CP2406 Assessment 1 – Plan

Smart Home Automation Simulator

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Sun***  ***SUNNY (46%)*** | | | ***Rain***  ***RAINY (22%)*** | | | ***Partial Sun***  ***CLOUDY (22%)*** | | |
| **Time** | **Temp** | **Sun** | **Time** | **Temp** | **Sun** | **Time** | **Temp** | **Sun** |
| 5 AM | 14° | 0%< | 5 AM | 16° | 0%< | 5 AM | 15° | 0%< |
| 6 AM | 17° | >100% | 6 AM | 17° | >60% | 6 AM | 17° | >80% |
| 12 PM | 30° | 100% | 12 PM | 26° | 75% | 12 PM | 28° | 90% |
| 6 PM | 25° | 100%< | 6 PM | 22° | 65%< | 6 PM | 23° | 75%< |
| 7 PM | 24° | >0% | 7 PM | 22° | >0% | 7 PM | 22° | >0% |
| 12 AM | 20° | 0% | 12 AM | 19° | 0% | 12 AM | 21° | 0% |

Every hour the weather is updated with a chance of it being sunny, rainy or cloudy.  
Every Second in real time equals One-Minute in the simulation (60:1 ratio).

## Ways to keep a set in-door temperature without relying on manual inputs:

* Smart Blinds
* Smart Air-con
* Smart lights (adds unwanted heat)

## Trigger Events:

* Environmental Conditions: (Single Sensor – Indoor)
  + Sunny, rain, cloudy protocol.
  + Hourly weather updates.
* Household Activities:
  + Person enters/leaves room.

## General Requirements:

* Display statuses of appliances and home fixtures.
* Trigger appliances and home fixtures to change behavior on triggering rules.

## Goal for Home Automation to do:

* Regulate electricity usage appropriately during the day and night.
* Monitor water usage in the garden depending on environmental conditions.
* React to home security threats and hazards (e.g. fire, smoke, intruder).
  + Fire / smoke controlled by non-IoT smoke alarm.

The simulator must be capable of demonstrating the effect on electricity usage and water usage over the simulated day while triggering events occur. Please note that even though the environmental conditions are “random”, they should produce the same “pseudo-random outcomes” every time the simulator is run – this provides a way to show people the effect of using (or not using) a smart appliance.

## 10 Meaningful User Stories (5 spike users)

describe how a user can interact with the simulator to control what happens during the simulation.

|  |  |
| --- | --- |
| ***USER STORY 1*** | |
| **STORY** | A father needs to remotely water the garden so that when he is away the garden stays healthy. |
| **ESTIMATE** | 2 Days |
| **NOTE** | Selectable watering times |
| ***USER STORY 2*** | |
| **STORY** | A consumer needs to keep their house clean so that they don’t have to do it when they get home. |
| **ESTIMATE** | 2 Days |
| **NOTE** | User can manually initiate cleaning protocol via GUI. |
| ***USER STORY 3*** | |
| **STORY** | A user needs to see live output in the GUI so that they can understand their energy usage. |
| **ESTIMATE** | 4 Days |
| **NOTE** | Displays selected fixtures and appliance status |
| ***USER STORY 4*** | |
| **STORY** | As a user, I can check when the main entry has been unlocked. |
| **ESTIMATE** | 1 Day |
| **NOTE** | Display date, time and possible photo |
| ***USER STORY 5 (spike)*** | |
| **STORY** | As a homeowner, I want to monitor my daily energy use so that I can easily understand my past and current energy consumption. |
| **ESTIMATE** | 1.5 Days |
| **NOTE** | Graphic view to display and compare |
| ***USER STORY 6*** | |
| **STORY** | As a user, I want to choose the appliances, so I can add appliances at will. |
| **ESTIMATE** | 1 Day |
| **NOTE** | Add and remove appliances at users will |
| ***USER STORY 7*** | |
| **STORY** | As a user, I want to choose the appliances, so I can add appliances at will. |
| **ESTIMATE** | 2 Days |
| **NOTE** | Add and remove appliances at users will |
| ***USER STORY 8*** | |
| **STORY** | As a user, I want to run a simulation to get a sense of how the system would work. |
| **ESTIMATE** | 8 Days |
| **NOTE** | Uses user fixture and appliances to run a realistic simulation. |
| ***USER STORY 9*** | |
| **STORY** | As a homeowner, I want to keep my house secure with motion sensors to alert me of any intruders |
| **ESTIMATE** | 1 Day |
| **NOTE** | Notifies the homeowners phone about unwanted visitors. |
| ***USER STORY 10*** | |
| **STORY** | As a homeowner, I want to monitor the temperature so that I can view changes in fixture activity. |
| **ESTIMATE** | 6 Hours |
| **NOTE** | Automatically changes the behavior of fixtures in accordance to the set temperature. |

Every story must have a set of tests.

Interpret the software’s problem statement.

Meeting with the customer.

"Appliances and fixtures are similar but not the same thing. A fixture is a smart device that has sensors and actuators that is fixed in position. Whereas an appliance is a smart device that has sensors and actuators that isn't fixed in position."

the rooms have fixtures and appliances, fixtures and appliances have state (e.g. on/off), the room has a current temperature and current ambient light. The garden can be considered an (outdoor)room.

## UML Class Diagram

**As a homeowner, I want to** see my daily energy use in a histogram **so that I can** quickly understand my past, current, and projected energy consumption.

As a homeowner, I want to monitor the temperature so that I can view changes in fixture activity.

## House Details

1. **Living Room** – Motion Sensors, Light, Aircon, Ceiling Fan, Door Lock, TV, Vacuum.
2. **Main Bedroom** – Motion Sensors, Light, Aircon, Fan, TV.
3. **Second Bedroom** – Motion Sensors, Light, Fan.
4. **Kitchen** – Motion Sensors, Light, Oven, Kettle, Coffee Machine.
5. **Garage** – Motion Sensors, Light, Door Lock, Car.
6. **Garden** – Motion Sensor, Light, Sprinklers.

## Fixtures - KEY

1. Motion Sensors - spike
2. Room Aircon
3. Room Lights
4. Room Ceiling Fan
5. Car Port Garage Door
6. Sprinklers

use a single global temperature, so when (say) the global environmental temperature reaches (say) 30 degrees then the aircon might switch on in a room...

## Appliances - KEY

1. Car – report status like service, tire pressures, fuel level and distance.
2. Oven – tells you progress, changes temp accordingly.
3. TV – Lets you
4. Kettle -
5. Coffee Machine -
6. Smart Vacuum (my idea) – cleans the specified areas



