

Brainstorming:

Directional input -> joystick, potentiometer

Visual cues -> LEDS, something that moves

Autitory cues -> buzzer, vibrator

Continues input -> force sensor, light sensor

Game ideas: a dominos game

A balance game

Doctor board game

A balancing game:

A game where the player is an acrobat performing a balancing show. The player has to move across the tight rope, while dodging objects being thrown at them. The player moves left and right, and if they move too fast, they may lose balance.

The controller will use a potentiometer to control the direction and the speed of the player's movement. If the character in game is losing balance, there will be a vibrator that starts to vibrate to give an audio and haptic cue to the player. An LED will flash when an object is about to be thrown at the character. The player must hold this controller with both hands. There will be two force sensors on each side of the controller, one for each thumb that will detect if the player is gripping the controller properly.

The design of the controller brainstorm:

Board

Flat

Card shaped

Thin

Like one of the Nintendo switch detachable controller

Rethinking the design of the controller:

Realizing that the player needs to a hand to grip the controller and a hand to control the potentiometer, one force sensor will be removed. In the game, the force applied to this sensor is grants the player more grip to the tight rope for some in game events such as wind or the tightrope suddenly being shaken.

The design process.

Making the lid

I started off with the lid. I made a rectangle and put a hole for the sensor button, the led and the potentiometer. Then I added a border underneath to center it when inserted in the box. I used a width of 1.6mm because in my past experimentation with PLA, I found that a thickness of 1.6mm works well. I realized that this lid needed a way to be secured to the box, so I added extra padding in each corner to fit a small screw (that would be approximately 3mm in diameter). This was done by putting a square in one of the corners and then adding a multi transform modifier that allows me to mirror this square on the x and y axes.

Making the box

Similarly as the lid, I made a rectangle and I extruded it to make a box. Then, by selecting the top face and using the skin tool in FreeCad, I was able to quickly make it hollow. I made the walls 1.4mm thick to give a 0.2mm gap between the lid's centering border and the walls of the box because this is my printer's tolerance for fitting two pieces together. I needed a screw insert, so, by following the same process as the lid, I gave one of the corner's an extruded square that has a screw insert hole that matches the lid's, then I added a fillet to the inner corner, then used the multi transform tool to mirror this into each corner. Finally, I put a hole on one of the sides of the box for the microcontroller's USB cable. I made it big enough to fit the male end.

Other parts

I imported a breadboard stl I had downloaded for assignment 2 and I also imported an Arduino stl that I had used in assignment 2 and 3. I quickly made a screw model with one sketch and using the revolve tool.