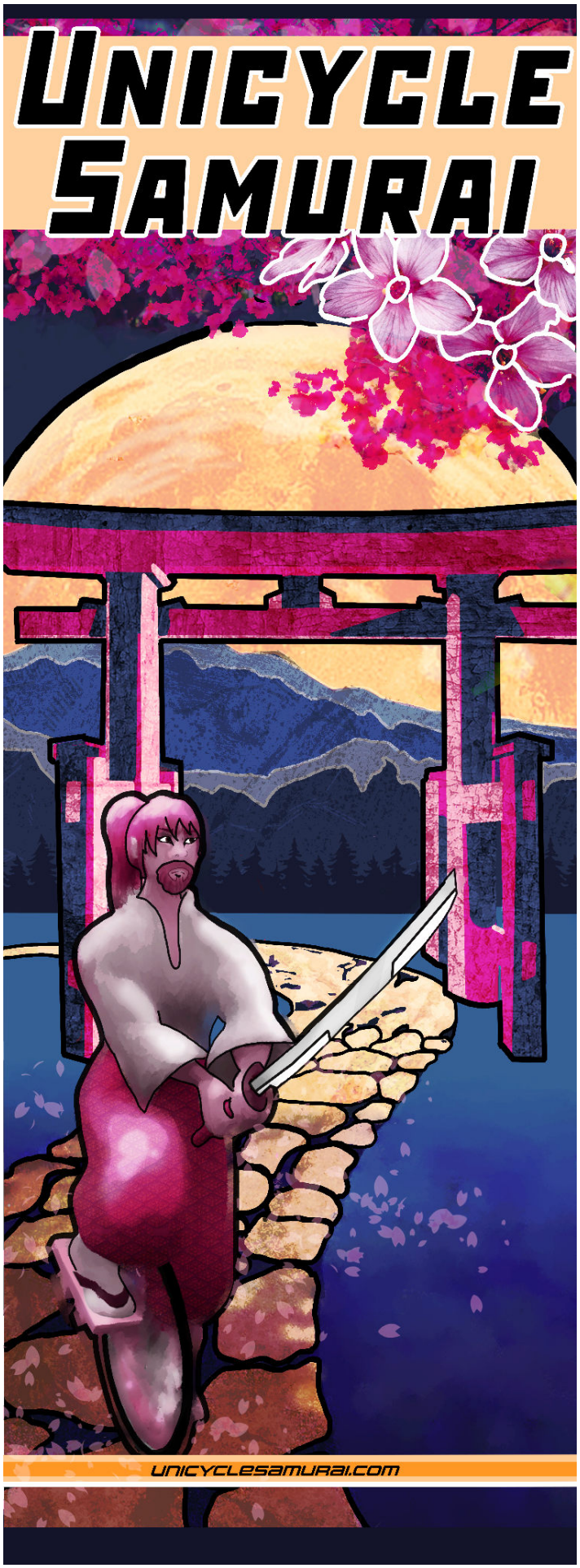


Alt Controls Design Binder

atl.ctrl.GDC 2023

Peter Guenther

Spartan Samurai

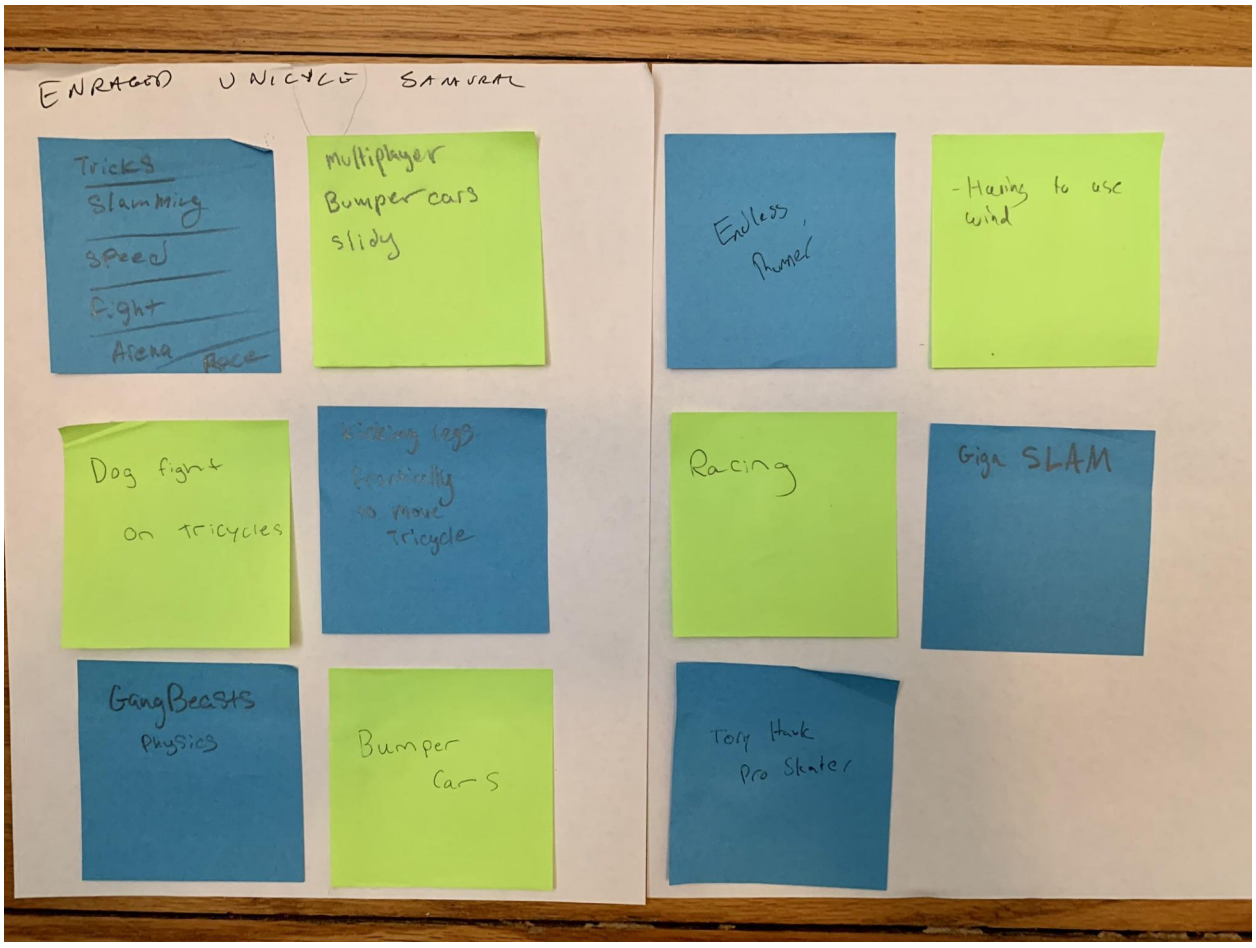
Michigan State University

Unicycle Samurai

Early Ideation

The game came from a class exercise in MSU's MI 455. We were given 5 randomly generated 3-word game titles from an online generator and told to mix and match them to come up with titles, then brainstorm what a game with that title could be.

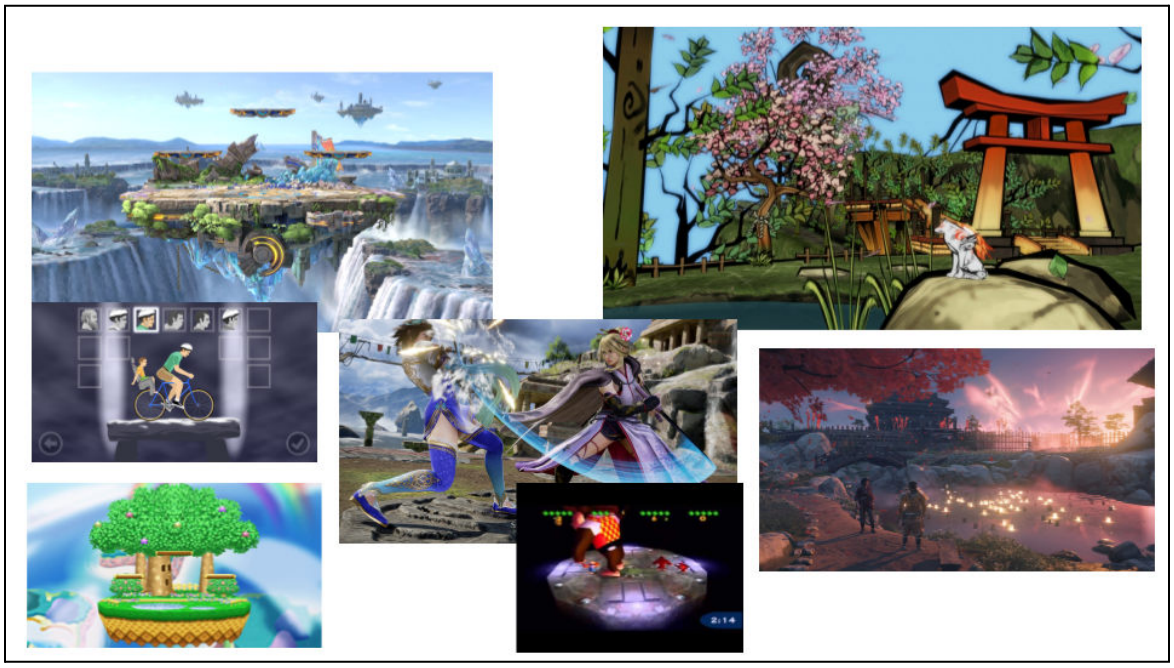
Our top two picks were **Enraged Unicycle Samurai**, our top pick, and **Night of the Crystal Battleships** as our backup.

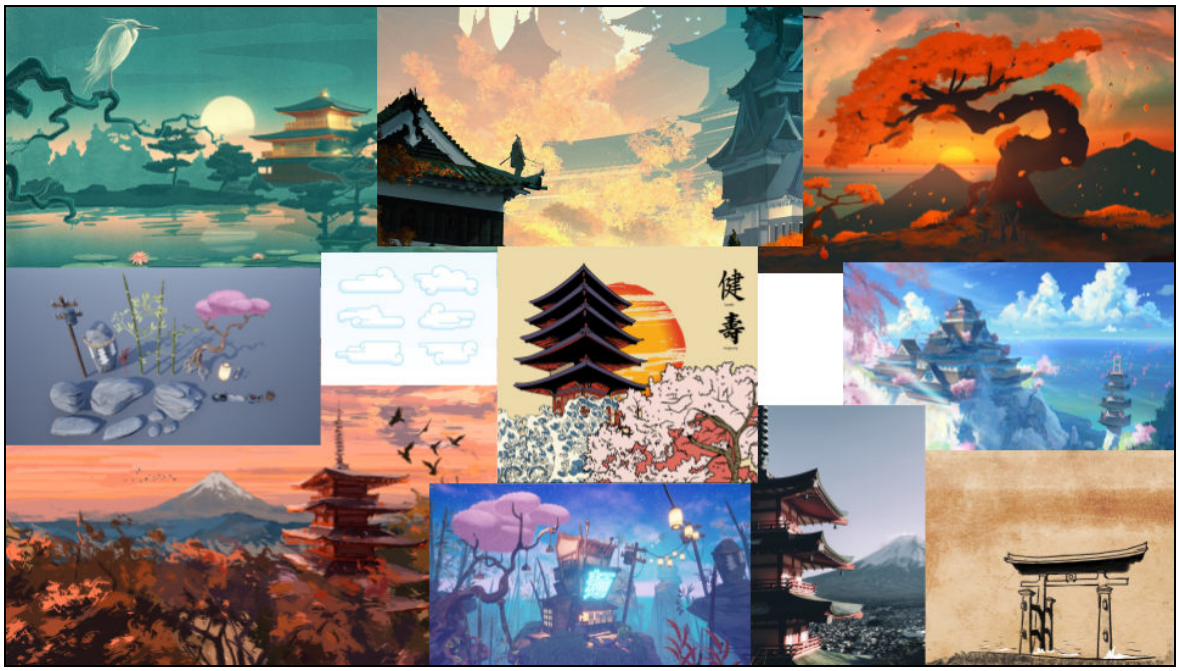


Brainstormed ideas of what Enraged Unicycle Samurai could be.

Unicycle Samurai

Original Pitch Mood Boards





Pitch mood boards by Kirsten Alumbaugh

Unicycle Samurai

Preproduction Sprint 1

Japanese Garden Level

Preproduction Sprint 2

Cemetery Level Mood Board

Unicycle Samurai

Alt Controls

As we were pitching the game for consideration for a full semester of production, our professor Jeremy Bond suggested we could do an alternative controller for alt.ctrl.GDC. With final presentations coming up quickly, we put together a proof-of-concept that weekend

Mark I

Our first concept used a $30 balance board, a $3 gyro, and an Arduino.

Pros

- Inexpensive
- Highly portable
- Great core workout

Cons

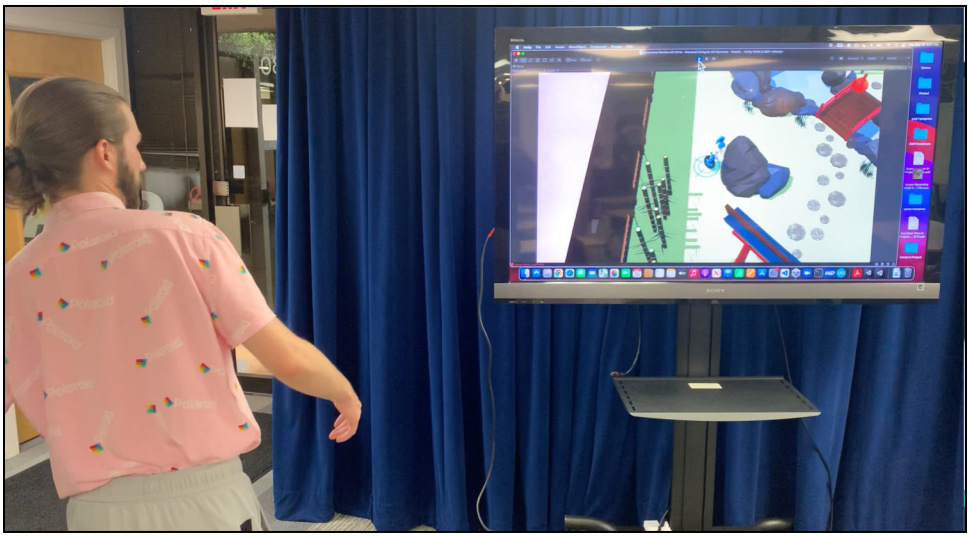
- Steep learning curve
- Wee bit unstable

Unicycle Samurai

Mark II

With the final pitch behind us, while we waited for a decision we took the game and controller to the IGDA Ann Arbor May meeting to test out.

For this version, we added a wooden base with a circular cutout to keep the balance board centered and four heavy-duty springs to make it more stable.



Pros

- Still portable and inexpensive

Cons

- Not much more stable than the Mark I
- Minor chance of springs shooting out unpredictably

Unicycle Samurai

Mark III

Two days after the IGDA Ann Arbor event we were scheduled for an Indie Showcase at Replay Cafe Detroit, so we had to iterate on a very short timeline to test again with more players.

The highest-impact change we could make quickly was a stability bar that players could hold while balancing. We kept the balance board and the wooden base with the springs.

We also switched the perspective from the top-down view of the original game to behind the samurai to put the player more in-the-moment and also to make the movements more natural.

Pros

- Much more stable
- Perspective made it easier to control
- Players had a lot of fun

Cons

- The springs didn't do enough to help the player
- Involved balance but didn't feel like a unicycle

Unicycle Samurai

Mark IV

While we had a fun and somewhat safe design with the Mark III, it was time to make this look and feel more like a unicycle. After considering a number of options, we went with a bicycle seat mounted on a pipe, attached to a base with a universal joint (u-joint) to allow movement in two directions like a joystick. We continued using a gyro to sense angle while surgical tubing provided resistance to make the seat return to center.

Pros

- Looked and felt more like a unicycle
- Still a good core workout
- Involved some balance

Cons

- Still a sharp learning curve
- Two-axis movement didn't feel good to players
- Very hard on the knees

Unicycle Samurai

Mark V

By this point we knew that Unicycle Samurai was accepted for a full semester of development by a larger team (originally 4, we grew to 8 and then 10). By the start of the semester we had our next iteration.

This version separated out the movements for turning and accelerating/decelerating/ reversing; the player would turn their hips to turn, more like a real unicycle, and lean forward and backward to control speed. We accomplished this with two axles, each with a through-bore rotary encoder sensing angle; a horizontal axle allowed the lean forward and back, while a vertical axle allowed the turn rotation.

Pros

- Easier to learn and handle with two separate movements
- Relatively robust design

Cons

- Center of rotation for lean was too low–didn't feel right

Unicycle Samurai

Mark VI

By now we definitely felt we were on the right track and needed smaller refinements. This version raised the horizontal axis to 12” off the ground, where a typical unicycle’s axle would be, and moved the turning joint right below the bicycle seat. We re-added the stability bar from the Mark III. We had enough confidence in this design that we built a second copy for head-to-head battles.

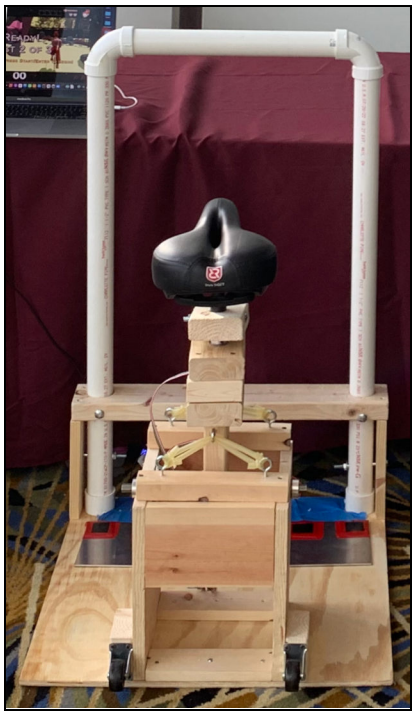
We continued to iterate on how the player could activate abilities in the game, This version had four main variations:

Mark VIa: Traditional Arcade Buttons

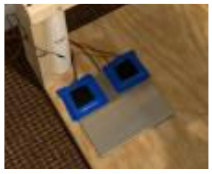
The version we brought to MSU’s LAN party in October 2022 had five arcade buttons (start, dash, dodge, spin left, spin right). We had some problems reliably wiring them and they were sometimes difficult to hit while players were balancing and focusing on the screen.

Unicycle Samurai

Mark VIb: Pressure Pads



Unicycle Samurai appeared in the Indie Showcase at the Youmacon anime convention in Detroit at the beginning of November 2022, where it was played by more than 100 people over the course of three days.



This version had one arcade button near the stability bar to start and four pressure pads for dash, dodge, activate powerup, and spin. Unfortunately, the pressure pads quickly stopped working because of normal use moving wires around. While the design could have been made more robust, it was abandoned because we found the pads difficult for players to hit without looking.

This version also had vibration motors under the metal pads for haptic feedback; we had them working from the Arduino but were not able to complete the gamepad emulation for them in time for Youmacon, and we did not try further once we abandoned pressure pads and the metal plates.

Mark VIc: Heel Buttons

Based on Youmacon feedback we tried arcade buttons on the side of the controller's core; we felt these would be easy to locate and activate with the side of the foot without looking. This is the version we recorded in our alt.ctrl.GDC application videos, but based on playing for the videos we decided they were still difficult to find and hit while playing.

Unicycle Samurai

Mark VId: Pedals

We determined that a larger pedal behind the foot would be easiest to find and press, so we built our own with a piece of wood, a hinge, and a microswitch from an arcade button mounted on an aluminum bracket.

We took this version to the MSU Games Showcase in December 2022 where it was played by dozens of people and these buttons tested well.

Mark VII

The version at alt.ctrl.GDC is the Mark VII. Functionally the same as the Mark VId, it's designed for easier transportation. The base is a about 1.5" smaller to fit in a shipping crate; the stability bar is constructed to be broken down into three pieces and reassembled on site, and is also mounted to the base more tightly, Finally, the base is reinforced with aluminum brackets to minimize flexing if someone pulls hard on the stability bar.