Total Party Kill:
A D&D Combat Simulator

Project Abstract

As both D&D players and game masters, we have all dealt with the difficulties of an **unbalanced combat encounter**. To solve this, we created a **web application** that allows users to implement player character sheets, design monsters, and build combat encounters that can then be ran against our **combat simulator**. Leveraging a **multi-threaded batch processor** and **Monte Carlo simulation**, we provide robust and precise information for game masters to balance encounters with.

Team Members

- **Brandon Thompson** – Computer Science
- **Sam Puffer** – Computer Science
- **Nick North** – Computer Science
- **Dr. John Gallagher** – Advisor



Technologies

Goals

- **Develop a user-friendly front-end website** for account and character creation, combat encounter simulation, and result visualization.
- **Build a back-end database** to store user data, encounter details, and simulation results, with full integration to the web app and combat simulator.
- **Create a dynamic combat simulation system** using state vectors and production rules to model behavior, run Monte Carlo simulations, and output detailed results to the database.

Applications

- **Partnership with Online Tabletops:** By working with virtual tabletops like D&D Beyond or Roll20, we could pull users' character sheet and encounter data to provide accurate reports with our combat simulator.
- **Sports Analytics and Strategy:** The technology could be repurposed to predict match outcomes based off player stats and past performances.
- **Defense Sector:** D&D has roots in the defense industry as an accurate wartime simulator. That means our product could help predict the outcomes of real-world encounters.

Accomplishments

- **User input for all aspects** of our final design. Meaning **full creativity** for GM's using our website.
- **Variety of programmed combats** showing proof of concept.
- **Accurate data analysis and results** for complex encounters