

## CS340 Final Project Proposal

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In the world of motorsports, managing a car or driver is one of the most challenging tasks. Race engineers and pit crews make crucial decisions before a race, to decide on tire and fuel strategies, amount of pit stops, etc. During races, they must react and make split-second decisions based on unpredictable events that happen on the track. Fans of motorsports often fail to realize just how much knowledge and experience is required to make these decisions. My proposal aims to mitigate that gap in knowledge. I propose a gamified learning tool called PitWall. The idea of PitWall is a race strategy simulator where users can decide on tire and fuel strategies, pit stops, etc., and the game simulates a race. Since each racing circuit has different rules regarding pit stops, fuel, etc., users will be able to select the discipline of racing they wish to simulate, such as NASCAR, Formula 1, and IndyCar. It will feature a simulation engine to view race progress, a multiplayer mode to compete with friends, and ingests historical race data from databases like the Ergast F1 API.

PitWall solves one problem in the racing world. In addition to being a fun learning tool for fans to practice and compete with, it offers race engineers a method of direct practice at their skill. Many race teams have expensive simulators that accurately recreate racing environments, but these systems exist mostly for the drivers, leaving the race engineers to rely only on prior experience. PitWall is a tool for race engineers – especially those who are younger and less experienced – to make decisions in a controlled environment without the risk of ruining a race for the team.

Software packages and dependencies for this project are not too complicated. The frontend will be built in React, with the backend in Node.js. A custom simulation engine will need to be built, likely in Python. Additionally, database software like PostgreSQL and the F1 Ergast API for historical data, car models, and results will be needed.

PitWall is an intriguing idea for a fun learning tool that would make a great project. It will easily fit the agile scrum framework, and offers lots of potential for stretch goals, such as safety cars and weather effects, and custom races and rules. I believe that I would learn a lot from this project about software engineering, as well as enjoy it out of my love for motorsports.