

Control-Flow Graph Visualizer

Open source Contribution

Project Number: 15003416

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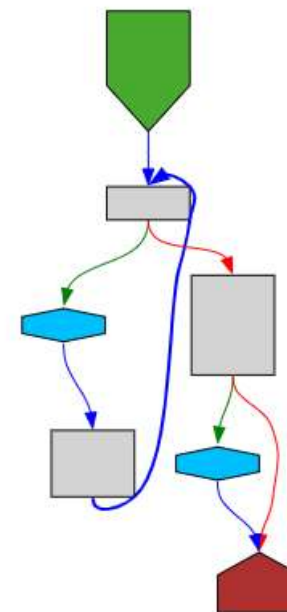
Led by: Mr. Amir Kirsh

The Problem

- Developers and mainly students, often need to understand unfamiliar code.
- Reading through long functions just to follow the control flow is probably a time waste.
- The goal is to tell the story of a function, without getting lost in all the little details. That's where our project comes in.

The project

- The project generates a Control Flow Graph (CFG) for a given function.
- A VS Code extension allows users to visualize the CFG of the currently selected function directly in the editor.
- In addition, there's a [web-based viewer](#) available where users can paste or write a function and view its flow graph.
- The project is implemented in TypeScript.
- Supported languages include:
Go, C, C++, Python, TypeScript, and TSX.



What We've Added So Far

- Shareable Graph Views
- Enhanced the render page with function data
- Nested function visualization

Shareable Graph Views

- We added a share feature to the web-based viewer (demo page), allowing users to share both the code and the generated graph including all selected configuration options.
- The sharing is done via a URL that encodes the current state of the graph view.
- When someone opens the link, the viewer automatically applies the stored settings and displays the graph accordingly.

Demo

<https://youtu.be/cEjOYBcF6jI?si=ohnVzPq76pSAZqs> 9

Enhanced the render page with function data

- We added a feature that analyzes code and gets useful info about any kind of function.
- The metadata includes the function name, how many lines it has, how many nodes and edges in the syntax tree, and the complexity of the graph.
- Added more than 30 tests to make sure the extraction works well for different cases.

Demo

https://youtu.be/Gjlq_EtyXYU?si=bAT3JAjg62DVvOUy

Support for nested functions

- Nested function support in the VS Code extension.
- Clicking a function call node will open the control flow graph of the called function.
- Simplify level of the Graph view.

Demo

<https://youtu.be/SU7pC82pKr7udqWSTutfrl=is?8qI1B>

Next Steps

- **Continuing development of nested function support**

Improving and refining the feature until it's ready to be included in the main project.

- **Debugger integration**

Connecting the flow graph to a live debugger for dynamic interaction.