Teaching Computer Science with GPT and LLMs
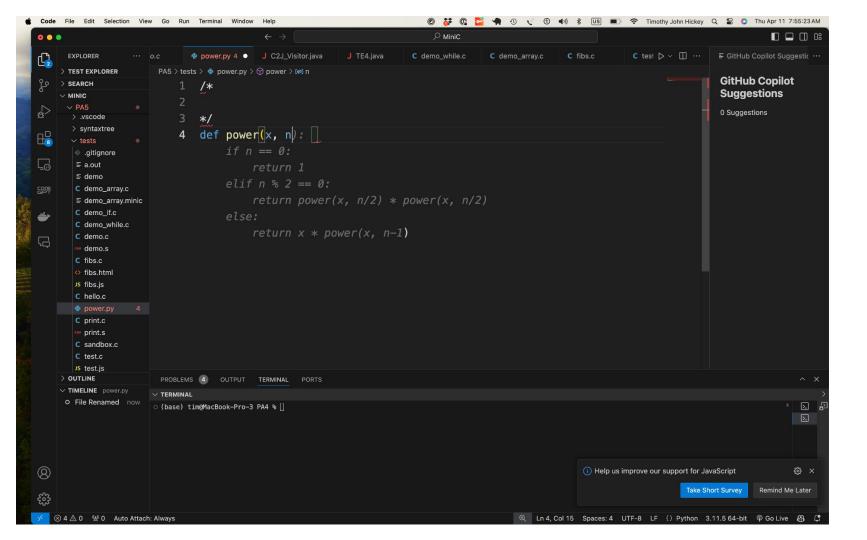
Tim Hickey, Computer Science, 4/12/24
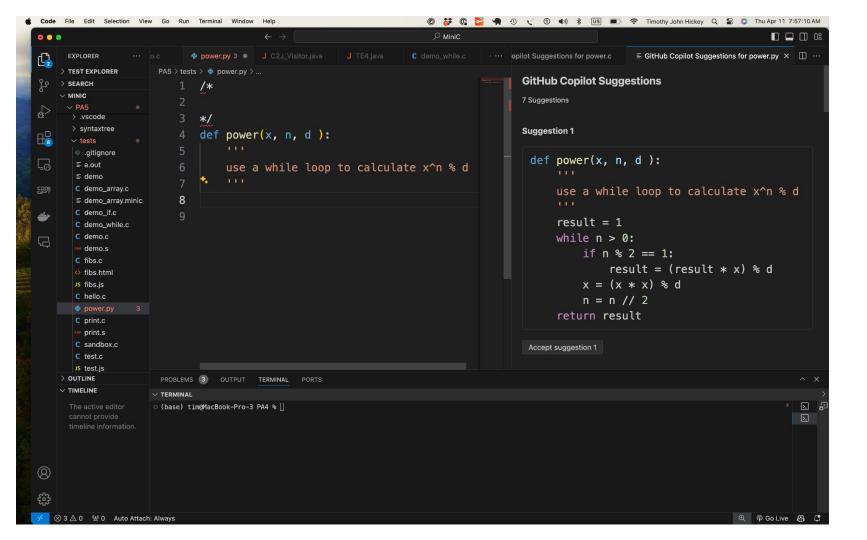
Overview - LLMs in CS Education

- Teaching students to use Github Copilot in CS150
- Teaching students not to use Github Copilot in CS10
- Designing GPT-resistant takehome exams and projects
- Teaching students to build GPT-based applications
- Guiding research on LLMs
- Using LLMs as an instructor

Professional Developers use GPT

- LLMs aren't replacing Software Developers
- LLMs are make Developers more efficient
- Students need to learn these tools to be competitive

```python
/*

*/
def power(x, n):
    if n == 0:
        return 1
    elif n % 2 == 0:
        return power(x, n/2) * power(x, n/2)
    else:
        return x * power(x, n-1)
```

```
/*

*/
def power(x, n, d ):
    '''
    use a while loop to calculate x^n % d
    '''

```

GitHub Copilot Suggestions

7 Suggestions

Suggestion 1

```python
def power(x, n, d ):
    '''
    use a while loop to calculate x^n % d
    '''
    result = 1
    while n > 0:
        if n % 2 == 1:
            result = (result * x) % d
        x = (x * x) % d
        n = n // 2
    return result
```

Accept suggestion 1

Teaching Intro Programming

- chatGPT correctly answered all CS10a homework and exam questions from Spr22
- chegg and LLMs are similar threats to assessment
- students understand they won't learn if they ask someone or something else to do their homework

GPT Resistant CS homework

Strategies to enhance assessment accuracy

- require students to submit a 60 second video explaining their solution to the problems or part of their code
- give in class exams on paper asking students to analyze their homework solutions
- ask them to credit sources (including GPT)
- use similarity detection tools on homework as GPT answers will be similar

GPT as an API

- ask students to build applications which use LLMs
  - e.g. Cover Letter generator
  - e.g. Prompt support
- ask students to compare different LLMs and install on their own laptops

LLM research

- encourage students to read papers about new developments in LLMs
- encourage students to reach for the low-hanging fruit in LLM research
- encouraging students to explore new applications of LLMs
  - e.g. DSI Internship program

Using LLMs as an instructor

- summarizing survey answers in large classes
- asking LLMs to create variations of exam and hw problems
- asking LLMs to create 1st drafts of instructions about using new technology (e.g. how to install ssh on windows)