Why a new AP course?

- Need to define “general education” computing skills necessary for all college graduates to contribute in today’s society
- NOT (just) a course for CS/Math/Science majors
  - Something for everyone – closest perhaps AP Calculus
  - Does not replace the existing AP Computer Science Programming A course
How Did the Course Change Them?

- 1000+ Students
- 70%+ Freshmen
- 60%+ Women
- (General Education) Required Course
Increased Confidence

“It has given me confidence that I’m able to figure things out on a computer that I never would have thought that I could do.”
“Now, every time I find myself playing a video game, I actually understand what makes it work.

That these games are not magically produced, that it takes time, skill, and sufficient funds to create these games.

I appreciate these games more than before taking this class.”
“We learned in Alice that computers do exactly what you have them do.

Using this knowledge, we can understand how programs like Excel and Numbers work and learn that when we are using these programs, we need to specify and be exact with what we are doing in order for the programs to meet our needs and plans.”
“Programming allows a person to think more logically, thinking in order and debugging allows the user to gain valuable problem solving skills.

Aspiring to go to law school, thinking logically is extremely important and I think this has helped.”
Analysis Transferable Skills

“I feel that learning the language of computing definitely helps you understand dense reading a lot more efficiently.

I personally have noticed that my in-depth understanding of Computer Science wording has helped me understand my mathematical theorems and proofs more regularly than before.”
“In today’s technologically-centered world, using a program like Alice gives us valuable exposure to discussing things technically with other people and explaining clearly what we are trying to do.”
Organizational Skills

“Through Alice, I learned to stay organized and structured in anything I do, including studying for other classes. Although at first, thinking with several concepts at a time was very difficult, now I am more confident.”
How did we do it?
Peer Instruction: Students Engage in Analysis Through Discussion

## What We Did: Alice + Excel

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<tr>
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<td>Sequential Execution</td>
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<td>Static Methods, Parameters</td>
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## The EXACT Content Choice Isn’t It

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**What We Do: Develop Skills in Analysis and Communication**

- **Analysis and Communication Skills:**
  - ~40-50 minutes per 1:20 lecture “discussion” in teams
    - Guided by tutor
    - Reflected on/Modeled afterwards by instructor

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**Analysis via Discussion**

- **First Exposure:** With resources and Feedback
- **Homework**
- **Quiz**
- **Lab**
- **Exam**
- **Practice Knowledge Mastery**
- **Show Knowledge Mastery**
How many of the underlined “items” result in values?

A) 1   B) 2   C) 3   D) 4   E) Don’t Know
What does this code do?

| item 0 = frog3 |
| item 1 = frog2 |
| item 2 = frog |

A. The frogs talk in order left to right
B. The frogs talk in backwards order (right to left)
C. Each frog talks, but the order depends

```plaintext
For all world.frooggies, one item_from_frooggies at a time
item_from_frooggies say Hello more...
```
Understanding, by Doing…

- Analyzing Effects of Computation
- Communicating Processes and Results
- Analyzing Problems and Artifacts
- Working Effectively In Teams
- Creating Computational Artifacts
- Using Abstractions and Models
Discuss **Programming**: Get So Much More

- Confidence
- Changed View of Technology
- Analysis (Transferable)
- Communication
- Organization

**Very few students said:**

I learned to make a video game in Alice, and that I can use in my future.
Change Society: A New Norm

High School Biology

CS Principles
Questions?