



GITHUB

COPILOT FOR FRONTEND

# AGENDA

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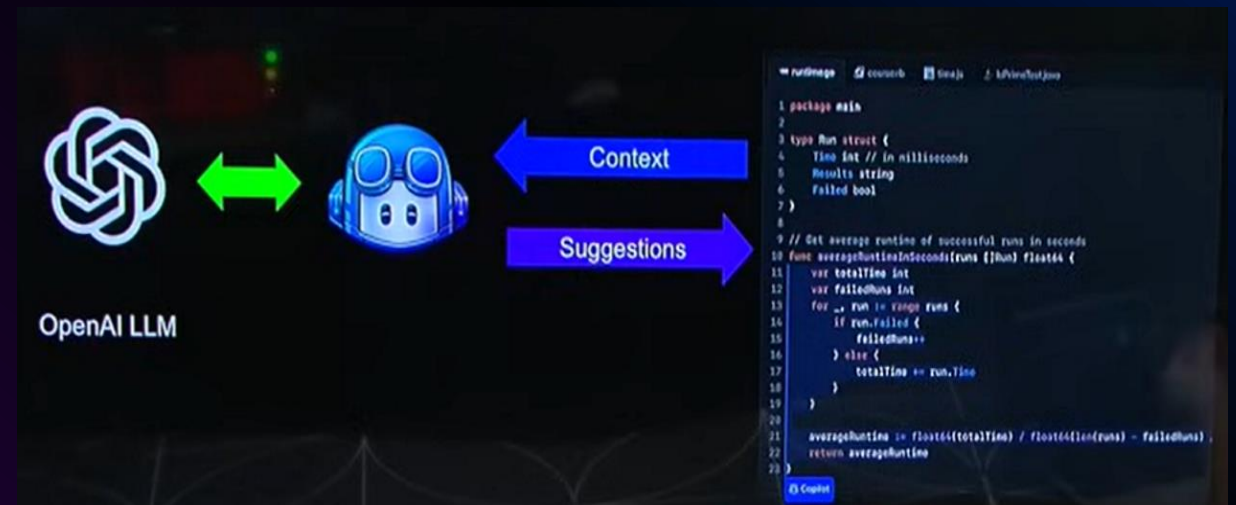


- What is GitHub CoPilot?
- Code Generation – Build App
- Code Generation - Techniques
- Test Automation - Unit Test Code Generation
- Debugging Errors
- Test Automation - Playwright Test Code Generation

# WHAT IS GITHUB COPILOT?

- GitHub Copilot is an AI-powered code assistant developed by GitHub in collaboration with OpenAI
- It integrates seamlessly into popular editors (IDEs) and supports a wide range of programming languages
- It analyzes the context of your current code and comments to provide real-time, relevant code suggestions

<https://docs.github.com/en/copilot>



## GitHub Copilot Context

- Current file and other open tabs
- Copilot chat offers options to add files, workspace, terminal, and code selections in context
- It continuously learns from your feedback and adapts to your coding style

# MY 'TO-DO' LIST APP

Create a new 'To-do-List' User Interface to mark our 'Take-off' checklist from scratch using CoPilot

### Ashie Airlines

Add item

Task	Actions
Fuel	✓ ✕
Engine	✓ ✕
Radio	✓ ✕
Weather	✓ ✕
Final Take Off	✓ ✕

# CODE GENERATION – BUILD APP

*Write me a frontend code with specifications and workflow as below*

- 1. Allow user to add a to-do item by providing a text input field and an Add item button with light blue color positioned center in page. The input should be using ngModel binded to 'newTodo'*
- 2. Add check mark in light green color to mark the to-do item as complete & strike that item from list out. Allow user to delete the item with cross mark from the to-do list with background color red. The input should be using ngModel binded to a list 'todoList'.*
- 3. Suitable title as 'Ashie Airlines' at the top & show list in a HTML table with header as Task & Actions, both positioned center in page. Make sure to have space between check mark & cross mark*
- 4. Make background in white color & other user-friendly styles should be part of the separate scss file.*
- 5. Define all variables & functions referred in the HTML Code in the component TodoListComponent*
- 6. Add Comments in each file to explain the code*

*I would like to improvise on the scss file to show it a better look & feel. Provide me with changes for the complete file again*

### Ashie Airlines

Add item

Task	Actions
Fuel	✓ ✕
Engine	✓ ✕
Radio	✓ ✕
Weather	✓ ✕
Final Take Off	✓ ✕



# CODE GENERATION TECHNIQUES

```
<ul>
  <li><a routerLink="/">Home Page</a></li>
  <!--Add a new routerLink to the list for new path for todo-list -->
  <li><a routerLink="/todo-list" routerLinkActive="class2">Todo List</a></li>
  <li><a routerLink="/control-flows" routerLinkActive="class2">Control Flows</a></li>
  <li><a routerLink="/deferred-loading" routerLinkActive="class2">Deferred Views</a></li>
  <li><a routerLink="/singleton" routerLinkActive="class2">Singleton</a></li>
  <li><a routerLink="/prototype" routerLinkActive="class2">Prototype</a></li>
  <li><a routerLink="/facade" routerLinkActive="class2">Facade</a></li>
  <li><a routerLink="/factory" routerLinkActive="class2">Factory</a></li>
  <li><a routerLink="/adapter" routerLinkActive="class2">Adapter</a></li>
  <li><a routerLink="/logging" routerLinkActive="class2">Logging</a></li>
  <li><a routerLink="/state" routerLinkActive="class2">State</a></li>
  <li><a routerLink="/iterator" routerLinkActive="class2">Iterator</a></li>
  <li><a routerLink="/ashiverse-art" routerLinkActive="class2">Art</a></li>
  <li><a routerLink="/apple-pie-recipe" routerLinkActive="class2">Receipe</a></li>
</ul>
</nav>
```

INLINE PROMPTS

The screenshot shows a VS Code editor with a Copilot chat window on the right and an inline prompt in the code editor. The chat window is titled "Adding a new page and route for To-Do-List in an Angular project" and contains the following instructions:

1. Add the route for the To-Do-List in your `app.routes.ts` file.
2. Add the component to the routes array.

Here is how you can do it:

```
// Add this import at the top of your app.routes.ts file
import { TodoListComponent } from './todo-list-app/todo-list-app.component';

// Add this route to your routes array
{
  path: 'todo-list',
  component: TodoListComponent
}
```

This will add a new route `/todo-list` which will load the `TodoListComponent` when navigated to.

How can I navigate to the To-Do-List page in my Angular project?

Ask Copilot a question or type `/` for commands

The inline prompt in the code editor is:

```
path: 'todo-list',
component: TodoListComponent
```

COPILOT CHAT

# TEST AUTOMATION - UNIT TEST CODE GENERATION

## 1. Functional Testing

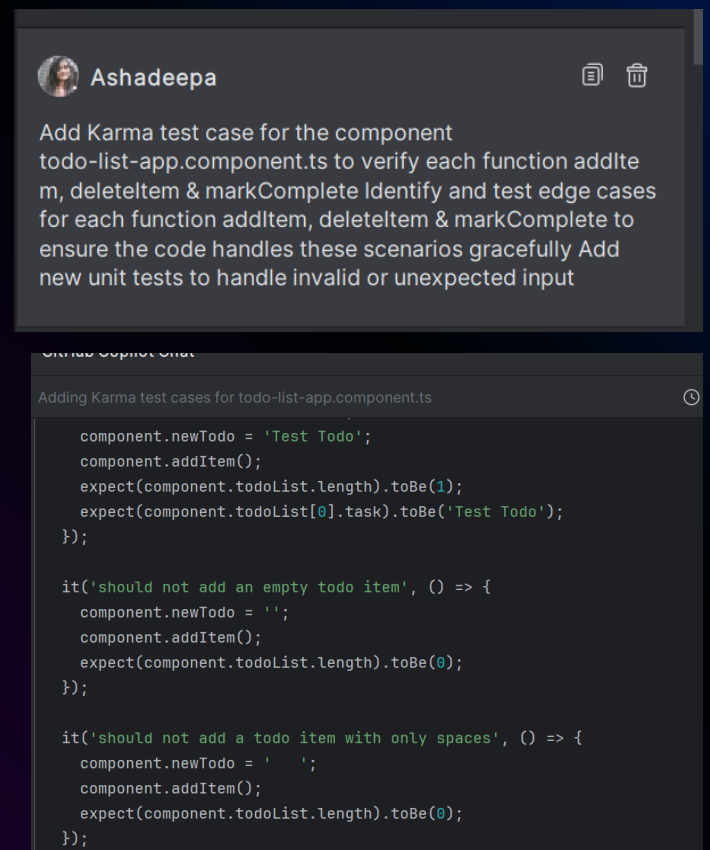
**Prompt:** Write unit test cases to verify each function in the todo-list-app component.

## 2. Edge Case Testing

**Prompt:** Identify and test edge cases for each function in the todo-list-app component to ensure the code handles these scenarios gracefully.

## 3. Input Validation

**Prompt:** Add new unit tests to handle invalid or unexpected input.



Ashadeepa

Add Karma test case for the component todo-list-app.component.ts to verify each function addItem, deleteItem & markComplete. Identify and test edge cases for each function addItem, deleteItem & markComplete to ensure the code handles these scenarios gracefully. Add new unit tests to handle invalid or unexpected input.

```
component.newTodo = 'Test Todo';
component.addItem();
expect(component.todoList.length).toBe(1);
expect(component.todoList[0].task).toBe('Test Todo');
});

it('should not add an empty todo item', () => {
  component.newTodo = '';
  component.addItem();
  expect(component.todoList.length).toBe(0);
});

it('should not add a todo item with only spaces', () => {
  component.newTodo = ' ';
  component.addItem();
  expect(component.todoList.length).toBe(0);
});
```

# DEBUGGING ERRORS



```
Chrome 126.0.0.0 (Windows 10): Executed 4 of 27 SUCCESS (0 secs / 0.229 secs)
LOG: 'Number of instances: ', 2
Chrome 126.0.0.0 (Windows 10): Executed 6 of 27 SUCCESS (0 secs / 0.266 secs)
LOG: 'Number of instances: ', 3
Chrome 126.0.0.0 (Windows 10): Executed 8 of 27 SUCCESS (0 secs / 0.309 secs)
Chrome 126.0.0.0 (Windows 10) TodoListComponent should add multiple todo items and verify the list length FAILED
Error: Unexpected "TodoListComponent" found in the "declarations" array of the "TestBed.configureTestingModule" call, "TodoListComponent" is marked as standalone and can't be declared in any NgModule - did you intend to import it instead (by adding it to the "imports" array)?
    at forEach (node_modules/@angular/core/fesm2022/testing.mjs:765:23)
    at Array.forEach (<anonymous>)
    at assertNoStandaloneComponents (node_modules/@angular/core/fesm2022/testing.mjs:761:11)
    at TestBedCompiler.configureTestingModule (node_modules/@angular/core/fesm2022/testing.mjs:836:13)
    at TestBedImpl.configureTestingModule (node_modules/@angular/core/fesm2022/testing.mjs:1903:23)
    at Function.configureTestingModule (node_modules/@angular/core/fesm2022/testing.mjs:1730:37)
    at UserContext.<anonymous> (src/app/todo-list-app/todo-list-app.component.spec.ts:10:19)
    at Generator.next (<anonymous>)
    at asyncGeneratorStep (node_modules/@babel/runtime/helpers/esm/asyncToGenerator.js:3:1)
```

> Using 4 References



Ashadeepa



Fix this error & write the test case again Chrome 126.0.0.0 (Windows 10) TodoListComponent should add multiple todo items and verify the list length FAILED Error: Unexpected "TodoListComponent" found in the "declarations" array of the "TestBed.configureTestingModule" call, "TodoListComponent" is marked as standalone and can't be declared in any NgModule - did you intend to import it instead (by adding it to the "imports" array)?



```
Run test x
Chrome 126.0.0.0 (Windows 10): Executed 11 of 27 SUCCESS (0 secs / 0.079 secs)
LOG: 'Employees: ', [Object{id: '123', name: 'John Doe', email: 'john.doe@abc.com'}, Object{id: '234', name: 'Jane Doe', email: 'jane.doe@abc.com'}]
LOG: 'Departments: ', [Object{id: 'D1', name: 'Sales'}, Object{id: 'D2', name: 'R&D'}, Object{id: 'D3', name: 'Marketing'}]
Chrome 126.0.0.0 (Windows 10): Executed 11 of 27 SUCCESS (0 secs / 0.079 secs)
LOG: 'Number of instances: ', 1
Chrome 126.0.0.0 (Windows 10): Executed 12 of 27 SUCCESS (0 secs / 0.088 secs)
LOG: 'Number of instances: ', 2
Chrome 126.0.0.0 (Windows 10): Executed 13 of 27 SUCCESS (0 secs / 0.093 secs)
LOG: 'Number of instances: ', 3
Chrome 126.0.0.0 (Windows 10): Executed 14 of 27 SUCCESS (0 secs / 0.097 secs)
LOG: 'Number of instances: ', 4
Chrome 126.0.0.0 (Windows 10): Executed 15 of 27 SUCCESS (0 secs / 0.102 secs)
Chrome 126.0.0.0 (Windows 10): Executed 27 of 27 SUCCESS (0.211 secs / 0.186 secs)
TOTAL: 27 SUCCESS
```



# TEST AUTOMATION - PLAYWRIGHT TEST CODE GENERATION

```
1 // Add Playwright test code here
2 import { test, expect } from '@playwright/test';
3
4 new *
5 test( title: 'basic test', body: async ({ page :Page }) :Promise<void> => {
6   await page.goto( url: 'http://localhost:4200/todo-list');
7   const title :Locator = page.locator( selector: 'h2');
8   await expect(title).toHaveText( expected: 'To-Do List');
9 });
```

`npx playwright test --ui`

The screenshot displays the Playwright Test interface. On the left, a sidebar shows the test results: '1/1 passed (100%)' and a list of tests including 'todo-list-e2e.spec.ts' and 'basic test'. The main panel shows the 'Actions' tab for the 'basic test', detailing the steps: 'Before Hooks' (2.4s), 'page.goto http://localhost:42...' (557ms), 'expect.toHaveText locator('h2')' (115ms), and 'After Hooks' (538ms). The total duration is 3.7s. On the right, a preview window shows the 'To-Do List' application running on 'http://localhost:4200/todo-list'. The application has a navigation bar with links like 'Home Page', 'To-Do List', 'Control Flows', etc., and a main content area with a 'To-Do List' form and buttons for 'Add Item', 'Task', and 'Actions'.



## WORD OF CAUTION

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- Use CoPilot with caution and always take the necessary steps to properly review and test its AI-generated output.
- GitHub Copilot is a supplement to a developer's skills and should not replace manual coding entirely
- Still Requires Human Input, Monitoring, and Evaluation

# THANK YOU

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