Blue/Red Video Game for Attack and Defensive Analysis

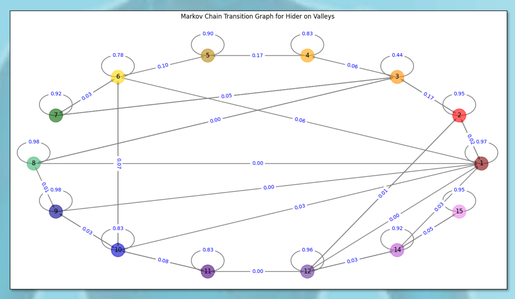
Obed Amaning-Yeboah, Jared Butler, Deniz Misirlioglu, Riley Taylor
Advisors: Dr. Peter Jamieson & Dr. Bhunia

Hider

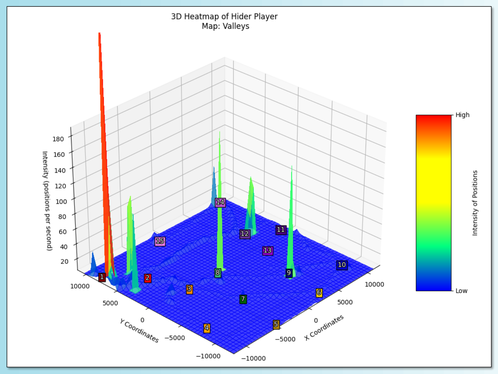
Seeker

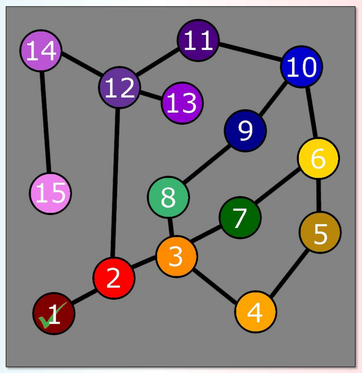
HAS

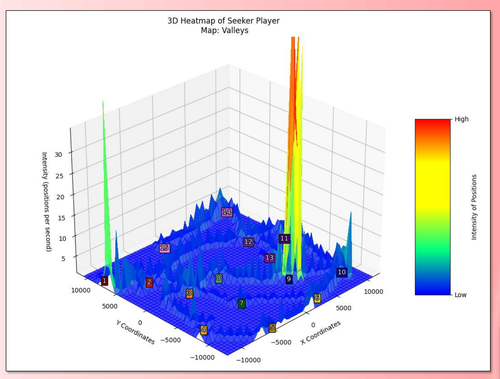
Hide-and-Seek

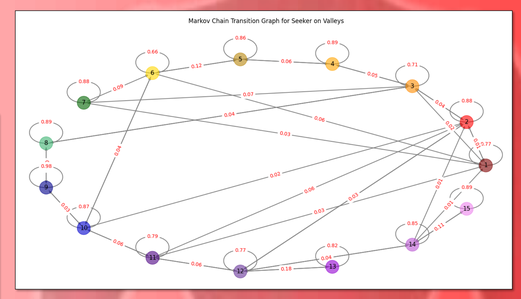


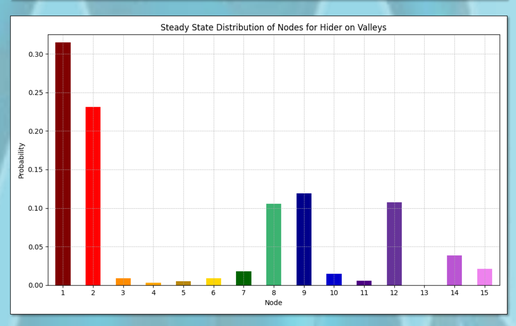
Valleys is a planar graph with no real-world representation. The data analyzed is from 17 games played.

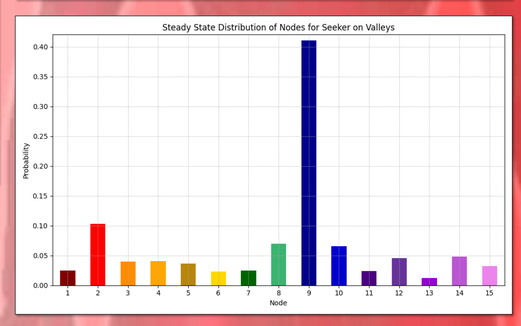




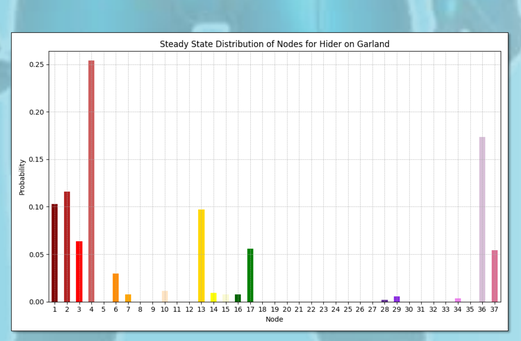


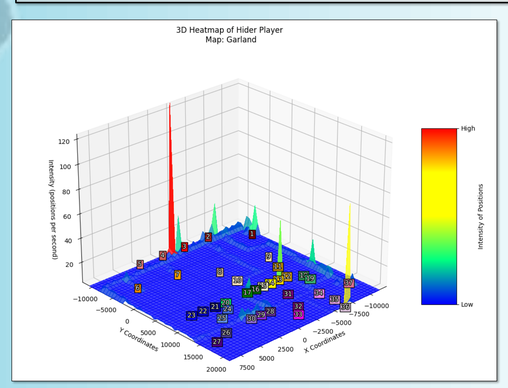


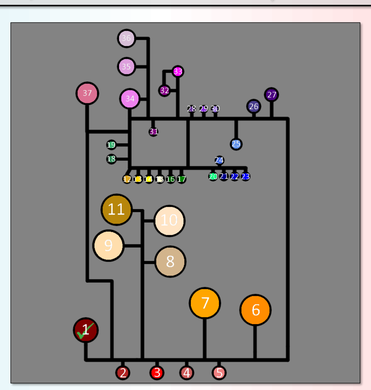


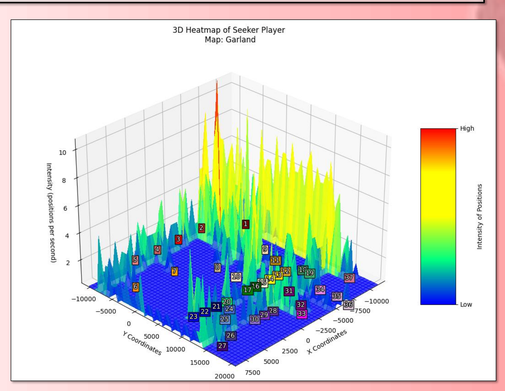


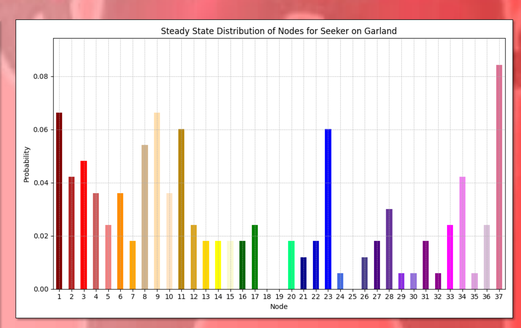
Garland represents Garland Hall, all floors, at Miami University. The data analyzed is from 10 games played.



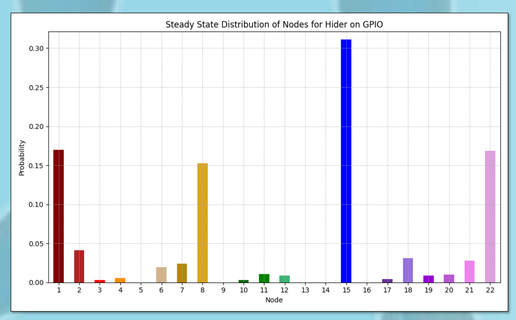


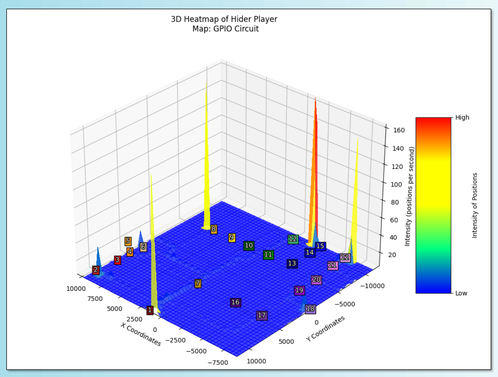


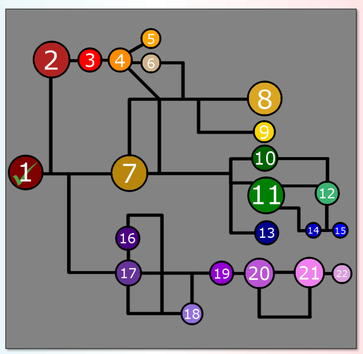


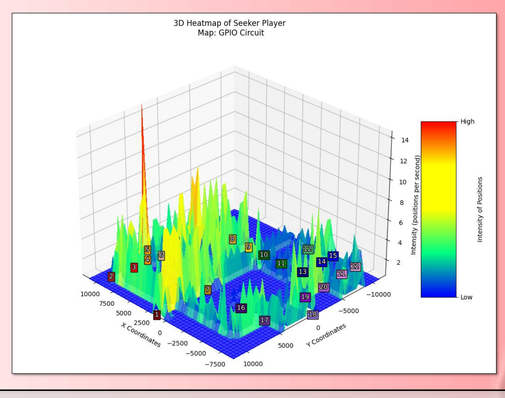


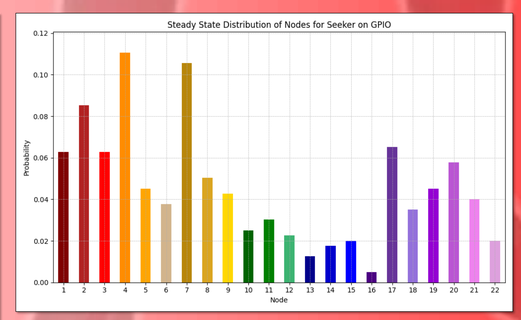
GPIO represents a GPIO circuit from an 8-bit AVR microcontroller. The data analyzed is from 10 games played.











ABSTRACT

HAS is a project that explores the dynamics of a unique hide-and-seek game, serving as a metaphorical simulation for cybersecurity practices. In the context of cybersecurity, hide-and-seek is an on-going cat-and-mouse game. This project aims to model the 'Seeker's Dilemma,' a game theory scenario that mathematically represents hide-and-seek on a graph. HAS is designed as a two-player, first-person game using Unreal Engine 5, with multiplayer capabilities facilitated through Steam. The maps are based on planar and utility graph models. By collecting and analyzing positional data, we can visualize the strategies employed by both hiders and seekers. This analysis is performed using Markov chain models to construct transition graphs and steady-state distributions, which help in understanding varying player behaviors.

MIAMI UNIVERSITY
College of Engineering and Computing
Electrical and Computer Engineering