Progress Report

- Increment 2 -

Group #25

**1) Team Members**  
Erik Princi - ep16g - nole444

Noah Lee - nhl18b - TomahawkEVO

Keene Meckfessel - kcm22f - keenemeck

**2) Project Title and Description**  
  
Our project is a web application intended to simulate F1 tire strategies in races. We want to have a login-based scoring system with scenarios for users to experiment with. Specifically, users will be presented with a driver in a particular scenario, and are then prompted with all available data to make a decision on the strategy. Each scenario will have an optimal strategy, and users will be scored depending on how close to that strategy they get. Logging the results of the simulation and the users’ predictions will show them their progress over time and will be stored in a database only accessible through an account system.

**3) Accomplishments and overall project status during this increment**

During the latest development increment of the F1 Strategy Web App, our team has made substantial progress towards building a comprehensive and reliable platform tailored to the needs of Formula 1 enthusiasts. This period has been marked by significant achievements in backend development, database integration, and foundational feature implementation, aligning closely with our initial project scope and functionality objectives.

One of the cornerstone accomplishments of this increment has been the successful integration of the PostgreSQL database with our Flask-based backend. Establishing a robust connection between the application and the database ensures reliable data persistence, enabling the storage and retrieval of essential information such as user profiles, race data, and prediction results. This integration not only guarantees data integrity but also lays the groundwork for scalable data management as the application grows. By implementing Flask-Migrate, we have streamlined the process of handling database migrations, ensuring that schema changes can be managed efficiently without compromising existing data.

Our team has diligently developed the backend architecture, focusing on creating modular and maintainable code structures. We have built and refined core classes responsible for user authentication, data handling, and the simulation logic that underpins race predictions. This modular approach facilitates easier updates and feature expansions in the future, ensuring that the application remains adaptable to evolving user needs and technological advancements. Additionally, by leveraging Flask’s capabilities, we have ensured that the backend is both robust and flexible, capable of supporting complex functionalities with ease.

A significant milestone achieved during this increment is the initiation of the simulation logic for race predictions. By analyzing historical race data, our algorithms are beginning to generate accurate and insightful predictions for upcoming races. This feature is central to the app’s value proposition, providing users with data-driven insights to enhance their strategic decision-making. Although still in the early stages, the foundational work laid during this period positions us well for further refinement and enhancement of the simulation capabilities in subsequent increments.

While the primary focus has been on backend and database development, we have also made strides in enhancing the user interface. The user account page (account.html) has been updated to include placeholders for future features such as achievement badges and detailed race listings. These placeholders ensure a cohesive and user-friendly interface, maintaining a consistent user experience as we continue to develop and integrate more complex functionalities. This forward-thinking approach allows us to design the frontend in tandem with backend developments, ensuring seamless integration of new features as they become available.

Several changes were made on the visual front, bringing the product closer to what the finished version should look like. This includes making the UI more intuitive to navigate, as well as small visual effects that should make the app more pleasurable to look at and maneuver about.

**4) Challenges, changes in the plan and scope of the project and things that went wrong during this increment:**

On the race simulation front, things were delayed slightly as a result of some untimely personal matters. Noah is still working on refining the simulation engine and further integrating it with the API scraping functions from Keene. The simulation engine is accurate within a few minutes over a race distance when compared to finishing time from recent real races though, so some progress has been made!

The database persistence was failing since I did not migrate and initialize the database first. I was able to run Flask commands such as Flask db init to initialize the database and set up the schemas and tables for it.

**5) Team Member Contribution for this increment**  
  
Noah Lee - Contributed to this document, including sections 2, 3, 4, 5 and 6. Also contributed to sections 5 and 6 in the IT document. Refined the race simulation engine, including a rudimentary testing system for race distance simulation which proved to be accurate within a few minutes over a race distance.

Erik Princi- Contributed to the IT, RD, and progress report document. I also was able to connect the Database to the app. I successfully connected the PostGreSQL database. I then set up the home.html page using CSS and bootstrap for styling. I then added some issues to the Github page. I also added Flask routes to handle http GET and POST requests. A user can now create an account and it will be stored in our database.

Keene Meckfessel - Contributed to the IT, RD, and progress report documents. The formatting was tuned using Bootstrap so that it falls more in line with the final product we have visualized. Significant testing was done to ensure the API scraped data backwards in time if data from the moment desired wasn’t available. This led to much finer control over error-handling and more accurate displays of data rather than interpolation of past data.

**6) Plans for the next increment**  
  
Our goal going into the next increment is to enhance the accuracy and reliability of race predictions to provide users with valuable insights. Develop the badges system and detailed race listings to enrich the user experience. We also need to implement Role based access. Finally, we need to conduct more thorough testing to identify and resolve any issues, ensuring the app's stability and performance.  
  
The next step for the race simulation engine will be to add simulation for all 20 cars within a race, and then integrate the simulation engine with the API scraping functionality that Keene has been working on. This will allow users to select a previous race to load, and then allow them to choose strategy and then compare to other strategy options as well as the strategy choices of the other 19 cars.

Our primary concern will be to integrate our separate modules into one cohesive project. We have placed a large focus on modularity and designing with minimal coupling in mind, ensuring that functions should only need a minimal amount of information about each others’ processes in order to work properly. Combining these should realistically be of negligible difficulty, allowing us to work on more important aspects such as fine-tuning of the user experience and simulation results.

**7) Stakeholder Communication**

Dear Stakeholders,

I am pleased to provide you with an update on the development of our F1 Strategy Web App. Our team has been diligently working to establish a robust and scalable foundation for the application, ensuring that it meets both our functional requirements and performance standards.One of our significant achievements to date is successfully connecting the application to our PostgreSQL database. This integration allows us to maintain data persistence effectively, ensuring that all user data, race information, and simulation results are securely stored and easily retrievable. By leveraging PostgreSQL's reliability and scalability, we are confident in our ability to handle the anticipated data load as the application grows.Our development team has made substantial progress in building the backend architecture. We have developed and refined the classes responsible for handling the application's core functionalities, including user authentication. This modular approach not only enhances the maintainability of the codebase but also facilitates future feature expansions with minimal disruption. To maintain data integrity and streamline future updates, we have implemented a comprehensive migration strategy using Flask-Migrate. This ensures that any changes to the database schema are systematically managed, allowing for seamless updates without data loss. Our migration scripts are thoroughly tested to guarantee that the application's data remains consistent and secure throughout its lifecycle.We are excited to announce that the team is actively developing the simulation logic for race predictions. By analyzing historical race data, we aim to create accurate and reliable predictions for upcoming races. This feature will provide users with valuable insights and enhance their strategic decision-making capabilities within the app.As with any complex software development project, we have encountered some challenges along the way. These include integrating various libraries and dependencies essential for the application's functionality. However, we have implemented effective strategies to overcome them. Our commitment to continuous learning and adaptability has kept the project on track despite these hurdles.By the next project milestone, we anticipate having Role based access and an operational simulation engine. This will position us to move forward with user interface enhancements and broader feature implementations, bringing us closer to delivering a robust and user-friendly F1 Strategy Web App. We remain dedicated to delivering a high-quality application that meets your expectations and serves the needs of the F1 community effectively. Thank you for your continued support and trust in our team. We will keep you informed of our progress and any significant developments as the project advances.

Sincerely,

Erik P. , Noah L. and Keene M.

**8) Link to video**

Paste here the link to your video.