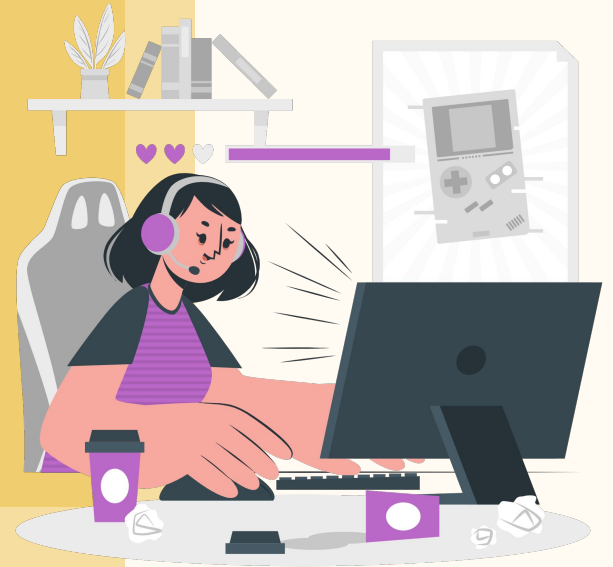
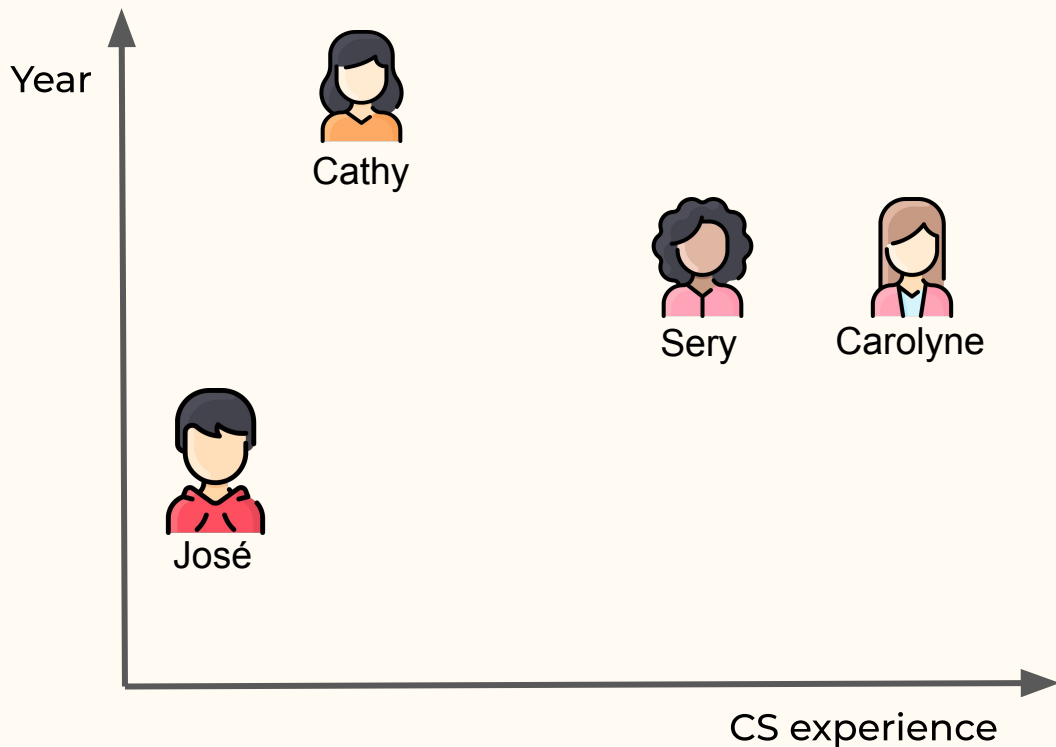


# Post-secondary CS Education

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# Our Interviewees



- From social circles
- Interviewed on Zoom
- From a range of school years
- Have a range of CS experience
- From different types of schools

What's your most memorable CS learning experience?

How do you approach an assignment? What's the flow?

How do you describe your learning style?

Tell me about your favorite instructor.

At which points did you feel the most stressed?

What's the biggest difference between CS and your major?

Can you walk me through a lecture experience?



What tools did you use outside of classroom?

How did you feel when sitting in that classroom?

What was the most negative experience in that class?

Why was that experience such a huge surprise?

What made that assignment so special?

What pushed you away from CS, why?

“I rarely reach out for help when doing my assignments, but it’s always good to know there’s help available so that I feel safe trying to solve problems on my own.”

– *Cathy*

MS&E Grad Student at Stanford





“I'm kind of independent in computer science classes because I don't want to hear that, ‘Oh, you don't know how to do this? Well, we learned this in freshman year.’”

– *Carolynne*

Junior CS Major at Yale

“When starting out, being able to form connections and feeling a sense of belonging is crucial in staying involved.”

– *Sery*

Junior CS Major at OSU





“The first stereotype that I think of is like someone just at their computer for 12 hours per day in a dark place—in a dark basement, typing away at code for 12 hours a day... that's the first thing that comes to mind.”

— *José*

Math/Econ Major at a SLAC



# Analysis

From our interviews, we learned...

# Say

- “I felt the need to protect my work from other students”
- “It’s not the culture to ask classmates for help on the homework”
- “It’s hard to contribute when you look around and no one is like you”
- **“CS seems like a solitary discipline”**
- “I was worried I was behind before I even started”
- “Discussion sections were the most helpful part of the course”
- “People behind me in lecture complained about grades that were high A’s which made me feel like I didn’t belong in this class”
- **“I work independently to protect my confidence and sense of belonging”**
- “My first CS class was collaborative which drew me in to the field”
- **“Knowing that I have a safety mat makes me more empowered to work on solving problems on my own”**

# Think

- CS is a powerful tool
- The typical CS student likes to work alone
- CS students must be self reliant
- **Other people know so much more than me**
- Slope does NOT make up for y intercept
- **None of my peers want to help me**
- **It is more rewarding to succeed when you work independently**
- Collaboration is so helpful
- Need to start CS early to really succeed
- Others are ahead of me because they are working on side projects

# Do

- Take CS classes even if they are intimidated
- Recognize the application of CS
- **Work on homework mostly independently**
- Only collaborate with non-intimidating peers
- Rely on staff support rather than classmates
- Utilize in person resources rather than online
- **Pretend you are doing really well even when struggling**
- Create a self-imposed limitation on possible connections in the course
- **Falsely put other students on pedestals**
- Teach other students to demonstrate mastery and feel a sense of belonging

# Feel

- **Isolated**
- Inexperienced
- **Like an imposter**
- Self conscious
- **Intimidated**
- Competitive
- **Underrepresented**
- Challenged
- A sense of progress
- Accomplishment



# What's Interesting/Surprising



CS is not a collaborative culture  
Collaboration can be helpful



Supported by professors  
Intimidated or isolated by peers



Feeling behind is demoralizing  
It can also be motivating



CS intro courses are for beginners  
Diverse experience levels

## Insight

Students feel that their classmates judge them based on their CS abilities more than their peers actually do



## Need

A judgement free space to collaborate

Feelings of intimidation come from unstructured parts of the course (working on homework and office hours)



Exposure to other students' challenges

## Insight

Students feel empowered when they solve problems on their own, but feel discouraged when they need support



## Need

More opportunities to solidify understanding rather than fixing hw problems

Students have a big impact on the morale of their peers (more than they intend to)



More awareness of how one's actions impact the morale of their peers

## Insight

Students feel a stronger sense of belonging when they see people who are like them



## Need

Reassurance that you're not the first or only person with this identity

Collaboration puts stress on both parties if they aren't at the same point in their work



An environment or opportunity that makes collaboration mutually beneficial

# Insight

Teaching a concept empowers students and fosters a sense of belonging



# Need

Opportunities for students to teach their peers or near-peers



# Summary



- Our problem space is post-secondary CS education
- We interviewed four people with different CS experiences
- We discovered what students like or struggle with and some common needs
- We will continue exploring the problem space while interviewing broader groups of users/non-users



# Further Questions

- If **peers** make someone feel intimidated and **professors** make them feel welcome, which one of these factors wins out?
- Is it more important for students to **feel ownership** or **camaraderie** when completing an assignment?
- How to eliminate **judgement** / incentive to **compete** in collaboration?
- How to **diversify exposure** to other students and leaders in the field?
- Can we influence how people talk about the course **outside of class**?





**What questions do you have?**

