CENG 3004: Software Engineering

Smarty Home

Software Requirements Specification Document

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8 **Hata! Yer işareti tanımlanmamış.**

9 24

1 Overview

Our smart home system has controlling your entire building technology with only one smart device. Namely, homeowners can control the security, comfort and energy efficiency of their home with smart devices, smart applications installed on smartphones and tablets. Our consumers are people who have high socioeconomic level.

How it works?

Our customer should download a mobile app that can remote control their smart home technology., Homeowner can check security system, electricity system and heat system even change them, when nobody is at home.

- **Security System:** Security is clearly a requirement for smart home. While they are also miles away from your home, the system checks your doors, windows and shutters. Also, our system can check housebreaking with mechanic sensors on doors and if someone forces the door, system sends a notification to nearest police station.

- **Electricity System:** Redundant lambs, whiteware and electronic appliance are closed automatically. Lambs, whiteware and electronic appliance will switch on automatically or by voice commands.

- **Heat System:** Our heat system allows you to control your heating via smart device of homeowner when he/she is not at home. It is a great way to save the energy. The system optimizes the temperature of house when the temperature reaches the degree that is set.

Mobile Application

Mobile application is an **obligation**, not optional. User can be sign up with **Name, Surname, Phone Number(s), e-mail address** and **Home Address**. Also, user must create a **password**. Otherwise, user can sign in with their **fingerprints** if they determine it.

If user have two or more houses, he/she can choose one of houses in list at our application starting menu. Also, the users can give permission to other family members at starting menu, too. The allowed users sign in with their fingerprints.

2 Requirements

2.1 Functional Requirements

Requirement Identifier	Priority	Description
lockDoors	High	The system allows to lock the doors.
turnOnOffLights	High	The system allows to turn on/off lights.
cutOffElectricity	High	The system allows to be cut electricity off.
calculateSleepTime	Medium	The system calculates the time of sleep.
checkTemperature	High	The system checks temperature of house parts.
changeTemperature	High	The system changes temperature.
faceRecognition	Medium	The system checks the faces of visitors.
checkFluidLevel	Medium	The system warns for fluid level of floor.
voiceCommand	Medium	The homeowner allows to command with his / her voice.
giveInfoOfWeatherCondition	Low	The system gives information about weather condition.

2.2 Nonfunctional Requirements

Requirement Identifier	Priority	Description
timeOfLockDoors	High	The system must lock the doors **1 minute** after the homeowner leaves the house.
call911	Medium	The system must call the police in **5 seconds** after the door is forced.
timeTurnOffLights	Medium	The system must switch off if there is no action for **30 minutes.**
voiceCommandOfLights	High	The system must change lights **2 seconds** after homeowner commands with his/her voice.
cutOffElectricityRemotely	Medium	The system must cut electricity off in **5 seconds** if homeowner command via mobile application.
setTemperature	Medium	The system does not allow the specified temperature to change by **4 °C.**
checkWasher	High	The system does not allow **1 lb.** more than defined amount of weight of laundry in washer.

3 Actors and Roles

- **Homeowner:** This actor is owner of smarty home and he/she is main user in our system. The homeowner can register via mobile application and control the his/her house. Also, he/she can command with voice for some stuff in smart house.

- **Police:** This actor is for security of smart house and the cops will come as quickly as possible if there is a theft attempt.

- **Mechanic Sensor:** This actor is for doors about forcing and it can also use for limit of washer.

- **Thermal Sensor:** This actor is for temperature of house and it can check the temperature all the time. It can optimize the temperature of house if there is an abnormality. Also, it can change temperature via voice command.

- **Sound Sensor:** This actor is for voice commands. It can understand the commands and it will do what homeowner wants.

- **Light Sensor:** This actor is for lambs and lights of house. It will turn lights off automatically if the homeowner sleeps and this situation provide savings of energy.

- **Smart Sleep Sensor:** This actor is about beds and sleep of homeowner. It can start the timer if homeowner sleeps and it can also stop the timer if homeowner wakes up. Then, it calculates the sleep time.

- **Electrically Sensor:** This actor is about the electricity. It can be cut off via mobile application if this actor fire alerts to mobile phone of homeowner.

4 Use Cases

Use Case Identifier	UC-1
Use Case Name	DetectThief
Participating Actors	Mechanic Sensor, Police
Flow of events	1. Home system gets the information from the mechanic sensor about forcing the door. 2. The notification will be sent to nearest police station if the door is forced. 3. The home system send notification to homeowner's phone about this theft situation.
Entry condition	Customer has an active email.
Exit conditions	Customer creates his/her account by successfully completing first activation process.
Related non-functional requirements[1]	call911

[1] Use the non-functional requirement identifier from Section 2 when appropriate

Use Case Identifier	UC-2
Use Case Name	CheckSleepTime
Participating Actors	Homeowner, Smart Sleep Sensor
Flow of events	1. House system gets information from smart sleep sensor. 2. House system calculates the sleeping time. 3. The system sends a notification about time of sleep to the mobile phone of homeowner.
Entry condition	Homeowner sleeps on the bed.
Exit conditions	Homeowner wakes up.
Related non-functional requirements[2]	calculateSleepTime

[2] Use the non-functional requirement identifier from Section 2 when appropriate

Use Case Identifier	UC-3
Use Case Name	TurnOffLightsAutomatically
Participating Actors	Homeowner, Light Sensor, Smart Sleep Sensor
Flow of events	1. Homeowner fall asleep for 30 minutes in bedroom or living room. 2. House system gets the information from the smart sleep sensor about time of sleep. 3. House system turns lights off.
Entry condition	Homeowner is situated in bedroom or living room.
Exit conditions	The lights are off.
Related non-functional requirements[3]	timeTurnOffLights

[3] Use the non-functional requirement identifier from Section 2 when appropriate

Use Case Identifier	UC-4
Use Case Name	ChangeLightWithVoice
Participating Actors	Homeowner, Sound Sensor, Light Sensor
Flow of events	1. The system gets the information from the sound sensor if the homeowner commands. 2. In two seconds, the lights are changed by the house system.
Entry condition	Sound sensor perceive the command of homeowner.
Exit conditions	The lights are changed.
Related non-functional requirements[4]	voiceCommandOfLights

[4] Use the non-functional requirement identifier from Section 2 when appropriate

Use Case Identifier	UC-5
Use Case Name	ChangeTemperature
Participating Actors	Homeowner, Sound Sensor, Thermal Sensor
Flow of events	1. Homeowner commands to the sound sensor for changing temperature. 2. Thermal sensor checks the temperature of house. 3. The system adjusts the temperature to the desired level.
Entry condition	Homeowner wants to change the temperature.
Exit conditions	Temperature is reached the desired level.
Related non-functional requirements[5]	changeTemperature

[5] Use the non-functional requirement identifier from Section 2 when appropriate

Use Case Identifier	UC-6
Use Case Name	Login
Participating Actors	Homeowner
Flow of events	1. Homeowner enters his/her username. 2. Homeowner enters his/her password. 3. The captcha verification will be done by homeowner.
Entry condition	The application runs.
Exit conditions	Homeowner logins successfully.
Related non-functional requirements[6]	

[6] Use the non-functional requirement identifier from Section 2 when appropriate

Use Case Identifier	UC-7
Use Case Name	Register
Participating Actors	Homeowner
Flow of events	1. Homeowner enters the related information to the application. 2. Application sends verification mail to homeowner. 3. Homeowner verifies the account via activation code.
Entry condition	Homeowner buys smarty home.
Exit conditions	Homeowner registers successfully.
Related non-functional requirements[7]	

[7] Use the non-functional requirement identifier from Section 2 when appropriate

Use Case Identifier	UC-8
Use Case Name	CheckWeatherCondition
Participating Actors	Homeowner, Sound Sensor
Flow of events	1. House system gets information from the internet. 2. House system gives information that is received to the smart device of homeowner.
Entry condition	Homeowner asks sound sensor for information about weather condition.
Exit conditions	The system gives weather information to homeowner.
Related non-functional requirements[8]	giveInfoOfWeatherCondition

[8] Use the non-functional requirement identifier from Section 2 when appropriate

Use Case Identifier	UC-9
Use Case Name	ControlWasher
Participating Actors	Homeowner, Mechanic Sensor
Flow of events	1. Laundries reaches a certain weight limit. 2. Mechanic sensor alerts. 3. Homeowner takes the laundry out.
Entry condition	Homeowner puts laundry into the washing machine.
Exit conditions	Alarm becomes deactivated.
Related non-functional requirements[9]	checkWasher

[9] Use the non-functional requirement identifier from Section 2 when appropriate

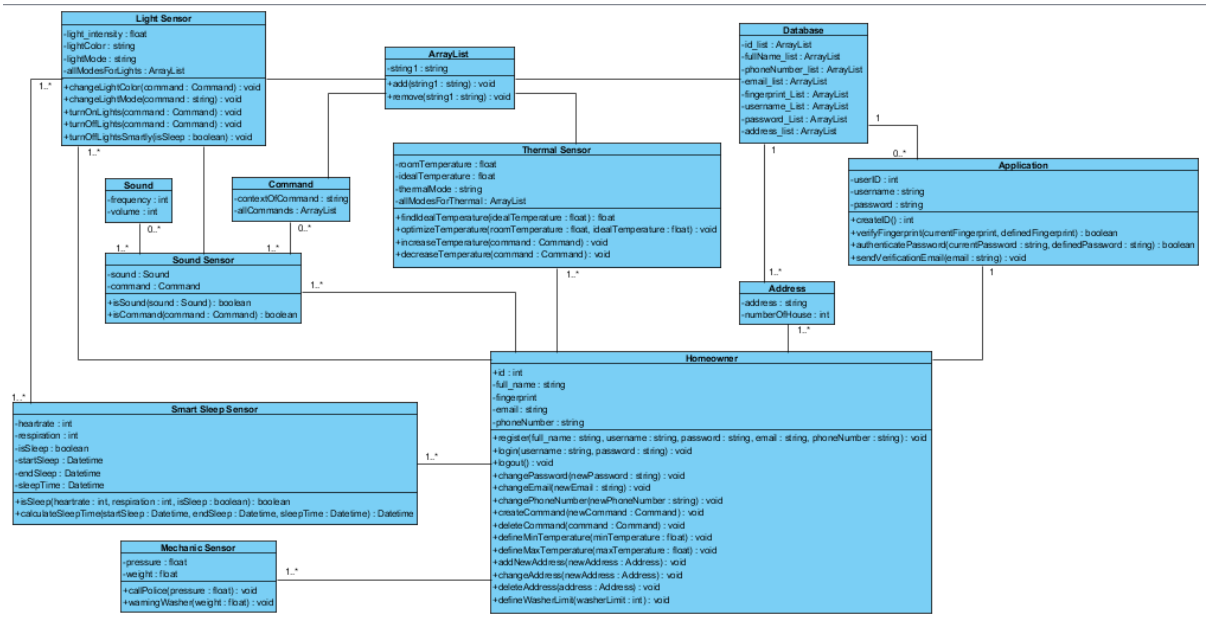
Use Case Identifier	UC-10
Use Case Name	CutOffElectricityForFire
Participating Actors	Thermal Sensor, Electrically Sensor
Flow of events	1. Thermal sensor detects fire. 2. Thermal sensor gives an information about fire to the electrically sensor. 3. Electrically sensor cuts the electricity off.
Entry condition	The fire has broken out.
Exit conditions	The electricity is cut off.
Related non-functional requirements[10]	cutOffElectricity

[10] Use the non-functional requirement identifier from Section 2 when appropriate

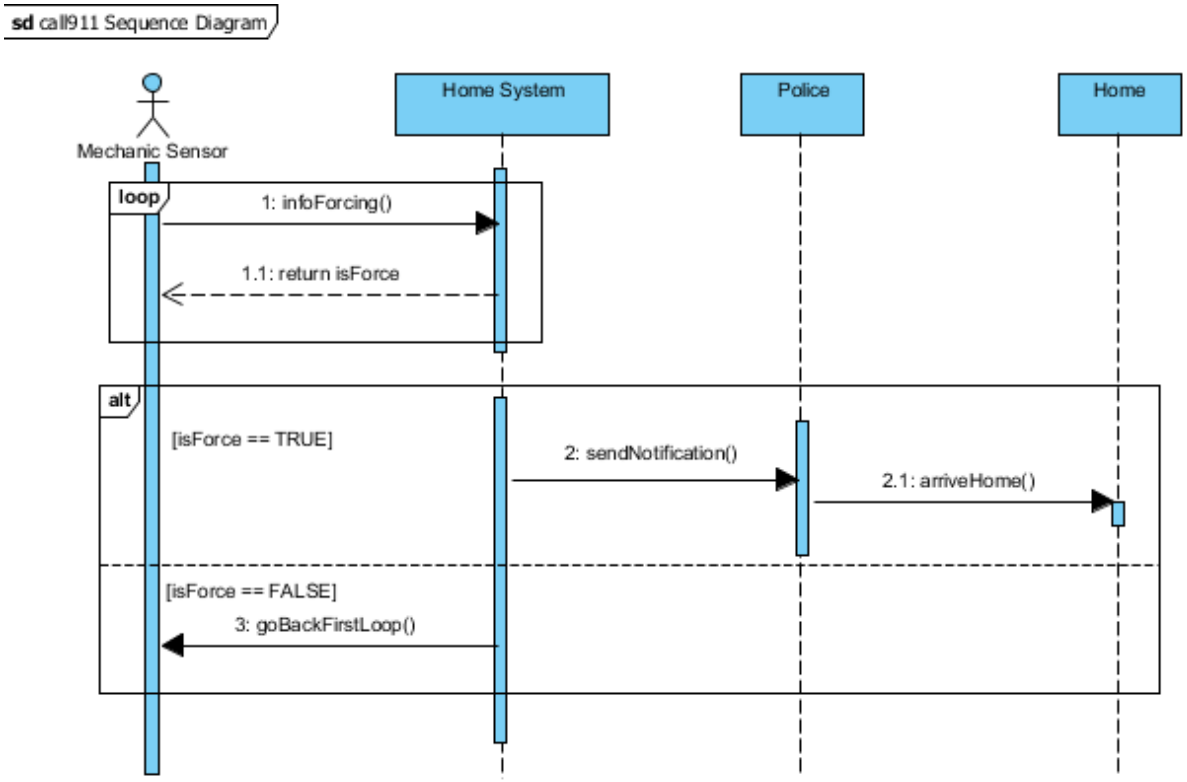
5 System models

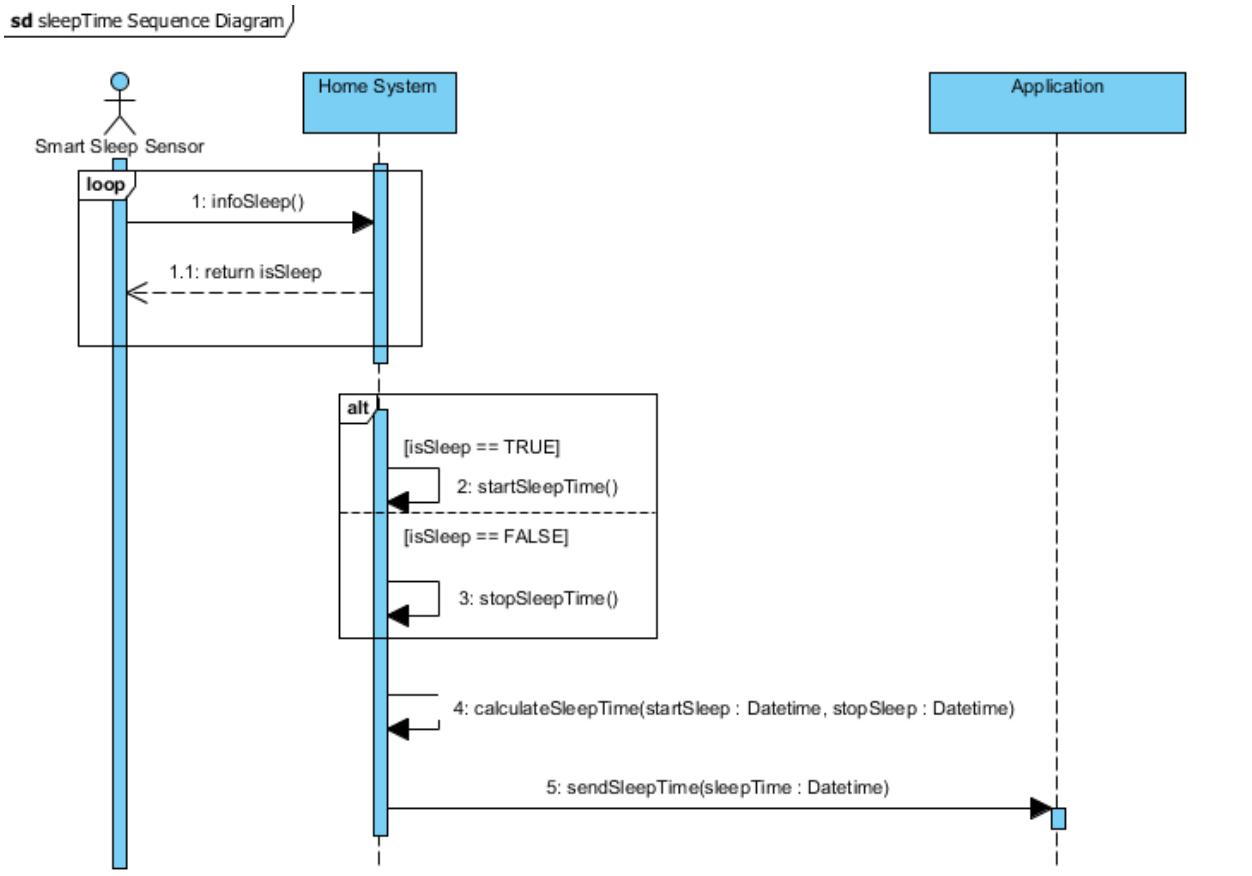
5.1 Use Case Diagrams

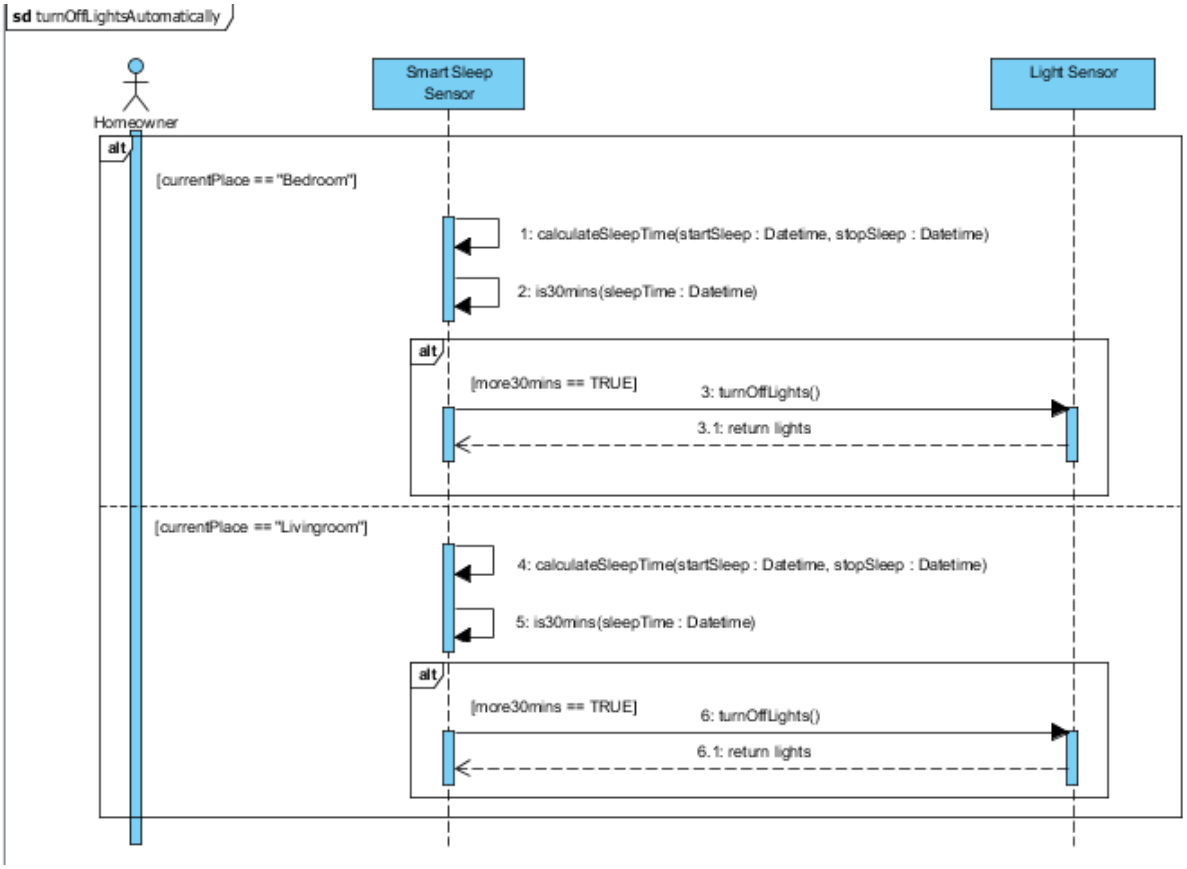
5.2 Class Diagram



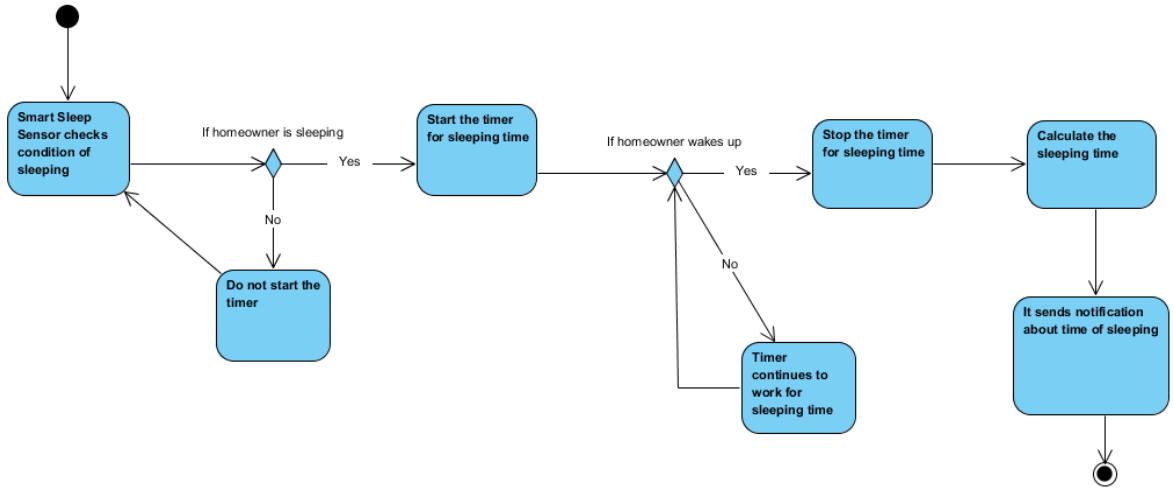
5.3 Sequence Diagrams

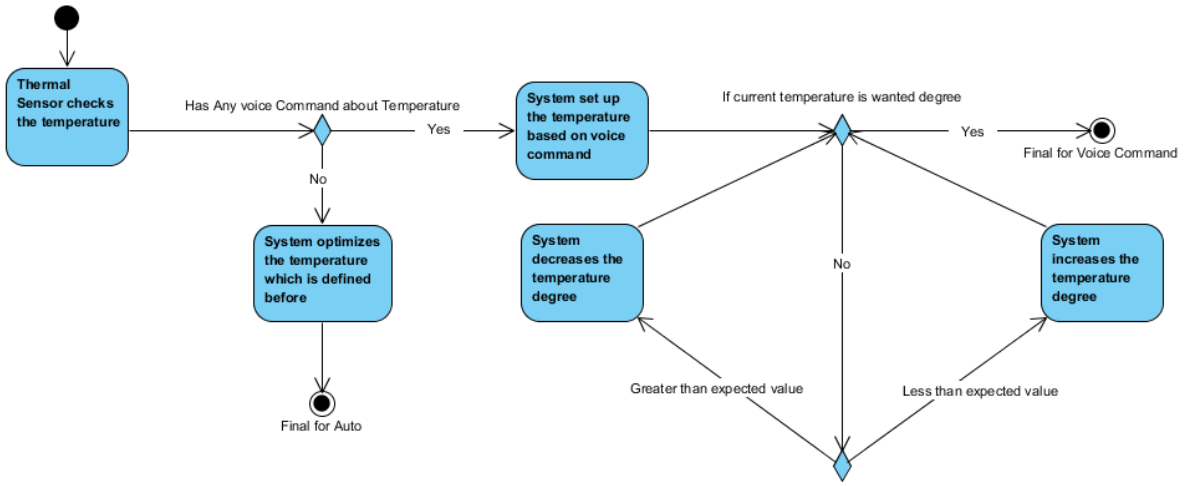


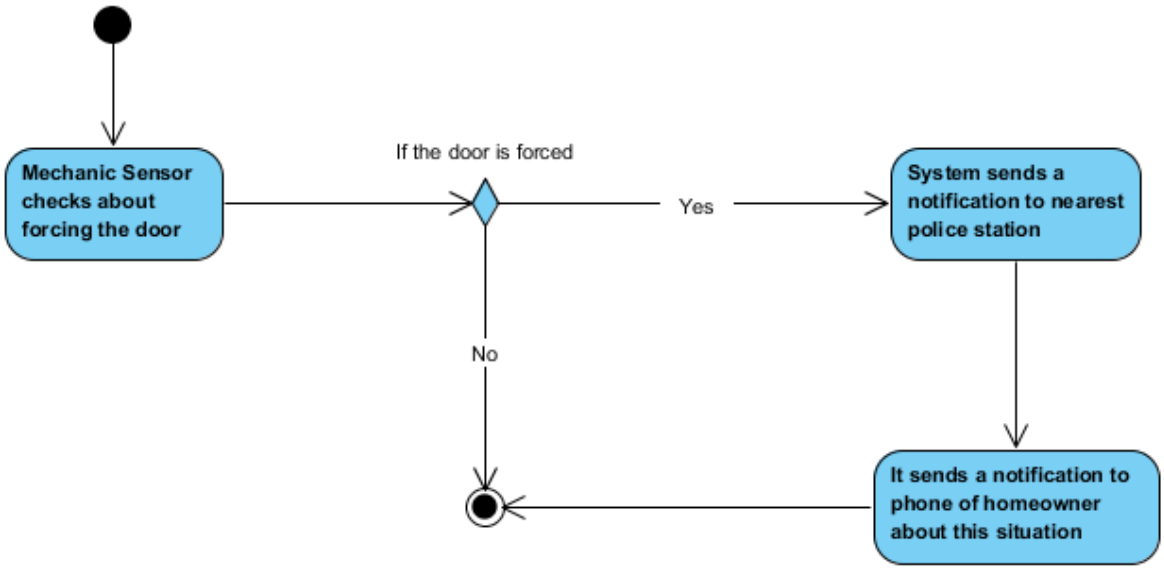




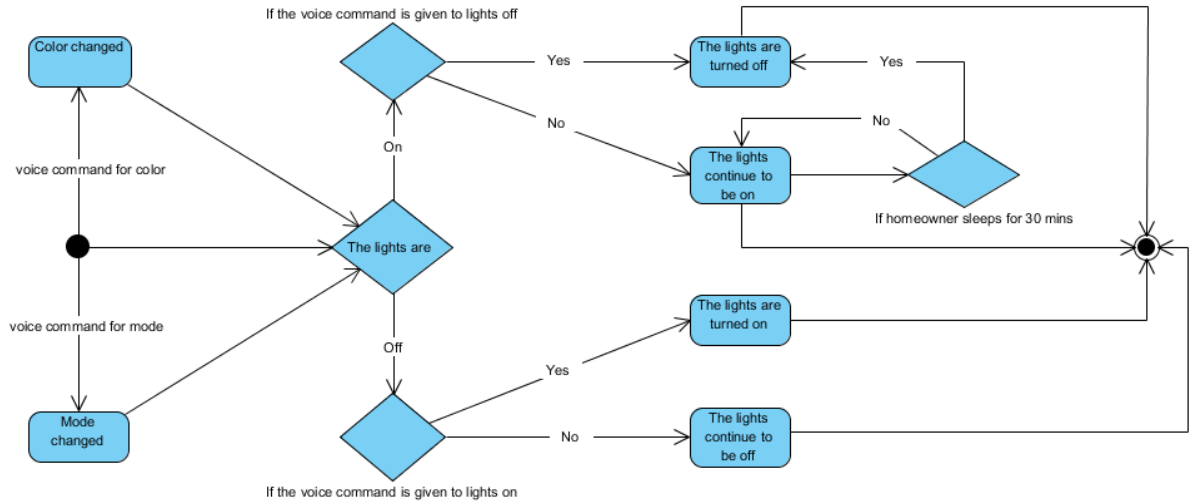
5.4 Activity Diagrams



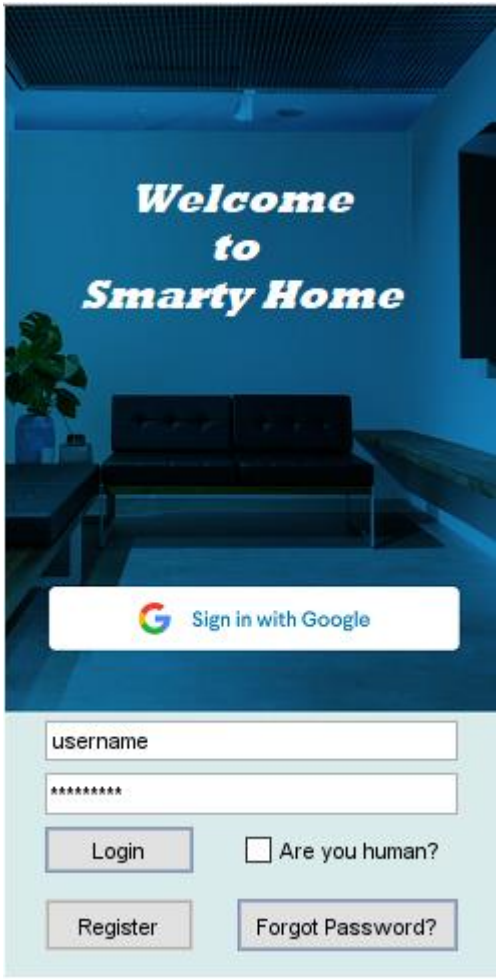

Thermal Sensor checks the temperature
Has Any voice Command about Temperature
Yes
No
System set up the temperature based on voice command
If current temperature is wanted degree
Yes
Final for Voice Command
System optimizes the temperature which is defined before
Final for Auto
System decreases the temperature degree
No
System increases the temperature degree
Greater than expected value
Less than expected value


Mechanic Sensor checks about forcing the door
If the door is forced
Yes
System sends a notification to nearest police station
No
It sends a notification to phone of homeowner about this situation

5.5 State Chart Diagrams



6 User Interface Diagrams



7 Glossary

Smarty Home: Name of the project which is designed by us.

Voice Command: A human command which provides interaction with the house system parts.

Visitor: A person who comes to smarty home.

Thief: A person who comes to smarty home without homeowner's permission and forces the door.

Smart Device: An electronic appliance, generally connected to other devices or networks via different wireless protocols.

Mode: A concept which is consists of information about the lights and temperature condition.

- **Thermal Modes:**
    1. Winter Mode
    2. Spring Mode
    3. Summer Mode
    4. Autumn Mode

- **Lights Modes:**
    1. Sleeping Mode
    2. Relax Mode
    3. Reading Mode
    4. Party Mode
    5. Romance Mode

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9 Appendix

We have no appendix part.