Creation of a Puzzle for a STEM-Based Escape Room 2

Overview

Our sponsor, Michael Alley, has tasked our team to design and build a puzzle for a STEM-based escape room that will be used to help students learn and encourage prospective students to attend Penn State. Our molecular puzzle design reinstates chemistry concepts learned throughout the first two years of engineering courses, but can be adapted to teach many other concepts. Our major challenge was designing the mechanism for our puzzle. Through the use of RFID tags and readers, an Arduino control board, and a magnetic lock, we were able to create a fully functioning puzzle as one would find in professional escape rooms.

Objectives

Our team’s goals were to create a mechanism that was durable and adaptable to suit the needs of Penn State University in creating its own escape room. The puzzle itself was also to be STEM-related to peak the interest of students who were currently or considering pursuing a career in science, technology, engineering or math that would encourage teamwork amongst it’s participants.

Approach

- We obtained our customer needs from our sponsor, which included: STEM-based, team-oriented, adaptable, and durable.
- We listed out different STEM subjects and brainstormed puzzle concepts based off concepts within these subjects.
- After finalizing 5 different concepts for the escape room, we created a concept scoring matrix based off the customer needs to move forward with an idea.
- We chose an escape room puzzle based off of chemistry concepts and created CAD models and circuit diagrams for our electronics to accurately assess how an alpha prototype would be built and function.
- We tested the mechanism to see if the magnetic lock released when the RFID tags were matched with the correct RFID readers, tested the base to see if the wires were easily accessible, and tested the boxes to determine their durability.

Outcomes

- A STEM-based puzzle and mechanism was designed and built to target prospective college students and underclassmen.
- The mechanism built is durable, as well as adaptable. The puzzle can easily be modified by altering clues.
- Our Sponsor, Michael Alley will be able to use this mechanism over the years the escape room exists, with a minimal maintenance cost.