Bar Pong Gaming Table

Overview
The team was asked to develop a design for an automated game table capable of playing the commonly known game of beer pong. The table was expected to have a mechanism that would linearly translate cups in and out of the table, utilizing an electronic system that would be activated upon insertion of money. Electronic configuration was not expected of the team. It is important to note that the sponsor emphasized keeping the human element when creating the design, meaning the entirety of the table should not be fully automated. Additionally, when the game table was not being used for play, the table was expected to serve as an additional dining table so that space in the commercial establishment was not wasted.

Objectives
Project objectives included: Designing a durable working product that could be mass produced, creating an associated bill of materials with a cost efficient price point, and creating a working prototype of the final design. The team proposed to submit CAD drawings of the table components, a detailed description of the mechanism in which the table would operate, and a detailed bill of materials list of all recommended materials for the design with an associated price.

Approach
- Working with the sponsor the team first developed a detailed customer needs assessment for the design. The most critical needs to be considered consisted of efficiency, durability, and creativity in the table design.
- The patent of the design was provided to the team allowing the members to understand all design limitations.
- Considering all customer needs as well as the patent specifications, the team brainstormed multiple possible solutions to linearly translating the cups and creating a mechanism to cover the holes to ensure the table could be multi used.
- Collectively the team agreed upon utilizing a linear actuator to linearly translate the cups. Three separate actuators were purchased to determine the most appropriate product to be used in the design.
- Through extensive testing the team chose to use a Firgelli Actuator because of its simplistic design and its ability to meet all desired specifications.
- Collaboratively the team chose three possible solutions to cover the holes on the table consisting: a rubber flower approach, and a single flap vs. dual flap cover coupled with a spring loaded hinge.
- Through extensive testing again the team chose to use a single flap coupled with a spring loaded hinge to cover all holes in the design of the table.
- The team determined it would be most beneficial to construct the table in two sections- A box assembly housing the mechanical and electrical components, and a table base. This design creates faster manufacturing capabilities as well as the ability to safely secure all expensive equipment in a secure shelling also allowing for ease of maintenance.
- CAD drawings were created simultaneously with the construction of the prototype.
- The team troubleshoot multiple issues throughout the process including a new design required to eliminate the vibration of the cup as it linearly rose and lowered through the table.

Outcomes
- A working prototype was constructed and delivered to the sponsor.
- CAD files were compiled and delivered to the sponsor.
- A detailed bill of materials was compiled and delivered to the sponsor including a price point of creating the table: $1,330.44 (not including mass production, electronics, or labor).
- Recommendations were offered to the sponsor for completion of the design including: Adding a touch-screen interface for controlling the cups and appropriate materials to be used in the final construction of the design to match the desired customer needs.