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| **1. UAT Scope (In Scope – Out of Scope)** | |
| **UAT - In Scope** | **UAT - Out of Scope** |
| - Temperature can be controlled with UI  - Rough estimate of Room occupancy. User is only notified when an excess is detected  - Light reacts to room occupancy | -Setting temperature outside of the specified range of 10⁰ C to 30⁰ C  -Changing the humidity of the closed environment  - Modifying the voltage from the regulator  - Fully accurate room occupancy data  - Entities entering through the exit or exiting through the entrance |

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| **2. UAT Assumptions and Constraints** |
| **UAT Assumptions** |
| The user will have been assumed literate, possessing a basic understanding of the Celsius metric and can perceive basic colors (red, green, blue, etc). The heating and cooling system will be scaled to suit the given environment. The environment is assumed to have a separate security system that is alerted when an excess room occupancy is reached. The MAX led on the board symbolizes an alert signal to be sent to the security system, which in turn will evaluate the actual room occupancy count. Since the system is contained within the environment, displaying a count of people in the room is not needed. |

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| **UAT Constraints** |
| The temperature may only be set between 10-30 degrees Celsius. The modeled environment will contain no more than five entities within its enclosure. These entities must enter in the designated entrance, and exit in the designated exit. The max voltage the system will draw from the power jack is 12V. The terminal entries of the relay will draw a maximum of 110V from a power outlet. |

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| **3. UAT Risks** | | | |
| **Description** | **Probability**  **High|Med|Low** | **Impact**  **High|Med|Low** | **Mitigation** |
| Short Circuit/  PCB malfunction | Low | Mid-High | Assure PCB was fabricated correctly and components are properly soldered and adjusted |
| Electrical Shock from power outlet | Med | High | Follow safe testing procedures when supplying the relay with the wall power. Cover all exposed wire and ensure clamp terminal connections are fully secure |
| User input delay | Low | Low-Mid | Ensure that the interrupt is handled and delayed appropriately in code |
| Entity detection delay | Low | Low-Mid | Ensure that the PC interrupt is handled and delayed appropriately in code |

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| **4. UAT Team Roles & Responsibilities** | | |
| **Name** | **Roles** | **Responsibilities** |
| Eric Pires | Product Designer | Ensure the hardware and software design meets technical speciation’s |
| Richard Harrison | User Representative  and Product Tester | Ensure the system design meets customer specifications |
| Johnny Lamanuzzi | Test Analyst | Document the testing procedure and ensuring the reliability of the system |

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| 5. UAT Entry Criteria | |
| **ID** | **Criteria** |
| 5.1 | Testing Environment – 72qt storage tote with cutouts for components and wiring. |
| 5.2 | Power – Wall outlet and power strip for three power connections (Main Board, Light, Heater) |

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| 6. UAT Requirements-Based Test Cases | |
| **ID** | **Test Cases** |
| 6.1 | **Procedure:** Measure Voltage Regulator  **Expected Results**: Voltage and current input is 12V, 1A while outputs are 5V, 200mA |
| 6.2 | **Procedure:** Measure Desk Lamp control  **Expected Results**: Desk lamp is provided with a maximum of 363mA when the relay is activated. |
| 6.3 | **Procedure:** Measure Heater control  **Expected Results:** Heater is provided with a maximum of 1.55A on the low setting, 2.27A on the high setting. |
| 6.4 | **Procedure:** Measure Fan control  **Expected Results:** MOSGET triggers the fan load with logic signal. (High for on, Low for off). Fans are provided with at most 250mA. |
| 6.5 | **Procedure:** Increase Set Temperature  **Expected Results:** The UI will instantly update the set temperature value accordingly to the number of presses from the user. The heating relay will activate and power on the personal heater (Defaulted to the low setting). The relay will deactivate once the set temperature is matched with the currently read temperature. |
| 6.6 | **Procedure:** Decrease Set Temperature  **Expected Results:** The UI will instantly update the set temperature value accordingly to the number of presses from the user. The cooling fan will be activated and will terminate when the currently measured temperature matches the set value. |
| 6.7a | **Procedure:** Add new entity into empty environment  **Expected Results:** IR entrance sensor will trigger. Light relay will activate and power the desk lamp. |
| 6.7b | **Procedure:** Add excess of entities into environment  **Expected Results:** MAX LED is enabled |
| 6.7c | **Procedure:** Decrease entities under maximum allowance  Expected Results: IR exit sensor will trigger. MAX LED is disabled |
| 6.7d | **Procedure:** Remove all active entities in environment  Expected Results: Light relay is disabled. Desk Lamp will turn off |

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| 7. UAT Test Results | | |  |  | |
| **ID** | **Test Cases** | **Pass/Fail** | **Tested By** | | **Date Tested** | |
| 6.1 | Measure Voltage Regulator |  |  | |  | |
| 6.2 | Measure Desk Lamp Control |  |  | |  | |
| 6.3 | Measure Heating Control |  |  | |  | |
| 6.4 | Measure Fan Control |  |  | |  | |
| 6.5 | Increase Set Temperature |  |  | |  | |
| 6.6 | Decrease Set Temperature |  |  | |  | |
| 6.7a | Add new entity into empty environment |  |  | |  | |
| 6.7b | Add excess of entities into environment |  |  | |  | |
| 6.7c | Decrease entities under max allowance |  |  | |  | |
| 6.7d | Remove all active entities in environment |  |  | |  | |

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| 8. Document Signatures | | | |
| **Role** | **Name** | **Signature** | **Date** |
| Project Designer | Eric Pires |  |  |
|  | John Lamanuzzi |  |  |
|  | Rick Harrison |  |  |

# 9. Addendums & Appendices

## Schematic

