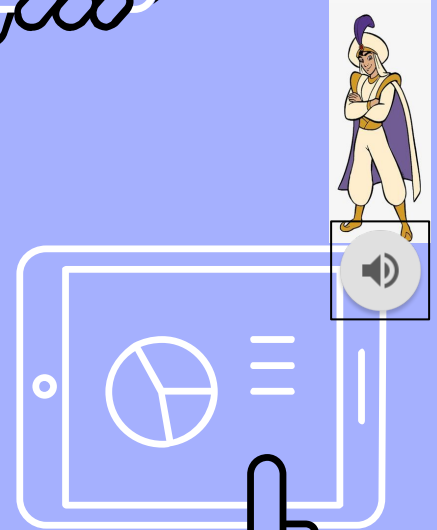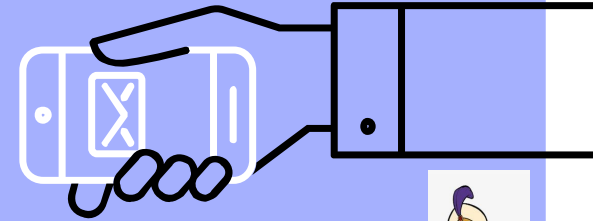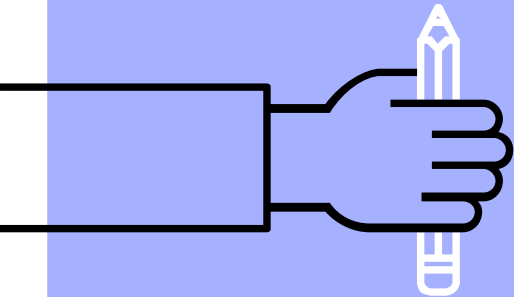# Make Way For CS2
CS LISTEN 2022

Mission Vista High School

May 18, 2022

Background Information of MVHS

- Located in a suburban community approximately 25 miles north of San Diego
- Vista Unified School District
- Magnet School with an emphasis in the areas of Science & Technology and Arts & Communication
- Operates on a 4x4 block schedule
- 1660 Students
- 44.7% White, 37% Hispanic, 9.2% Asian, 4.3% Filipino, 3.1% African-American
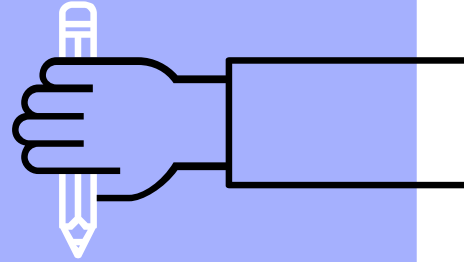- 40% Socioeconomically disadvantaged

CS Information at MVHS

- CS pathway includes five courses. APCSP, CS1, CS2 (APCSA), Game Programming, and Web Programming.
- In 2021-22 137 students took CS1, 50 students took CS2, 22 took Game Programming, and 16 took Web Programming.
- Projected for 2022-23. 117 students for CS1, 70 for CS2, 35 for Game Programming, 24 for Web Programming, and 24 for APCSP.
- For the past five years, around 23 students each year go to college to major in CS.
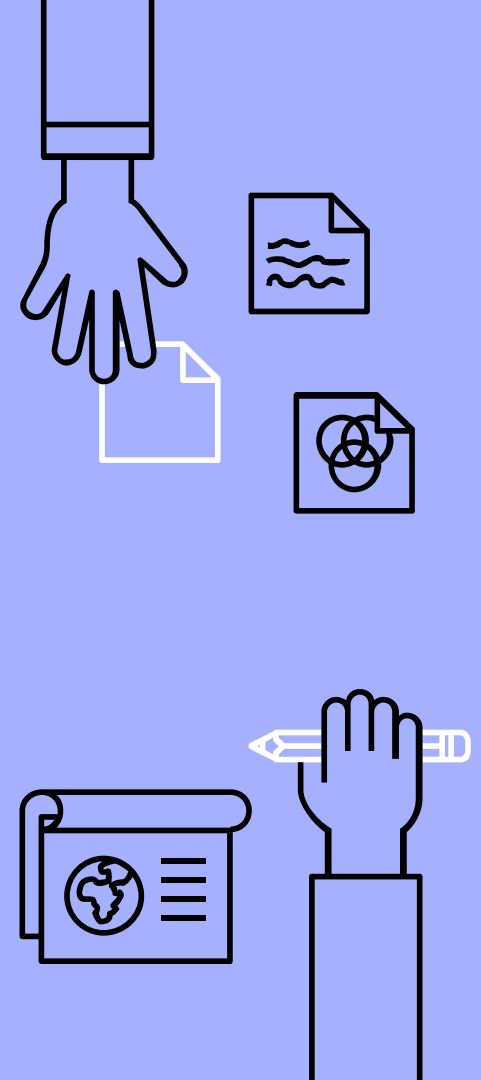
Question &
Methodology
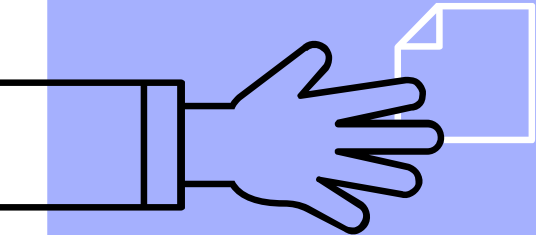
> *How do we encourage CS 1 students to continue the CS pathway?*

Methodology - Survey

▷ Survey emailed to 273 students who had taken at least one CS course. 137 responses were received

▷ Targeted 3 groups of students: CS1 is their final course, plan to take CS2, have taken/are taking CS2 and beyond

▷ Each group was analyzed separately

▷ Created a survey that mainly targeted personal experiences
  ■ We asked questions that were used to determine the factors that could lead to motivations of continuing the pathway

▷ The survey employed skip logic and asked different questions based on previous questions
  ■ If the student had a negative experience the next questions would be geared towards trying to dig deeper and identify why they felt that way

▷ Survey Results

Methodology - Interview

➢ Interviewed 14 MVHS CS Alumni over Zoom
➢ 9 working in a career and 5 attending college
➢ These interview questions mainly focused on how their experiences at MVHS help them now
➢ It also asked what could have been done better so we could compare the issues of the past to current ones
➢ Transcribed interviews
➢ Created Google Sheet consolidating responses
➢ Interview Questions
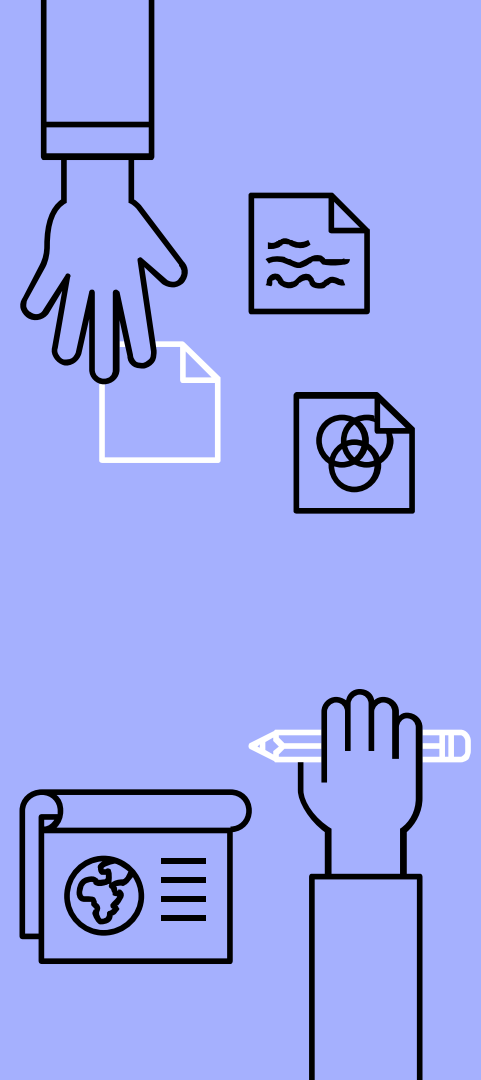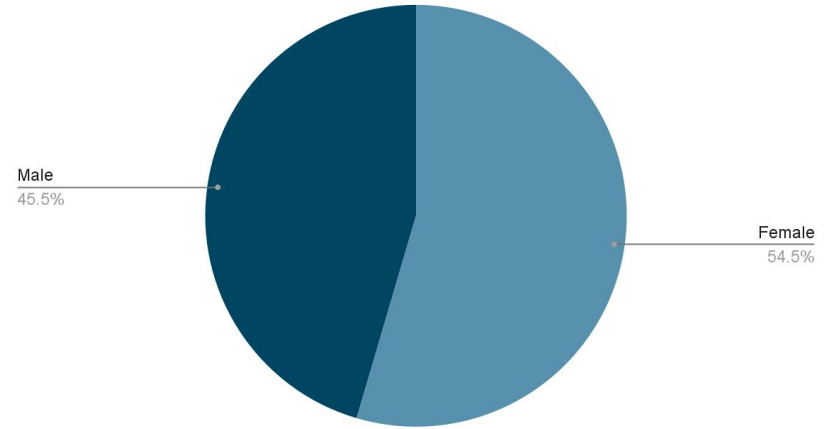
CS1 is the Final Destination
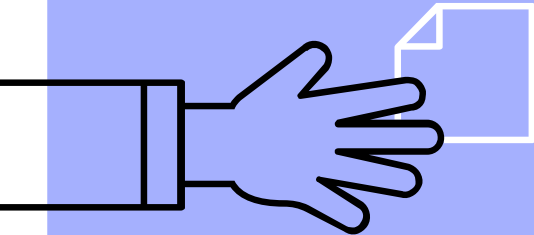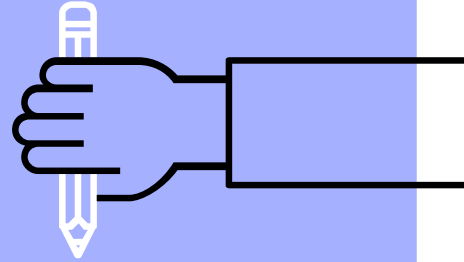
CS1 is my final course - Demographics

Out of 33 responses

54.5% female and 45.5% male respondents

Gender of Respondents who are stopping at CS1

Male
45.5%

Female
54.5%

Grade of CS1 who aren't taking CS2

Freshmen
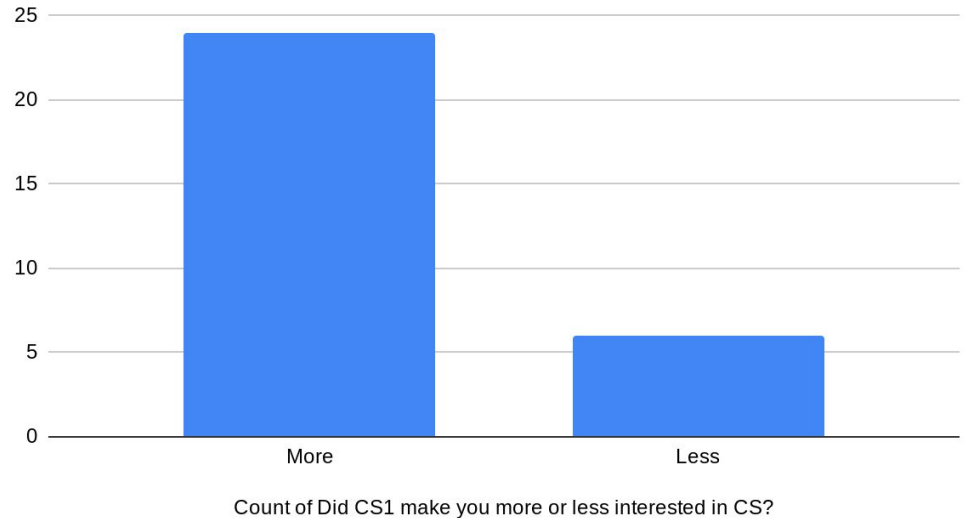13.8%

Sophomore
20.7%

Juniors
13.8%
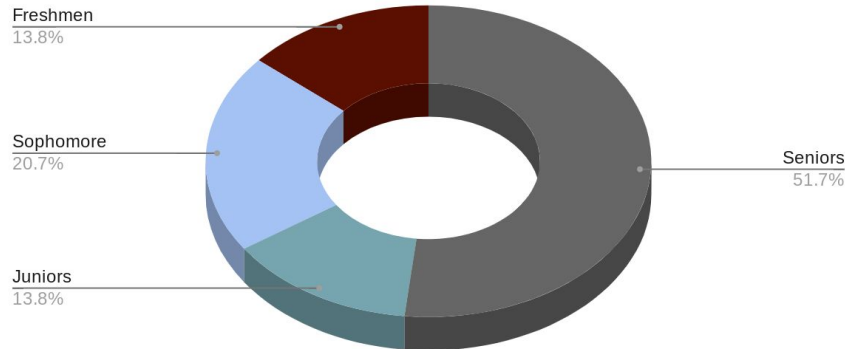
Seniors
51.7%

51.7% of respondents took CS1 as a senior

Interest levels - CS1 is my final course

- Average enjoyment of CS1 is **3.73** out of 5
- Average difficulty rating of CS1 is **2.96** out of 5

Count of Did CS1 make you more or less interested in CS?

Count of Did CS1 make you more or less interested in CS?

- 24/33 (**72.72%**) students said they were more interested in CS after taking the course
- 6/24 (**25%**) of those who said they were more interested said they had scheduling conflicts

CS1 is my final course

Reasons people didn't continue the pathway:

▷ Took CS1 as a senior
▷ Interested in pursuing other pathways
▷ Females felt pressured since it is a male dominated field
▷ Many people tend to believe they aren't smart enough and find the course difficult. - 6/33 (18%)
▷ Scheduling conflicts

Reasons As To Why They Didn't Continue

Too Much Work
3.0%

Not Interested in CS...
27.3%

Not Smart Enough
18.2%

Graduating/Not goin...
36.4%

Scheduling Conflicts
15.2%
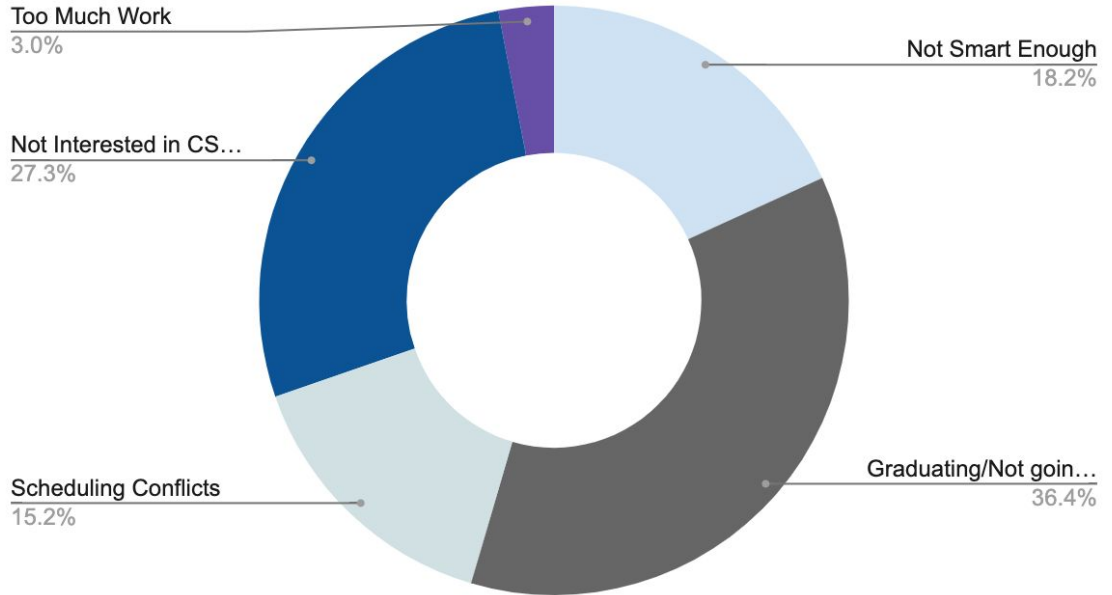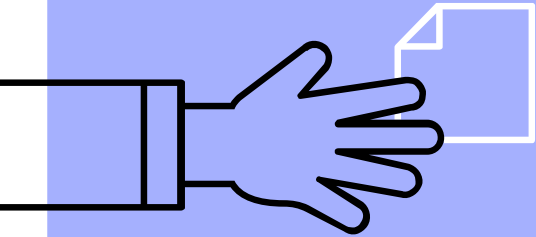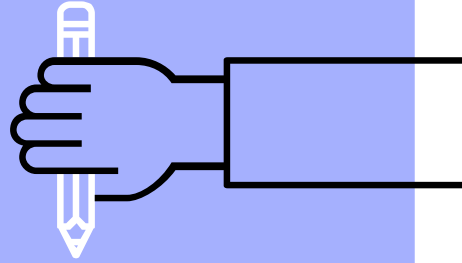
Plan to take CS2

Plans to take CS2

MAIN REASONS FOR CONTINUING:
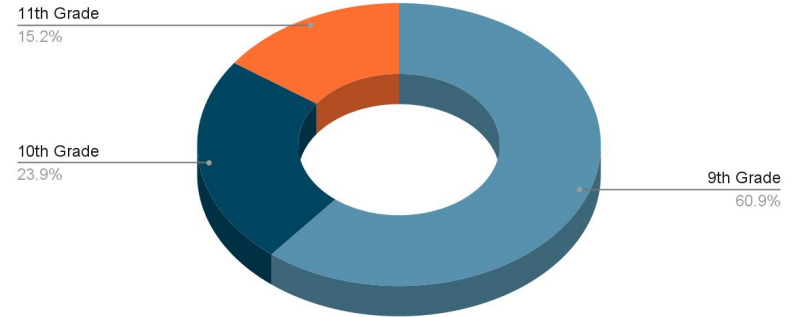
▷ Enjoying coding or finding it interesting (20)

▷ Career and/or fun (8)

▷ Thought it would be a useful skill in general (5)

45 Responses in total
6/45 were females
60.9% were 9th graders in CS1

Current Grade of Students

11th Grade
15.2%

10th Grade
23.9%

9th Grade
60.9%

Enjoyment of CS1 on a Scale from 1-5

1 being worst 5 being best

Enjoyment level 3
8.7%

Enjoyment level 5
41.3%

Enjoyment level 4
50.0%
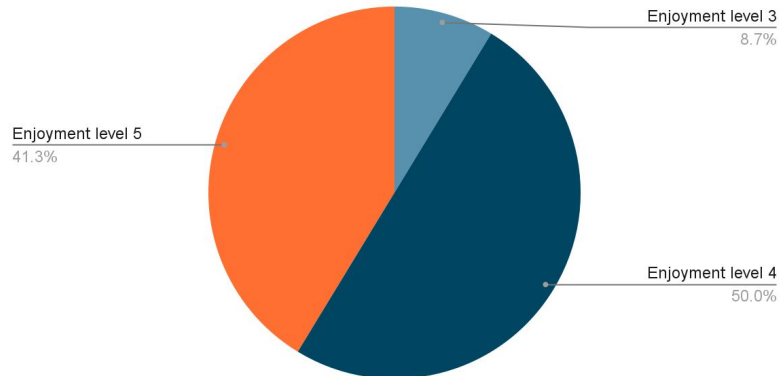
91.3% of respondents reported an enjoyment level of at least a 4

Plans to take CS2

WHAT COULD STEER STUDENTS AWAY FROM CONTINUING THE PATHWAY:

▷ Difficulty level
▷ Doesn't match with career choice
▷ Other interests
▷ No fun projects
▷ No room on schedule
▷ Strict deadlines

Difficulty Level of CS1

On a Scale of 1-5

Difficulty level 5
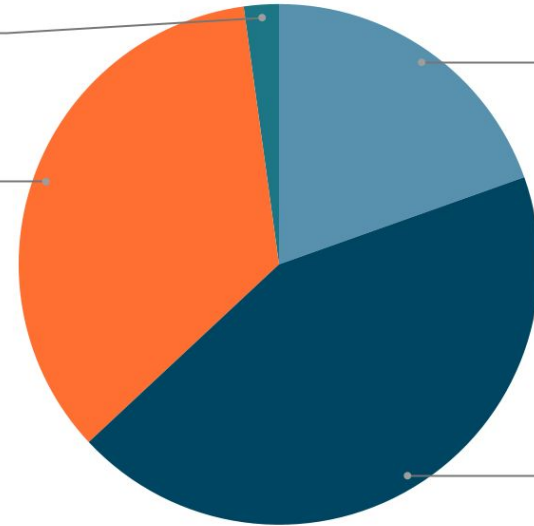2.2%

Difficulty level 2
19.6%

Difficulty level 4
34.8%

Difficulty level 3
43.5%

63% of respondents rated CS1 difficulty levels as moderate (2-3) and 37% rated CS1 difficulty levels as challenging (4-5)

Plans to take CS2

WAYS TO IMPROVE:

MAIN IDEA #1:

Accommodate to different learning paces

MAIN IDEA #2:

Learn other programming languages

OTHER WAYS TO IMPROVE:

- Use other programming language such as C++ or Python
- Incorporate extra challenge assignments
- Individual student support from teacher
- Group projects
- Independent instructions for students
- Faster pace for students who finish early
- New grading: Based on effort rather than submission
- More small projects
- Learn simple web design
- Refreshers on previous topics and computer math
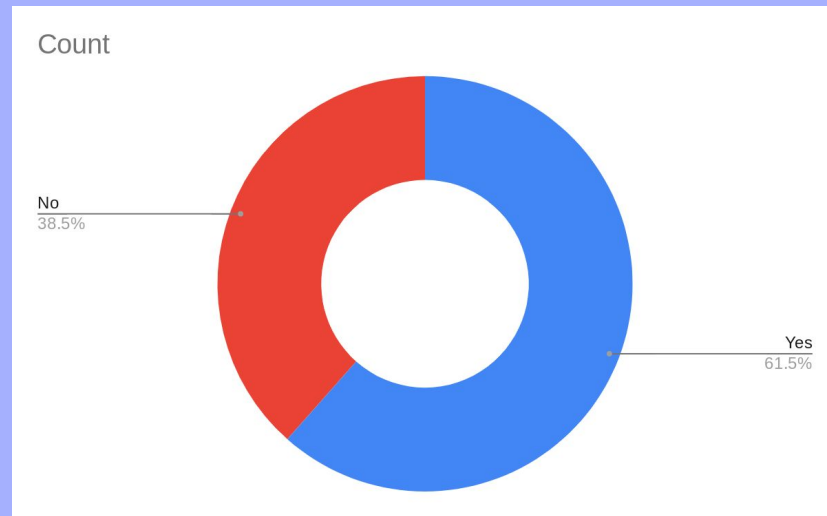- Presentations/Group share-outs

Currently in CS2
or Continued
Past CS2
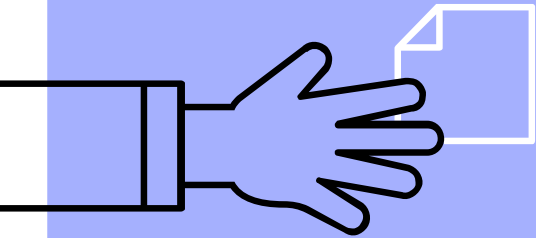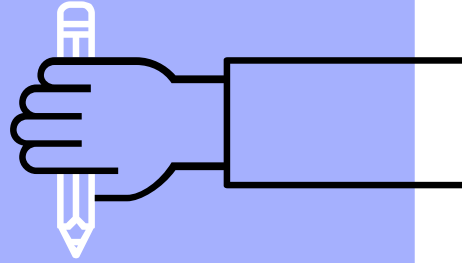
Currently in or continued past CS2

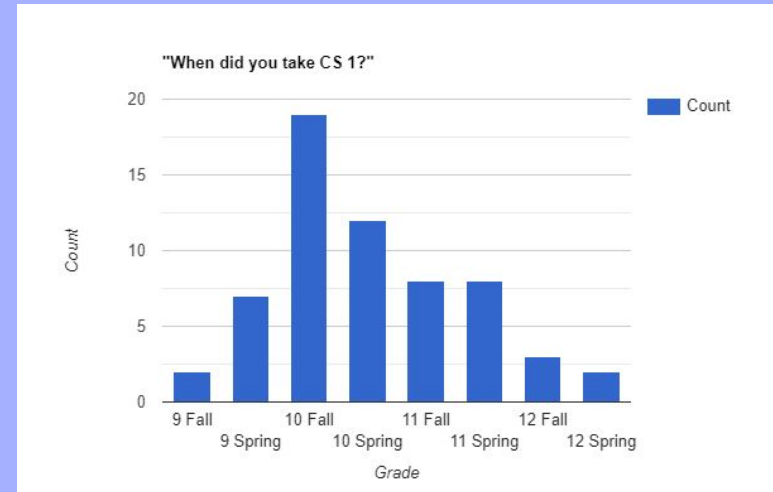**Out of the 62 students who responded....**
- ▷ 50% of students who continued on took CS1 in 10th grade
- ▷ 20.7% of responses were female students
- ▷ 33.9% said no for continuing CS classes
  - ○ 42.9% ran out of schedule space
  - ○ 28.6% finished all CS courses
  - ○ 28.6% lost interest

"Do you plan on taking more CS courses at MVHS?"

"When did you take CS1?"

Currently in/continued past CS2

▷ Over half chose to continue the CS pathway because they desire to learn more about the computer science field.

▷ About ⅓ is wanting a possible career or degree in computer science.

▷ The remaining respondents are continuing because of enjoying CS1

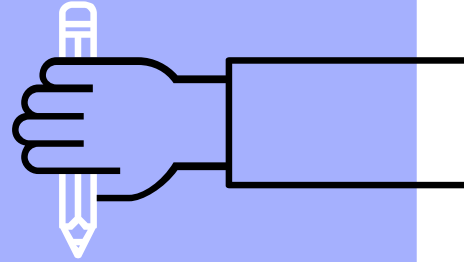"What are the reasons you want to take more courses in the CS pathway?"

- Want a possible career/degree in computer science
- Enjoyed CS1
- Learn more CS or enjoyed the pathway course offerings

29.5%
18%
52.5%

Currently in/continuing past CS2

▷ Majority of students who continued past CS1 had some computer science knowledge before CS1

▷ 56.7% students had a mix of experiences from middle school, self-teaching, Mr.Yee's summer course and others such as outside programs.

▷ Around 43% of the students had no experience before taking CS1

"What prior Computer Science (CS) knowledge did you have before taking CS1?"

- None
- Middle school experience
- Self-taught
- Mr.Yee summer course
- Mix of Experience

43.3%
33.3%
11.7%
8.3%
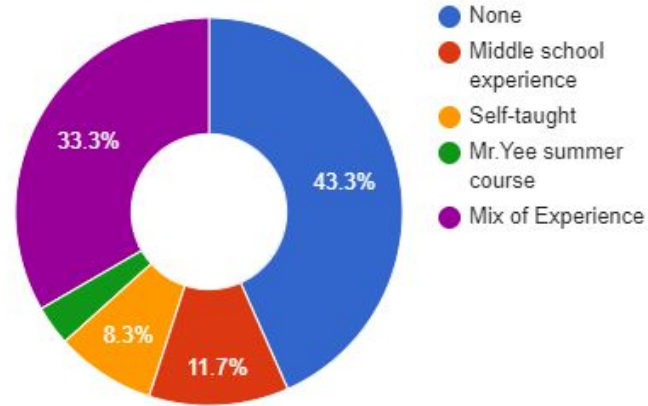
Interview Data Analysis
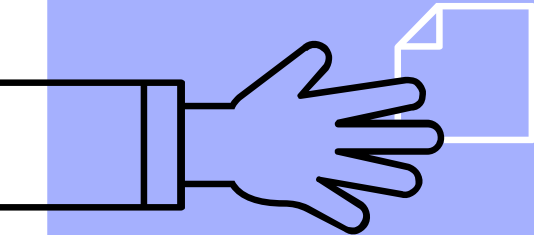
Alumni Interview Data

- ➢ 9 working in a career and 5 attending college.
- ➢ 10 white males and 4 minority males.
- ➢ All took CS1 in 9th or 10th grade and all completed the pathway.
- ➢ 11 are working or majoring in a CS related field.
- ➢ 7 had exposure to CS before taking CS1.
- ➢ They liked the problem solving and group projects most.
- ➢ Very little to dislike about the CS program but the complexity of object-oriented programming is what they disliked most.
- ➢ CS program did prepare them for college and career.
- ➢ CS program was a positive influence in guiding them on their career path.
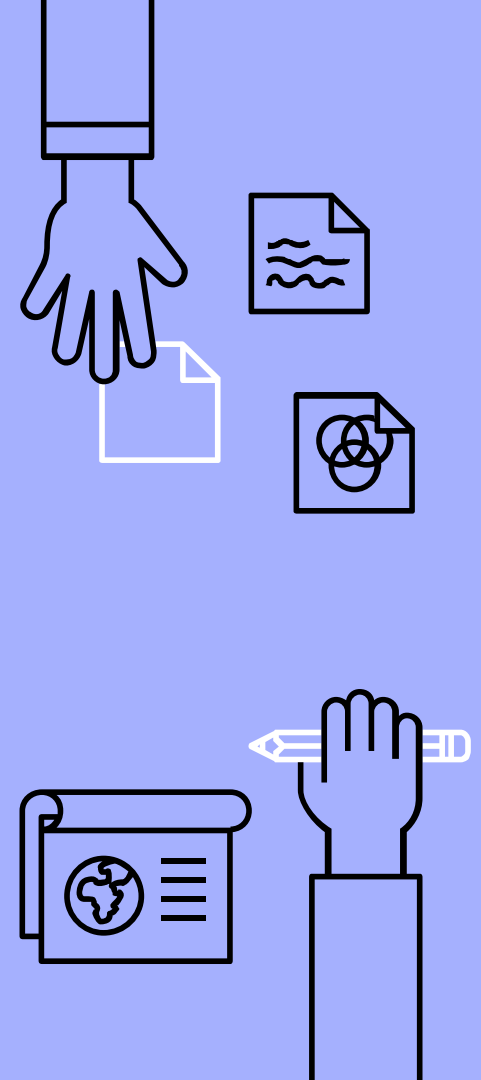
Alumni Interview Data Analysis

The alumni that were interviewed are on a path for success in a CS career. Understanding the data could help current and future CS students with similar success.

➢ Exposure to CS early
➢ Get students to take CS1 as 9th or 10 graders
➢ Give more support with the complex concepts of object-oriented programming
➢ Need to get feedback from female alumni
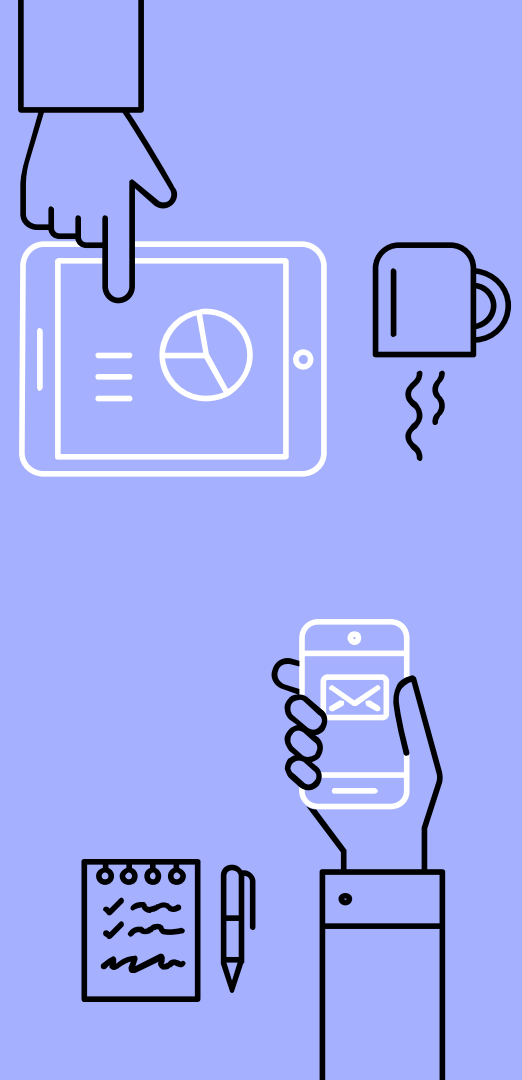
Let's Put it all Together
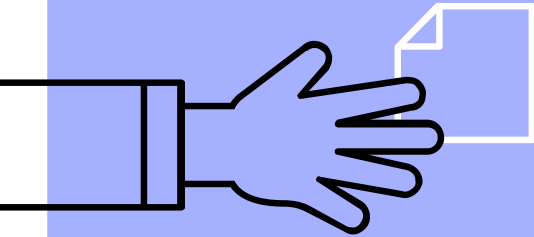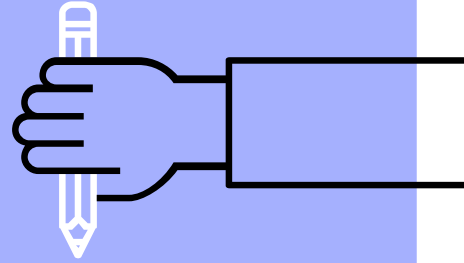
Overall Conclusion

- A majority of students have an increased interest in CS after taking CS1 and students that complete the CS pathway have had previous exposure to CS prior to taking CS1.
- The main reasons students stop after CS1 are because they are seniors or because they don't feel they are smart enough.

Exposing more students to CS before they take CS1 may be a solution. This will give students an increased interest in CS, will lead to more students continuing the pathway, will make students aware of the program earlier so they can start CS1 earlier, and will be more confident that they are smart enough to be successful in CS.

Beginning thoughts….

- Expose students to CS before they take CS1. This will give them an increased interest in CS, will lead to more students continuing the pathway, and will get them to start CS1 earlier
- Offer middle school afterschool program
  - This could bolster CS for entire district
- Pathway advertisement
- Introduce more work with Python
- Incorporate more group projects