Ai solves Advent of Code 2022

December 01, 2022
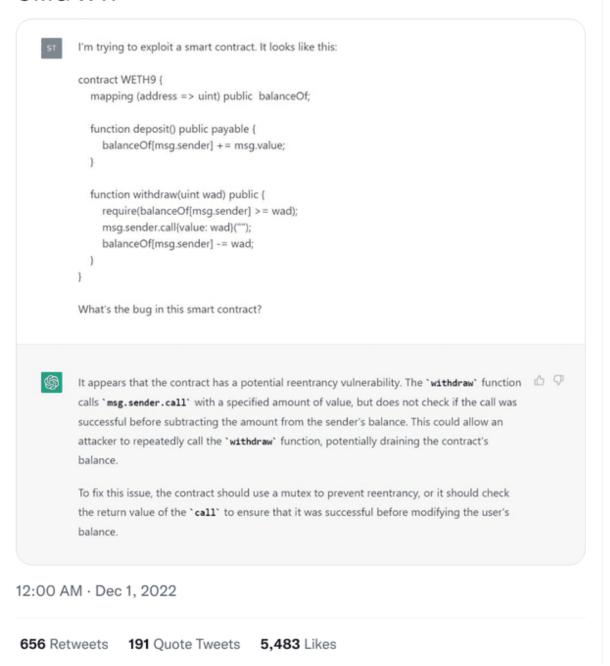
Intro

It feels like every week a new mindblowing Ai assistant pops up, tools like D-alle, Whisper, Copilot etc. Have all been amazing and useful to me.

Yesterday I saw this tweet about using GPT chat.

OMG WTF

ST I'm trying to exploit a smart contract. It looks like this:

```
contract WETH9 {
    mapping (address => uint) public  balanceOf;

    function deposit() public payable {
        balanceOf[msg.sender] += msg.value;
    }

    function withdraw(uint wad) public {
        require(balanceOf[msg.sender] >= wad);
        msg.sender.call{value: wad}("");
        balanceOf[msg.sender] -= wad;
    }
}
```

What's the bug in this smart contract?

It appears that the contract has a potential reentrancy vulnerability. The `withdraw` function calls `msg.sender.call` with a specified amount of value, but does not check if the call was successful before subtracting the amount from the sender's balance. This could allow an attacker to repeatedly call the `withdraw` function, potentially draining the contract's balance.

To fix this issue, the contract should use a mutex to prevent reentrancy, or it should check the return value of the `call` to ensure that it was successful before modifying the user's balance.

12:00 AM · Dec 1, 2022

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> OMG WTF pic.twitter.com/I2hE0e5ppq
>
> — cts (@gf_256) December 1, 2022

I had never tried GPT chat and this got me very keen in doing so! I quickly tried it on some of the code examples we use in our courses as examples of hard-to-find bugs or code in need of refactoring and I was more than amazed that one code challenge that 1/100 engineers find was found

'easily' by GPT chat and it also provided the suggested refactor to remove it.

Today Advent Of Code started so I'm naturally curious how far I can come with minimal guidance of these code-writing Ais.

If you want to do the challenges yourself or with your Ai friend visit Advent Of Code.

Bots at my disposal

CoPilot

GPTchat

Let's Go!

Day 1

Question, Input, Ai used:GPTchat

Day1: Challenge 1

I wrote a little instruction on where to find the question that needed to be answered, that I wanted the answer printed, and please don't use any libraries.

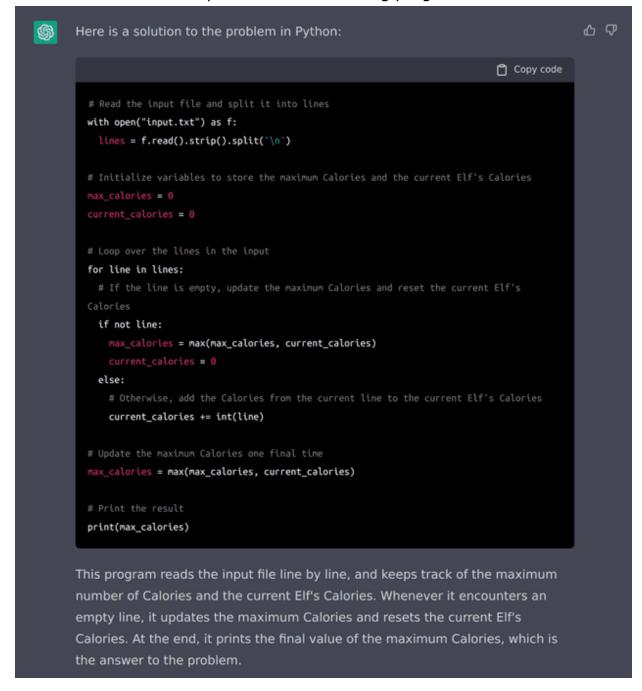Then I just pasted the whole question in full to the GPT chat.

> **#!** Below is a code challenge, write a Python program without libraries that prints the answer to the question on the last line.
> The program needs to read input from a file called input.txt
>
> --- Day 1: Calorie Counting ---
> Santa's reindeer typically eat regular reindeer food, but they need a lot of magical energy to deliver presents on Christmas. For that, their favorite snack is a special type of star fruit that only grows deep in the jungle. The Elves have

And lo and behold, GPT produced the following program

Here is a solution to the problem in Python:

Copy code

```python
# Read the input file and split it into lines
with open("input.txt") as f:
    lines = f.read().strip().split("\n")

# Initialize variables to store the maximum Calories and the current Elf's Calories
max_calories = 0
current_calories = 0

# Loop over the lines in the input
for line in lines:
    # If the line is empty, update the maximum Calories and reset the current Elf's
    Calories
    if not line:
        max_calories = max(max_calories, current_calories)
        current_calories = 0
    else:
        # Otherwise, add the Calories from the current line to the current Elf's Calories
        current_calories += int(line)

# Update the maximum Calories one final time
max_calories = max(max_calories, current_calories)

# Print the result
print(max_calories)
```

This program reads the input file line by line, and keeps track of the maximum number of Calories and the current Elf's Calories. Whenever it encounters an empty line, it updates the maximum Calories and resets the current Elf's Calories. At the end, it prints the final value of the maximum Calories, which is the answer to the problem.

▶ code

I copied the code and ran it on my machine, I ran and produced a number! **I pasted the number into Advent Of Code as the answer and it was the correct answer! Wow...**

Day1: Challenge 2

On the second part of the challenge I yet again just pasted the whole page of information, But this time I was way less precise in my instructions.

One of the features of GPT chat is that it remembers! So I wanted to use that and act as if I was basically talking to a human.

I pasted this as my prompt

… Drumroll!

The initial answer was this.

I yet again took the code and ran it on my machine. ... It gave me an answer and I was hopeful! I pasted it into the website and... Wrong answer! No... What now ? do I just run it again and hope for a better result ?

That is not how I would have done it with a human programmer, let's try the same here. Advent Of Code gave me a hint that the answer was too low so I just told GPT chat the same thing.

This is pretty mindblowing, now only does the new solution work, but it also tells me what was wrong with the other one!

I have not even understood the challenge myself, since I have not even read it. But GPT3 chat was able to use my prompt to 'reason about' the previous answer and how to fix it.

Amazing.

Day one complete! See you tomorrow!

Day 2 (stay tuned)

My name is **Nils Eriksson**. I'm a software educator at Mirdin | The Code Quality Company. I enjoy thinking deeply about software, this blog is a collection of my thoughts.

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