STEM-Based Escape Room - Team 1

Overview
The goal of our project was to design and build an escape room that meets the following criteria:
- Tests STEM knowledge learned in the first 1-2 years of classes
- Features, and teaches players about, “hidden figures” within STEM
- Puzzles which can not be completed by randomly guessing
- Have a “cool” factor to excite potential students and sponsors

In addition to designing and building an escape room, we also performed the systems engineering for future puzzle designs. We documented and outlined our thought process from the broad requirements to a fully functional escape room. Our main goal was to provide documentation for overcoming the initial project definition stage of the escape room, to expedite future capstone/undergrad student’s escape room designs.

Objective
Our primary objective was to design a room that would help to secure more funding for future escape room projects. In our design we were to perform the initial systems engineering for building a “general” escape room, to aid in the future project once more funding is secured. We also brought our escape room to the BJC, to show to potential sponsors that a Penn State College of Engineering escape room is a project worth supporting. Our project was to complete the groundwork for future groups, and to design an agile/portable room to demonstrate the value of escape rooms to sponsors.

Approach
- Create a functional decomposition for a “general” escape room, then apply it to our requirements
- Research “hidden figures” in engineering and design puzzles featuring their accomplishments
- Select four puzzles that flow into each other and create functional decompositions and workflows for each
- Use Arduino microcontrollers and a Raspberry Pi microprocessor to implement and control the puzzles
- Design the room around our puzzles and “hidden figures”

Outcome
Our documentation will be used in future escape room designs, and the project has secured more funding and a room on the Penn State campus to implement escape rooms in more permanently. Our software will be able to be used and understood by future students following our documentation. Our systems engineering will greatly aid future groups to allow them to design bigger and better rooms.