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TECHNICAL REQUIREMENTS:

Object-oriented programming (Python Classes and Class methods)

USER INTERFACE APPLICATION SPECIFICATIONS:

SCREENS:

* Home Screen

1. Present Time of Use Billing information in a Graphic and intuitive way
2. Means to access menu of connected appliances and loads (Thermostat and EV)
3. Time/Date and other relevant information

* Menu Screen:

1. Means to access control screens and information for the thermostat and EV
2. Means to return to home screen

* Thermostat Screen:

1. Control the temperature level based on user input
2. Means to switch between Heating and/or Cooling Modes
3. Collect user scheduling input
4. Display historical energy consumption
5. Means to return to previous screen

* EV Screen:

1. Means for Switching the load remotely
2. Means for collecting user scheduling input
3. Means of displaying historical energy consumption
4. Ability to return to previous screen

* Scheduling Screen:

1. Retrieve user input for specifying deadline for appliance
2. Retrieve user input for specifying appliance start times
3. Means to cancel schedule
4. Means to return to previous screen

* Energy consumption Screen:

1. Present Appliance Energy Consumption Data in a Graphical and intuitive way
2. Means to return to previous screen

CENTRAL CONTROL UNIT GRAPHIC USER INTERFACE APPLICATION DESIGN:

OVERVIEW:

1. HOME SCREEN

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| --- | --- |
|  | |
| Purpose: |  |
| Navigation and User Interaction: |  |

1. MENU SCREEN:

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| --- | --- |
|  | |
| Purpose: |  |
| Navigation and User Interaction: |  |

1. THERMOSTAT SCREEN:

|  |  |
| --- | --- |
|  | |
| Purpose: |  |
| Navigation and User Interaction: |  |

1. EV SCREEN:

|  |  |
| --- | --- |
|  | |
| Purpose: |  |
| Navigation and User Interaction: |  |

1. THERMOSTAT SCHEDULING SCREEN:

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| --- | --- |
|  | |
| Purpose: |  |
| Navigation and User Interaction: |  |

1. EV SCHEDULING SCREEN:

|  |  |
| --- | --- |
|  | |
| Purpose: |  |
| Navigation and User Interaction: |  |

1. ENERGY CONSUMPTION SCREEN:

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| --- | --- |
|  | |
| Purpose: |  |
| Navigation and User Interaction: |  |

UML CLASS DIAGRAM:

**\*\***

CENTRAL CONTROL UNIT GRAPHIC USER INTERFACE APPLICATION TESTING:

STAND-ALONE TESTING:

The following tests will be performed on the central control unit application to evaluate the design against the design specifications listed above:

1. Log into the utility portal and enter new Time of Use (ToU) pricing information
2. Run the CCUGUI.py program.
3. Confirm that the ToU information displayed on the Home Screen is correct
4. Confirm the current data and time displayed on the home screen
5. Evaluate the home screen based on the following interface specification:

HOME SCREEN:

|  |  |
| --- | --- |
| **Specification** | **Y/N** |
| Retrieve and Present Time of Use Billing information in a Graphic and intuitive way |  |
| Means to access menu of connected appliances and loads (Thermostat and EV) |  |
| Time/Date and other relevant information |  |

1. Click on the menu button on the home screen
2. Evaluate the menu screen based on the following specifications:

MENU SCREEN:

|  |  |
| --- | --- |
| **Specification** | **Y/N** |
| Access buttons and/or icons for the control screens and information for the thermostat and EV |  |
| Means to return to Home Screen |  |

1. Click on the thermostat icon
2. Attempt to increase or decrease temperature setting
3. Change from heating to cooling mode
4. Evaluate the screen based on the following specifications:

Thermostat Screen:

|  |  |
| --- | --- |
| **Specification** | **Y/N** |
| Control the temperature level based on user input |  |
| Switch between Heating and/or Cooling Modes |  |
| Means for the retrieval of user scheduling input |  |
| Display historical energy consumption |  |
| Means to return to previous screen |  |

1. Return to the menu screen
2. Select the EV icon
3. Evaluate the screen based on the following specifications:

EV Screen:

|  |  |
| --- | --- |
| **Specification** | **Y/N** |
| Switch the load remotely |  |
| Collect user scheduling input |  |
| Display historical energy consumption |  |
| Return to previous screen |  |

1. Select the scheduling option
2. Input a test schedule for EV charging at future time
3. Delete Schedule
4. Evaluate the screen based on the following specifications:

SCHEDULING SCREEN:

|  |  |
| --- | --- |
| **Specification** | **Y/N** |
| Specify deadline for appliance in HH:MM time format |  |
| Specify appliance runtime in HH:MM time format |  |
| Specify appliance start times in HH:MM time format |  |
| Cancel schedule |  |
| Return to previous screen |  |

1. Return to EV screen
2. Select the usage option
3. Evaluate the screen based on the following specifications:

ENERGY CONSUMPTION SCREEN:

|  |  |
| --- | --- |
| **Specification** | **Y/N** |
| Present Appliance Energy Consumption Data in a Graphical and intuitive way |  |
| Means to return to previous screen |  |