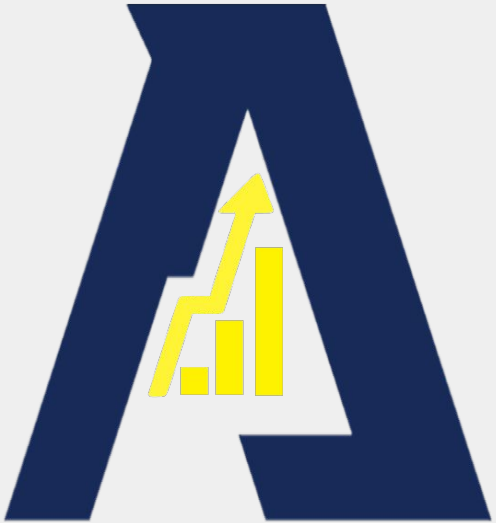
DESKTOP APPLICATION FOR ABET DATA MONITORING

TEAM EXCELSIOR

Austin Torrence - Leader
Matt Rittenback - Webmaster
Brandon Thomas - Architect

Team Mentor: Eck Doerry Project Sponsor: Toby Hawking



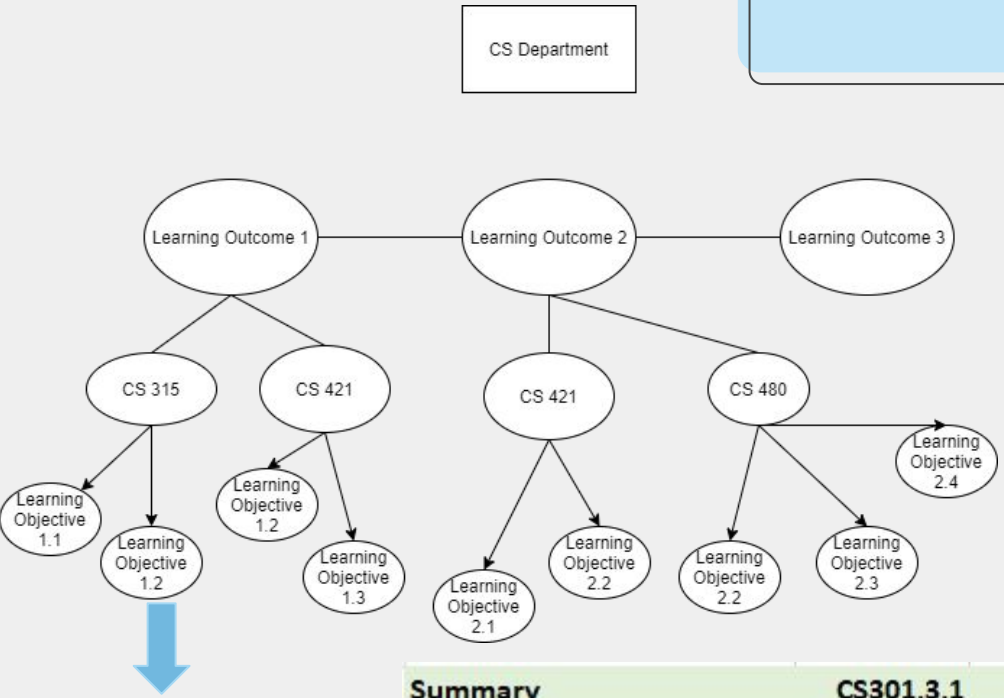
WHY ARE ENGINEERS IMPORTANT?

- Responsible for systems from trains to emails
- Poorly built systems could result in invasion of privacy to loss of life
- How do we ensure the safety of these systems?

ABET - ACCREDITATION BOARD FOR ENGINEERING AND TECHNOLOGY

- Set the global standards, and acknowledge those who perform
- Regular 6 year checks to continue accreditation
- Accredited programs ensure employers competent employees

HOW TO STAY ACCREDITED



- Example Learning Outcome (EE486)

Outcome 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

- Example Learning Objective

EE486.1.2 Develop model(s) that describe systems associated with the project problem

Final Exam/ Presentation/ Project question/ portion

Summary	CS301.3.1	CS301.3.2	CS301.3.3	CS301.3.4	CS301.4.1	CS301.4.2
1 <= x < 2	0.00	19.00	0.00	18.00	4.00	21.00
2 <= x < 3	0.00	2.00	0.00	3.00	22.00	4.00
3 <= x < 4	27.00	21.00	27.00	21.00	20.00	20.00
4 <= x <= 5	20.00	5.00	20.00	5.00	1.00	2.00
LoA: Meets or exceeds (70% min)	100%	! 55%	100%	! 55%	! 45%	! 47%
LoA: Exceeds	43%	11%	43%	11%	2%	4%

CLIENT

Toby Hocking

Assistant Professor for School of Informatics Computing and Cyber Systems

MENTOR

Eck Doerry

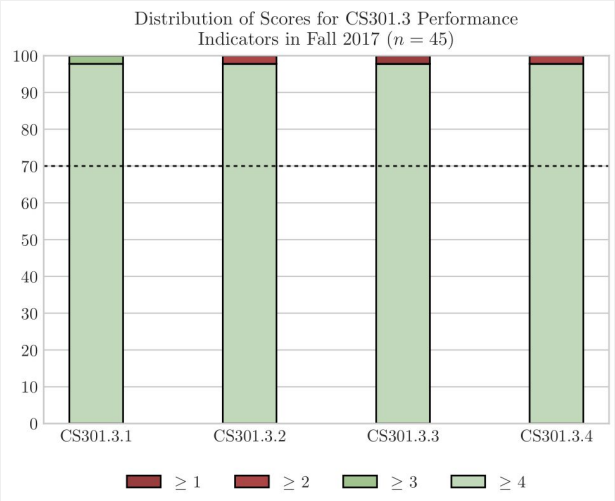
Professor for School of Informatics Computing and Cyber Systems

PROBLEM STATEMENT

- Current system is:
  - Error Prone
  - Tough to Analyze
  - Hard to monitor performance or completeness
- Current visualization is unavailable to most professors & requires programming background

Xlsx file containing ABET data

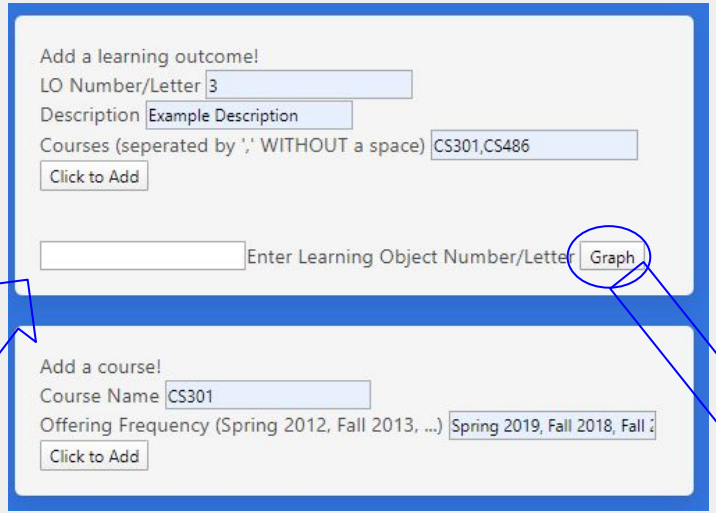
Current Solution (Python script)



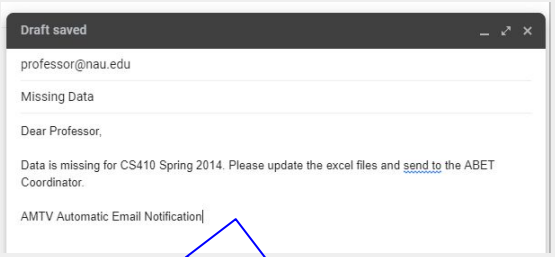
SOLUTION OVERVIEW

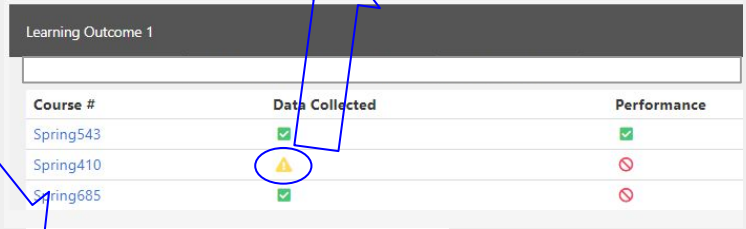
- Takes in and processes raw data
- Dashboard to customize visualizations
- Provides insightful graphs & data
- Tracks and monitors performance notifying professors when necessary

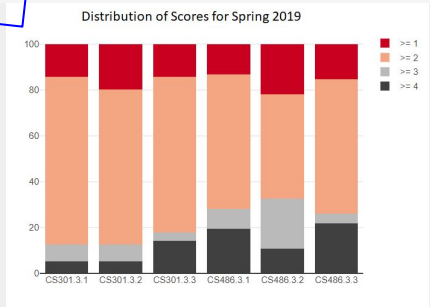
Xlsx file containing ABET data



Local Data Storage

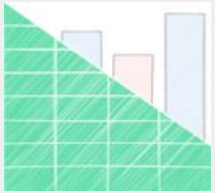




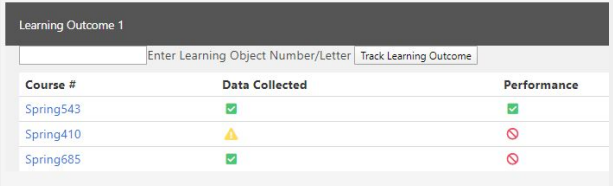


KEY REQUIREMENTS

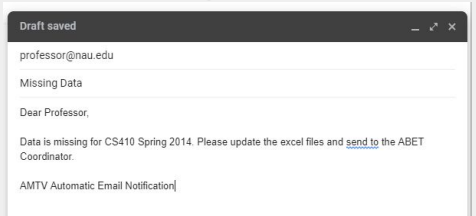
- Usable on any OS system
- Takes in files following the .xlsx format
- Displays graphical visualisations
- Display and monitor data completeness



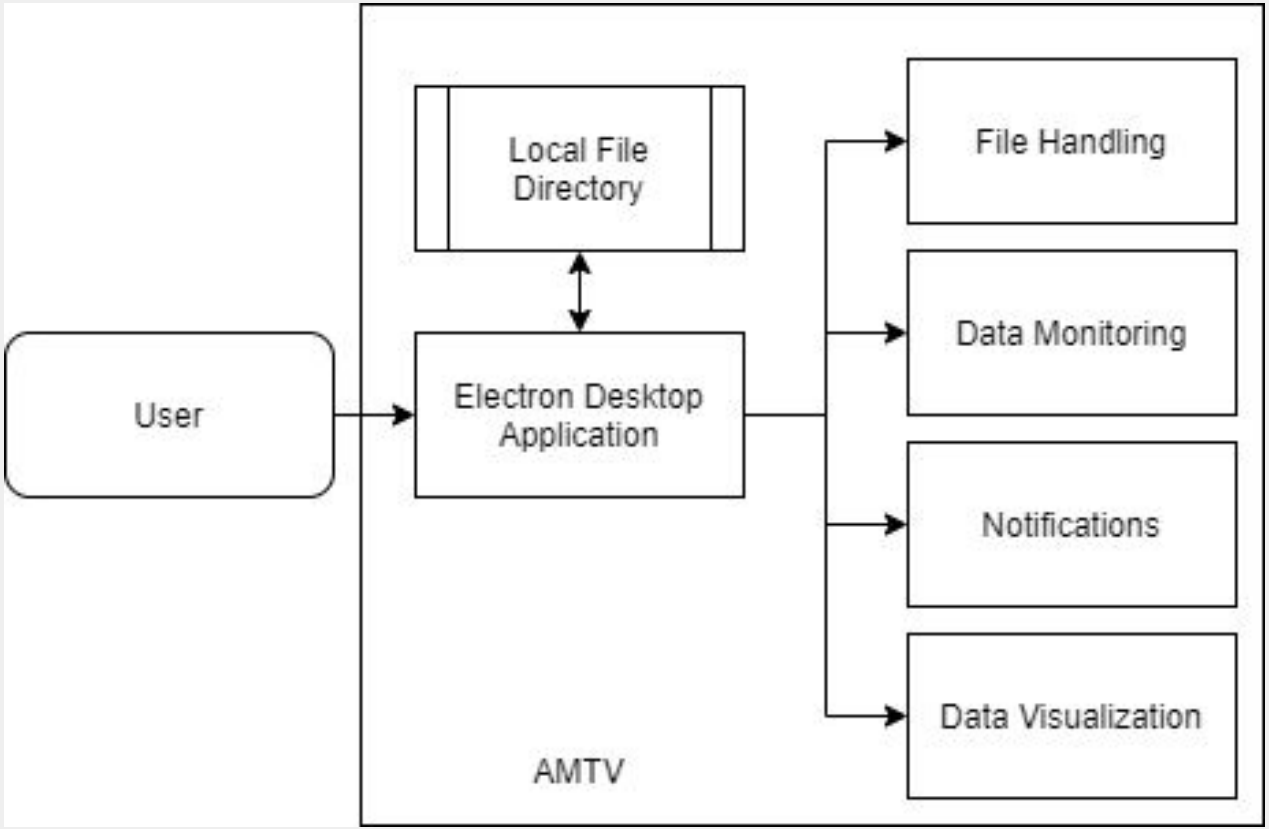
SheetJS



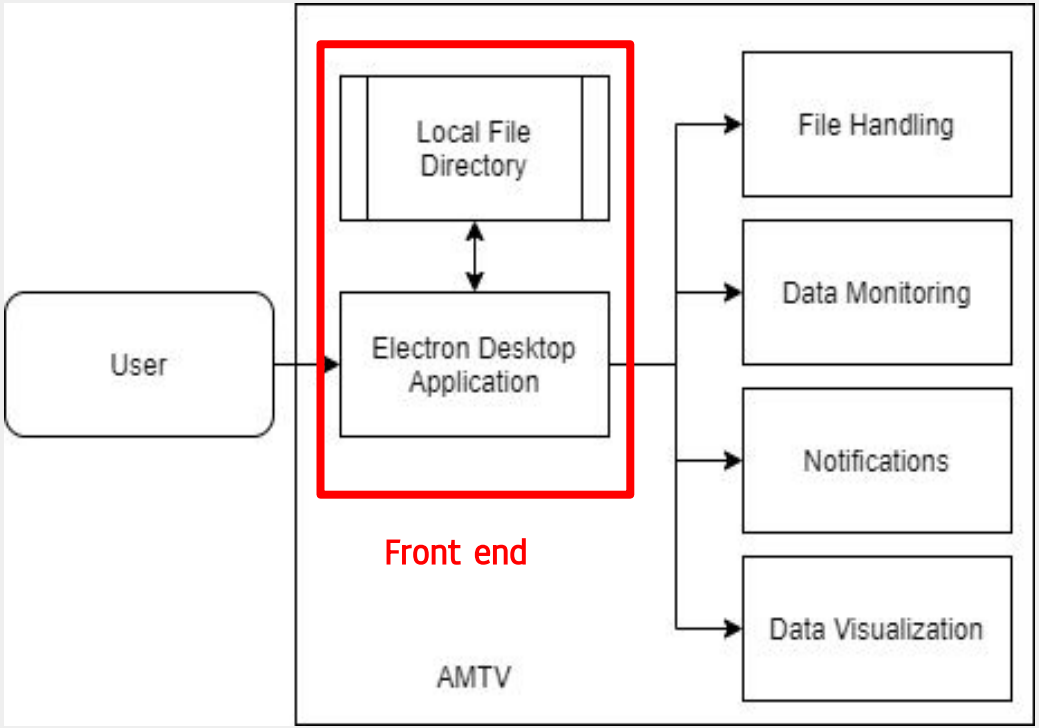
- Send notifications to appropriate staff for missing data/unsatisfactory performance



ARCHITECTURE OVERVIEW

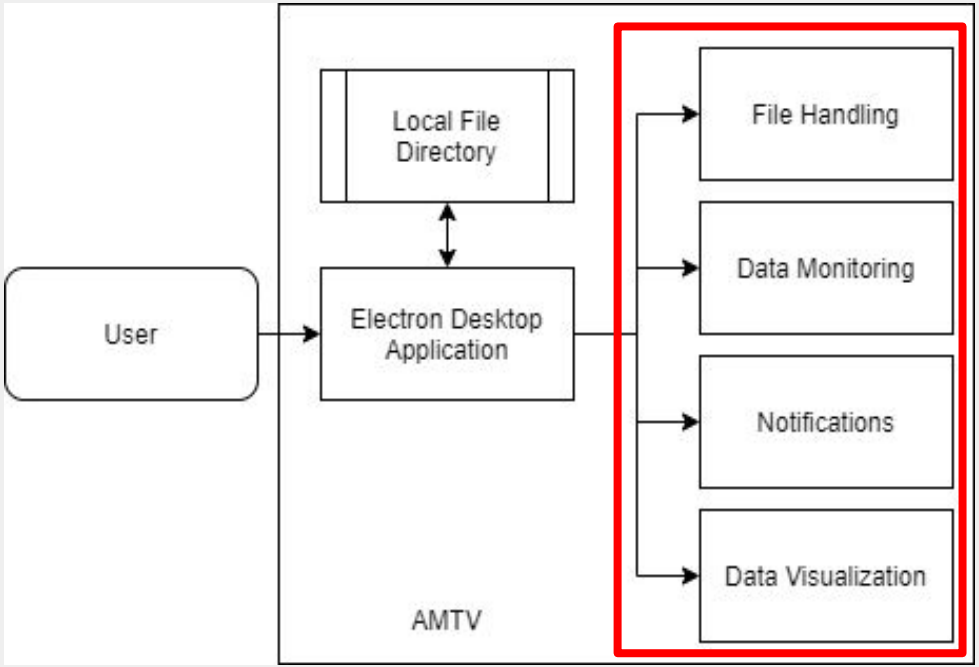


IMPLEMENTATION OVERVIEW - FRONT END



- Electron
- Local File Browser
- HTML/CSS for UI design
  - Bulma

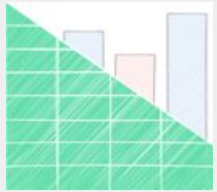
IMPLEMENTATION OVERVIEW - BACK END



Back end

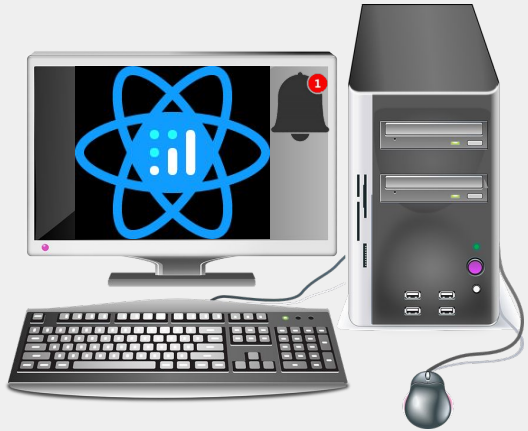
- Javascript
  - SheetJS (File Handling)
  - Plotly.js (Data Visualization)
- Node.js
  - node-localstorage (Data Monitoring)
  - Nodemailer (Notifications)

CHALLENGES AND RESOLUTIONS



SheetJS

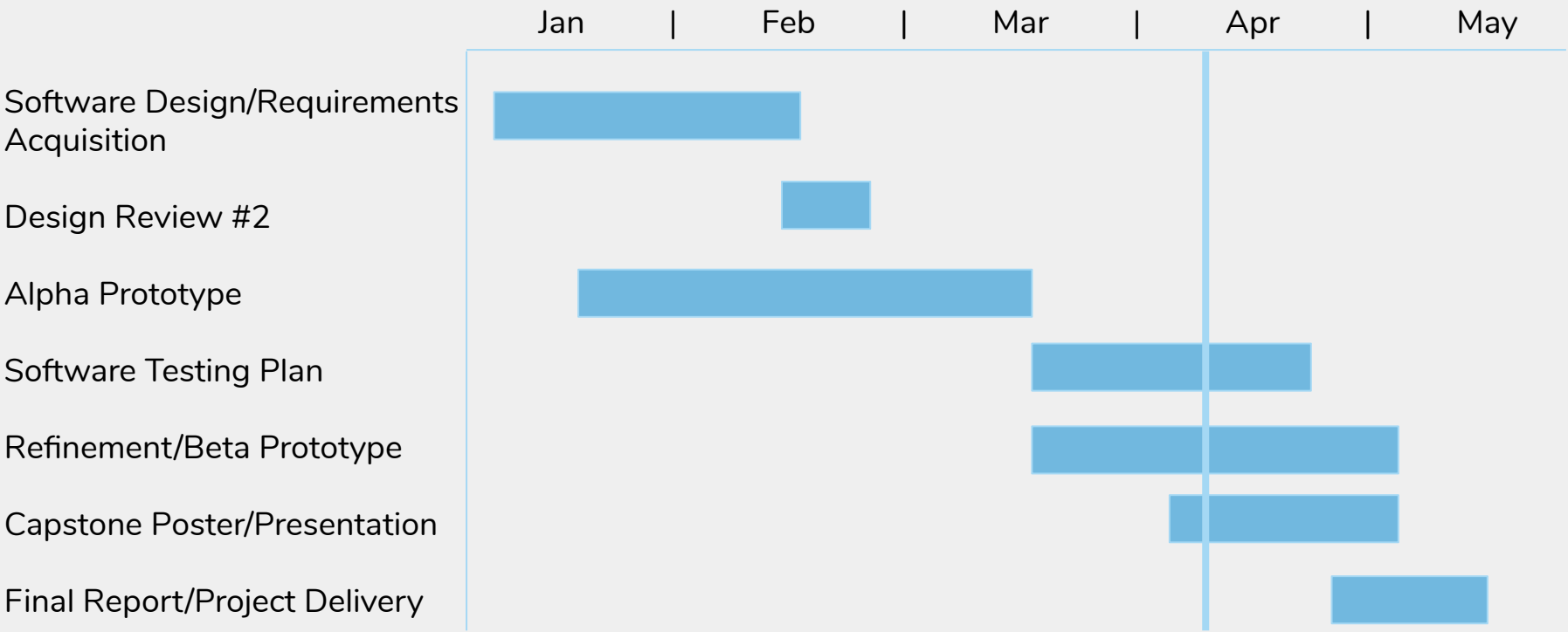
- Excel file handling
  - SheetJS solution



- Authentication
  - Local application using local files

- Notification system without web host
  - Background helper program

SCHEDULE


Jan
Feb
Mar
Apr
May
Software Design/Requirements Acquisition
Design Review #2
Alpha Prototype
Software Testing Plan
Refinement/Beta Prototype
Capstone Poster/Presentation
Final Report/Project Delivery

TESTING

Unit Testing - Correct data importing and handling

Integration Testing - Communication between main program, config, and helper program

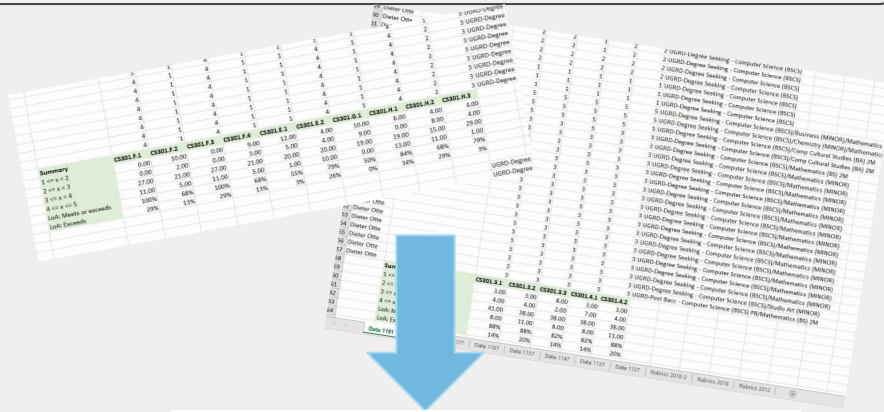
Usability Testing - Gather user feedback to better user experience

FUTURE WORK

- Web Application for all ABET accredited programs
- School integrated notification system

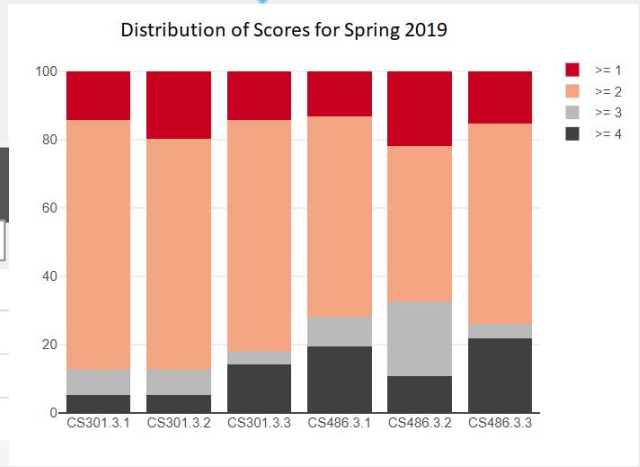
CONCLUSION

- Safe systems require well educated engineers
- ABET data collection is arduous
- Our desktop application solution will help
  - Track Performance
  - Analyze learning outcomes better
  - Track, monitor, and notify for data completeness



Learning Outcome 1

Course #	Data Collected	Performance
Spring543	✅	✅
Spring410	⚠	🚫
Spring685	✅	🚫



THANK YOU!

- Link to our website
  - https://cefns.nau.edu/capstone/projects/CS/2020/Excelsior-S20/index.html

- Questions about our product? Contact team lead at:
  - art296@nau.edu