**Escape Room Assignment**

**Team 16**

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**Description -**

For the theme of the escape room, you will be presented in an old library of the haunted mansion you’re trying to escape from. With the walls covered in bookshelves except for the entrance and an exit door which has no handle. The players will be told that the exit door is frequently used by those that stay there, but not one person who lives in the haunted mansion can read. The players will have to deduce that the button would be located behind the book which is not dusty as it is regularly moved to be accessed whereas the other books are caked in dust as they haven't been picked up in centuries. When the player moves the book aside and presses the button, a sound will play and the servo motor will be triggered, unlocking the door and drawing the player’s attention towards it.

**Key Design decisions –**

We used a push button as the main sensor in the artefact, a buzzer was incorporated to give players audio feedback when the button is pressed alerting them to the door being unlocked, a servo motor was used as an actuator to simulate the unlocking and locking mechanism of the door.

**Components –**

Raspberry Pi Pico, Push Button (sensor), Buzzer (Actuator), Servo Motor (Actuator)

Raspberry Pi Pico – Microcontroller to control the puzzle

Push Button – Used for player’s input to trigger unlocking mechanism

Buzzer – Used as an audio indicator that the puzzle was completed

Servo Motor – used as the actuator for the unlocking mechanism of the exit

**Wiring –** (diagram of wiring at bottom)

|  |  |  |
| --- | --- | --- |
| Component | Raspberry Pi Pin | Function |
| Push Button (leg 1) | GP14 | Input (Checks when pressed) |
| Push Button (leg 2) | GND1 | Completes circuit |
| Buzzer (-) | GND2 | Completes circuit |
| Buzzer (+) | GP18 | Output (plays a sound when pressed) |
| Servo Motor (PWM) | GP17 | Controls the servo |
| Servo Motor (V+) | VBUS (5V) | Powers the servo |
| Servo Motor (GND) | GND3 | Completes circuit |

**User interactions and Error handling -**

1. If the correct button is pressed: the buzzer plays a sound for 1 second and the servo motor moves to the open position.
2. If the button is pressed again: the buzzer remains off and the servo motor will return to its closed position.
3. Error prevention: a short delay (0.5s) was inputted into the code and prevents accidental multiple presses of the button by players.

**Code explanation –** (picture of code at bottom)

GP14 was used for the push button to detect presses.

GP17 will send PWM signals to the servo motor, a Boolean ‘servo\_open’ was used to keep track of the servo motor’s state as well.

GP18 was used for the buzzer to sound when the button is pressed.

**Networking –**

The system could be connected to a room management system via the Wi-Fi which would allow those running the haunted mansion to know how long they’ve spent trying to solve a puzzle and could give them extra hints if needed.

**Reflections –**

While making the artefact we originally used an LED and resistor as a way of alerting the player’s that the door has been opened, we then realised it would make more sense in the scope of the escape room if a sound was played instead to follow the haunted feel of the mansion. We also changed the servo motor to toggle on and off to ensure the door would stay open so that players could leave the room and not accidentally re-lock the door on them.

**Diagram of Artefact**

