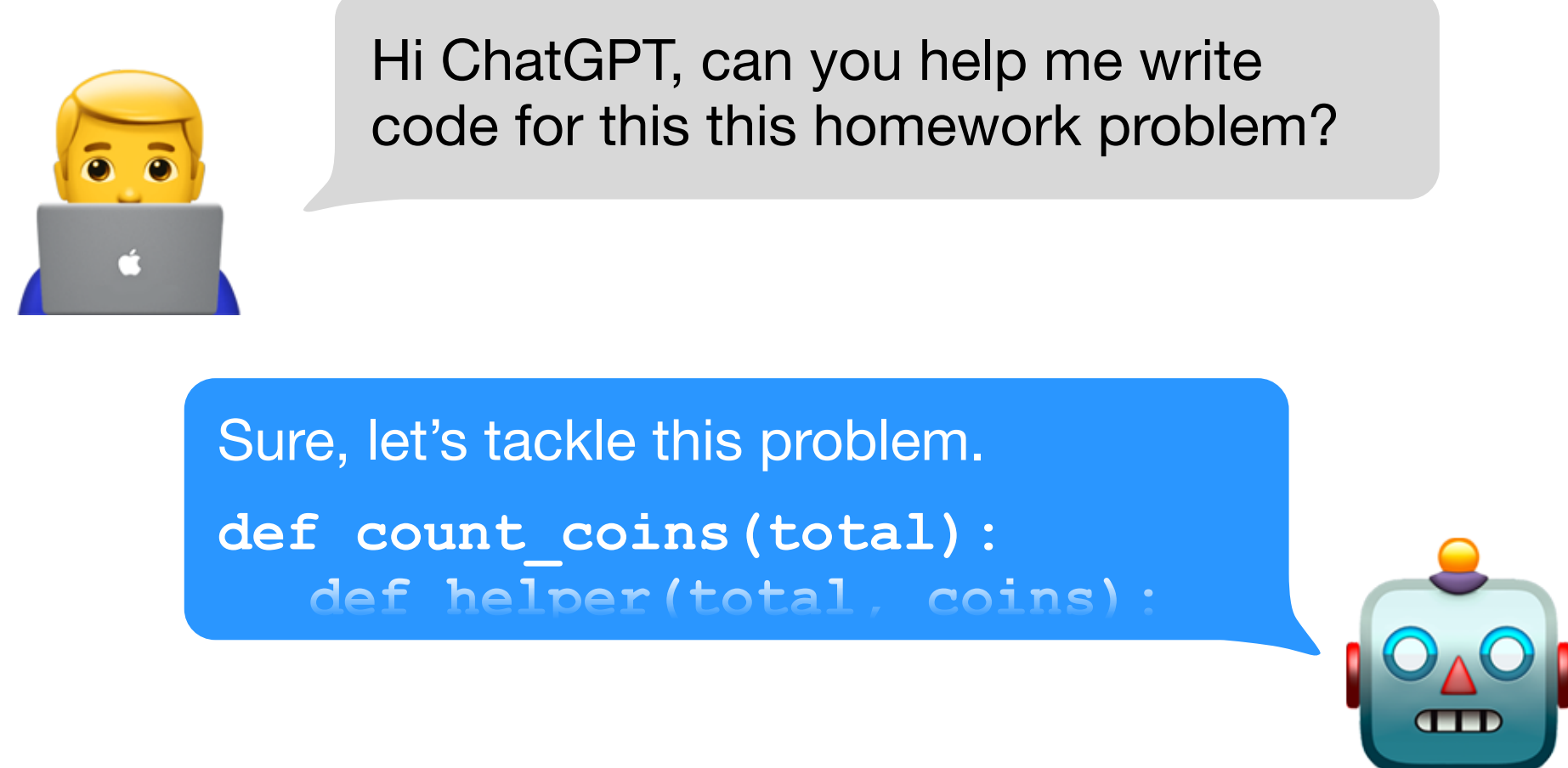


# LLM-Powered Interactive Support in an Introductory Computer Science Course

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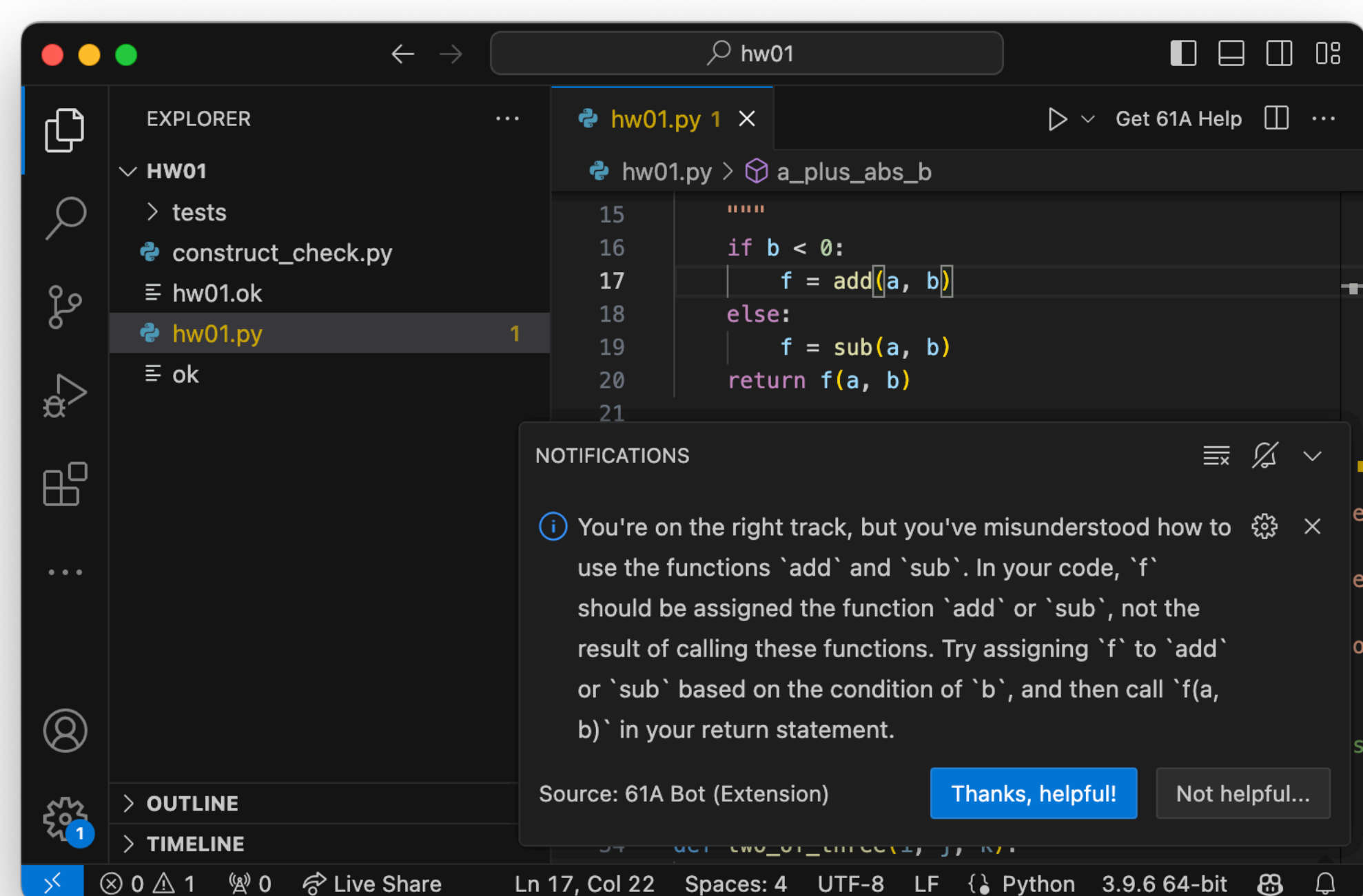
## Problem? ChatGPT too easy

ChatGPT can write code for many problems given to students in intro CS courses—a tempting alternative to asking for help on programming assignments, not ideal.



## Solution? Interactive Support

Our alternative: an in-editor agent offers assistance while still requiring students to develop solutions themselves, supporting the learning associated with this process.



## Interactive Help: Example Case

Remember, you need to use recursion to solve this problem. You can start by defining a helper function within `count_coins` that takes two parameters: the remaining change and the current coin.

The base case of your recursion would be when the remaining change is 0, in which case you have found a valid way to make change, so you should return 1. If the remaining change is less than 0 or there are no more coins to use (i.e., the current coin is None), you should return 0 because there are no valid ways to make change in these cases.

For the recursive case, consider two possibilities: using the current coin or not using it. If you use the current coin, the remaining change decreases, but the current coin stays the same. If you don't use the current coin, the remaining change stays the same, but the current coin changes to the next smaller coin.

The total number of ways to make change is the sum of the number of ways in these two possibilities.

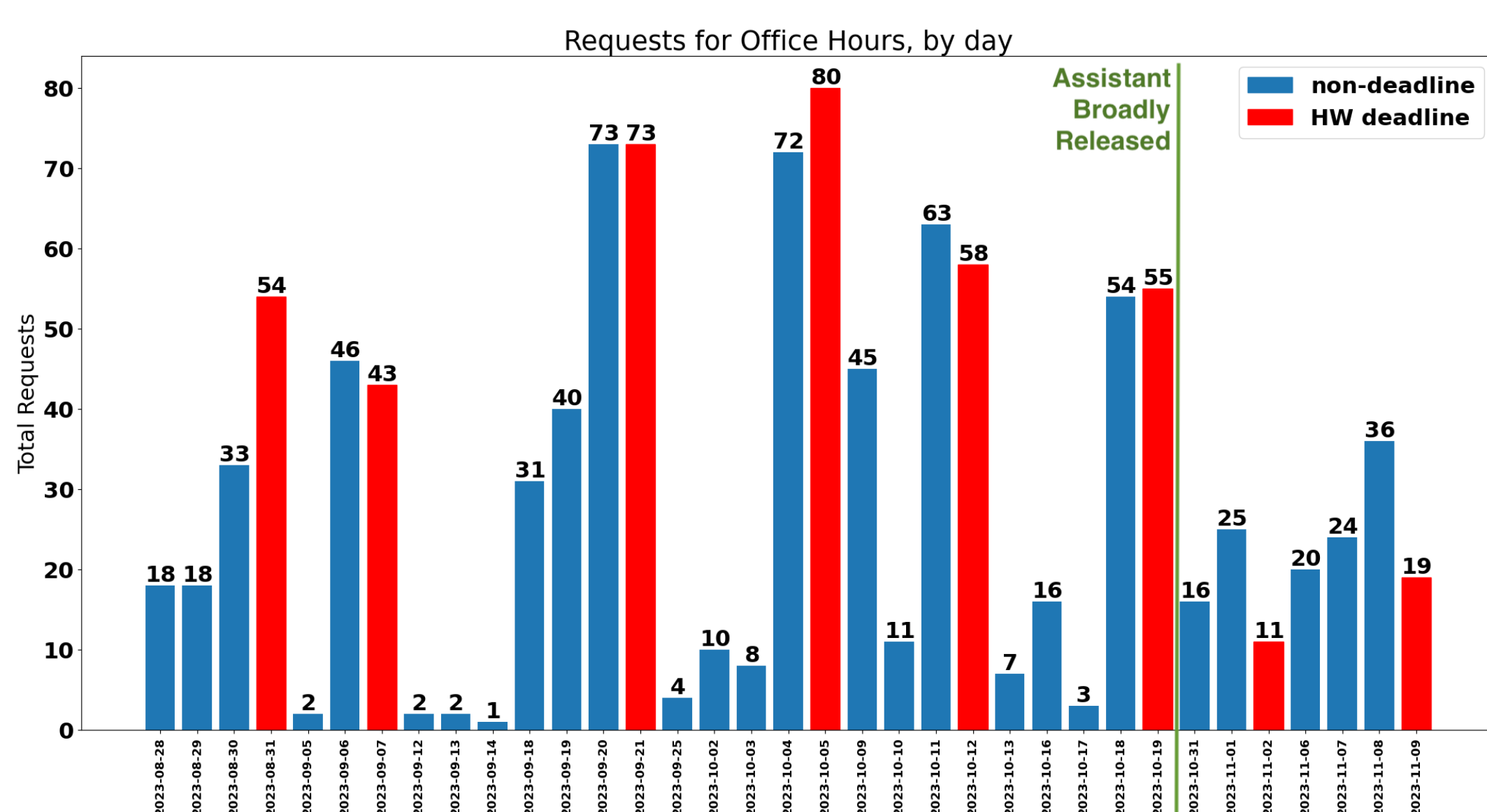
## Challenges & Questions

Addressing errors is a cat-and-mouse game across homework assignments. *False positives* especially pernicious: students led down meandering paths from almost-correct code, sometimes oscillating between close alternatives.

Future work includes evaluating:

1. What kind of bot support is most helpful?
2. What are the student costs of bot errors?
3. What interactive feedback from *students* is best?

## Usage & Impacts



Office hours requests, by week: though not statistically significant, after we released our agent widely across our course, both average request counts—and request counts on homework due dates—dropped.

1300 students total, over 1000 used agent more than once, most many times. Requests more evenly distributed across problems and dates than expected!

