Link to github: https://github.com/Rheinixl/Physical-Computing/blob/main/final_code.ino

Elevator Speeches:

Version 1:

My Parents' Basement has a super lively interior with pinball machines and comics, but the outside seating can feel a lot less engaging—so when the inside is packed, some people don't want to sit outside or may even leave. My project is a small interactive "attraction" designed to close that experience gap: a smart, gacha-style dispenser that lives on top of the cutlery shelf where everyone passes by. Customers wave at a motion sensor to start a quick raffle animation on the LED panels, and then it randomly dispenses a small prize from one of four tubes—like a Lindor chocolate or other bar-appropriate snacks. The goal is to add a playful, themed moment that feels very "MPB," gives people a reason to smile in the outside area, and makes the space feel more fun and worth staying in even when the inside is full.

Version 2:

My Parents' Basement, or MPB, is a bar in Atlanta with a really playful identity — pinball machines, comic books, and lots of quirky decoration that makes the inside feel energetic and memorable. But the outside seating area doesn't have as much of that atmosphere, so when the inside is full, customers can be less excited to sit outside, and the space feels more like "overflow" than part of the experience.

My project is an interactive decoration meant to bring some of that MPB energy into the outside area using a spot that everyone already passes: the cutlery shelf. I built a gacha-style smart dispenser with LED displays, a motion sensor, and four tubes inside. The interaction is simple and inviting: you wave to start, the front LEDs play a short raffle animation, and then the device randomly selects one of the four tubes and dispenses a small prize. It's designed around Lindor-sized items, but it can dispense any small bar-friendly treats or giveaways the owner wants to load. The goal is to create a quick, playful moment that feels very "MPB," makes the outside area feel more intentional and fun, and gives customers a reason to engage with the space even when the inside is packed.

Version 3:

My Parents' Basement, or MPB, is a bar in Atlanta with a really playful identity — pinball machines, comic books, and tons of quirky decoration that makes the inside feel like an experience, not just a place to drink. A big part of how MPB works is also very self-serve: customers grab their own cutlery, napkins, and other small necessities from a shelf, so people naturally get up and move around instead of staying seated the whole time. That creates these predictable "traffic lanes" where almost everyone passes through at some point during the night.

The problem is that the vibe is much stronger inside than it is outside. The outside seating is useful when the inside is packed, but it can feel comparatively empty and less engaging, which makes people less inclined to sit out there — or even turn away when they realize the inside is full. So the core idea behind my project is to use that self-serve behavior to our advantage: if everyone already has to go to the cutlery shelf, that's the perfect place to add a small interactive moment that pulls attention, adds personality, and helps the outside area feel more like it's part of MPB.

What I built is a gacha-style smart dispenser designed to sit right on top of that shelf. You wave at it to start, it runs a short raffle animation on LED panels, and then it randomly chooses one of four tubes and dispenses a small prize. It was designed around Lindor-sized items, but it can dispense any small bar-friendly treats or giveaways the owner wants to load. The goal isn't just giving out snacks — it's creating a quick, playful interaction in a spot everyone already visits, so the outside section feels more intentional, more entertaining, and more aligned with MPB's overall theme.

5 Research Papers:

Parker, C., Tomitsch, M., Davies, N., Valkanova, N., & Kay, J. (2020). Foundations for Designing Public Interactive Displays that Provide Value to Users.

Parker et al. (2020) argue that public interactive displays succeed when they offer clear perceived value in context, not just attention-grabbing visuals, and they synthesize in-the-wild research into four factors that shape value—people, location, community, and time—with aspects like relevance to users' immediate goals, trust/privacy, and how value changes across repeated encounters. This is directly useful for my MPB dispenser because it validates my placement strategy on the self-serve cutlery shelf as a "high-permeability" spot where opportunistic interaction naturally happens, and it frames my design challenge as ensuring the interaction stays relevant and low-friction for people who are there to grab utensils quickly while still feeling playful and on-theme for the MPB community. The paper also highlights gaps that remain for my project: what specific "value" I'm optimizing (outside-seat retention vs. general atmosphere), how value changes over time for regulars versus first-time visitors (the repeat-engagement problem), what the right balance is between playful "gacha" anticipation and the need for speed at a task-focused location, and whether I should add clearer cues about what the sensor is doing to strengthen user comfort and trust.

ten Koppel, M., Bailly, G., Müller, J., & Walter, R. (2012). Chained Displays: Configurations of Public Displays can be used to influence Actor-, Audience-, and Passer-By Behavior.

ten Koppel et al. (2012) show that the physical configuration of a public display strongly shapes how people notice it, feel motivated to approach it, and interact socially around it. They introduce "chained displays" (multiple screens arranged into different shapes) and a design lens using Nimbus (where something can be perceived) and Focus (where attention/interaction is

directed), then compare Flat, Concave, and Hexagonal setups in a real field deployment. The key takeaway is that designs that make both people's actions (manipulations) and the system's response (effects) visible to others tend to create stronger social learning and a stronger honeypot effect (crowds attracting more crowds), while configurations that hide effects or constrain interaction space reduce multi-user engagement. This is useful for my MPB dispenser because it supports the idea that placement and "visibility of what's happening" matter: locating it at the cutlery shelf leverages an existing walking path, and making the wave trigger + raffle outcome legible to bystanders (clear animations, obvious "start" feedback, visible dispense moment) can increase curiosity and encourage others nearby to try it. It also raises questions for my design: how visible should the interaction be in a bar without feeling intrusive, how can I maximize social learning (so new users instantly understand "wave to play") through clearer cause to effect feedback, and how should the dispenser be oriented relative to the natural traffic flow so people notice interactivity early rather than only after they pass it.

Jacucci, G., et al. (2010). Worlds of Information: Designing for Engagement at a Public Multi-Touch Display.

This paper (Jacucci et al., 2010) studies how to design a walk-up-and-use public multi-touch display so that it stays engaging and supports multiple people at once. Their core idea, "Worlds of Information," splits content into multiple independent "worlds" (3D sphere-like widgets) so several users can explore different content in parallel, while still having a shared 2D area where items can be brought together. They found people generally had a positive, social experience and that parallel interaction worked well—but discoverability was still hard: most users began with one-finger interaction, struggled to discover "opening" actions or advanced navigation without watching others, and relied heavily on social learning (observing others, then trying) plus cooperative exploration.
Useful for my MPB project: it reinforces that in public settings, the biggest design challenge isn't "can people use it," but can they understand it instantly without instructions—and that multi-step interactions can work if the system scaffolds learning (clear entry points, gradual reveal, and cues/help that appear at the right moment). For my dispenser, the analog is: make "wave to start" feel unmistakable, make the raffle phase legible to bystanders (so social learning kicks in), and structure the interaction so it rewards quick, shallow use.
Gaps / questions it raises for my design: how do I keep the interaction equally understandable for people arriving at any "system state" (idle, mid-animation, just dispensed), how do I provide just-in-time guidance without annoying people in a bar, and how do I balance parallel social engagement (crowds + anticipation) with territoriality and interference (people triggering sensors early, blocking the dispense zone, or "taking over" the experience).

Rosseland, R. B., Berge, G. S., & Culén, A. L. (2014). Publicly Displayed Interactive Installations: Where Do They Work Best? (ACHI)

Rosseland et al. (2014) show that the same Kinect-based interactive installation produces very different user behavior depending on the public space: in a university library (a pass-through, normed "serious" environment) interactions were short and users were noticeably more

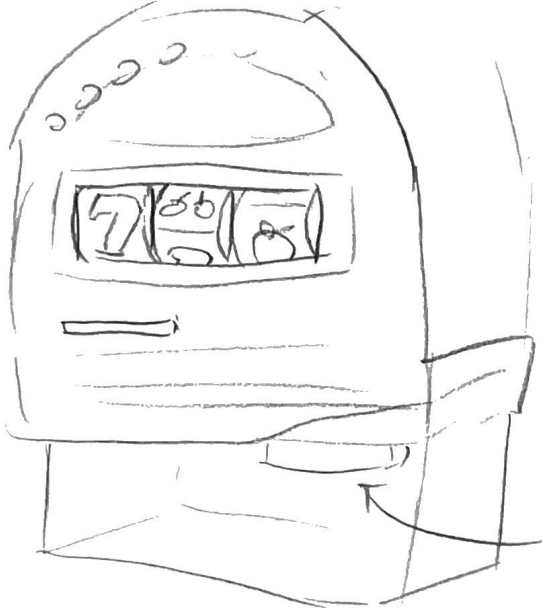
self-conscious, while in a museum/Maker Faire (a destination where exploration is expected) people interacted longer, were more joyful/expressive, and group engagement was stronger—plus they found sound was crucial for attracting attention and overcoming "display/interaction blindness." However, for my project I deliberately choose not to use audio cues because they are too distracting and annoying in a bar setting.

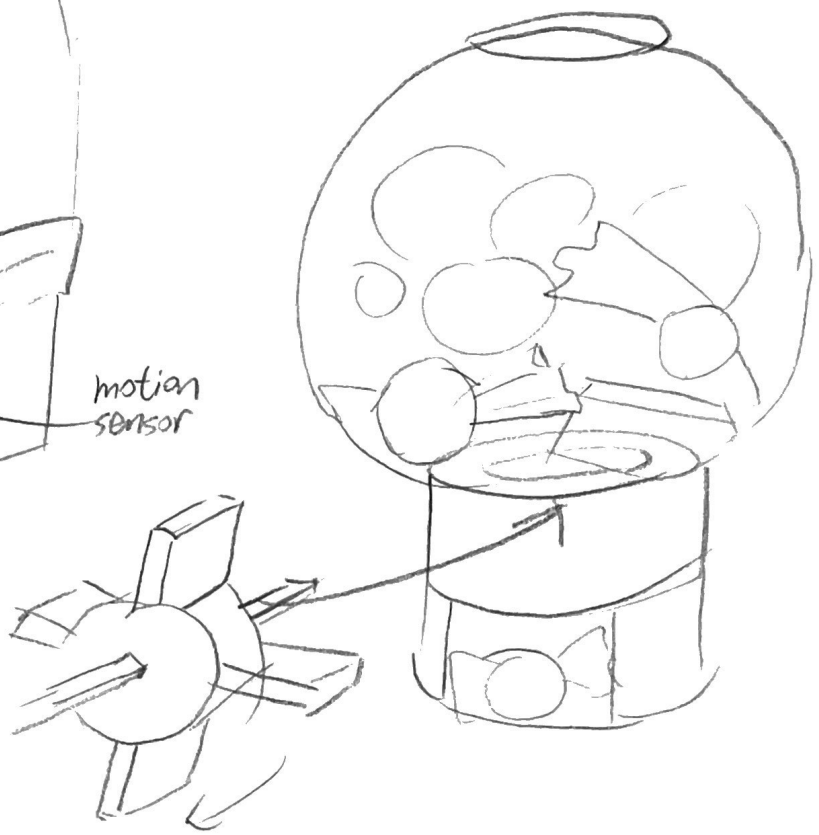
Clark, L., & Zack, M. (2023). Engineered highs: Reward variability and frequency as potential prerequisites of behavioural addiction. Addictive Behaviors, 140, 107626.

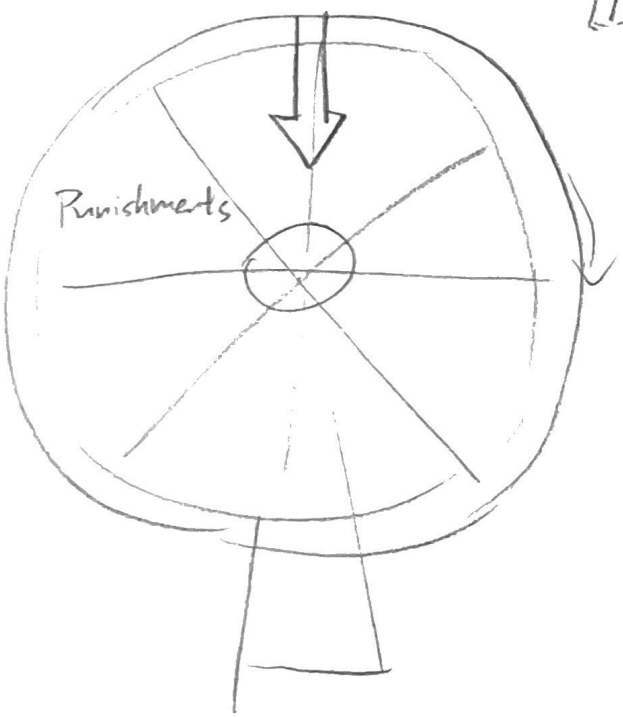
Clark & Zack (2023) argue that reward variability ("uncertainty") plus high-frequency delivery can make non-drug digital experiences "drug-like" by repeatedly triggering dopamine-driven reward prediction errors (under variable schedules), which may escalate incentive salience and promote behavioral addiction; they broaden "variability" beyond classic variable-ratio wins in gambling to layered variability in modern products (e.g., bonus features, loot boxes, infinite scroll, autoplay/personalized recommendations), and they highlight two key moderators: how uncertainty unfolds/resolves over time (resolution utility vs lingering uncertainty) and event frequency/temporal compression that accelerates learning and sensitization. For my project (designing engaging interactive experiences), this is a direct ethical/design lens: if I use novelty, randomness or rapid feedback loops to drive engagement, I may inadvertently recreate the "engineered highs" profile—so I should be intentional about pacing, transparency, cooldowns, and offering meaningful user control rather than relying on unpredictable micro-rewards.


1
I wish we were inside...
Same
2
WAVE 2 PLAY
OMG
What is this
3
READY...
Sensor
Sus but
Lemme try
...


4
YOU WIN
Oh yeah! Jackpot! !!~
whoatt...
5
Yayy my turn!
Can yall pls fasters?
Get in the line kiddo
Pls I want to play
Almost there...



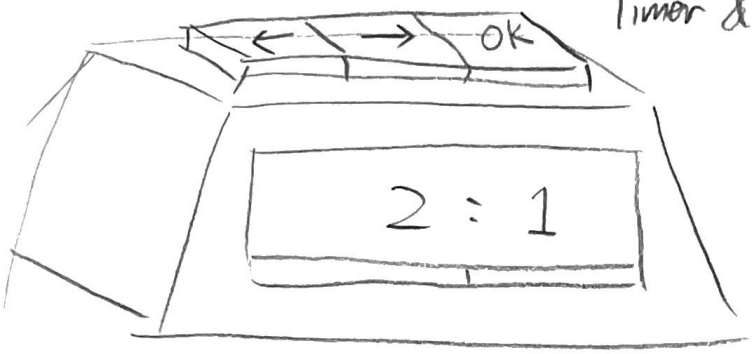




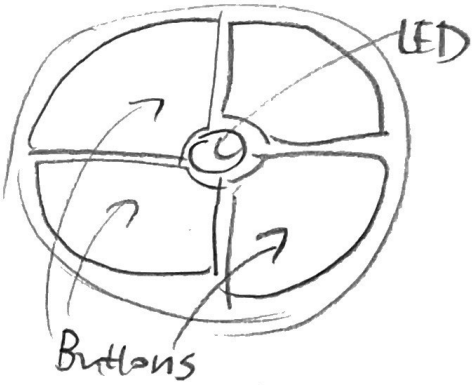
2 Player Reaction-Time game

Slap button when screen turns green

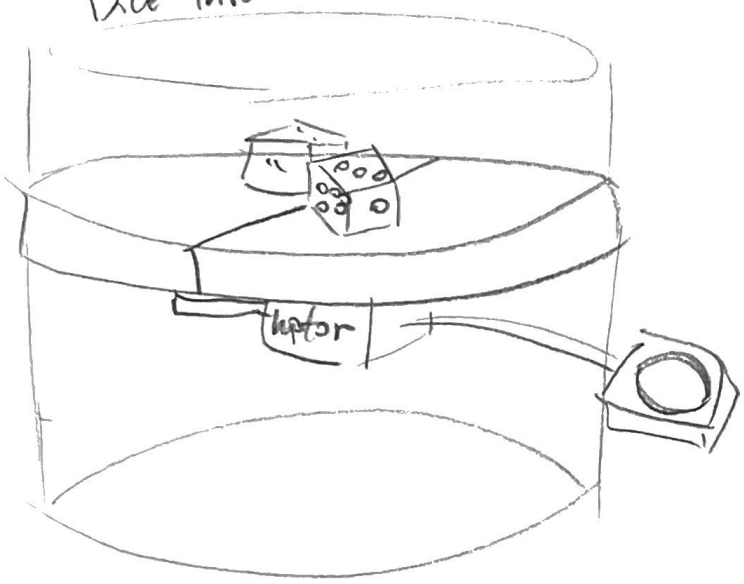
Timer & Scoreboard

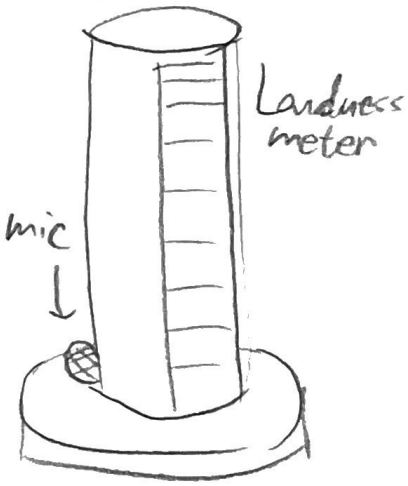


Memory Game

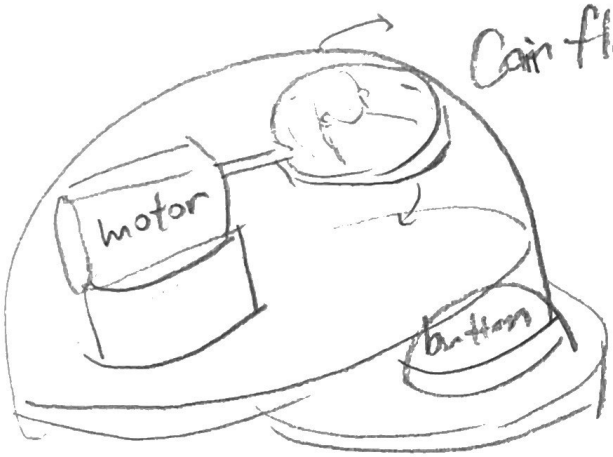


Dice Thrower

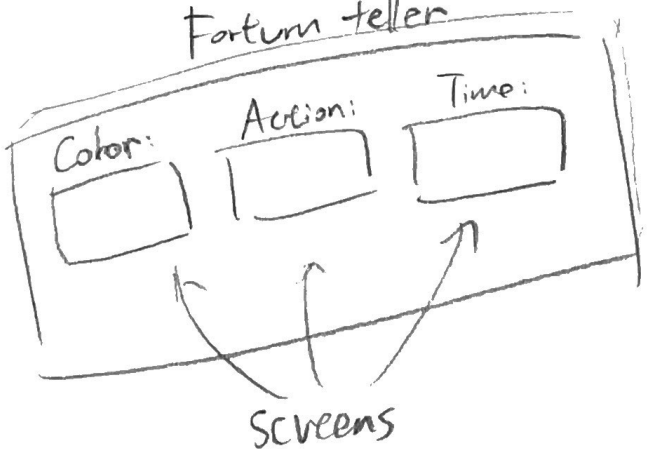


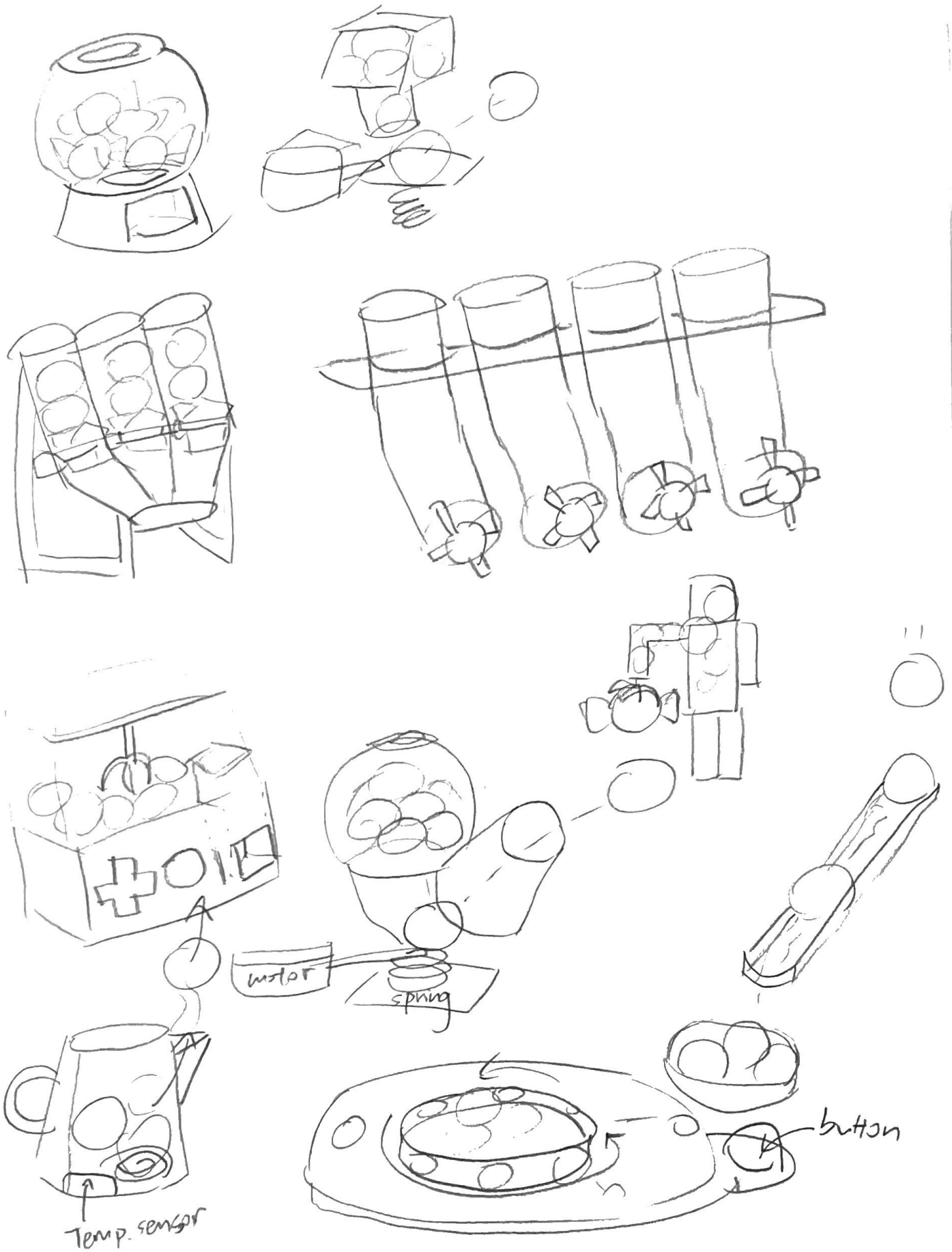


Coin fliper



Fortune teller




motor
spring
Temp. sensor
button