# Individual Report: Development of SushiGo Heuristic in TAG Framework

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### Overview

In my part of the project, I took on the challenge of developing a heuristic evaluation function for Sushi Go, a card game implemented within the Tabletop Games Framework (TAG). What made this particularly interesting was dealing with the game's unique blend of simultaneous play and complete information - imagine everyone playing their cards face down, but having the superpower of knowing what cards could come your way.

### Development Process and Implementation

Starting out, I dove deep into understanding how TAG handled Sushi Go, examining its core components like SGGameState and SGForwardModel. While the TicTacToe heuristic provided some great insights, I knew Sushi Go needed its own special touch. It's like learning chess rules but then playing poker - similar basics, but completely different strategy.

My first attempt was pretty straightforward - just basic card scoring. But I quickly realized this was like trying to win a chess game by only counting pieces. I needed something smarter. So I built a system that could learn and adapt, including: - A memory system that remembers what cards have been played (like counting cards in blackjack, but legal!) - Smart evaluation of card sets, even incomplete ones - Special attention to power cards like Wasabi and Chopsticks - Dynamic strategy adjustment based on how the game unfolds - Careful planning for those end-game Pudding points that can make or break a game.

### Technical Challenges and Solutions

The biggest puzzle was finding the sweet spot between grabbing quick points and playing the long game. It's like choosing between taking a quick 2 points now or setting up for a massive 10-point play later. I solved this by carefully balancing different factors: - Making sure each scoring element was properly weighted - Giving partial credit for almost-complete sets - Keeping a close eye on the Maki roll race - Planning ahead for Pudding card scoring - Keeping track of everything without slowing down the game

### Results and Impact

Here's the exciting part - my heuristic ended getting the report of **win rate 0.71 +/- 0.020 Mean Ordinal 1.28 +/- 0.02** in 500 games against the basic version of the agent. It's like turning a rookie player into a seasoned pro. This wasn't just about winning more games though - it was about understanding how to make AI think strategically in games where everyone plays at once.

This coursework taught me so much about both game AI and Sushi Go strategy. I built something that not only plays well but can also help others understand how to approach similar challenges in game AI development. The system too is flexible and can be tweaked and improved even further.