent mode. Copilot will automatically use multiple requests to pick files to edit, run terminal commands, and iterate on errors.

Copilot is powered by AI, so mistakes are possible. Review output carefully before use.

or type # to attach context

Edit files in your workspace in agent mode

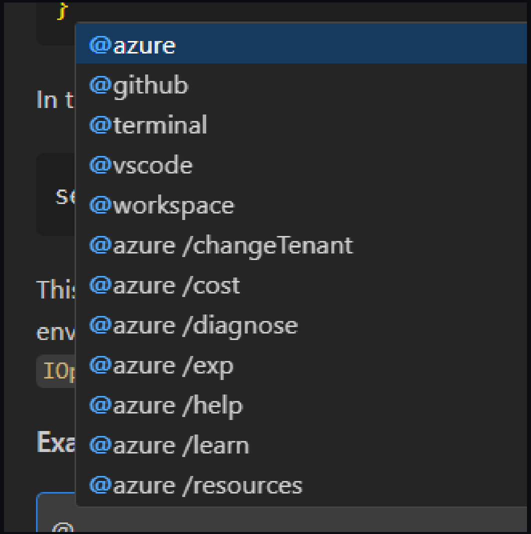
Slash Commands

Command	Description	Usage
/explain	Get code explanations	Open file with code or highlight code you want explained and type: /explain what is the fetchPrediction method?
/fix	Receive a proposed fix for the problems in the selected code	Highlight problematic code and type: /fix propose a fix for the problems in fetchAirports route
/tests	Generate unit tests for selected code	Open file with code or highlight code you want tests for and type: /tests
/help	Get help on using Copilot Chat	Type: /help what can you do?
/clear	Clear current conversation	Type: /clear
/doc	Add a documentation comment	Highlight code and type: /doc You can also press CMD+I in your editor and type /doc/ inline

Slash Commands

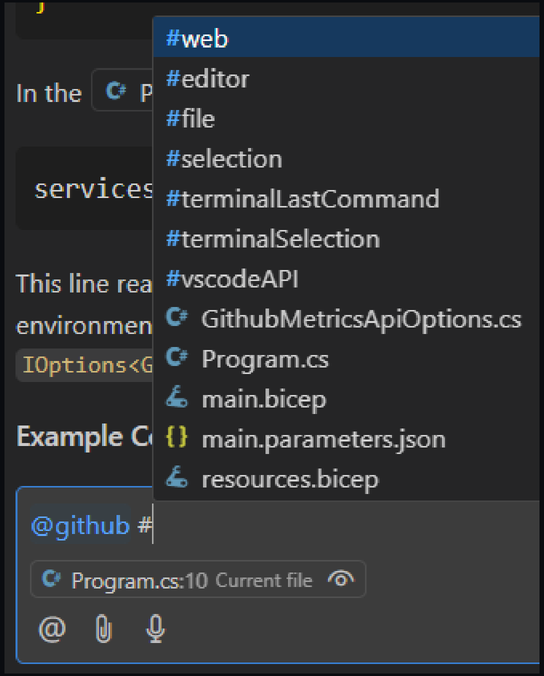
/generate	Generate code to answer your question	Type: /generate code that validates a phone number
/optimize	Analyze and improve running time of the selected code	Highlight code and type: /optimize fetchPrediction method
/clear	Clear current chat	Type: /clear
/new	Scaffold code for a new workspace	Type: /new create a new django app
/simplify	Simplify the selected code	Highlight code and type: /simplify
/feedback	Provide feedback to the team	Type: /feedback

Chat Participants

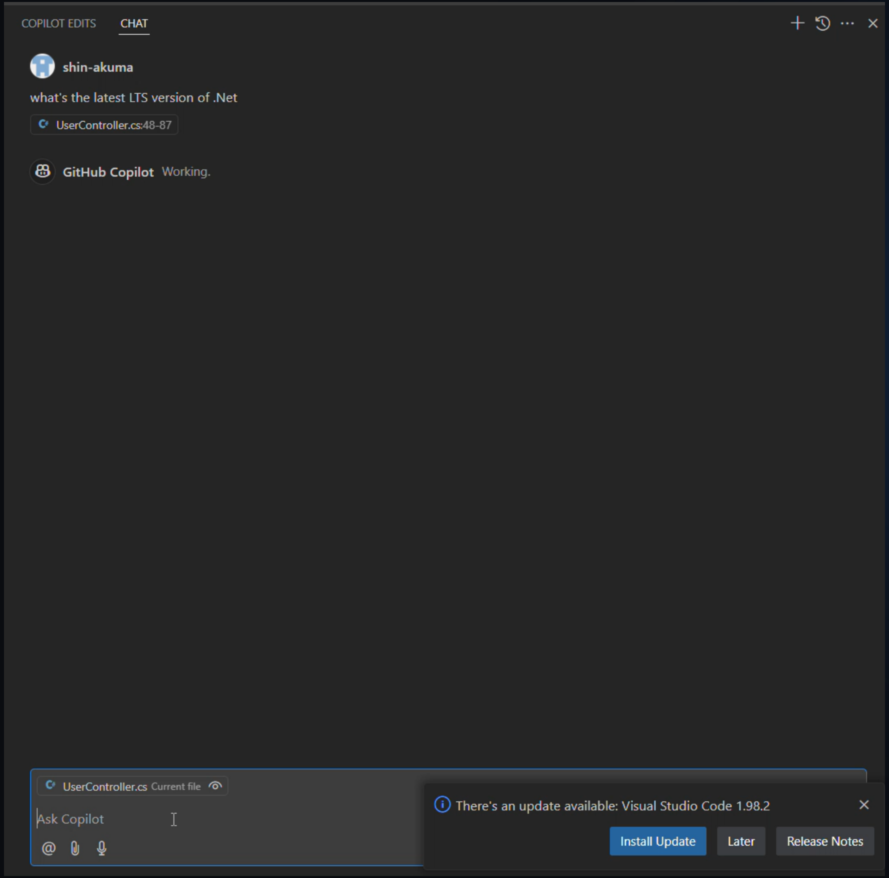


- Doesn’t respond straight away
- Analyzes the current workspace files and directories
- Creates a context from everything it was able to collect.

Chat Variables



- **Use chat variables to include specific context in your prompt.**
- **Use # in the chat prompt box, followed by a chat variable.**
- **#webSearch is in GA that uses Bing web search engine**



shin-akuma

what's the latest LTS version of .Net

UserController.cs:48-87

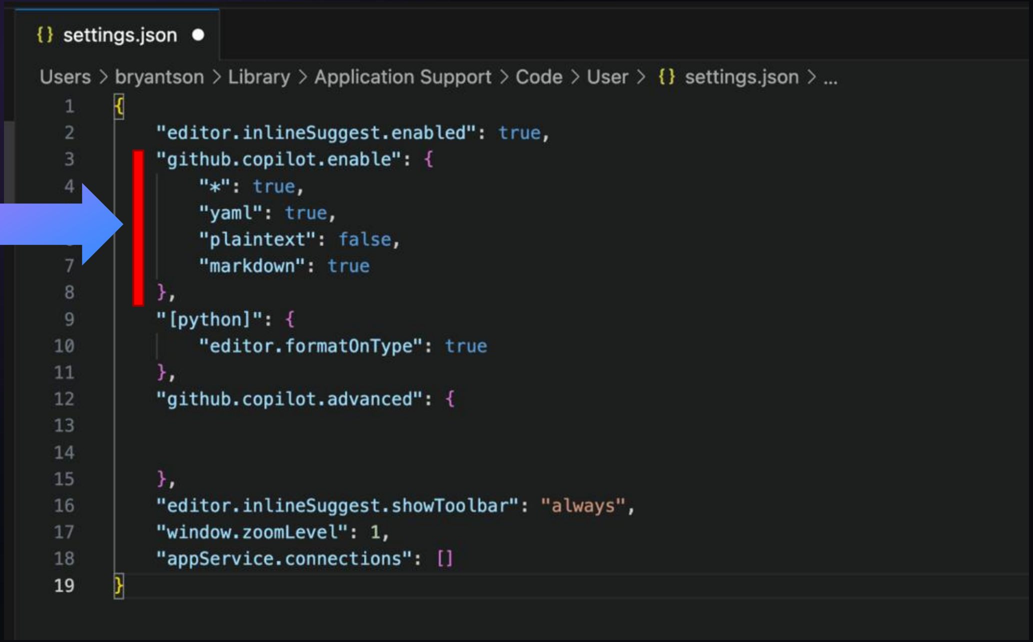
GitHub Copilot Working.

There's an update available: Visual Studio Code 1.98.2

Enable non-programming Meta Files

In **settings.json**, add

```
“github.copilot.enable”:
{
  “*”: true,
  “yaml”: true,
  “plaintext”: false,
  “markdown”: true
}
```



{} settings.json ●
Users > bryantson > Library > Application Support > Code > User > {} settings.json > ...

```
{
    "editor.inlineSuggest.enabled": true,
    "github.copilot.enable": {
        "*": true,
        "yaml": true,
        "plaintext": false,
        "markdown": true
    },
    "[python]": {
        "editor.formatOnType": true
    },
    "github.copilot.advanced": {


    },
    "editor.inlineSuggest.showToolbar": "always",
    "window.zoomLevel": 1,
    "appService.connections": []
}
```

Let’s think step by step

Breaking Down Tasks

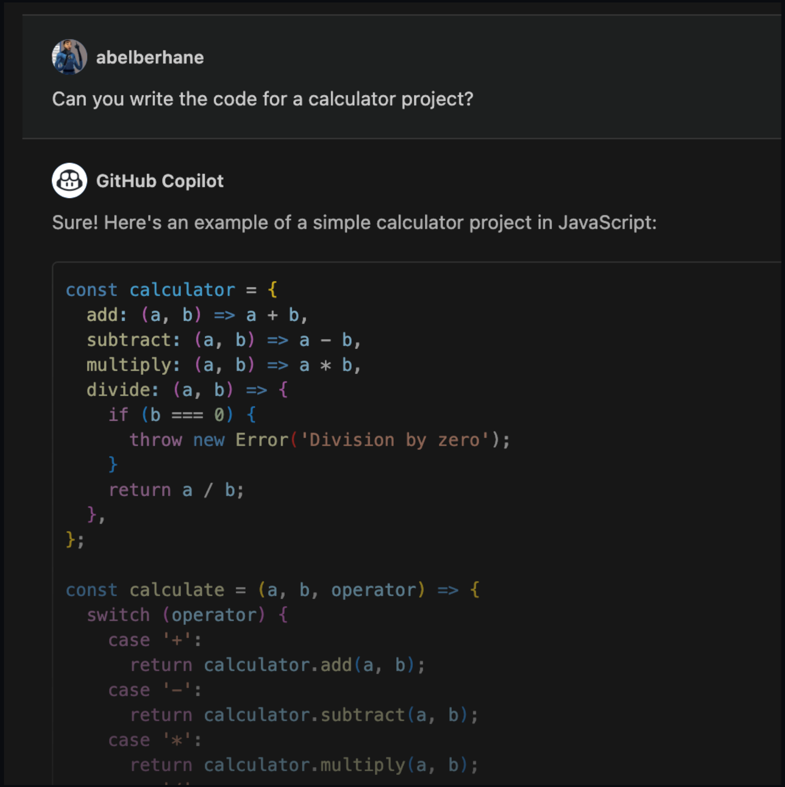
Itemises each step for you

Ensuring Clarity

Takes time to spell everything out

Avoiding Overwhelm

Organised approach



abelberhane

Can you write the code for a calculator project?

GitHub Copilot

Sure! Here's an example of a simple calculator project in JavaScript:

```
const calculator = {
  add: (a, b) => a + b,
  subtract: (a, b) => a - b,
  multiply: (a, b) => a * b,
  divide: (a, b) => {
    if (b === 0) {
      throw new Error('Division by zero');
    }
    return a / b;
  },
};

const calculate = (a, b, operator) => {
  switch (operator) {
    case '+':
      return calculator.add(a, b);
    case '-':
      return calculator.subtract(a, b);
    case '*':
      return calculator.multiply(a, b);
```

Let’s think step by step

Breaking Down Tasks

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Ensuring Clarity

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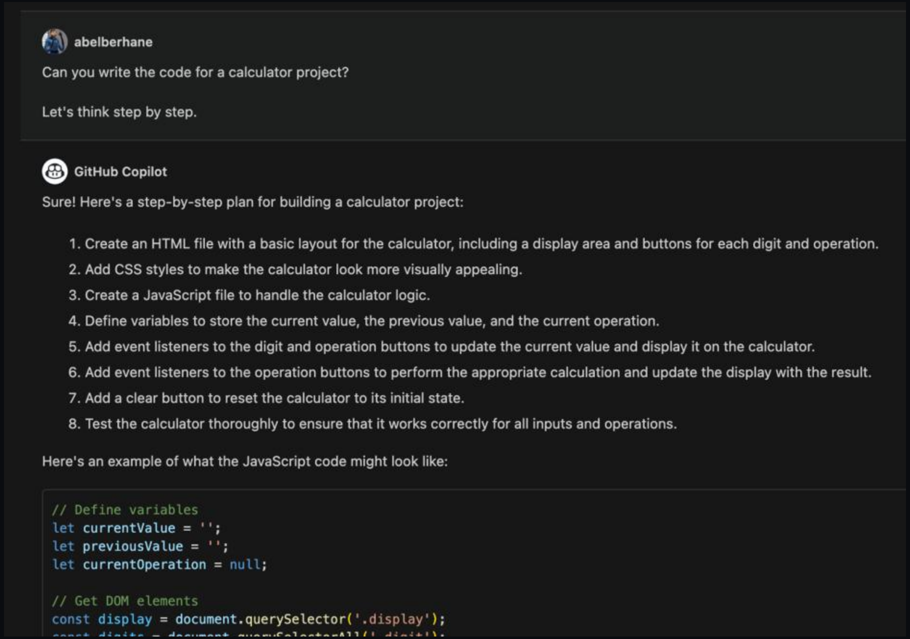


abelberhane

Can you write the code for a calculator project?

Let's think step by step.

GitHub Copilot

Sure! Here's a step-by-step plan for building a calculator project:

1. Create an HTML file with a basic layout for the calculator, including a display area and buttons for each digit and operation.
2. Add CSS styles to make the calculator look more visually appealing.
3. Create a JavaScript file to handle the calculator logic.
4. Define variables to store the current value, the previous value, and the current operation.
5. Add event listeners to the digit and operation buttons to update the current value and display it on the calculator.
6. Add event listeners to the operation buttons to perform the appropriate calculation and update the display with the result.
7. Add a clear button to reset the calculator to its initial state.
8. Test the calculator thoroughly to ensure that it works correctly for all inputs and operations.

Here's an example of what the JavaScript code might look like:

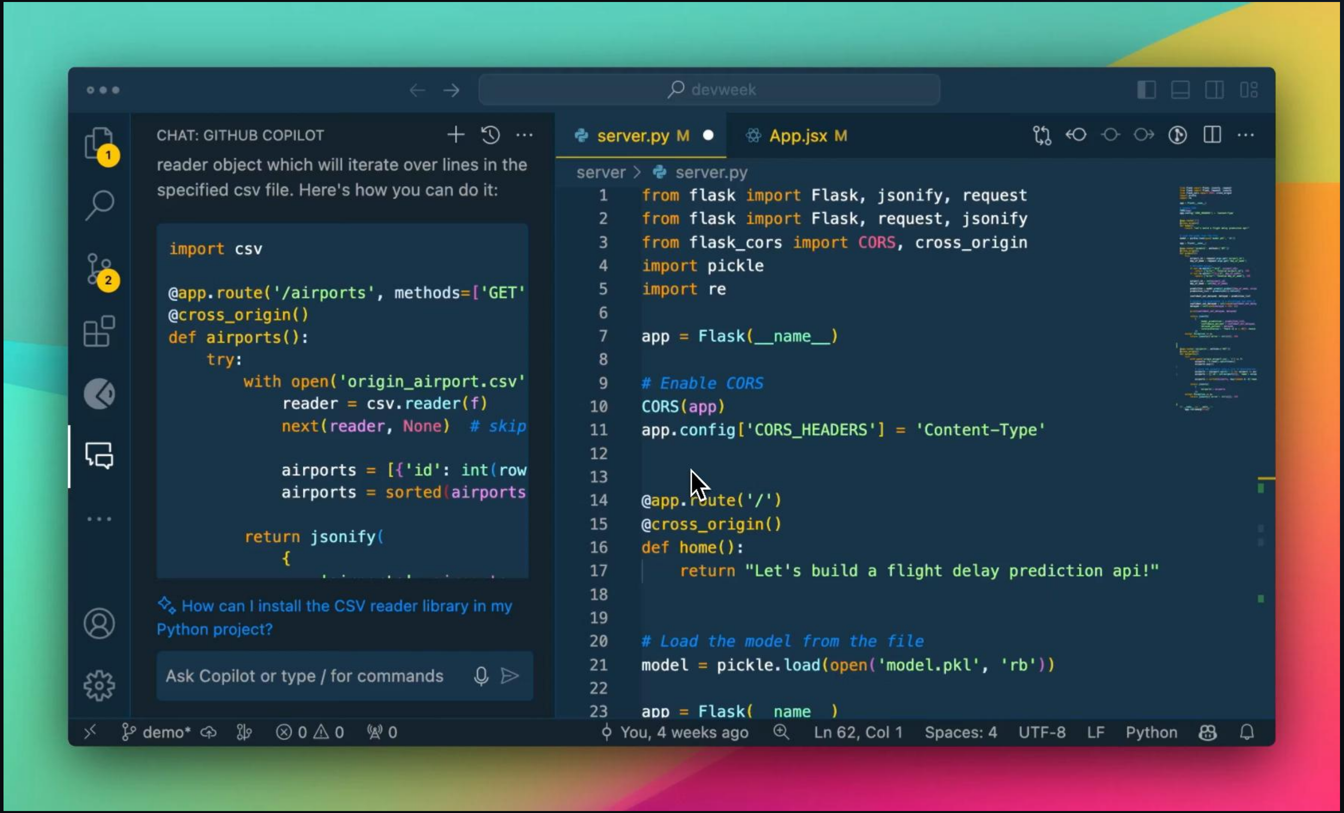
```
// Define variables
let currentValue = '';
let previousValue = '';
let currentOperation = null;

// Get DOM elements
const display = document.querySelector('.display');
```

More tips

- Attach relevant files for reference
- Start with GitHub Copilot Chat for faster debugging
- Be on the lookout for sparkles!

More tips



reader object which will iterate over lines in the specified csv file. Here's how you can do it:

```python
import csv

@app.route('/airports', methods=['GET'
@cross_origin()
def airports():
    try:
        with open('origin_airport.csv'
            reader = csv.reader(f)
            next(reader, None)  # skip

            airports = [{'id': int(row
            airports = sorted(airports

        return jsonify(
            {
```

How can I install the CSV reader library in my Python project?

Ask Copilot or type / for commands

```python
from flask import Flask, jsonify, request
from flask import Flask, request, jsonify
from flask_cors import CORS, cross_origin
import pickle
import re

app = Flask(__name__)

# Enable CORS
CORS(app)
app.config['CORS_HEADERS'] = 'Content-Type'


@app.route('/')
@cross_origin()
def home():
    return "Let's build a flight delay prediction api!"


# Load the model from the file
model = pickle.load(open('model.pkl', 'rb'))

app = Flask(  name  )
```

Conclusion

- Context
- Prompt Crafting
- Stay in control

Frequently Asked Questions

“Is the information shared with GitHub Copilot secure?

“For example, let’s say I enter some sensitive information through GitHub Copilot, is it going to store the data like my user information?”

“Can I train GitHub Copilot on my private codebase?”

"Is the Copilot suggestion from an IDE based on my computer, a project opened in my IDE, files opened through tabs or just a single file?"

“What telemetry data can I get from GitHub Copilot ?”

“How can GitHub Copilot integrate with existing pipelines/automations/scripts that we have?

“For example, I have this GitHub Actions/Azure DevOps pipeline, can GitHub Copilot integrate with those products so our code will always be secure?”

“Will Copilot replace my job”

“How much of my work can it take over?”

Q & A

Analyze and document code using GitHub Copilot

- Analyze and document code using GitHub Copilot | mslearn-github-copilot-dev
- https://github.com/MicrosoftLearning/mslearn-github-copilot-dev/raw/refs/heads/main/DownloadableCodeProjects/Downloads/AZ2007LabAppM2.zip

Develop new code features using GitHub Copilot

- Develop new code features using GitHub Copilot | mslearn-github-copilot-dev
- https://github.com/MicrosoftLearning/mslearn-github-copilot-dev/raw/refs/heads/main/DownloadableCodeProjects/Downloads/AZ2007LabAppM3.zip

Create unit tests by using GitHub Copilot Chat

- Develop unit tests using GitHub Copilot | mslearn-github-copilot-dev
- https://github.com/MicrosoftLearning/mslearn-github-copilot-dev/raw/refs/heads/main/DownloadableCodeProjects/Downloads/AZ2007LabAppM4.zip

Challenge 1

- C#
- https://learn.microsoft.com/en-gb/training/modules/generate-documentation-using-github-copilot-tools/6-exercise-complete-code-documentation-challenge
- Python
- https://experience.cloudlabs.ai/#/labguidepreview/f9fd80ac-fc1a-4609-a3f1-06650aec389e (Page 9)

Challenge 2

- C#
- https://experience.cloudlabs.ai/#/labguidepreview/f9fd80ac-fc1a-4609-a3f1-06650aec389e (Page 6)
- Python
- https://experience.cloudlabs.ai/#/labguidepreview/f9fd80ac-fc1a-4609-a3f1-06650aec389e (Page 5)

Upcoming Sessions

1. Intro to Prompt Engineering
2. GitHub Copilot for Data/ML Engineers
3. GitHub Copilot for DevOps Engineers
4. GitHub Copilot for Developers

Thank you!