CySim

Bailey Heinen, Brady Schlotfeldt, Matthew Daoud, Ethan Swan and Jacob Boicken

CySim Breakdown

What is CySim?

- CySim is a currently in progress cyber sports complex that can be used to host cyber security scrimmages or skill-development events
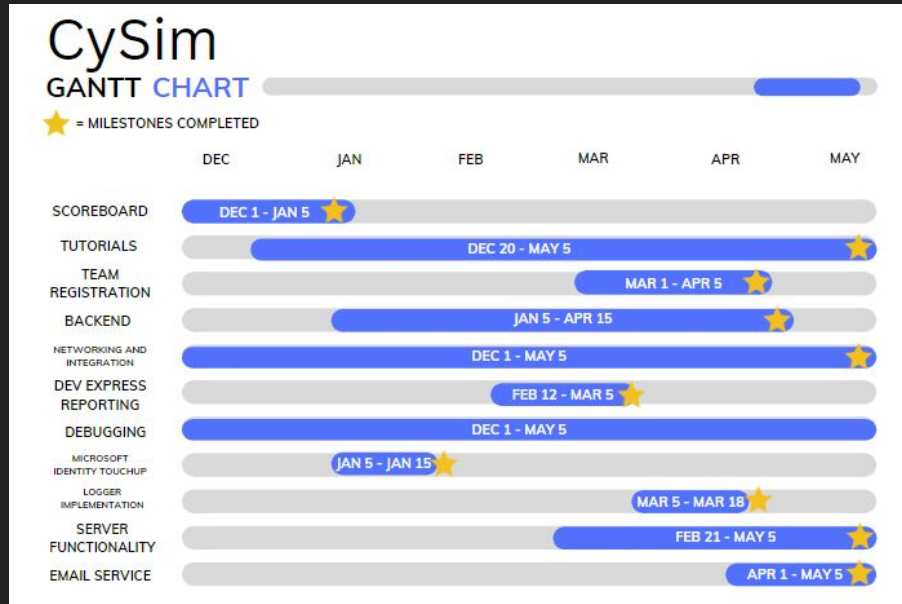
What is the goal of CySim?

- The goal of CySim is to help students improve their cybersecurity skills and readiness
- Help employers find the best candidate for the job by giving them a safe place to test their skills
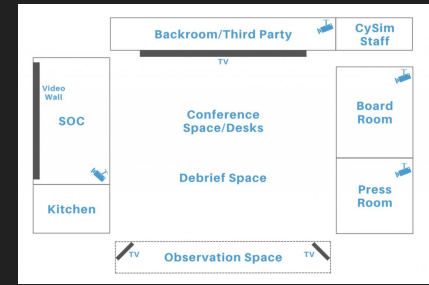
Implementation Architecture

Below is our Gantt Chart of CySim for how we planned to tackle the implementation of the web application.

# Implementation Architecture

Below is a video displaying the current state of the CySim Web Application, showing its features.

CySim Progress

Tasks Completed:

- Creation of the CySim Web Application
- Logging in as Admin, Red member, and Blue member
  - Loading different views based on the user's role
- Scenario Page
  - Add a new Scenario
  - Upload documents
- Scoreboard Page
- Tutorials page
  - Add a new Tutorial
  - Upload Documents
- Team Registration
  - Add/Edit Teams
  - Delete Team
  - Join Team
- Docker Implementation
  - Integration Tests Backend
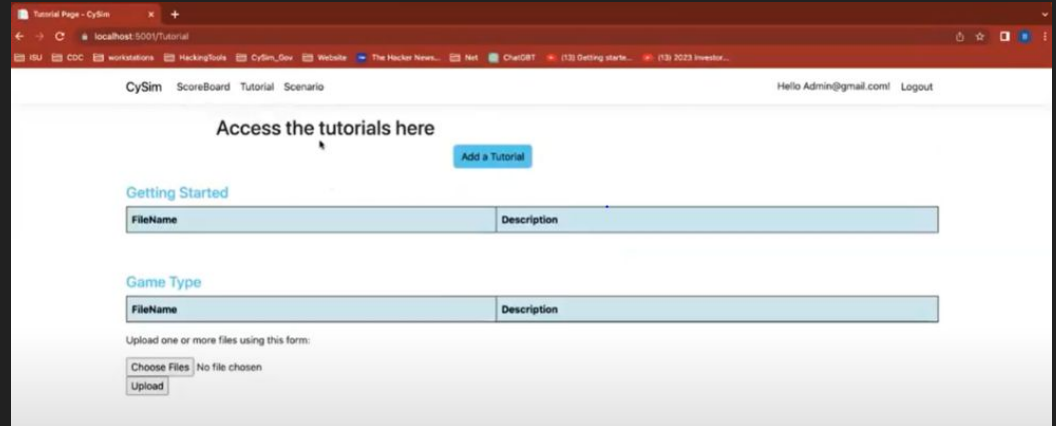
CySim Progress Continued

Tasks to be completed:

- Finish creating and implementing the machine communication between VMWare and CySim
- Clean documentation of the Web Application
- Update Nuget Packages in CySim
- Implement various design features to make the web app more user friendly
- Fix bugs in Team Registration backend
- Fix Microsoft Identity bug where email is showing instead of username
- Implement serilog logger to print log info to a file
- Implement various design features to make the web app more user friendly
- Full troubleshooting of the tutorials to make sure it loads for every kind of user and what they would need access to

Bailey's Work

- Creation of the CySim web application through .NET Core 3.1
- Creation of database to talk with web application and established the best way to query database
- Upgraded CySim to use .NET Core 6
- Successfully implemented Microsoft Identity to work with CySim
- Made CySim load different views based off the users role admin, red, and blue
- Full creation of the home page
- Started frontend development on Scenarios, Team Registration, Tutorials, and Scoreboard
- All of backend work in Scenarios, Team Registration, Tutorials, and Scoreboard
- Implement a document upload service for tutorials and scenarios
- Guided team to get the project running on their local machines
- Beginning implementation of machines that will talk to CySim

Brady's Work

- Helped establish and layout some of the original plans and design features of the Web Application.
- Worked on the creation and implementation of the tutorial pages within the Web Application.
- Doing in depth research on .net in order to accurately work through the CySim website.
- Designing and developing different display items for CySim to make it appeal more to the user and make it easy to use and operate.
- Documentation for the Web Application and how it relates to the future of CySim.
- Currently beginning work on the Machines for the Scenario implementation and development.

Current Tutorials

We have built in tutorials for the following:

- Admin Accounts
- Blue Team Accounts
- Red Team Accounts

Matthew's Work

- Administrative work such as meeting setup and client communication.
- Worked on setting up team members who use Windows with the local SQL server needed to run the web application locally for development.
- Cleaned up the scoreboard page placeholders in preparation for dynamic table size based off number of teams.
- Implemented a primitive dynamic table size in preparation for the data to become available to pull for the scoreboard from the SQL server.
- Implemented multiple CSS and other styles for use with the scoreboard.
- Updated necessary database migrations with flags and usability scores for future population

Current Scoreboard Design:

Ethan's Work

- Designed some higher level systems including rough network architecture
- Collaborated with client to help define the scope of this year's progress amid this multi-year project
- Working towards modular interface designs in scoreboard and team pages to support future versatility
- Working on enhancing user interface through C#HTML
- Researching .NET and C#HTML to support further feature development

Jacob's Work

- Set up deployment with Docker to be used on Linux Systems
- Creation of docker integration tests and healthchecks to ensure docker's network environment is functional
- Researched .NET, C#, C#html, and MVC architecture
- Worked on design of the scenarios for easy of use for admins to upload files and for players to view scenario files
- Set up unit and integration tests in .NET core 6.0 using Xunit
- Creation of GitHub pipeline to check for Xunit test failure when code is updated
- Automated updates of dependencies with dependabot

Key Challenges/Solutions

- We had issues getting everyone full access to the Web App and git repo due to various OS issues
  - This was solved through trial and error in team meetings
- Load different views based off of the users roles
  - Microsoft Identity was able to help us with this
- Working on an efficient way to implement the Tutorials/Scenarios without having to add a bunch of new pages
  - Using Baileys document upload service that will allow you to upload documents to the app and working to get it so the user can click a direct link to the tutorials we developed.
- We had trouble between Frontend and Backend on deciding whether to use .net 7 or .net 6.
  - This was due to Jacob's testing fork needing .net 7 to resolve packet compatibility.
  - We decided to use .net 6 and have Jacob implement a work around, if this doesn't work we would have to move everything to .net 7.

Conclusion

What have we learned so far?

- How to use .NET Core framework and how it works on various platforms.
- Designing a web application in a team setting.
- How to manage working different pieces of the project and combining them together.
- What we need to do in order to get CySim to where we need it to be.

Next Steps for CySim?

- Full Database implementation for the Scoreboard.
- Creating of mock machines as well as Scenarios for the game to be played.
- In depth documentation on what has been done on the Web Application.
- Updated designs and displays for the Web Application that will be implemented.
- More Backend to Frontend connection.
- Fix microsoft identity so that username is displayed when logged in and not the email address.