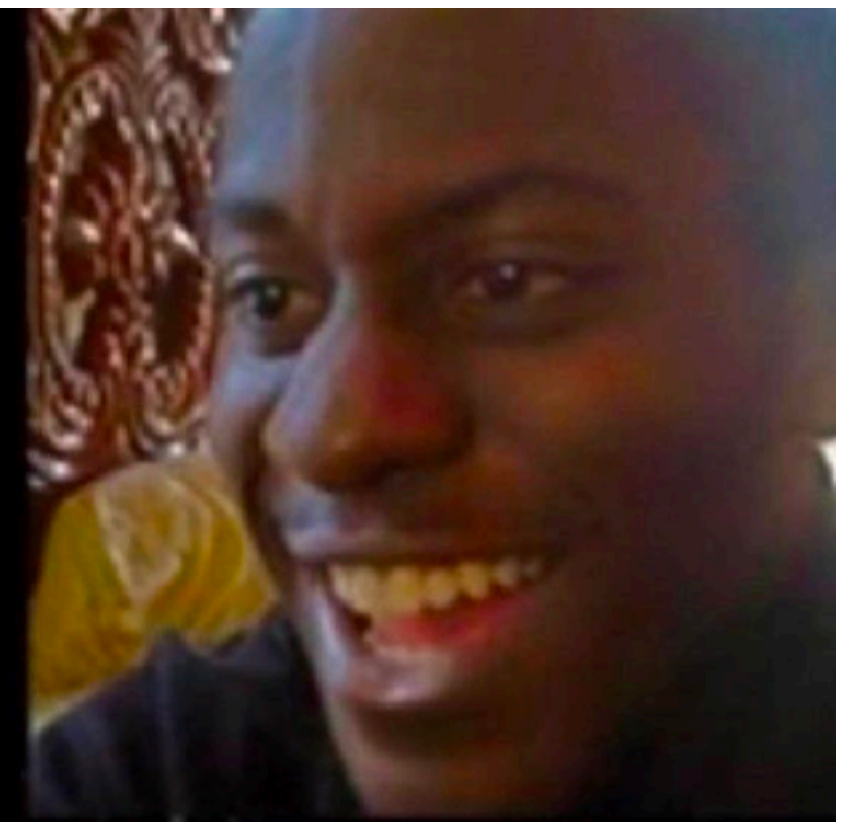




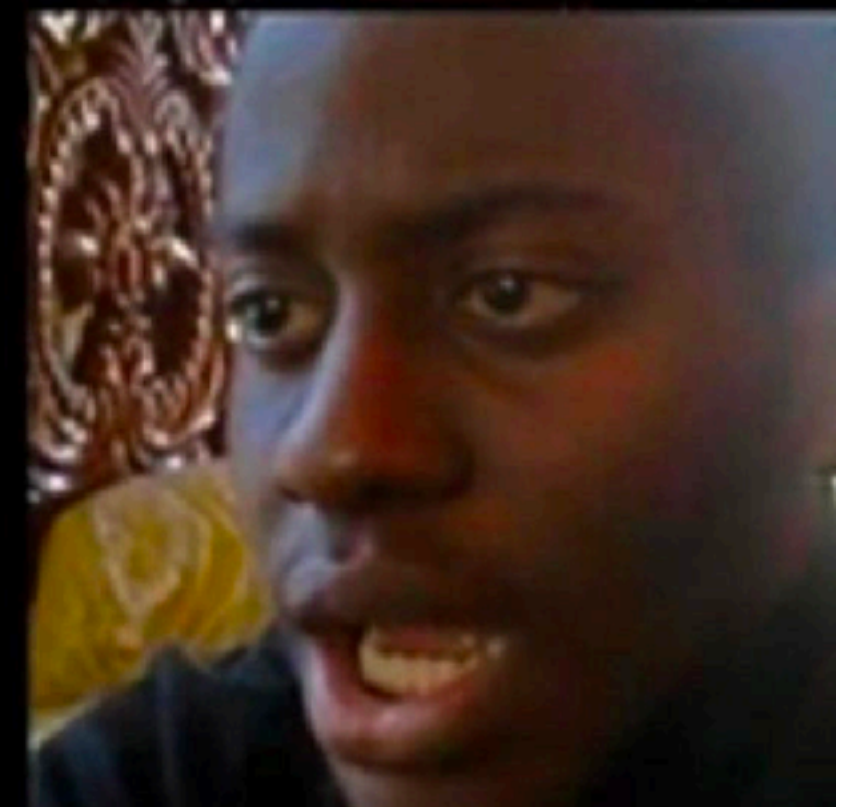
# Unit-Tests with OpenAI ChatGPT

V. Dorosh, 15th of September 2023

When I realize  
ChatGPT can do  
my job for me



When I realize  
ChatGPT can do  
my job for me



# Intro

## Why we are here?

- Share new GPT's “know-how” development approaches
- To remind you about ChatGPT // again:)
- Show practical case using ChatGPT for unit tests



**Developers  
back in 1996**



**coding without  
stackoverflow**

**Developers  
now**



**ChatGPT bacha lo**

# Intro

## OpenAI ChatGPT Overview



- OpenAI is a research laboratory consisting of the non-profit OpenAI Inc. and for-profit OpenAI LP
- Founded by Sam Altman and Elon Musk in 2015
- ChatGPT is an LLM-based chatbot developed by OpenAI, launched on November 30, 2022
- Microsoft invested \$1b and \$10b in 2019 and 2023
- Has API to develop new products upon ChatGPT



# Intro

## Benefits for developers

ChatGPT's features for Software Engineers:

- Converting code from one programming language to another
- Explain code
- Performance and readability check
- Generate comments
- Learning new commands
- Generate parts of code
- **Generating unit tests**





# Intro

## Writing unit tests with ChatGPT

Unit tests stereotypes:

- takes up to 35% additional development time
- usually a “boring routine” for developer
- lots of times being moved to technical debt



### How much additional time does unit testing take? [closed]

Asked 12 years, 11 months ago   Modified 1 year, 4 months ago   Viewed 10k times

6 Answers

Sorted by: Highest score (default)



17

I know that you're not interested in going for full TDD just yet, but I think the best performance and planning markers are going to be found in Test Driven Development case studies, such as those conducted by both Microsoft and IBM.



Case studies were conducted with three development teams at Microsoft and one at IBM that have adopted TDD. The results of the case studies indicate that the pre-release defect density of the four products decreased between 40% and 90% relative to similar projects that did not use the TDD practice. Subjectively, the teams experienced a 15–35% increase in initial development time after adopting TDD. [Source.](#)

# Intro

## Benefits for business

Benefits:

- Increased effectiveness of coding processes



# Intro

## Common pitfalls for business

- Using ChatGPT  $\neq$  decreasing engineers staff
- ChatGPT has “hallucinations” most of the time
- Any technical output needs a review **by an expert**, as it may have obscure bugs or issues

Exam	GPT-4	GPT-4 (no vision)	GPT-3.5
Uniform Bar Exam (MBE+MEE+MPT)	298 / 400 (~90th)	298 / 400 (~90th)	213 / 400 (~10th)
LSAT	163 (~88th)	161 (~83rd)	149 (~40th)
SAT Evidence-Based Reading & Writing	710 / 800 (~93rd)	710 / 800 (~93rd)	670 / 800 (~87th)
SAT Math	700 / 800 (~89th)	690 / 800 (~89th)	590 / 800 (~70th)
...			
Leetcode (easy)	31 / 41	31 / 41	12 / 41
Leetcode (medium)	21 / 80	21 / 80	8 / 80
Leetcode (hard)	3 / 45	3 / 45	0 / 45

Table.1. GPT performance on academic and professional exams. (Ref. GPT-4 Technical Report by OpenAI)

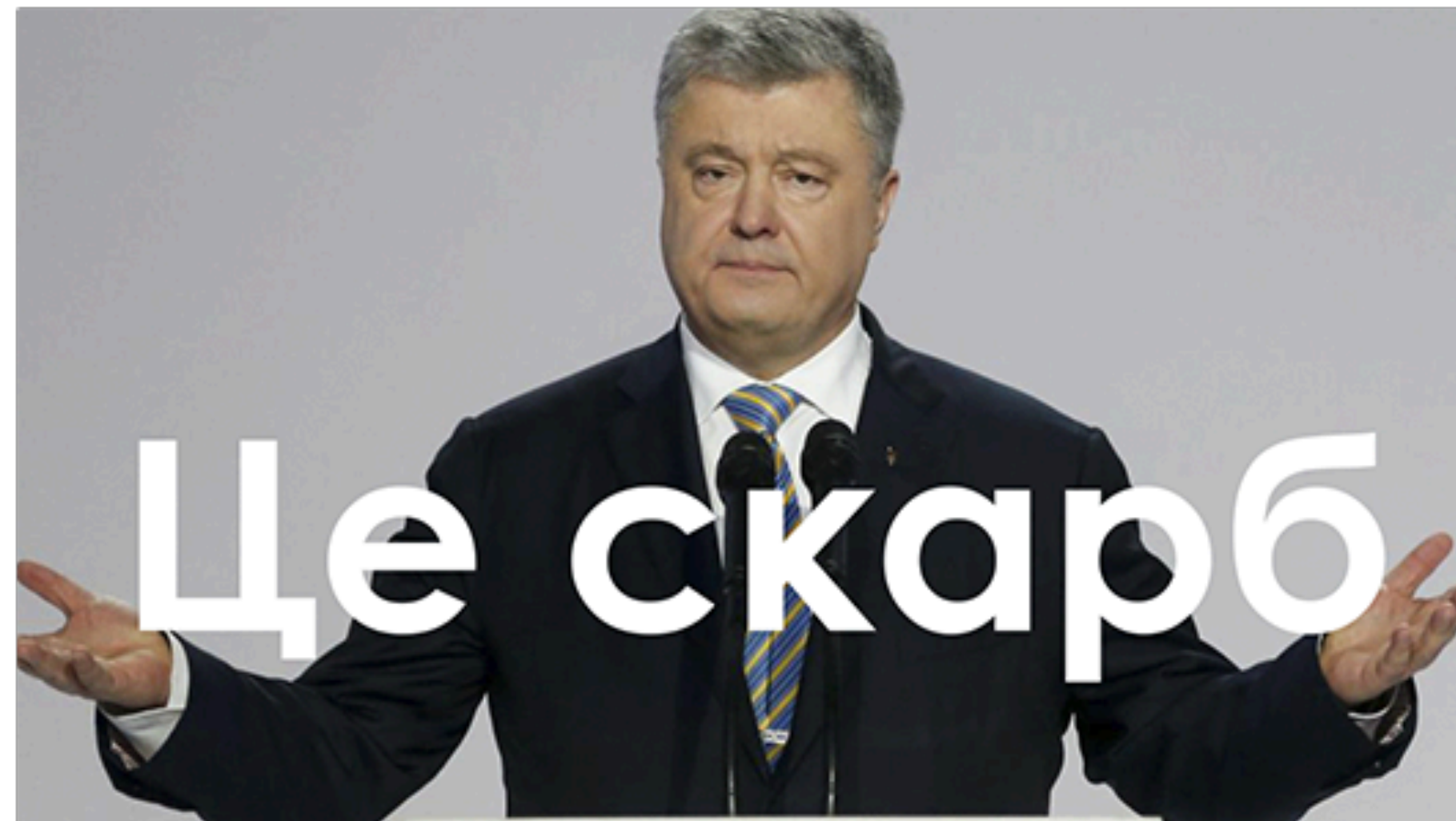


# Intro

## Unit tests with ChatGPT scenarios

Practical scenarios of unit tests with ChatGPT:

1. Generate unit tests
2. Generate unit tests for uncovered test cases
3. Generate refactoring and improvement ideas for unit tests





# Intro

## How to install & use?

- Go to <https://chat.openai.com/>
- Login/Register

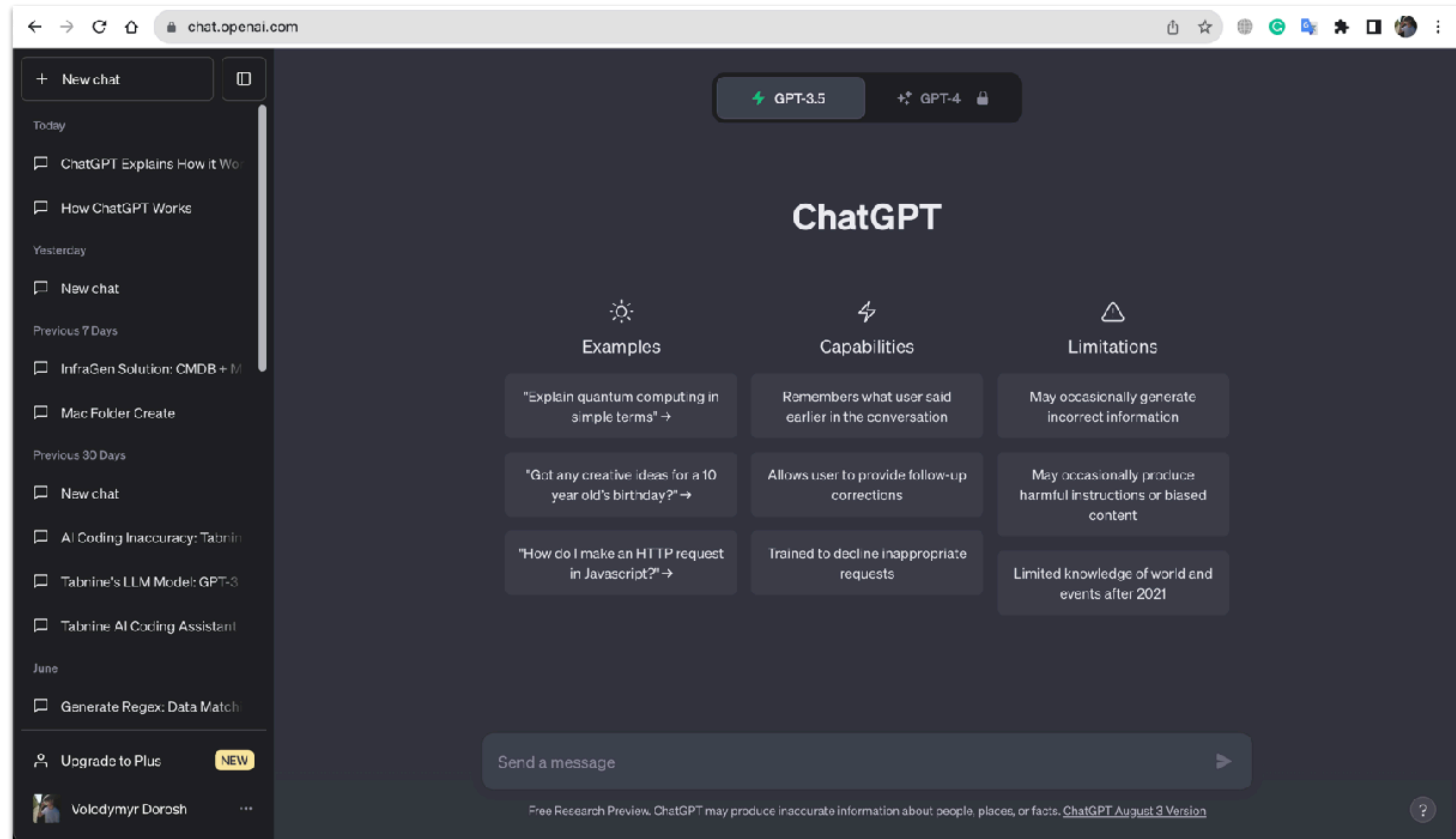
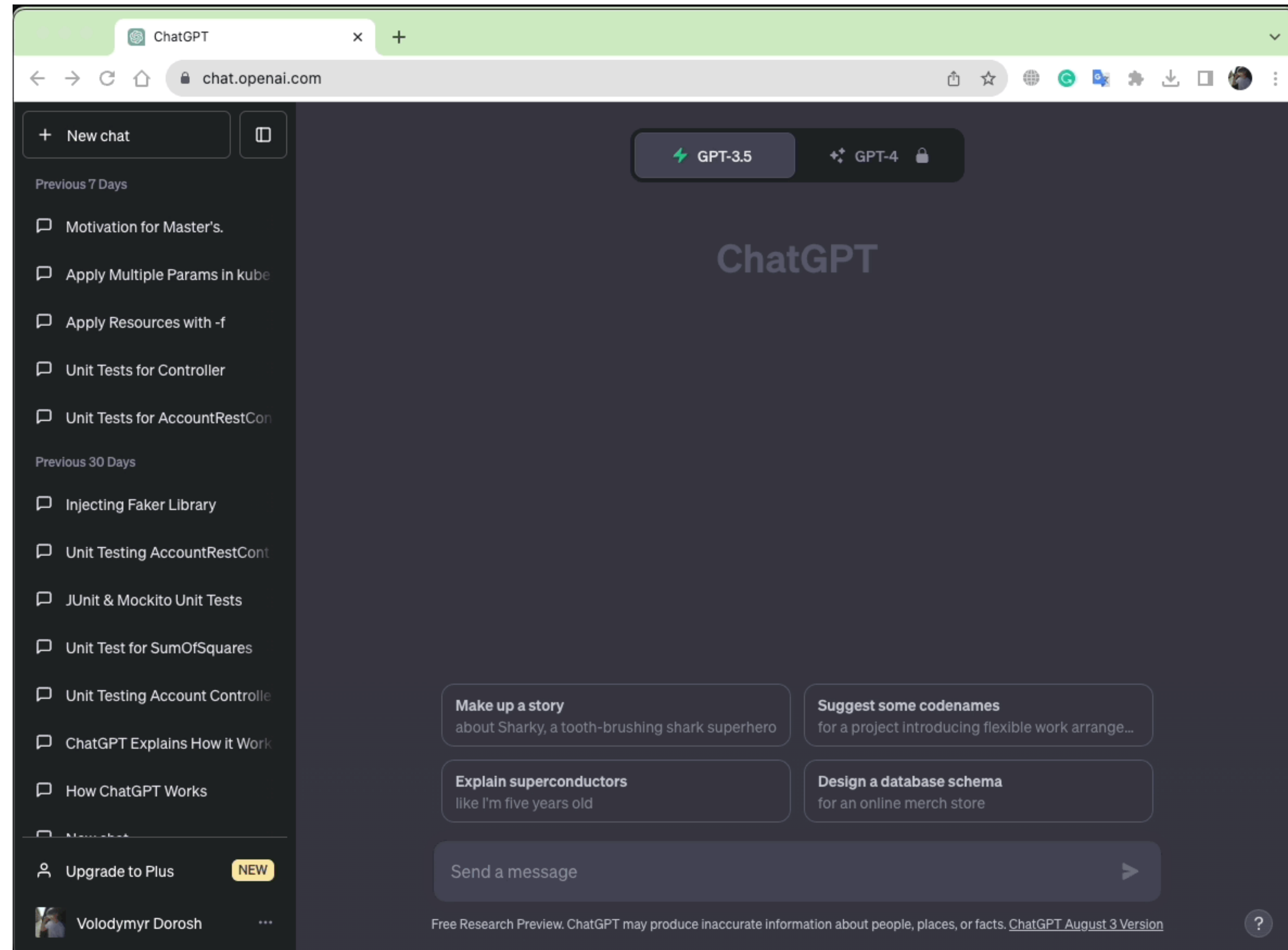


Figure.1. ChatGPT Main Page

# Intro

## How to install & use?

Before using ChatGPT at your project it is important to disable training OpenAI's GPT model by using your proprietary code.



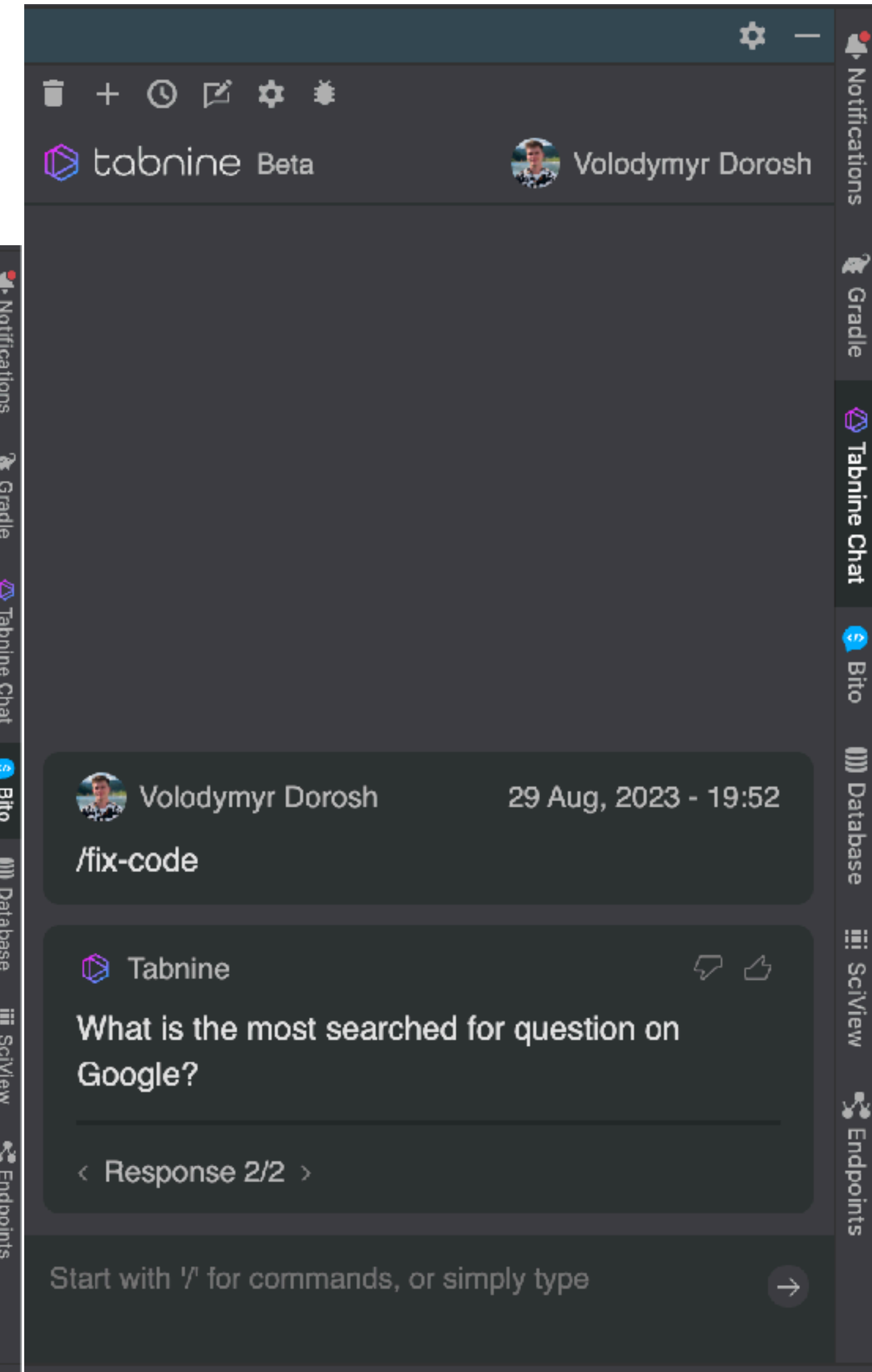
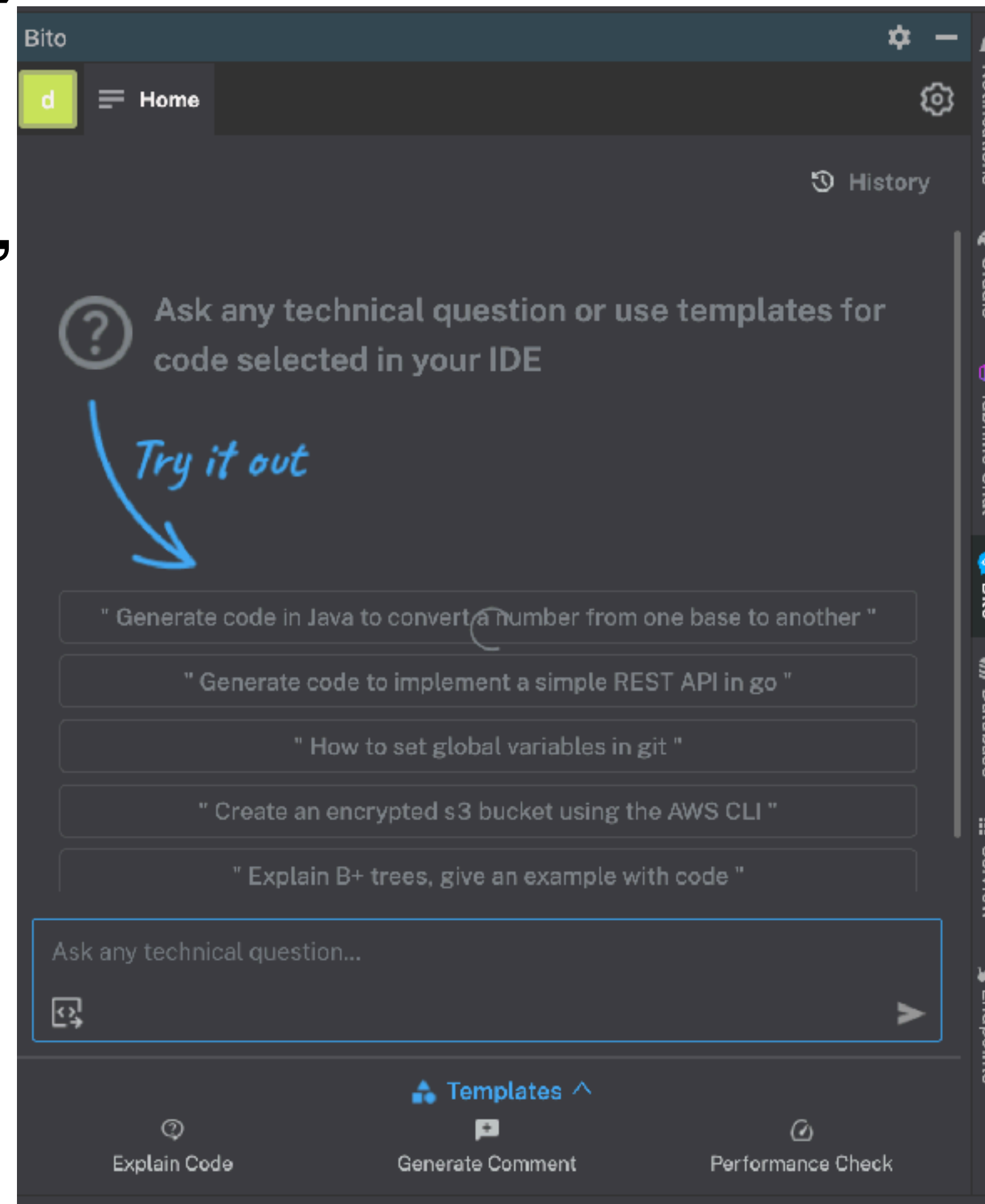
GIF.1. Opt-out “Chat history & training”



# Intro

## How to install & use?(Tips)

Find and install code-assisting tools for your IDE: Bito, Tabnine, Copilot, Machinet etc.



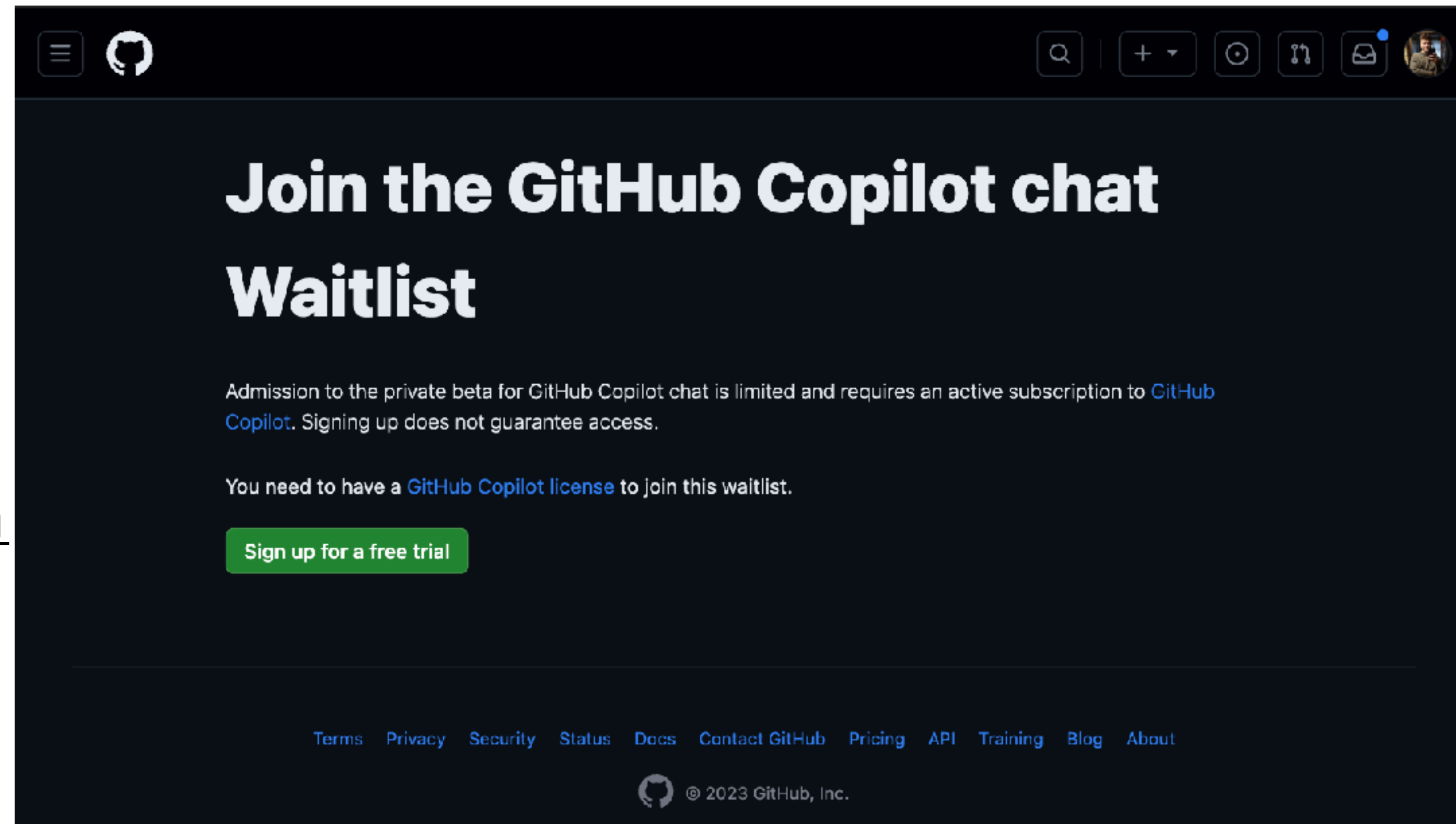
# Intro

## How to install & use?(Copilot)

Copilot Chat available in beta **only** for **organisations and enterprises**

To enable Copilot Chat:

1. Join the waitlist in a limited beta
2. Go to the [Copilot Chat instruction](#)
3. Enable Copilot Chat for organization





# Intro

## ChatGPT free vs paid version

### Free plan:

- Access to GPT-3.5 model
- Standard response speed
- Regular model updates

### ChatGPT Plus:

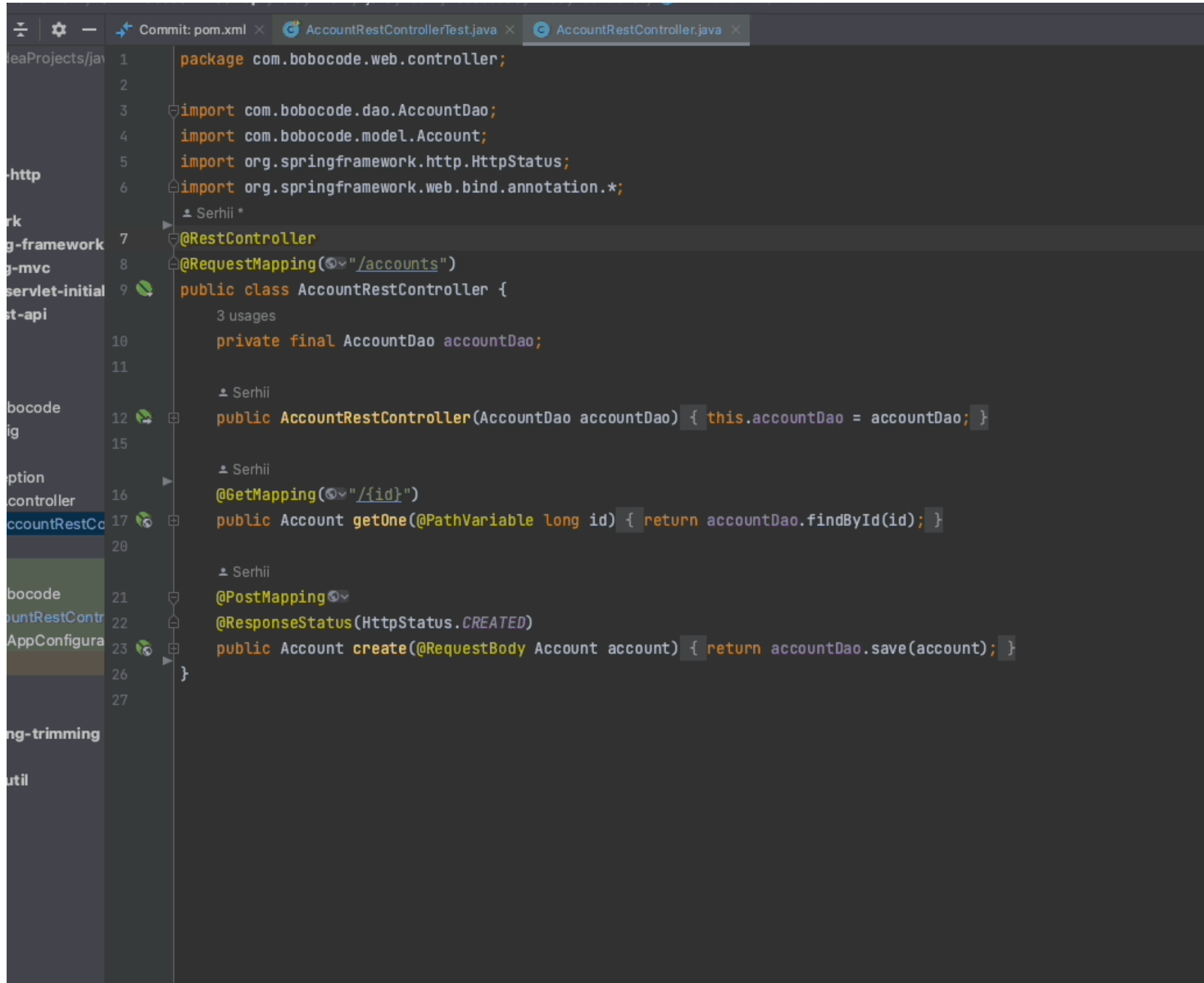
- \$20 per month
- Access to GPT-4 model
- Faster response speed
- Access to beta features like Browsing, Plugins, and Advanced Data Analysis
- Access to 200+ plugin store

# Intro

## How does it work?

To generate unit tests by ChatGPT:

1. Open ChatGPT chat
2. Prepare your prompt, e.g.:  
*Generate unit tests for the following code: {your\_code}*
3. Put generated unit tests in your IDE
4. Verify the results



The screenshot shows an IDE with three tabs: pom.xml, AccountRestControllerTest.java, and AccountRestController.java. The AccountRestController.java file contains the following code:

```
1 package com.bobocode.web.controller;
2
3 import com.bobocode.dao.AccountDao;
4 import com.bobocode.model.Account;
5 import org.springframework.http.HttpStatus;
6 import org.springframework.web.bind.annotation.*;
7
8 @RestController
9 @RequestMapping("/accounts")
10 public class AccountRestController {
11     private final AccountDao accountDao;
12
13     public AccountRestController(AccountDao accountDao) { this.accountDao = accountDao; }
14
15     @GetMapping("/{id}")
16     public Account getOne(@PathVariable long id) { return accountDao.findById(id); }
17
18     @PostMapping
19     @ResponseStatus(HttpStatus.CREATED)
20     public Account create(@RequestBody Account account) { return accountDao.save(account); }
```

Figure.1. Unit tests by ChatGPT demo(GIF)



# Intro

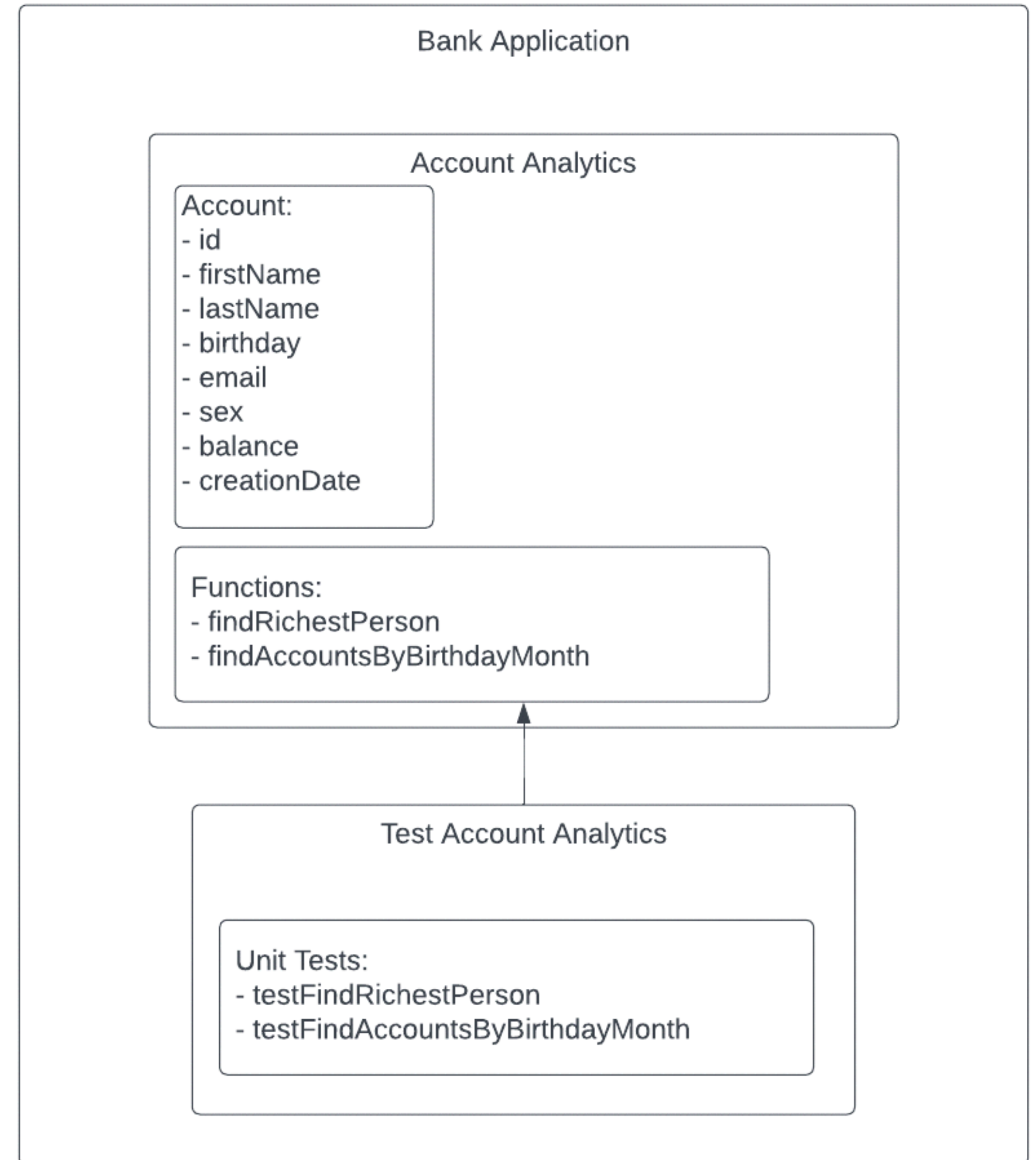
## ChatGPT prompts

- The process of giving ChatGPT is known as Prompt Writing/Engineering
- The general rules for writing prompts are:
  - **Start simple** - start with a simple prompt and build on it;
  - **Call to Action** - start the prompt with an action word like "Write", "Create", or "Summarize" instead of "Can you";
  - **Add Context** - add specific and relevant context to the task you want to perform;
  - **Add Expectations** - add clear and direct expectations for the content, like how long it should be and what to include;
- In order to generate a unit test you shall use the same requirements to your prompt. Prompt example for unit-test: ***“Generate unit tests for the following code: {your\_code}. Use {your\_library} for mocking and {your\_library} for assertion. During naming methods use {code\_convention\_pattern} naming convention as a pattern for tests.”***

# Live Demo

## Task

- We are working on the app for the bank
- The new release is coming - there are new functions developed for Account Analytics
- The next step is to test each function





# Live Demo



# Summary

ChatGPT can fasten the unit-tests writing, but it's important to remember that results are not so accurate and require expert verifying.

Therefore blind usage of ChatGPT on at project is forbidden.

Thank you for your attention!

# Communities

- ChatGPT Community - <https://community.openai.com/c/chatgpt/19>
- FlowGPT Prompts - <https://flowgpt.com/?category=programing>



# Links and Official Guides

- Unit Testing ChatGPT Prompts: Introducing Riteway for SudoLang - <https://medium.com/javascript-scene/unit-testing-chatgpt-prompts-introducing-riteway-for-sudolang-52761c34abc4>
- Effective Unit Testing With ChatGPT (PHP) - <https://dev.to/hstrychalski/effective-unit-testing-with-chatgpt-533g>
- ChatGPT can write better code than me (by Nick Chapsas) - <https://www.youtube.com/watch?v=z2CKQFi746Q>
- Using Chat GPT to write Unit Tests [Testing AI] - <https://www.youtube.com/watch?v=zYadXkGCbnA&t=1s>

# General security recommendation of using AI tools.

## **Use a trusted AI tool:**

Access the AI tools only through their official channel. Install applications only from official app stores and from a trusted source.

## **Use unique and strong passwords:**

If you are using an account to access the AI tools, make sure that you are using a unique and strong password. Avoid using the same password for multiple accounts and enable two-factor authentication whenever possible.

## **Be cautious of phishing attempts:**

Hackers may attempt to make use of AI tools to impersonate and steal personal information. Always verify that you are interacting with legitimate AI tools and avoid clicking on any suspicious links or downloading any attachments.

## **Keep your OS and software up to date:**

Always keep your operating system, applications, and antivirus software up to date with the latest security patches to prevent vulnerabilities that could be exploited by attackers.

## **Use a secure network:**

Avoid using public Wi-Fi or other unsecured networks when accessing the AI tools. Instead, use a secure Wi-Fi network or a VPN (Virtual Private Network) to protect your internet connection.

## **Don't share personal or sensitive information:**

Avoid sharing any sensitive or confidential information, such as name, company name, project or customer name, address, phone, passwords, personal identification, or financial information, etc. with the AI tools.

## **Validate the outputs generated by AI tools:**

Validation of the outputs generated by AI tools is recommended since the results provided by AI tools may not be accurate enough. Developers should also double-check the code generated or reviewed by the AI tools, make sure no malicious code is inserted and avoid security breaches.