Contents

Recording	Slides
Workshop 1 Recording - SharePoint	Series1-Workshop-Intro-Setup.pptx

Overview

1. Introduction to BugSweeper tool
2. Creating, cloning a GitHub repository
3. Building, running first NUnit tests
4. Debugging NUnit tests
5. Using GitHub Copilot AI to write tests

Prerequisites

Prerequisites in order to run BugSweeper tool are found 👉here👈. We need these completed before moving forward.

Video learning resources

Video resources here cover key topics such as C#, GitHub, GitHub Desktop, Visual Studio, VS Code, NUnit, and Copilot. For those new to programming, it is suggested to spend some time getting familiar with C#.

Step 1: Let's introduce BugSweeper!

BugSweeper is a test automation tool used for all business verticals of IGT gaming.

BugSweeper uses the libraries EgmClientsLite and UtpClient to connect to an EGM to facilitate automated configuration and gameplay for our games.

- EgmClientsLite communicates with the Test FI to perform Foundation/AI-level actions (i.e. games configuration, machine-wide settings, pressing physical buttons, other Test FI features)
- UtpClients communicates with the game-side UTP server to perform game-specific actions (pressing screen buttons, seeding snippets, etc.).

Feedback-driven development

This tool is tailored to the user needs, meaning your feedback is ❗ crucial ❗. Throughout BugSweeper's development the team relies on your feedback to make fixes and improvements.

Reach out to the BugSweeper Team for any feedback, thank you!

Step 2: Let's clone our first GitHub repository!

Now that we have GitHub access, let's jump to the BugSweeper Template repository and create our first repository.

This page should guide users on how to create and clone their repository to their local computer.

☝ From here on out we will use VS Code as our IDE, but users with VS Pro 2022 can still follow along.

Step 3: Let's build and run our first tests!

At this point, for our VS Code users, after cloning the IDE should be look something similar to this:

If so, we are ready to keep moving ✔

Documentation on using VS Code for Testing exists in the BugSweeper wiki, but this workshop will provide steps as well.

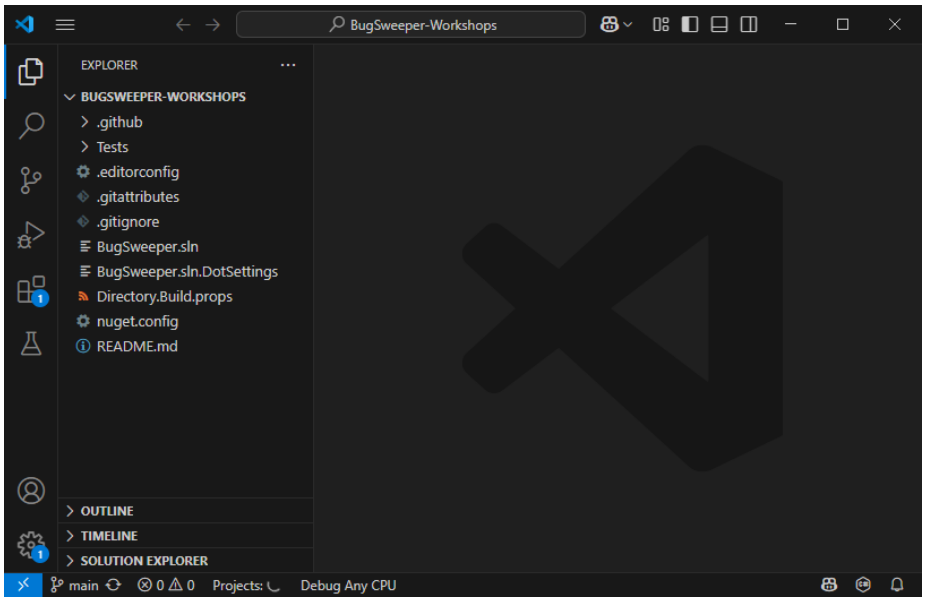


Figure 1: image

VS Code Extensions

For our VS Code users (🥷 NOT VS Pro users 🥷), we will need to install additional extensions to run our tests:

On the far left-side, select the 'Building Blocks' icon labeled 'Extensions':

Here we can search for and install the two needed extensions:

- `.NET Core Tools`
- `C# Dev Kit`

These extensions set up our VS Code C# development environment to start working in.

Building the BugSweeper project

In VS Code, there are a couple ways to build the BugSweeper project. Navigate to the 'Explorer' tab on the far left-side at the top, where we previously found the 'Extensions' tab:

To build, right-click either the `Tests.csproj` or `BugSweeper.sln` file and select 'Build .NET Core project':

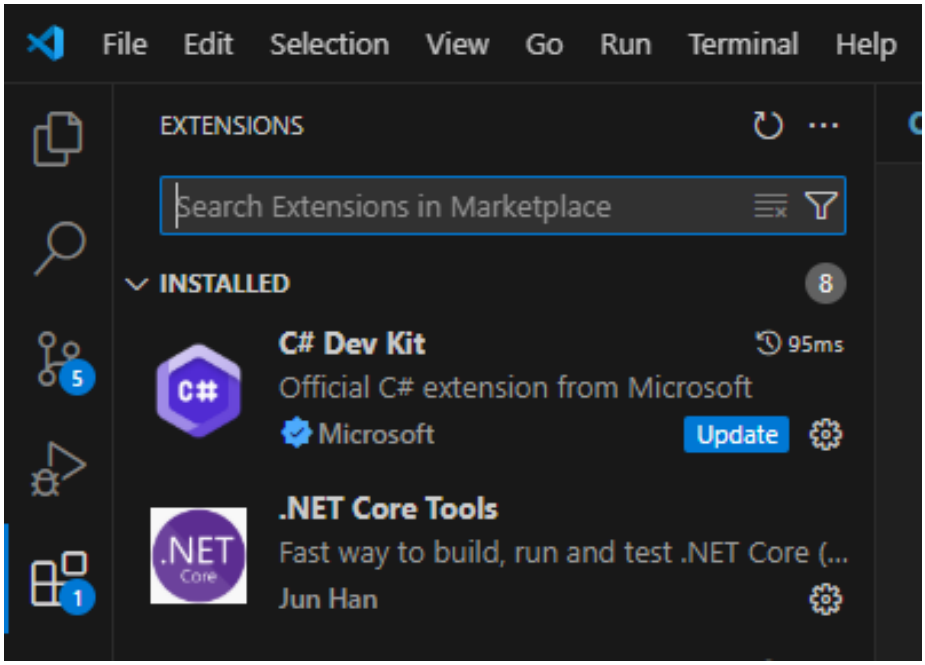
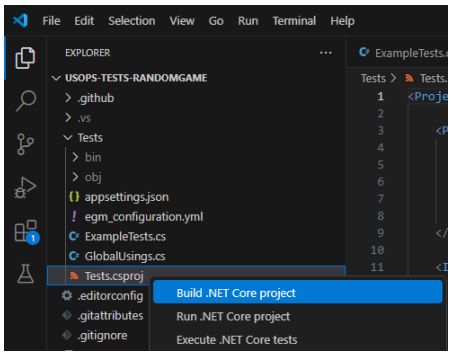
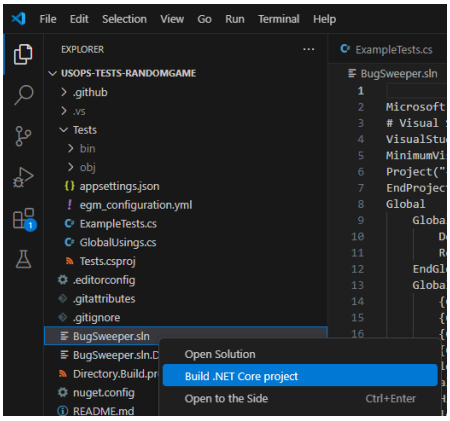


Figure 2: image

Figure 3: image

Figure 4: image

via .csproj file	via .sln file
	

If everything in your environment is set up, you should see a green `succeeded` result in the Terminal:

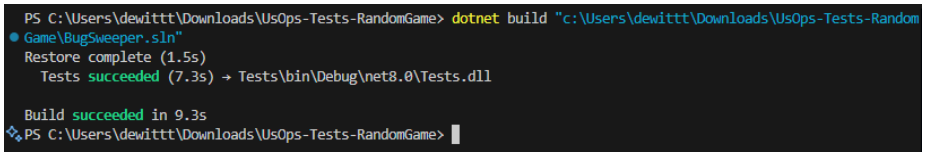


Figure 5: image

If not... refer to our wiki section: Building BugSweeper fails! If still encountering issues, please reach out to the BugSweeper Team.

Running the example tests

After a successful build, let's run the example NUnit tests! This workshop's version of the BugSweeper template comes with a few example, game-agnostic tests that should apply to virtually any Ascent/GGA game.

These example tests reside in `Workshop1\ExampleTests.cs`, an existing file within our BugSweeper Workshops repository.

So, to run these example tests we would need a game enabled and running. This is when you should have your EGM/AoW up with the installed Test FI:

In VS Code, jump to the 'Testing' tab on the far-left:

Hey! The example tests from `Workshop1\ExampleTests.cs` are now there! 😎

Figure 6: image

Figure 7: image

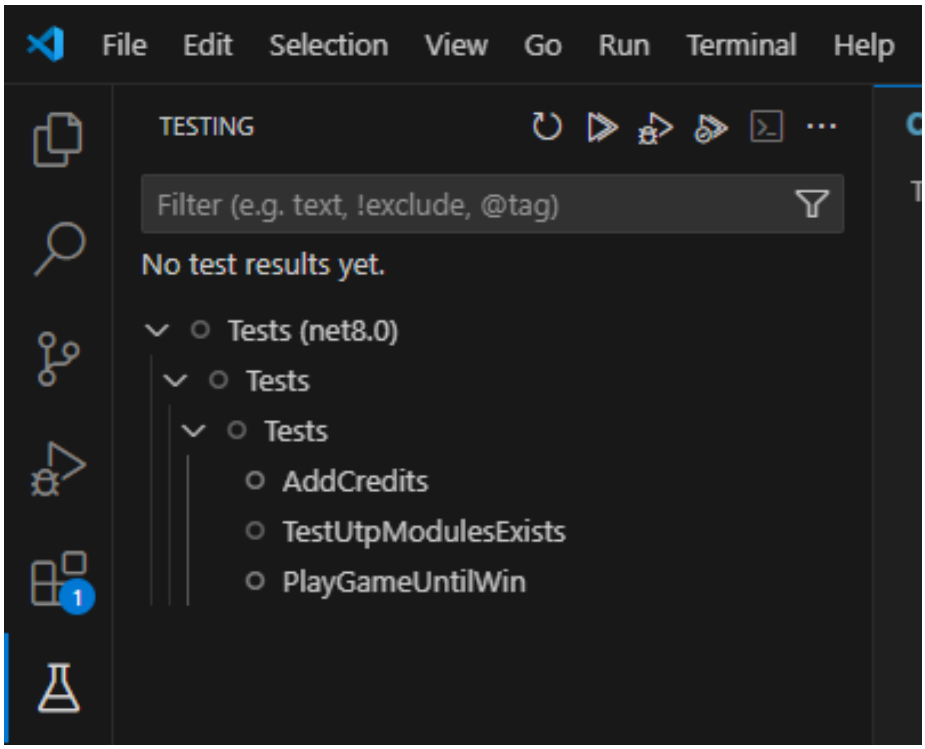


Figure 8: image

Not seeing them? Refer to our wiki section: My tests aren't being discovered in VS!

Ensure the `appsettings.json` in the BS project is targeting the IP address of the EGM.

- Using AoW? Assign `Address` to `127.0.0.1`.

Let's finally run our first test, `AddCredits`. This test will simply add 1000 credits to the EGM. To run the test, either right-click on the test and select the option or select the 'Run Test' icon to its right when hovering over it:

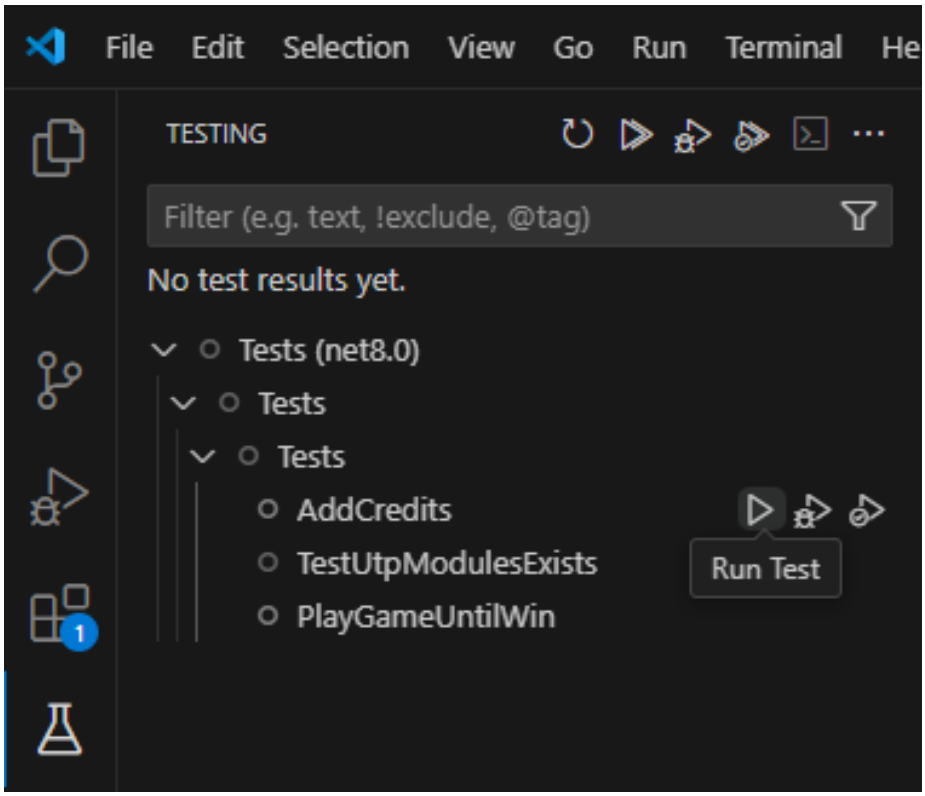


Figure 9: image

WOO! 🎉 Running the test SHOULD result in 1000 credits being added to our game:

Not seeing this? EgmClientsLite not behaving? Refer to our wiki section: EgmClientsLite is failing to connect!

Figure 10: image

Step 4: Let's debug these tests!

Debugging is an essential skill for any programmer, as it allows you to identify and fix issues in your code. In this step, we will guide you through the process of debugging NUnit tests using Visual Studio Code.

Debugging involves setting breakpoints, running your tests in debug mode, inspecting variables, and controlling the flow of execution.

Here are the official VS Code docs on debugging, but below is a quick introduction:

What is a breakpoint?

A breakpoint is a marker that you can set in your code to tell the debugger to pause execution at that specific line. This allows you to inspect the state of your application at a particular point in time, which is useful for identifying and fixing bugs.

How to Debug a test/hit a breakpoint in Debug mode

1. Open Your Test File: In Visual Studio Code, open the file containing the NUnit tests you want to debug.
2. Set a Breakpoint: Click in the left margin next to the line number where you want to set a breakpoint. A red dot will appear, indicating that a breakpoint is set.

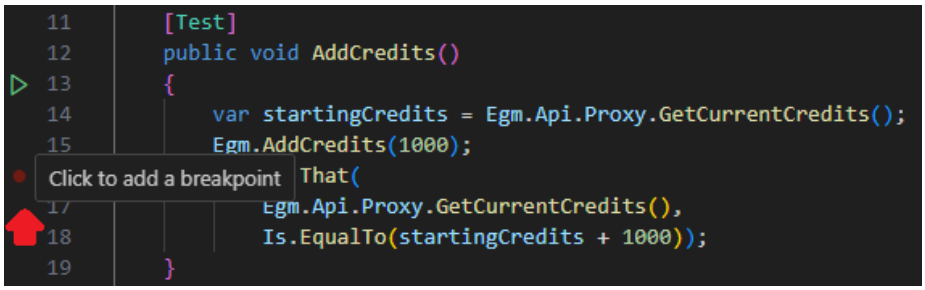


Figure 11: image

3. Debug Your Test: In the Testing tab, right-click on the test you want to debug and select Debug Test.

Analyzing variables when hitting breakpoint

When the debugger hits a breakpoint, the execution of your code will pause, and you can inspect the variables:

1. Run and Debug view: Users can inspect variables and expressions in the VARIABLES section of the Run and Debug view:
2. Hover Over Variables: Simply hover your mouse over a variable in the code to see its current value.

Continue from breakpoint

Once you have inspected the variables and the state of your application, you can continue the execution:

1. Continue Execution: Press F5 or click the Continue button in the debug toolbar to resume running the code until the next breakpoint or the end of the test.
2. Step Over: Press F10 to step over the current line of code, which means the debugger will execute the line and pause at the next line.
3. Step Into: Press F11 to step into a function call, allowing you to debug inside the function.
4. Step Out: Press Shift+F11 to step out of the current function and return to the calling function.

Step 5: Let's play with Copilot AI!

Please refer to the official GitHub Copilot Chat docs for an in-depth explanation of all the features available for Copilot Chat.

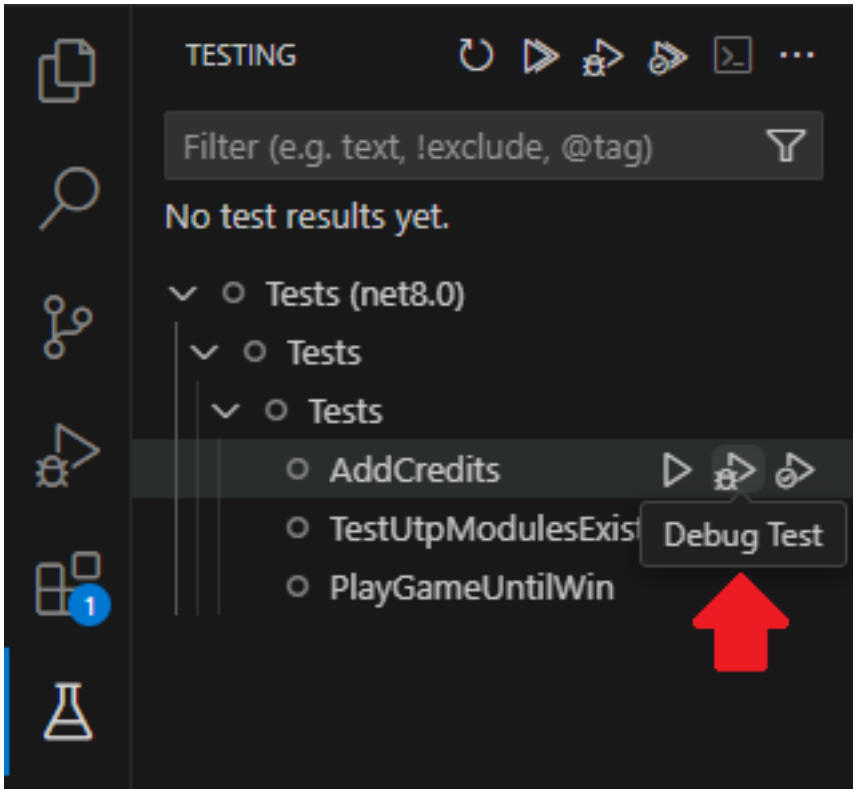


Figure 12: image

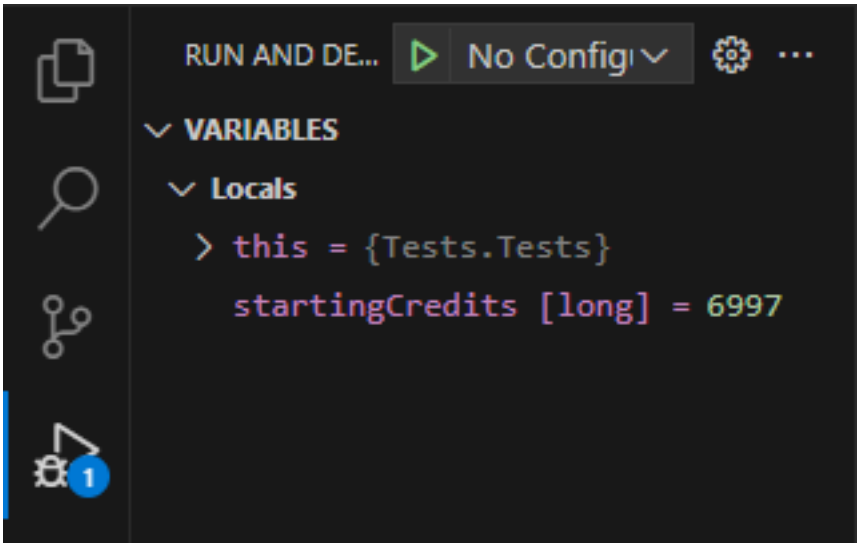


Figure 13: image

```
11  [Test]
12  public void AddCredits()
13  {       6997
14      var startingCredits = Egm.Api.Proxy.GetCurrentCredits();
15      Egm.AddCredits(1000);
16      Assert.That(
17          Egm.Api.Proxy.GetCurrentCredits(),
18          Is.EqualTo(startingCredits + 1000));
19  }
```

Figure 14: image

For a quick crash course in getting up-and-running with Copilot, keep following!

Installing GitHub Copilot

For VS Pro: Copilot should be integrated with the latest version of the IDE. If you don't already have it, update your VS Pro.

For VS Code: There are two additional extensions needed to be installed in order to integrate Copilot into our IDE:

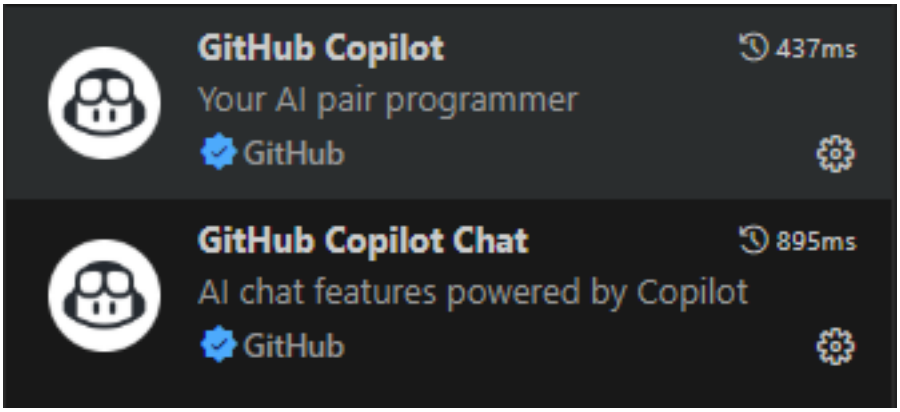


Figure 15: image

Once installed, open the Copilot chat window here:

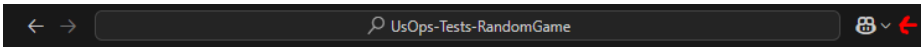


Figure 16: image

You may need to sign in to your GitHub account to use Copilot, go ahead and do that.

Having issues with Copilot? Refer to our wiki section: I can't connect to GitHub Copilot!

With Copilot up, we can start leveraging its AI powers to help us write tests!

Using Copilot

For our users who are new to programming, there are high-level programming concepts that may be hard to grasp initially. Fortunately, we can use Copilot to clarify these concepts!

For example, in `ExampleTests.cs`, the test `PlayGameUntilWin()` executes a method `PlayOneGame()` until a win is achieved. To understand its logic, one

could simply prompt Copilot with the question:

> Can you explain what the method `PlayOneGame()` does, line-by-line?

This should describe `PlayOneGame()` from one individual step to the next. At the end Copilot summarizes with:

> Summary: The PlayOneGame method simulates playing a single game on the machine. It: 1. Prepares the machine by adding credits. 2. Sets the bet amount. 3. Starts the game by pressing the "Spin" button. 4. Waits for the game to start and end. 5. Ensures the machine returns to an idle state before finishing. 6. Cleans up event subscriptions to avoid resource leaks.

Great job, Copilot!

What else can we do with this AI? We can certainly have Copilot generate us code as well!

We can access the Chat to prompt for code generation in several ways. Another way to submit prompts is with the Inline Chat!

Here we can select a block of code and right-click on it to contextualize the prompt we are about to send:

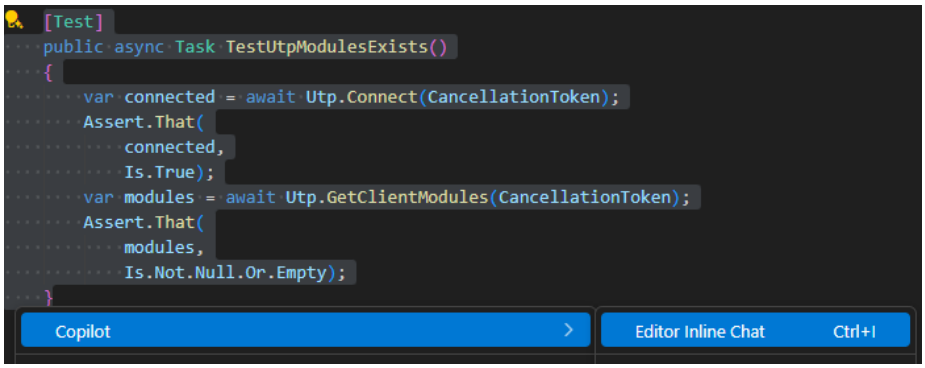


Figure 17: image

In this example we will highlight the test `TestUtpModulesExist` and ask it to update the logic to print out all modules and their respective commands:

> Can you modify this test to print out all the modules, as well as the command for each of those modules? The command string is found in the command.Command property.

This prompt given this test should generate the following code suggestion:

Accepting the changes should update `TestUtpModulesExists` to:

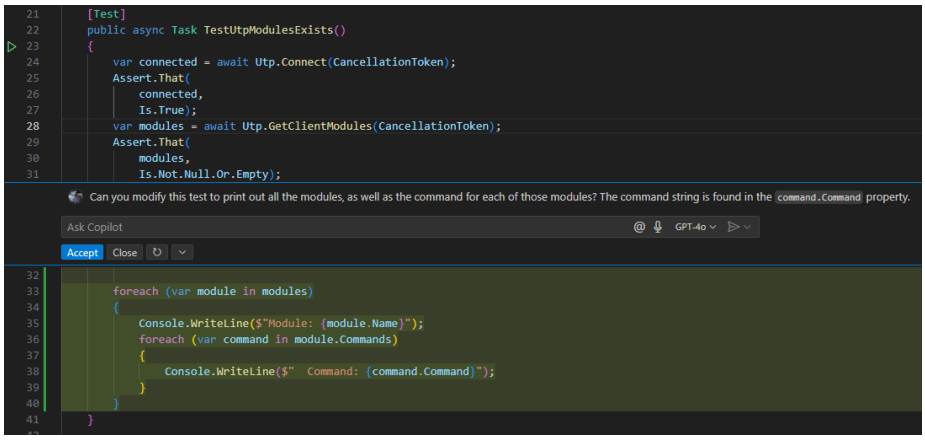


Figure 18: image

```
[Test]
public async Task TestUtpModulesExists()
{
    var connected = await Utp.Connect(CancellationToken);
    Assert.That(
        connected,
        Is.True);
    var modules = await Utp.GetClientModules(CancellationToken);
    Assert.That(
        modules,
        Is.Not.Null.Or.Empty);

    foreach (var module in modules)
    {
        Console.WriteLine($"Module: {module.Name}");
        foreach (var command in module.Commands)
        {
            Console.WriteLine($"  Command: {command.Command}");
        }
    }
}
```

With this change, running `TestUtpModulesExists` should result in output within 'Test Results' that should look similar to:

```
Module: UtpController
  Command: InitializeModules
  Command: ReinitializeModules
  Command: GetHelp
```

```
  Command: GameShutdown
  Command: PauseStatusUpdated
Module: MPT
  Command: GetGamePlay
  Command: QueueNextGamePlay
  Command: SetGamePlayAutomated
  Command: GetGamePlayAutomated
  Command: GetCurrentPersistence
  Command: SetCurrentPersistence
  Command: SetPlayerDecisions
..........
```

Viola! Copilot helped us extend this test to do more! 👍

Conclusion

That wraps up Workshop 1, congratulations! 🏆

More documentation on BugSweeper functionality are found in the BugSweeper Template wiki, which covers other concepts we will be exploring in the later workshops.