Angela's Self-Guided Summer Project Brief: Theme Park Project
Date Began: June 14th, 2022

Project Overview	*The Story*: [Vanellope] Now that I'm Princess around here, I've decided that *everyone* gets a chance to race in Sugar Rush. I just developed a new track: will you help me test it out? - First, you've got to design your kart. Welcome to my *sweet* new kart bakery! *Broad*: Design & Engineer an immersive experience driven by storytelling of an existing Intellectual Property *Specific*: Design & Engineer an immersive experience based on *Wreck It Ralph*'s kart-making scene to give guests the experience of building their own kart, becoming a racer, and realizing that they, too, are capable.
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Intellectual Property Overview	• *Intellectual Property:* The franchise is owned by the Walt Disney Company. There are several video games and spin-off films in addition to *Wreck It Ralph* and its sequel. These works include cameos and references of other video games and their characters, both within and outside of Disney's IP.
	• *Storytelling*: this scene is a turning point
	    ○ For Ralph, this is the moment he begins to realize that, despite his being a villain in his own video game, he is a good person at heart. Even though the final product is not perfect, Vanellope is ecstatic.
	    ○ For Vanellope von Schweetz, this is her moment of hope; she finally feels like a real racer, capable of showing others that she is worthy. Ralph risks everything to help her.
	• *Theme*: Others' perceptions do not define whether someone is good;

	being a villain in one story doesn't mean hero in none. It's not your responsibility to make everyone love you; it is simply enough to give them the opportunity. The power of friendship & giving.
	● *Current Attractions based on IP:*
	  ○ Movie itself was released in 2012, the sequel in 2018
	  ○ A 3-D motion-based dark ride, where guests play a variety of interactive arcade games presented in the movie; rumored in 2018 to open in 2022 in Disney World's "Tomorrowland" replacing an existing attraction
	  ○ Meet & Greet with characters, with props and set design mimicking those of the movie

Users	● Older children and young adults who recently saw the film, and are hoping to experience Vanellope's defining moment (specifically seeks experience) ● Families/Family members who may not have seen the film, but would like to enjoy the experience, typically along with the younger family members (coincidentally comes across) ● Guests who watched the film when they were younger; feel nostalgic and want to revisit their childhood in an experiential way (either seeks experience or coincidentally comes across)

Objectives	*The Experience Itself*
	● Stages: multiple parts of the experience in order to maximize immersiveness and storytelling; the experience is both life-size and accessible for all users
	  ○ Stage 1: Life-size scale creation
	    ■ Full immersive experience of walking into the kart factory of the movie, choosing a kart, designing it using large paints of "frosting," customizing with other "candies"
	  ○ Stage 2: Implementation
	    ■ After the kart is made, guests ride around in the kart on the Sugar Rush course from the movie, with the ability to take pictures.
	  ○ Stage 3: Small-scale take home product
	    ■ After the experience, guests have the option of purchasing a miniature, an exact replica of the kart they designed.
	● Incorporate Themes, as well as Fail-Fast, Make-Mistakes, Celebrate-Success Approach; customizable experience and products encourage returning guests
	● There are no similar, current experiences and this attraction is easily accessible, making it attractive for everyone visiting the existing

	theme park *The Project* ● Showcase Art, Design, and Engineering skills, as well as Storytelling and Project Management ● Reimagine an existing intellectual property, giving it a new life by applying it to an original idea ● At conclusion, identify which part of project I really enjoyed and would like to spend more time/depth exploring

Project Details	● *Timeline*: complete Phases 1-4 and begin Phase 5 by August 27th, complete Phases 5 & 6 by end of Fall 2022 semester
	● *Deliverables*:
	  ○ Art
	    ■ concept art illustrations of each stage
	    ■ sketchbook shots of design sprints
	  ○ Design
	    ■ 2d Visualization (signage environmental design)
	    ■ 3d Visualization (ride vehicle design)
	    ■ environment & show set design (elevations, section drawing)
	  ○ Engineering
	    ■ CAD (bare-bones ride vehicle/kart)
	    ■ materials (ASTM standards)
	    ■ engineering analysis of mechanics/dynamics calculations (mechanical engineering, MATLAB, statics, ASTM standards)
	    ■ fluid calculations (MATLAB..?)
	● *Phases*
	  ○ Phase 1: Design Research & Ideation
	    ■ 1.1 Rewatch *Wreck It Ralph*, taking note of details with overall experience in mind (2.5 hrs)
	      ● Sketches based on movie stills
	    ■ 1.2 Blue Sky ideation (5 hrs)
	      ● Ride vehicle designs
	      ● Systems design (how making works)
	      ● Set design for systems
	      ● Set design for track
	    ■ 1.3 Research
	      ● original concept art for the film
	      ● other similar ride designs
	      ● similar "custom" flows: Funko Pop, Build-a-Bear, Lego, Star Wars Lightsabers, Hershey Park
	    ■ 1.4 Revisit Ideation

- Add designs
  - Show set
  - Minigame design
- Determine scale of each
- Phase 2: Engineering Research
  - 2.1 Research current technology: car-related rides, attractions, or experiences → decide what kind of life-size technology works best
  - 2.2 Materials: reverse engineering → from potential ride vehicle designs, work backwards identify which materials might work
  - 2.3 Summarize findings & see what would best be applied: full write-out on what & why
- Phase 3: Visualization
  - 3.1 Revisit & iterate on original ideas based on engineering constraints
    - Finalize measurements
    - Identify whether ZBrush would be helpful
  - 3.2 Final concept illustrations: illustrate experience using Photoshop/Illustrator/Procreate
    - Stage 1
    - Stage 2
    - Stage 3
  - 3.3 Environmental graphic/signage design
    - Design sprint: ideation
    - Final design
    - Digital design package
    - Mockup
  - 3.4 Ride vehicle design (kart) using Blender & ZBrush
    - Build base
    - Build add-ons & environment
    - Animate
  - 3.5 Section drawing of Stage 1
  - 3.6 Elevations for show set design of Stage 1
  - *** REVISIT:
    - 3.7 Packaging Design
    - 3.8 All Collateral Design / Digital Design Package for Signage Design
- Phase 4: Expert Feedback
  - Art/Design: feedback on ideas, finished quality of designs
  - Engineering: how to incorporate these ideas into a working attraction, how to incorporate ASTM

	standards, where would you start
	○ Phase 5: Engineering Execution
	  ■ * Note: scope of Phase 5 is just Stage 1
	  ■ *** REVISITED:
	    ● 5.0 ADA & ASTM Calculations to determine size & angles
	  ■ 5.1 CAD final model of ride vehicle design(s) using Solidworks/Fusion360
	    ● 5.1.1 Research how the engineering would work (electric motor batteries & 4-wheel drive, self-driving capabilities, how they are wired up, how bumpers (front and back only? Or surrounding), steering wheel, brakes, emergency brakes work, size of seats, leg length, how tall a rider must be)
	    ● 5.1.2 Parts & Assembly
	    ● 5.1.3 Base ride vehicle model drawing
	    ● 5.1.4 Exploded view of base model
	    ● 5.1.5 FEA (finite element analysis): how much weight can it bear, what other forces could it withstand, how it withstands vibrations
	  ■ 5.2 Using 3d printers, create physical miniature prototypes
	  ■ 5.3 Dynamics and forces analysis
	  ■ *** REVISITED:
	    ● 5.5 User Experience Analysis: how each user group experiences the attraction differently; how to maximize the experience
	○ Phase 6: Expert Feedback Part 2
	  ■ Overall feedback
	  ■ Would it be feasible? If not, how to improve it?

Technology Research	● Qualities of ride vehicle (kart)
	○ Must be washable
	○ Must be durable
	○ Must be accessible for everyone, from kids to disabled to elderly
	  ■ What are ride vehicle accessibility standards (ADA)?
	  ■ Additional government standards?
	○ Must be able to be driven
	○ Must adhere to ASTM F24 standards
	  ■ Standard Practice for Design of Amusement Rides and Devices
	  ■ GO KART ASTM STANDARDS

	- ■ Standard Practice For Measuring The Dynamic Characteristics Of Amusement Rides And Devices
	- ■ Standard Practice For Quality, Manufacture, And Construction Of Amusement Rides And Devices
	- ■ Standard Practice for Design of Amusement Rides and Devices that are Outside the Purview of Other F24 Design Standards
	- ● How do current ride vehicle technology work? Would it be on a track or free reign?
	   - ○ How many basic choices do we offer guests?
	   - ○ How much would it cost to execute?
	   - ○ How are these ride vehicles manufactured?
	- ● Qualities of Added Elements
	   - ○ Must be washable; able to be removed, but stays for a few hours and doesn't transfer if touched (look into oil vs. water based products)
	   - ○ Must dry quickly
	   - ○ How do we spray/add elements without damaging the kart?
	   - ○ How much would the add-ons weigh?
	   - ○ How much material would we need to cover the whole vehicle?
	   - ○ How does spray paint work? Can it exist on a large level?
	   - ○ How are cars in the real world colored?
	- ● How much would the experience cost? Would it be a fully paid experience or a partially paid experience?
	- ● (Not within scope) Take-home product
	   - ○ Miniature-sized, research technology & 3d printing capabilities, time, & cost

Expert Research	*to be revisited *Non-Specific* - ● What is the workflow like? Does it start in one department and go back and forth, or start with the art/creative department? *Art/Design Specific* - ● When you look at the work, what makes a design successful? *Engineering Specific* - ● Is this feasible? - ● Is the technology ever out of budget?

Success Criteria: based on Disney Imaginations Judging Criteria
This is a good basis for success criteria because, even though the Imaginations competition is about creating an original storyline with original characters, the challenge is similar to the one I am

undertaking: imagining and creating a unique immersive experience. These judging criteria also provide metrics that set the foundation for the qualities that are important to the industry.

"Submissions will be judged based on, but not limited to the following:

- *Mastery of skills and talents* – Concept should demonstrate mastery of skills that we can leverage at WDI. The team should be well-rounded in terms of skillset and background.
- *Guest Experience* – Concept should consider the diversity of audience and take in consideration accessibility for families and guests.
- *Adherence to project challenge* – Design should embody the spirit of the project challenge.
- *Uniqueness* – Concept should be a unique and one-of-a-kind experience.
- *Feasibility* – Demonstrate the research and planning has been done to ensure the credibility of the proposal (i.e. assumptions, budget, schedule, design and engineering practicality.)

Your submission should be fun, original and innovative, and one that:

- Recognizes the cultural nuances of the selected location
- Pushes the boundaries of what currently exists
- Evaluates its business implications and impact on the community

In addition, make sure that your submission demonstrates:

- Ability to tell a compelling and engaging story
- Broad appeal to a diverse audience
- Knowledge and passion for Walt Disney Imagineering"

Angela's Self-Guided Summer Project: Theme Park Project
User Experience Analysis / Persona Mapping / User Journey

General User	- First impression: discovery - the internet - may consider booking the experience in advance - word-of-mouth - a visit to the theme park - the attraction's sign is inviting
Persona #1: Nostalgic Nancies	*User Description*: - May have seen the film long ago, and have an emotional connection to it (eg. childhood) - May remember the broad storyline, but not individual details *User Journey* - Discovery through one of three above - As they go through queue, may be with friends - Throughout attraction, experience feeling of nostalgia, exploration, and creative freedom - During the go-kart ride, they may drive fast (or recklessly) to have the feeling of a real racer. May race against friends or enjoy casually. - Afterwards, experience a feeling of accomplishment, fun, and excitement. - As they walk through the gift shop, they may consider picking up a version of their kart, but also may not feel strongly about it.
Persona #2: The Tag-Alongs	*User Description:* - The parent, guardian, or friend of the experience-seeker - May not have seen the film - The experience should provide enough context to allow them to follow the storyline *User Journey:* - Discovery through the person they're tagging along with, but may have heard of the experience through one of three discovery points listed above - They may be more family or experience oriented – still engaged in the process, but stepping back to allow the experience-seeker to take more decision-making control - More unsure about purchasing a miniature of the kart in the gift shop after the experience - The experience may encourage them to see the film

	afterwards
Persona #3: The Experience Seekers	*User Description*: - Saw the film recently - Primarily kids / teens - Ride should be physically accessible for this persona *User Journey*: - Discovery through one of three points from above, or saw other guests holding the miniature karts from the gift shop throughout the park - Throughout the experience, their top priority is to have fun — they are more/less worried about being perfect in the process, but they may get more upset when the games are frustrating or challenging - They may feel excited or frustrated: point of growth - After the experience would want to purchase a miniature of the designed kart, and may want to ride again and again

Angela's Self-Guided Summer Project: Theme Park Project
Design Research
Date Began: June 17th, 2022

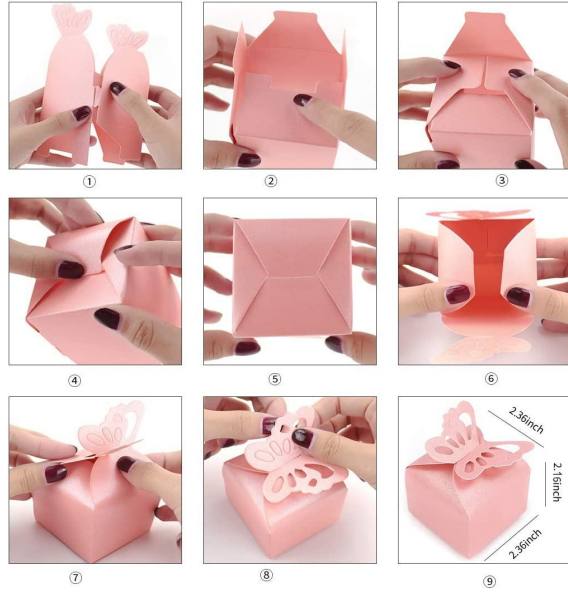| Environment Concept Art	*URL*: https://conceptartworld.com/news/wreck-it-ralph-conept-art-and-illustrations-by-walt-disney-animation-studios/ - Sugar Rush game concept art *Notable*: Color scheme, design & shape language, composition - Factory original concept art *Notable*: Storyboard shows ambitious environment design

Concept Artist: Cory Loftis	• *URL*: https://www.artstation.com/artwork/6akb2O • Original concept art for the Kart Bakery guard shack

Similar Ride: LEGOLAND Driving School	• *URL*: https://www.legoland.com/california/things-to-do/theme-park/rides/driving-school/
	• *Insights*:
	  ○ Users are elementary-school kids and their families, so the riders must be ages 6-13
	  ○ The set looks realistic, and they are not driving on a track, so it mimics the real world.

Similar Ride: Disney's Autopia	• *URL*: https://disneyland.disney.go.com/attractions/disneyland/autopia/
	• *Insights*:
	  ○ "Guests who are at least 54 inches (137 cm) tall may drive their own gas-powered car."
	  ○ Maneuvers like a real car, but is on a track, so is limited in direction

Go Kart Tracks	

Similar Experience: FunkoPop	• *Customize through Website*
	  ○ *URL:* https://www.funko.com/pop-yourself/designer
	  ○ Digital online platform that you customize, then the final product gets shipped to you.
	• *Customize In-Store: Hollywood Make Your Own POP!*
	  ○ Online waitlist/queue (handful of hours): 5 min. Grace period after notification
	  ○ Picking is outside & writing choices on paper: skin tone, hair style/color, outfits & accessories, bottoms → head inside, pick stickers for box?
	  ○ 15-20 minute wait to receive POP: you don't build yourself

Similar Experience: Build-a-Bear Workshop	• *URL:* https://www.buildabear.com/brand-about-story-experience.html
	• *Steps to Build:*
	  ○ Choose Me: Pick that special furry friend — from a silly superhero to a sporty mascot and a cheerleading bunny to a snuggly teddy bear.
	  ○ Hear Me: Add a special sound effect to your furry friend.
	  ○ Stuff Me: Customize your creation with sounds, scents, stuffing and, of course, our iconic special heart that holds your love and

	wishes. ○ Hug Me: Give your furry friend its first hug to make sure it's stuffed just right. ○ Dress Me: Turn up the fun with outfits and extras! ○ Name Me: It's official once your creation has a birth certificate of its bear-y own! ○ Take Me Home: Get ready for adventure with your new furry friend! ● *Insights:* experience lasts about an hour in store, target users are elementary and middle school kids
Similar Experience: Hershey Park	● *Create Your Own Candy Bar* ○ *URL:* https://www.chocolateworld.com/things-to-do/create-your-own-candy-bar.html, https://www.tripadvisor.com/ShowUserReviews-g52819-d106618-r115931826-Hershey_s_Chocolate_World-Hershey_Pennsylvania.html ○ *Insights:* $28.95 for the experience of choosing your own candy bar and customizing your own wrapper; guests get to see machines working and ingredients being added as they move along the conveyor belt; long lines if not booked in advance
Similar Experience: Disney, Savi's Workshop	● *Build Your Own Lightsaber Workshop* ○ *URL:* https://disneyland.disney.go.com/shops/disneyland/savis-workshop-handbuilt-lightsabers/ ● *Story:* ○ Travel to Black Spire Outpost, where a group known as the "Gatherers" ushers you into a covert workshop packed with unusual parts, whimsical pieces and miscellaneous memorabilia collected from the far reaches of the galaxy. ○ Under their guidance, you can construct your very own lightsaber and bring it to life through the power of kyber crystals. Builders beware—you must protect the shop's secrecy to avoid being discovered by the First Order! ● *Insights:* ○ $219.99 per lightsaber ○ choose one of 4 available hilt themes and receive a cloisonné pin, then pick a kyber crystal, then receive a kit to build the hilt [1 hilt, 4 sleeves (pick 2), 2 emitters (pick 1), 2 pommel caps (pick 1), 2 sets of activation plates and switches (pick 1 set)] ○ 31" lightsaber blade that lights up, with a carrying case

	included ○ Recommended Age: 5
Similar Experience: Ollivanders Wand Shop, Harry Potter World	● The wand picks the wizard; many different options, collectible ● Map with symbols tells guests which windows are interactive; the floor has a medallion, where there are spells that activate the windows ● In the wand pairing show, a magic door opens with a hidden wand chamber ○ "Failure" embedded until they can find the "perfect fit"
Hero Colors	● *URL:* https://twitter.com/disneyanimation/status/1176916531877298176 ● pinks, reds, and chocolates as their hero colors in the candy-filled world. Art by: Lorelay Bové, Visual Development

Kart User Research	● *User 1:* Nick
	    ○ 1: "average joe" all-around okay. Looks high speed but not high acceleration
	    ○ 2: not the best acceleration, but looks good for ramming into things
	    ○ 3: best acceleration because of compactness, looks less clunky/ more streamlined compared to #2 because of the round back, more going on/has more character than #1
	● *User 2:* Andrea
	    ○ 1: "flat," looks the most aerodynamic
	    ○ 2: "high heels"
	    ○ 3: "sneakers"
	● *User 3:* Dan
	    ○ 1: Sleek & smooth, cleanest-looking, fast-looking, would pick
	    ○ 2: Boxy & heavy
	    ○ 3: curvy, clean, aerodynamic (a close second)
	● *User 4:* Bella
	    ○ 1: classy, would choose because it reminds them of classic cars, has more character
	    ○ 2: sporty
	    ○ 3: wholesome
	● *User 5:* Louis
	    ○ 1: lean, would choose because it doesn't have sharp edges and looks to have the least air resistance
	    ○ 2: high heels, tall back looks like it would slow the kart
	    ○ 3: soft, vertical front looks like it would slow the kart

Box/Packaging Design	 ● *URL:* *https://www.amazon.com/Kslong-Boutique-Butterfly-Decoration-Dragees/dp/B0777JLBG7/ref=asc_df_B0777JLBG7/?tag=hyprod-20&linkCode=df0&hvadid=280497585511&hvpos=&hvnetw=g&hvrand=1823373494104191083&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9002242&hvtargid=pla-487589211508&th=1*
Citing Colors for Signage Design	● https://color.matthewspaint.tools : like "MP 10211 Citrus Yellow" ● https://www.pmscolorguide.com : like "PMS 108C"

Angela's Self-Guided Summer Project: Theme Park Project
Engineering Research
Date Began: June 23rd, 2022

THE KART (ASTM F2007-18)

2-Person Kart Model
- Examples:
    - https://en.rimo-germany.com/technical-data-of-the-sinus-twin.html
    - https://www.sodikart.com/en-gb/karts/rental/2drive-4.html
- Measurements Range
    - Length: 1900-2100 mm (74-83 in)
    - Width: 1460-1530 mm (57-60 in)
    - Height: 600-680 mm (23-27 in without rollbar), 1040-1200 mm (41-47 in with rollbar)
    - Torque: about 95 Nm per wheel
    - Max 7000 rpm
    - 35 minutes driving, 1 hour charging
    - Weight: 170-210 kg (375-463 lbs)
- Typically about $1500-4000 per kart

Wheels / Tires:
- *Aluminum Wheels*: easily manufactured by casting, very common
- *Concession Tires*: Out of the tire types, concession tires are made specifically for rentals rather than racing. They are durable, hard compound tires with thicker construction, allowing them to last longer.
    - For the purpose of this project, I will use Maxxis' Maxx Concession Tires as reference.
        - *URL*: https://maxxiskartracing.com/product/maxx/
        - Size: 12 x 4.00 - 5
            - Height: 12"
            - Tire Width: 4"
            - Rim Diameter: 5"
            - Circumference: 36 ¾"
        - Air Pressure: 40 psi
- *Hubcaps*:

    -
    - Have the outer diameter match the tire rim diameter (5")

- Implement retention ring system behind for easy application via robotic arms

- Padded seating
- Steering wheels about 10-12" in diameter

Restraint Systems (ASTM):
- 5.10.1 Restraint systems shall be designed using intended driver or passenger physical characteristics based on anthropometric data such as Dreyfuss Human Scales 4/5/6, 7/8/9, and CDC Growth Charts
- 5.10.3 Lap belts shall be installed so they engage the driver or passenger at an angle with respect to a horizontal plane at 40 to 70 degrees. The preferred belt angle is 60 degrees or more with respect to a horizontal plane.
- 5.10.4 When restraints are provided by means of seat belts made up of lap and upper torso belts, they shall be installed to pass over the shoulder between the driver's or passenger's shoulder joint and neck.
- 5.10.5 Restraint belts shall be a minimum of 1 ¾ in. (44 mm) in width

Accessibility (ADA) Guidelines:
- Transfer height: Ride seats designed for transfer must be between 14 and 24 inches above the load and unload area surface.

THE SPACE / BUILDING

Accessibility (ADA) Guidelines:
- Rides that are controlled or operated by the rider (such as bumper cars and go-carts) are not required to comply with the guidelines, but an accessible route to the ride and a turning space (60 inch diameter circle or T-shaped turning space) in the load and unload area must be provided.

STATION 1: FISH
- Use water jets on the floor at a 30-45 degree angle so that it does not interfere with the gummy bears floating on the surface. Some jets could bubble to the surface, which fits the Coca Cola theme.
- In a life-size lazy river, the velocity goal is 1-2 miles per hour. *calculate the rate proportional
- Have two wheels for user maneuver
    - Traditional-looking reel for up & down movement
    - Wheel modeled after movie wheel for left & right movement
- Fishing rod: about 7 feet, installed at a 45 degree angle
- Floating objects to fish: Gummy Bears, belly up
    - Use the same manufacturing process as rubber ducks: using different colored nontoxic vinyl plastic in liquid or powder form, in rotational molding

STATION 1 (cont.): PAINT
- *Main:* Chalk Spray Paint
    - Chalk spray paint takes about 15-25 minutes to dry to touch, which can be sped up through dehumidification, light heat (100-150 F), and ventilation. Because this is the first step, there is enough time for guests to finish the experience before interacting with the kart.
    - Washable with water because it's water-based: makes for easy clean-up.
    - Allows for multiple colors
    - Spray from about 12" away
    - Con: more expensive compared to other options, but the pros outweigh the cons.
- *Protective Layer Below:* Fire Retardant Paint
    - Acts as a layer in between protected object and flammable. It could be used as a barrier in between the spray paint and the motor and rest of the go kart.
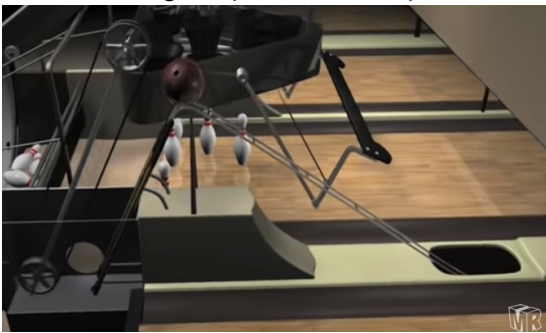
STATION 2: BUTTON GAME
- Use digital for screen so that it allows for easy updating, coordination with physical button

STATION 2 (Cont.): HUBCAPS
- See above ("Hubcaps" under Kart)

STATION 3: SKEEBALL
- Ball diameter: 3.5"
- Similar to bowling ball retrieval, the skee balls are returned using conveyor belts, acceleration, gravity, and a track system.
-

STATION 3 (Cont.): Kart Lights
- Digital-based computer technology: simplified video game picking

STATION 4: Decorations
- Water-activated tape material like confetti → kart could be lightly misted before this step, or the confetti can be misted as it's being fed out from the tubes, and will stick to the kart.
    - Only issue: in combination with chalk paint, it might slow the drying process. Could implement heavy fans and ventilation, and slow guests' moving to the final station using [idea].
    - If decorations fly off during riding around the track, it would not be a safety hazard.
- Halfway through, area lights are replaced with LEDS, creating a "glitch": concealing the final

product until the reveal

STATION 5: Reveal
- Standard garage model
- Heavy ventilation with fans