

SmartNest: Smart Home System.

Requirements Analysis Document

Team: Group B
Team Members: Heba Azeef & Harman Sandhu

Table of Contents

<i>Introduction.....</i>	<i>2</i>
Purpose of the system.....	2
Scope of the system.....	2
Objectives and success criteria of the project.....	2
Definitions, acronyms, and abbreviations.....	3
<i>Current System.....</i>	<i>3</i>
<i>Proposed System.....</i>	<i>4</i>
Overview.....	4
Functional requirements.....	4
Nonfunctional requirements.....	5
Usability.....	5
Reliability.....	6
Performance.....	6
Supportability.....	6
Implementation.....	6
Interface.....	7
Operations.....	7
Packaging.....	7
Legal.....	7
Security.....	7
System models.....	8
General Use Case Diagram.....	8
Scenarios.....	9
Use case descriptions.....	12
Activity Diagrams:.....	28
Sequence Diagrams:.....	36
State Machine Diagrams:.....	42
<i>Glossary.....</i>	<i>43</i>

Introduction

Purpose of the system

The proposed home management system aims to tackle the challenges faced by individuals in managing their smart home environments efficiently. With the rapid adoption of smart devices, homeowners encounter difficulties in coordinating and optimizing these technologies to meet their needs. This system aims to transform the way home environments are managed, by leveraging innovative technologies and industry best practices, to create a unified platform that seamlessly integrates smart devices, optimizes resource utilization, enhances user experience, and ensures compatibility and scalability for future enhancements.

Scope of the system

The scope of the proposed system covers numerous functionalities that incorporate the development of a comprehensive home management platform. This platform seamlessly integrates smart devices into a unified platform, optimizing resource consumption and energy efficiency, implementing robust security measures to protect user data and privacy, enhancing user experience through intuitive interfaces and customizable settings, and ensuring scalability and future-proofing for emerging technological advancements.

Objectives and success criteria of the project

1. Simple Configuration and User Onboarding:
 - Design an intuitive interface for effortless system navigation.
 - Ensure usability for diverse user groups with varying accessibility needs.
 - Offer clear training materials for user guidance.
2. Scheduling & Simplified Management:
 - Enable users to create and manage schedules with ease, including recurring events and reminders.
 - Automatically generate schedules based on user data.
 - Implement a user-friendly interface for managing smart office functionalities.
 - Automate routine tasks to minimize the need for dedicated personnel.
3. Streamline Integration:
 - Develop a unified platform to seamlessly integrate various smart office systems and devices.
 - Ensure interoperability among different providers for a cohesive experience.

4. Enhanced Security Features:

- Provide advanced security features to protect sensitive data and systems.
- Enable user authentication to access certain permissions (e.g., admin customization abilities).
- Implement real-time monitoring and alerts for rapid response to security incidents.

5. Optimization for Efficiency:

- Utilize data analytics to optimize energy consumption and operational efficiency.
- Integrate scheduling and automation features to streamline tasks and boost productivity.

6. Customization for Individuals:

- Develop a user-centric approach with user profiles to allow customization of home system settings based on individual preferences.
- Offer personalized profiles and settings to enhance comfort and productivity.
- Track user preferences for tailored automation and enable user authentication for permissions

7. Ticket Support:

- Establish a system for users to submit and track support tickets for technical issues or assistance.
- Provide timely responses and resolutions to submitted tickets
- Ensure transparency and accountability in the ticket resolution process.
- Implement user-friendly interfaces for submitting and monitoring tickets.

Definitions, acronyms, and abbreviations

2FA - 2-factor authentication

BT - Bluetooth

No additional acronyms/abbreviations were used. See glossary for definitions.

Current System

The current state of smart home management is characterized by inconsistent solutions and incompatible devices, leading to inefficiencies and challenges for homeowners. The cost to own a smart ecosystem in the current market comes in two forms, the cost of equipment and the cost of integration. These two costs often strain consumers when attempting to achieve seamless integration and efficient management, as many households rely on standalone smart devices that operate on different protocols, lacking interoperability. In addition, each company tends to prioritize compatibility exclusively with its own devices within its ecosystem, further exacerbating the challenges consumers face. These communication protocols consist of Wi-Fi, Bluetooth, Serial, X10, and ZWave just to list a few. Additionally, the complexity of these systems often requires ongoing management and maintenance, presenting challenges for everyday individuals without specialized technical knowledge.

Proposed System

Overview

The proposed home management system aims to address the challenges of fragmented smart home management by offering centralized control, cross-device compatibility, and intelligent automation. It will prioritize seamless integration of diverse smart devices, ensuring ease of use for the homeowners regardless of the brand or communication protocol it utilizes. In addition, the system will prioritize optimization of resource utilization and energy efficiency through the implementation of intelligent algorithms and automation, allowing for more efficient use of resources. With user-friendly interfaces and customizable settings, the system will help enhance the user experience by catering to individual preferences and making it easier for users to interact with their smart home systems. Furthermore, implementing robust security measures into the system to safeguard user data and protect against cyber threats, ensures peace of mind for homeowners. Ultimately, the system will be designed to support scalability and accommodate future upgrades, allowing it to evolve alongside emerging technologies and meet the changing needs of the homeowners over time.

Functional requirements

1. SmartNest must allow for the creation of 'homes' which link together various rooms, devices, and users

2. SmartNest must allow users to be invited to a home, as well as the configuration of different user permissions (specific permissions regarding devices as well as the home in general)
3. SmartNest must allow the addition of new smart devices regardless of the type as long as they communicate using WiFi, Bluetooth, Serial, X10, and/or ZWave.
4. SmartNest must allow adding new rooms, for users to partition their home environment.
5. SmartNest must allow for the creation and customization of new scenes that may take place in their rooms or environments.
6. SmartNest must provide centralized control, allowing users to manage and control all connected devices and rooms from a single interface.
7. Multi-user access must be supported, allowing for a hierarchy of various levels of control and access functionalities.
8. Users will have the ability to configure notifications and alerts for specific events.
9. SmartNest must support real-time monitoring and reporting of device status.
10. SmartNest must be available for remote access and control over smart devices from any location with an internet connection.
11. Capacity to generate standard reports, including energy efficiency, device activity data, and connection disruption.
12. SmartNest adjusts the time and date scheduled for a scene/scenario that is scheduled.
13. SmartNest allows for support tickets to be submitted with ticket status.
14. The system should be able to change display languages and the format of numbers displayed (ie. 12 hours to the 24-hour clock)
15. The system should be able to display time in all time zones
16. SmartNest uses several temperature sensors throughout the home to better regulate any fluctuating temperature
17. SmartNest must be able to aircast mobile devices' screens to compatible registered devices inside the smart home
18. SmartNest must be able to integrate devices that are not provided by SmartNest but are still connected to the same network
19. SmartNest should be able to be integrated into the local network by connecting it directly to the modem
20. Automated “discovery” and onboarding of new devices, with simple prompts for users to define monitoring preferences.

Nonfunctional requirements

Usability

1. Users should be able to register their accounts and edit their home system on Chrome and Internet Explorer

2. The system should be intuitive and easy to use, requiring minimal training for homeowners to operate effectively.
3. Should provide the same level of functionality on both mobile and desktop
4. The system should be forward and backward-compatible with existing and new smart devices and technology.
5. The user can enable or disable sounds (alarms, notifications.)

Reliability

1. The system should be available with minimal downtime and disruptions of 30 minutes to home automation functionalities (provided Internet connectivity and electrical supply are available).
2. Mean time to failure should be 3 weeks or higher (What did you mean by this?)
3. SmartNest will use 2FA to provide robust security safeguards, with an access control mechanism.
4. System alerts will be sent whenever issues are encountered(e.g. loss of connectivity to specific devices, low battery warning on devices)

Performance

1. The system should be responsive, with response times under 20 seconds for device commands and scheduled triggers
2. The system should be able to process the creation of a new home template (without devices) in under 1 minute.
3. The system should be scalable and capable of accommodating up to 25 connected devices and 5 concurrent users in a single home without compromising performance or functionality.
4. The system should accommodate up to 200 online users creating new accounts or registering devices concurrently.

Supportability

1. The system should be easy to maintain with automated updates and troubleshooting tools to minimize downtime to <10% and ensure optimal performance.
2. The system should provide informative notifications of the occurrence of an error to a user, less than one minute after the error occurs (e.g. loss of connectivity to specific devices, low battery warning on devices)
3. The system can provide diagnostic information on demand for support personnel

Implementation

1. The system should be able to easily integrate other compatible systems and sensor tools not manufactured by SmartNest
2. All aspects of the SmartNest system should be coded in Java, for maintainability.

3. SmartNest should run on any Unix operating system
4. The SmartNest hardware (server) has a small footprint and can be installed anywhere in the house.
5. User will be able to download the application to their preferred monitoring devices (phone, iPad, desktop).

Interface

1. SmartNest complies with physical interfaces defined by Accessibility Guidelines allowing for haptics and features like text resizing and screen contrast.
2. Users can choose between primarily icon- or text-based interface.
3. Backlight and screen sleep feature to assist with visibility and power management.
4. SmartNest may lose some functionality of non-supported devices to integrate it with the smartNest user interface.

Operations

Packaging

1. SmartNest must be simply packaged allowing for simple transport and home delivery.
2. All connection cables (network, power) provided.
3. “Powered by SmartNest” window stickers are provided to serve as a possible crime deterrent and to generate market awareness.
4. Requires simple user installation of SmartNest hardware server with internet connectivity.

Legal

1. SmartNest must never adjust room or home temperatures to levels that would be harmful to humans.
2. SmartNest will log for audit, all alerts, and servicing messages. If the user chooses to ignore alerts, resulting in a loss of monitoring efficiency, there must be a record that alerts were delivered but not actioned.
3. SmartNest is a home automation system, not a security system. It is not integrated with live monitoring (beyond the Users themselves) nor with first response agencies.

Security

1. SmartNest must make restricted actions only available to users who have permission
2. SmartNest must enforce encryption for all stored user data to prevent unauthorized access by individual employees

System models

General Use Case Diagram

(Dashed Lines) For Include and Exclude



Scenarios

<i>Scenario name</i>	addBTDevice
<i>Participating actor instances</i>	Sarah: ChildUser Alice: AdminUser
<i>Flow of events</i>	<ol style="list-style-type: none">1. Sarah purchased a new smart thermostat for her living room, which she wants to add to her home automation system. Sarah does not have permission to add a new device, so Alice logs in to the SmartNest system on her laptop and clicks on the 'Add device' button.2. Alice clicks the option to pair the device using Bluetooth and follows the on-screen instructions to pair3. Alice looks for the smart thermostat in the list of detected devices and selects it after seeing the device identification details that confirm she's selecting the right device4. Alice is prompted with a form that provides generic thermostat device permissions for which Alice checks off permissions for various family members. Alice also checks Sarah as an Admin for this specific device before submitting the form.5. Alice receives and acknowledges the 'successfully added' message as well as the device summary on her screen

<i>Scenario name</i>	newSceneAdded
<i>Participating actor instances</i>	James: AdminUser
<i>Flow of events</i>	<ol style="list-style-type: none">1. James wants to create a custom scene with the devices in his home theater. So, he logs into the SmartNest interface and clicks on the 'add scene button'2. James uses the SmartNest interface to select the devices he wants to include (smart lights, audio system, and projector)

	<ol style="list-style-type: none"> James then configures the settings of each device to create the perfect ambiance before saving that setting Now, with a single tap, he can activate the "Home Theater" scene for an immersive movie-watching experience.
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<i>Scenario name</i>	userPermissions
<i>Participating actor instances</i>	Jane Smith and Eric Smith: Admin Users Natalie Smith, Mike Smith: Child User
<i>Flow of events</i>	<ol style="list-style-type: none"> The Smith family consists of parents Jane and Eric and their children Natalie and Mike who utilize the SmartNest system for managing their smart devices. Jane and Eric set up security cameras around the house so that they can monitor the events that happen in the house while they are gone. Natalie and Mike have restricted access to SmartNest and want to remove the security cameras from the SmartNest view so that they can have a party. When they try to remove the device, they are unable to do so as their permission level does not grant them the ability to remove devices that are not in their room. Natalie and Mike try to remove devices from their respective room and are allowed to add and remove devices without issue.

<i>Scenario name</i>	systemAlert
<i>Participating actor instances</i>	John: AdminUser
<i>Flow of events</i>	<ol style="list-style-type: none"> John accesses the SmartNest app on his smartphone. He navigates to notification settings within the app. John configures instant alerts for his front door's smart lock to receive push notifications when it becomes unlocked.

	<ol style="list-style-type: none"> John conducts a test by unlocking the front door. The SmartNest system promptly sends a push notification to John's smartphone, confirming the configured alert for enhanced home security.
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<i>Scenario name</i>	remoteControl
<i>Participating actor instances</i>	Lisa: User
<i>Flow of events</i>	<ol style="list-style-type: none"> Lisa is on vacation and realizes she forgot to turn off the lights at home. Lisa accesses the SmartNest remote control on her smartphone. Lisa connects to the SmartNest remotely through an internet connection using her credentials. Lisa then navigates to the device dashboard section where she can control her devices. Lisa selects the bedroom lights from the list of devices and toggles the switch to turn off the light remotely.

Use case descriptions

<i>Use case name</i>	CreateAccount	
<i>Participating Actors</i>	Initiated by Customer	
<i>Flow of Events</i>	Actor	System
	<ol style="list-style-type: none"> The user indicates that they would like to create an account by going to the page 	<ol style="list-style-type: none"> 1.1 The system responds by prompting the user with a 'basic personal information' form which asks the user for their name, valid email, and other relevant information.

	<p>2. The user fills out their basic personal information and submits the form</p> <p>3. Customer enters their billing information</p> <p>4. Customer enters a username and password of their choice</p>	<p>2.1 System verifies email with existing database and sends a confirmation email</p> <p>2.2 System saves customers' personal information</p> <p>2.2 System prompts customers for billing information, requiring their credit/debit card and address.</p> <p>3.1 System verifies entered credit/debit card information</p> <p>3.2 System saves billing information</p> <p>3.3 System prompts the user with a form to create their username and password</p> <p>4.1 The system verifies that the username is unused</p> <p>4.2 The system verifies that the password is valid according to password rules (8 characters or more, at least one capital and one lowercase letter, and one number)</p> <p>4.3 The system saves the username/password</p> <p>4.4 The system links the previously entered user information to the username/password combination</p> <p>4.5 The system presents a summary of the previously entered information for user reference</p>
<i>Entry Condition</i>	The customer requests to create a new login for the SmartNest system.	

<i>Exit Conditions</i>	<ul style="list-style-type: none"> - The customer receives an acknowledgment that the account has been created and prompts the user to log in - The customer has received an explanation indicating why the account cannot be created.
<i>Quality requirements</i>	<ul style="list-style-type: none"> - Confirmation should arrive on the user screen and email within 5 minutes after submission
<i>Exception Conditions</i>	<ul style="list-style-type: none"> - Invalid email is entered (email is already in use or does not exist) - The username is in use already

<i>Use case name</i>	AddUser	
<i>Participating Actors</i>	Initiated by Customer	
<i>Flow of Events</i>	Actor	System
	<ol style="list-style-type: none"> 1. The customer indicates their desire to add a new user to the home system. 2. Customer enters the username. 	<ol style="list-style-type: none"> 1.1 The system responds by opening a form that requests the username of the user being added 2.1 The system searches for the username to verify it exists 2.2 The system provides the user with a form to enter devices this user can access

	<p>3. The customer selects the devices this new user can access and submits the form.</p> <p>4. Customer enters the permissions and submits the form</p>	<p>3.1 The system provides a form with specific permissions for each device as well as the overall system, which allows them to check off specific permissions for the associated user</p> <p>4.1 The system saves the permissions associated with this username as well as a link to the home system as pending</p> <p>4.2 The system sends an invitation to the user</p>
<i>Entry Condition</i>	The customer requests to add a new user to the home system with a set of permissions.	
<i>Exit Conditions</i>	<ul style="list-style-type: none"> - Customer receives an acknowledgment that the invite has been sent and upon acceptance is given a notification. - Customer has received an explanation indicating why the user cannot be invited. 	
<i>Quality requirements</i>	<ul style="list-style-type: none"> - Username search should have feedback while typing, shown in 5 seconds or less 	
<i>Exception Conditions</i>	<ul style="list-style-type: none"> - The username/email was not found to be associated with an account 	

<i>Use case name</i>	AddRoom	
<i>Participating Actors</i>	Initiated by Customer	
<i>Flow of Events</i>	Actor	System
	<p>1. Customer indicates that they would like to create a new room in their digital home by going to the edit home page.</p>	<p>1.1 The system responds by prompting the user for the name, location, floor, and type of the new room.</p>

	<p>2. The customer types the name of the new room and designates the location and floor by selecting adjacent rooms from a drop-down menu.</p> <p>3. The customer has the option to provide more info about the system.</p> <p>4. The Customer indicates that they want to add a diagnostic device.</p>	<p>2.1 The system creates a digital room from a basic room template.</p> <p>2.2 System prompts the user for additional information (ie. the number of windows).</p> <p>3.1 System requests if the user would like to add any diagnostic devices to the room to help with data collection.</p> <p>4.1 System starts the “Add Device” use case</p>
<i>Entry Condition</i>	Customer requests to add a new room to their home by clicking the edit home button.	
<i>Exit Conditions</i>	<ul style="list-style-type: none"> - Customer receives an acknowledgment that the room has been created and can be seen as an additional room under Room. - Customer has received an explanation indicating why the room cannot be created. 	
<i>Quality requirements</i>		
<i>Exception Conditions</i>	<ul style="list-style-type: none"> - User must be an Admin of the home - User attempts to submit form without filling in essential fields such as name 	

<i>Use case name</i>	AddDevice	
<i>Participating Actors</i>	Initiated by Customer	
<i>Flow of Events</i>	Actor	System

	<ol style="list-style-type: none"> 1. Customer indicates their desire to add a new device 2. Customer selects their preferred option and either search for detected Bluetooth devices or enter a model in the search bar. 3. Customer selects a device to initiate a pairing session with. 4. The customer confirms the device 5. The user fills out the form, adding relevant users and permissions before submitting 	<ol style="list-style-type: none"> 1.1 The system responds by opening a 'New Device page' which offers the option to either search or pair with Bluetooth 2.1 The system returns a list of all devices detected 3.1 The system connects with the device (either with Bluetooth pairing or through the network) 3.2 The system prompts the user with a form confirming the details of the device (name, model, etc) 4.1 The system prompts the user with a personalized form to configure the device to the system. The user can specify admin, device owner, permissions, and so on. 5.1 The system returns a 'successfully added' message customer summary of details about the device (name, permissions, etc.)
<i>Entry Condition</i>	The customer requests to add a new device to the home system of a particular room.	
<i>Exit Conditions</i>	<ul style="list-style-type: none"> - Customer receives an acknowledgment that the device has been connected and is visible as a device available for control in a particular room. - Customer has received an explanation indicating why the device cannot be added. 	
<i>Quality requirements</i>	<ul style="list-style-type: none"> - Device search completed in a maximum of 3 minutes - Device search continues continuously until a device is selected, with devices found being displayed as soon as they are found 	

<i>Exception Conditions</i>	- The device could not be found in any searches
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<i>Use case name</i>	CreateScene	
<i>Participating Actors</i>	Initiated by Customer	
<i>Flow of Events</i>	Actor	System
	<ol style="list-style-type: none"> 1. Customer indicates a desire to create a scene and enter basic scene information. 2. Customer enters one or more triggers 3. The customer enters one or more triggers 4. The customer enters one or more actions 	<p>The system creates a new scenario.</p> <ol style="list-style-type: none"> 1.2 System prompts for customer potential trigger(s). 2.1 System creates triggers 2.2 System prompts for action based on a trigger. 3.1 System creates actions. 3.2 System associates scenario, trigger, and action. 3.3 System returns valid scene details. 3.4 System prompts for confirmation of scene creation. 4.1 System creates scene
<i>Entry Condition</i>	- Customer requests to create a scene for a selected registered device from the device menu.	
<i>Exit Conditions</i>	<ul style="list-style-type: none"> - Customer receives an acknowledgment that the scene has been created and is saved as a preset in scenes. - Customer has received an explanation indicating why the scene cannot be created. 	
<i>Quality requirements</i>	<ul style="list-style-type: none"> - Response time to create a scene with a maximum time of 5 seconds from initiation. - Support the creation of scenes with multiple triggers and actions for complex automation scenarios. 	

<i>Exception Conditions</i>	<ul style="list-style-type: none"> - Customer enters invalid or duplicate scene name. - Customer tries to create a scene without any triggers or actions. - Customer enters an invalid trigger that is not possible to detect on the device. - Customer does not have sufficient permission to create scenes or access certain features.
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<i>Use case name</i>	AddSchedule	
<i>Participating Actors</i>	Initiated by Customer Communicates with Schedule System	
<i>Flow of Events</i>	Actor	System
	<ol style="list-style-type: none"> 1. Customer indicates their desire to view all registered devices by going to the device manager page. 2. Customer clicks on the name of the device that they are interested in. 3. Customer clicks add schedule from the list of options the system provides 4. The customer enters the time or timeframe this action should happen each day and the days in the week it should happen. 5. Customer indicates the desired action for the schedule by selecting it from the dropdown menu. 	<ol style="list-style-type: none"> 1.1 The System responds by providing a list of all devices currently connected to the system 2.1 The System provides information on the device and a list of activities that can be performed on said device. 3.1 The System requests what time or timeframe this action should take place as well as which days in the week 4.1 The System requests what type of action should take place from a dropdown menu. 5.1 The System registers the action to be performed by the selected device

<i>Entry Condition</i>	- Customer requests to create a schedule for a selected registered device from the device menu.
<i>Exit Conditions</i>	<ul style="list-style-type: none"> - Customer receives an acknowledgment that the schedule has been applied and can be viewed under the device schedule. - Customer has received an explanation indicating why the schedule cannot be created.
<i>Quality requirements</i>	
<i>Exception Conditions</i>	- Action is not compatible with the type of device.

<i>Use case name</i>	ArmSystem	
<i>Participating Actors</i>	Initiated by Customer Communication with the Security System	
<i>Flow of Events</i>	Actor	System
	<ol style="list-style-type: none"> 1. Customer indicates the desire to arm systems. 2. Customer confirms to arm the system with delay. 3. Customer confirms they want to monitor the system. 	<ol style="list-style-type: none"> 1.1 System checks Fire Sensors & Security Sensors to see if the status is online. 1.2 System prompts for Customer to enter a delay. 2.1 System confirms delay and arms the system. 2.2 The system prompts customers if they would like to monitor the status. 3.1 System checks for fire, by associating temperature, smoke, and carbon monoxide. 3.2 System checks for signs of intrusion, by associating motion, open doors or windows, and forced entry. 3.3 The system returns an alert notification of the reported emergency to the Customer.

<i>Entry Condition</i>	<ul style="list-style-type: none"> - Customer requests to arm the system when the customer is going to be away from their home.
<i>Exit Conditions</i>	<ul style="list-style-type: none"> - Customer receives an acknowledgment that the system has been armed and can be monitored through the monitor tab. - The customer has received an explanation indicating why the security system cannot be armed.
<i>Quality requirements</i>	<ul style="list-style-type: none"> - Arm security system on customer request with a maximum failure rate of 2%. - System should respond to customer requests within a maximum of 5 seconds from initiation. - Notify customers of any conditions preventing the arming of the security system. (Doors, Windows, excessive delay times, power failures)
<i>Exception Conditions</i>	<ul style="list-style-type: none"> - The delay time is excessive. - The door/window is open when trying to arm. - Electricity is down and there is no backup power.

<i>Use case name</i>	CreateEnergyReport	
<i>Participating Actors</i>	Initiated by Customer	
<i>Flow of Events</i>	Actor	System
	<ol style="list-style-type: none"> 1. The customer indicates the desire to view the energy report. 2. Customer enters the time frame they would like to view. 	<ol style="list-style-type: none"> 1.1 Prompts the user to enter the timeframe in the form for the detailed report. 2.1 The System confirms the time frame selected by the Customer. 2.2 The System associates identify devices, measure consumption, and record time stamps for every device 2.3 The System compiles a report. 2.4 The System validates the report and add suggestions for optimization.

		2.5 System returns valid report.
<i>Entry Condition</i>	- Customer requests an energy report by pressing the report button.	
<i>Exit Conditions</i>	<ul style="list-style-type: none"> - Customer receives a progress bar that acknowledges the report request and delivers the final report requested to the user for viewing. - Customer has received an explanation indicating why the report cannot be made. 	
<i>Quality requirements</i>	<ul style="list-style-type: none"> - The system shall generate an energy report with a maximum timeframe of 5 minutes from customer request. - The system shall have a robust error-handling mechanism to address any issues during data collection or report generation. 	
<i>Exception Conditions</i>	<ul style="list-style-type: none"> - Customer does not have any devices connected to the system. - Customer devices do not run into errors communicating with the system. - Customers have permission to access the energy monitoring features to generate the report. 	

<i>Use case name</i>	CentralizedControl	
<i>Participating Actors</i>	Initiated by Customer	
<i>Flow of Events</i>	Actor	System
	<ol style="list-style-type: none"> 1. Customer views a summary of all her connected devices using the dashboard. 2. Customer selects their living room thermostat. 3. The customer goes back to the dashboard and selects their security cameras. 4. The customer reviews the footage and manages all connected devices through the intuitive interface. 	<ol style="list-style-type: none"> 1.1 The system displays a dashboard with an overview of all connected devices. 2.1 The system allows the customer to view and manage their thermostat. 3.1 The system displays footage from the security cameras on the interface. 4.1 System updates device and sends Customer confirmation of the device changes. 4.2 The system continues to provide options for the

		customer to manage and control all connected devices easily.
<i>Entry Condition</i>	Customer wants to remotely check and control their smart home devices	
<i>Exit Conditions</i>	<ul style="list-style-type: none"> - Customer successfully interacts with and controls their devices. - System sends confirmation of the device status change - System provides feedback on any issues or failures in the device control 	
<i>Quality requirements</i>	<ul style="list-style-type: none"> - Real-time responsiveness of the interface. - Secure login and data transmission. - User-friendly and intuitive interface. 	
<i>Exception Conditions</i>	<ul style="list-style-type: none"> - If a customer's login credentials are incorrect, the system prompts them to enter the correct information. - In case of a connection failure or system unavailability, the system notifies the customer and advises them to try again later. 	

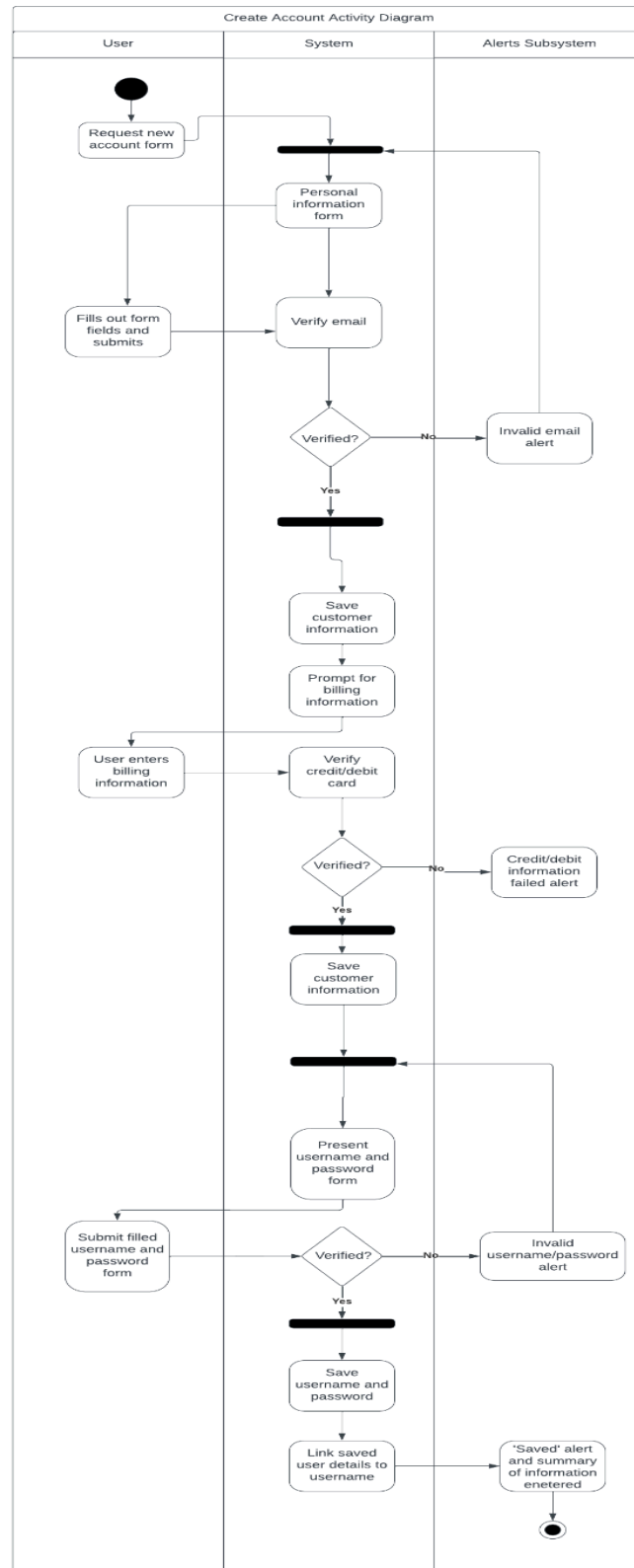
<i>Use case name</i>	Start Home Server
<i>Participating Actors</i>	Initiated by AdminUser
<i>Entry Condition</i>	1. The AdminUser logs into the server machine.
<i>Flow of Events</i>	2. Upon successful login, the AdminUser executes the startHomeServer command. 3. If the HomeServer was previously shut down normally, the server reads the list of rooms and the devices connected to the system. If the HomeServer has crashed, it notifies the AdminUser and performs a data integrity check.
<i>Exit Condition</i>	4. The HomeServer is available and waits for connections from the HomeClient

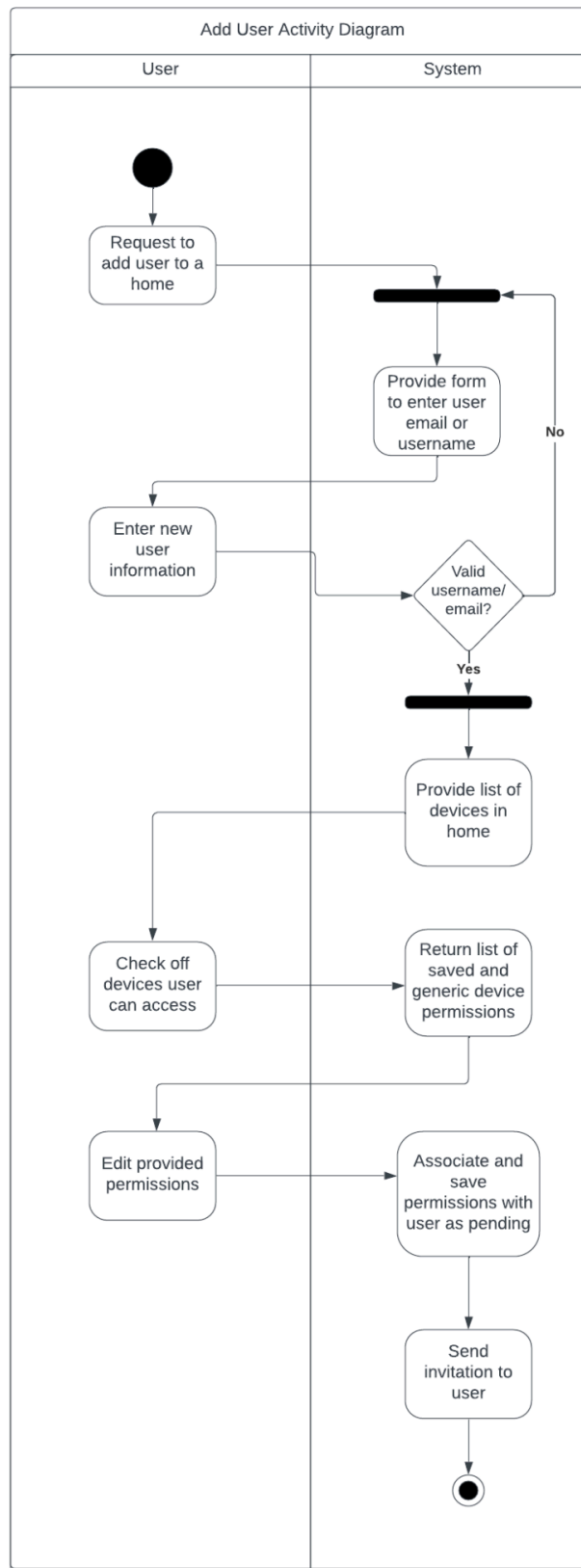
<i>Use case name</i>	Start After Outage
<i>Participating Actors</i>	Initiated by User
<i>Entry Condition</i>	1. The user refreshes the page and network availability is detected.

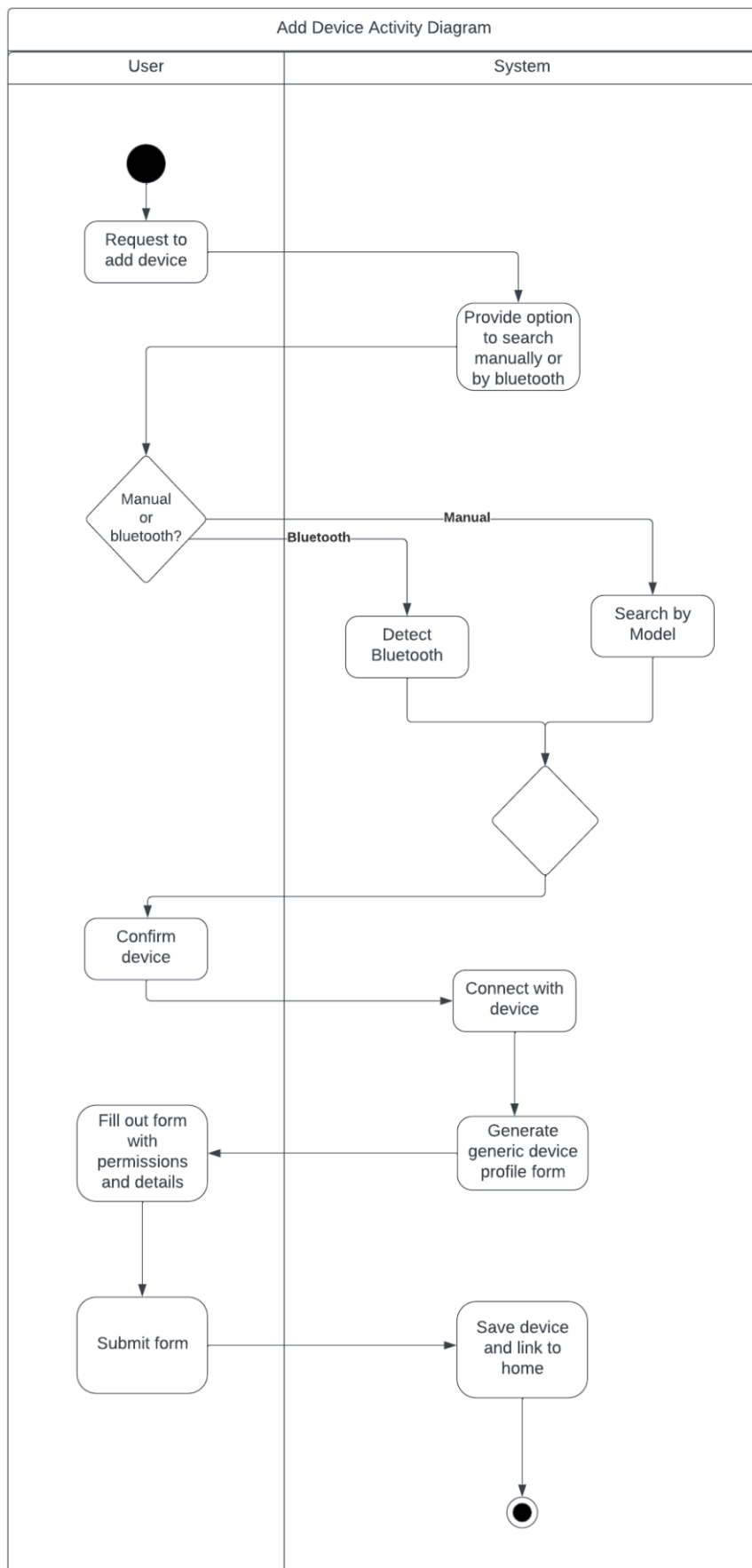
<i>Flow of Events</i>	<ol style="list-style-type: none"> If the user is in the process of entering data the system checks for any unsaved data in the form fields. If unsaved data is found the system displays a notification to the user regarding the network outage and the system automatically opens and displays the last open page. If not the system displays a notification to the user regarding the network outage and the system starts up normally. The user interacts with the system, viewing recovered data or continuing with new actions.
<i>Exit Condition</i>	<ol style="list-style-type: none"> The system successfully starts up after a network outage. It will open the last open page if unsaved data is found or else starts up as normal.

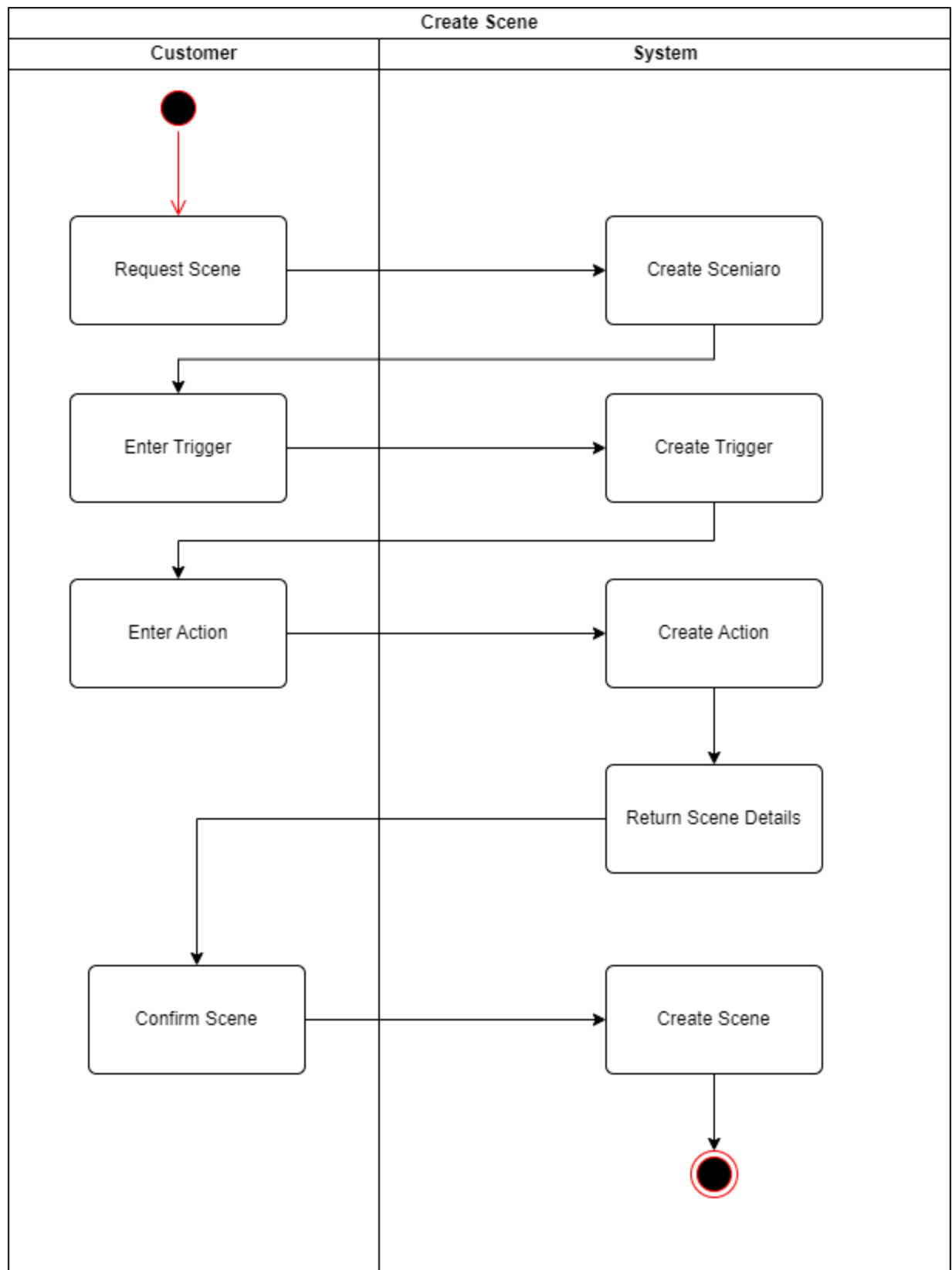
<i>Use case name</i>	Shutdown Home Server
<i>Participating Actors</i>	Initiated by AdminUser
<i>Entry Condition</i>	<ol style="list-style-type: none"> The AdminUser logs into the server machine.
<i>Flow of Events</i>	<ol style="list-style-type: none"> Admin users confirm the shutdown action. The system sends notifications to connected clients about the shutdown. HomeServer terminates all ongoing automation and network connections. The system waits for the completion of ongoing tasks and shuts down closing all active services.
<i>Exit Condition</i>	<ol style="list-style-type: none"> The HomeServer is successfully shut down, general users cannot access or modify the SmartNest.

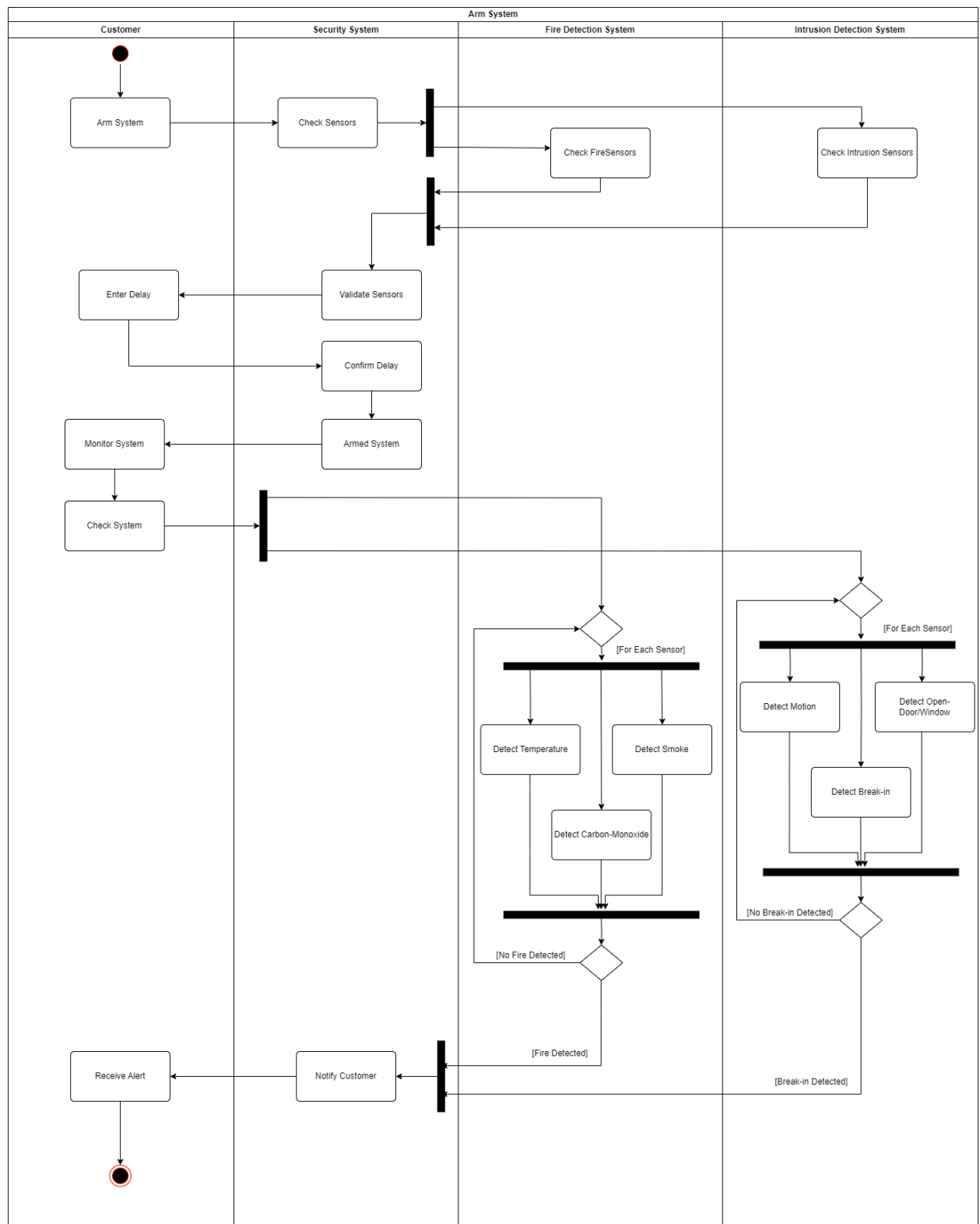
Activity Diagrams:

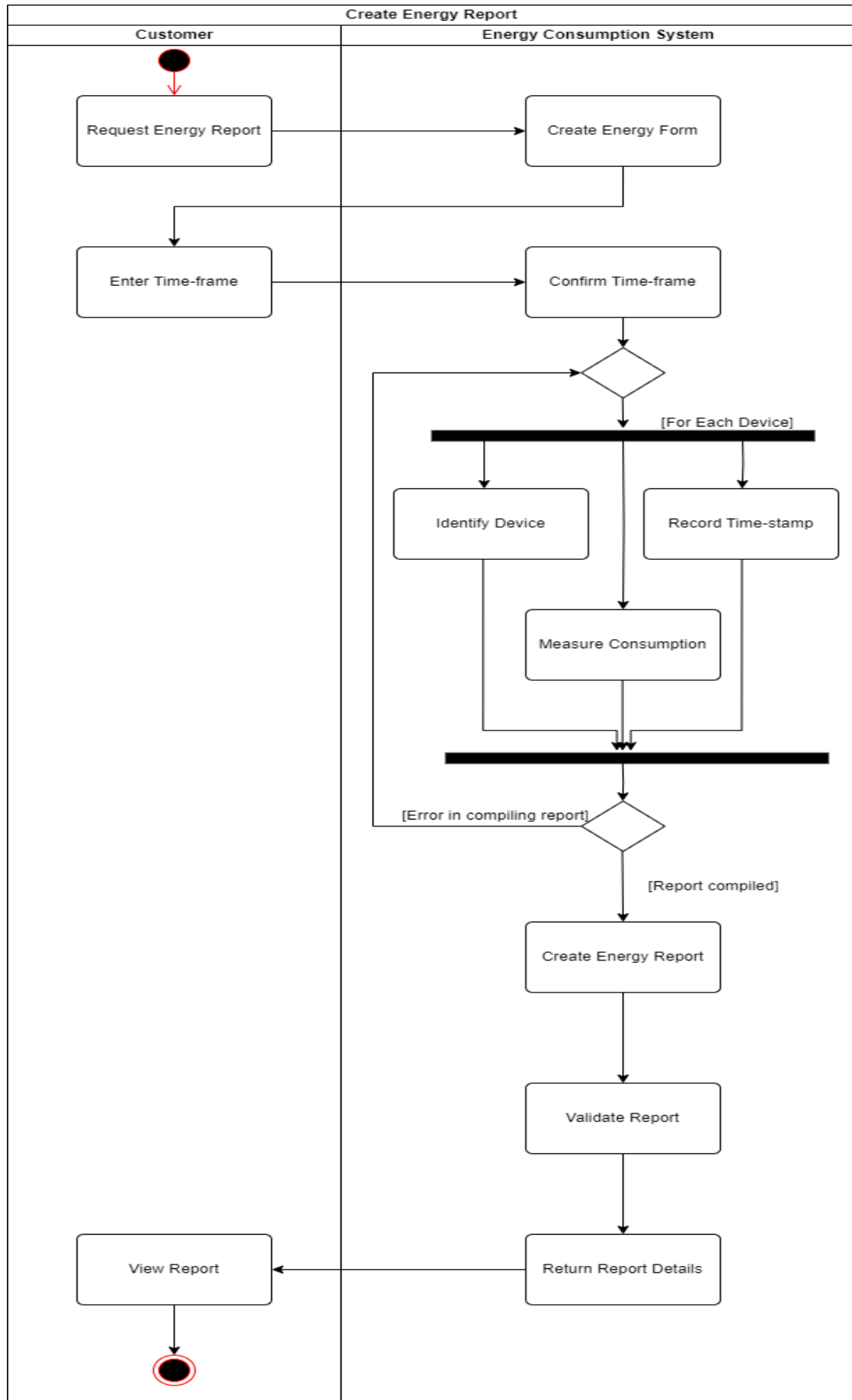


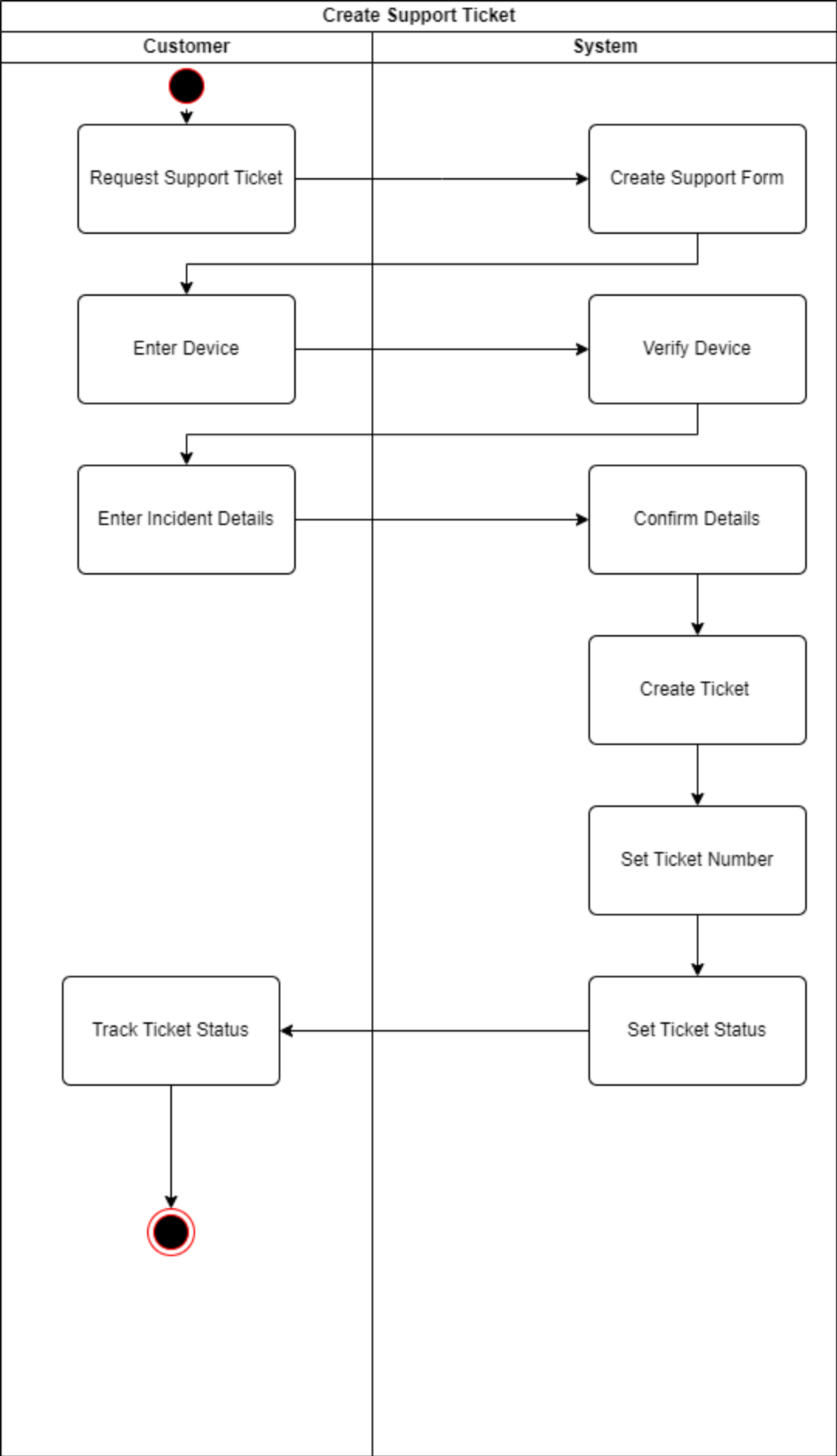


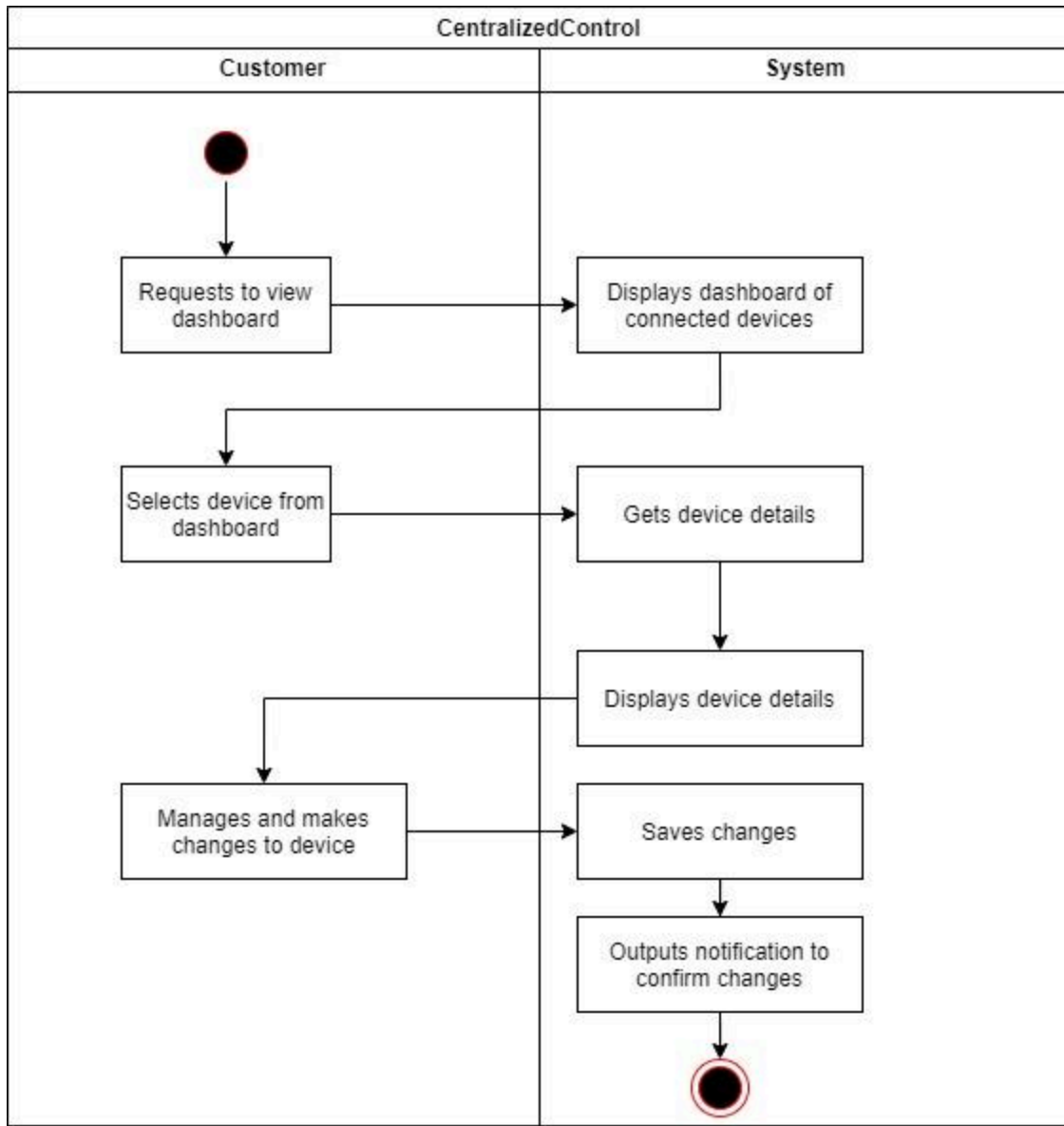




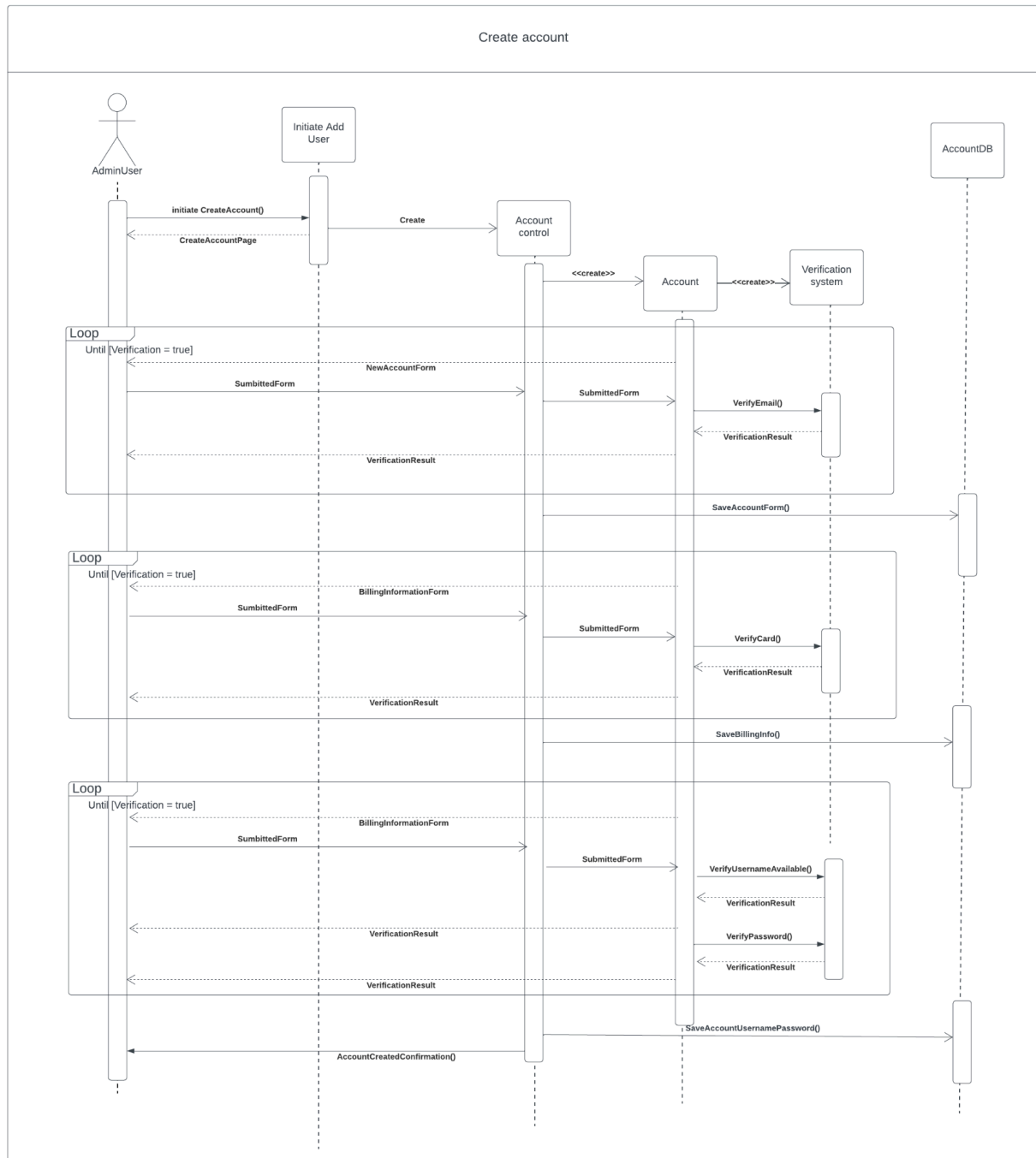


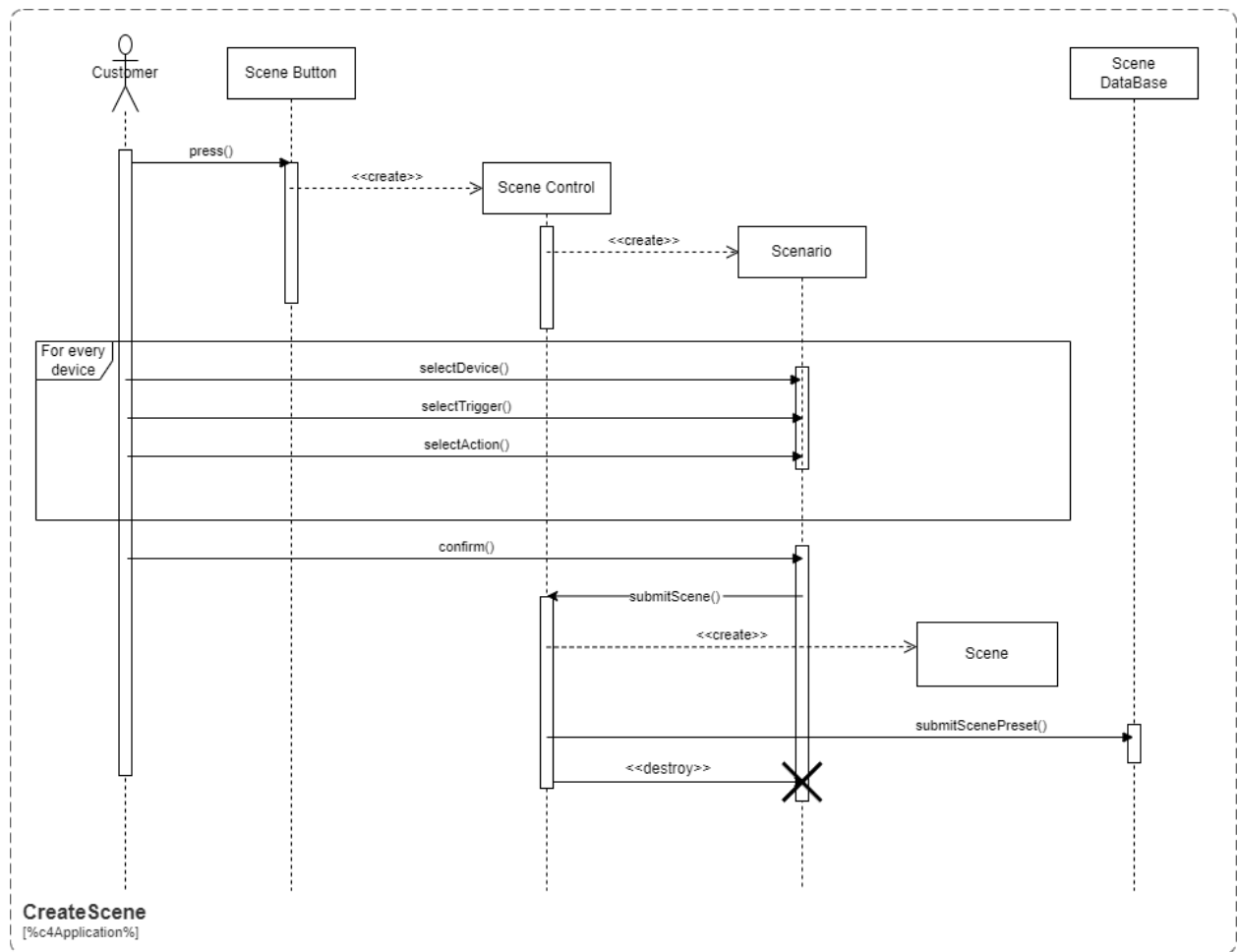


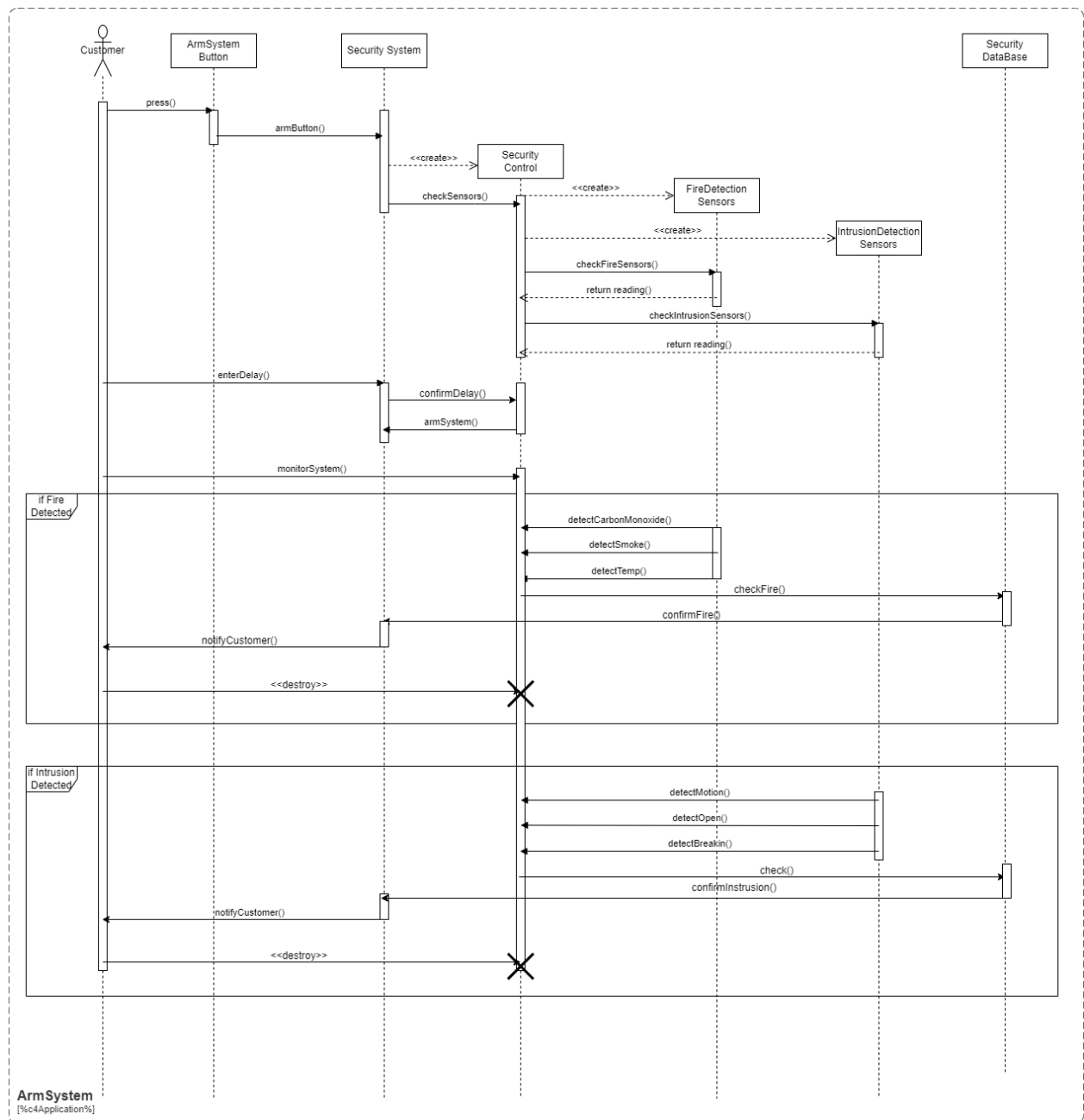


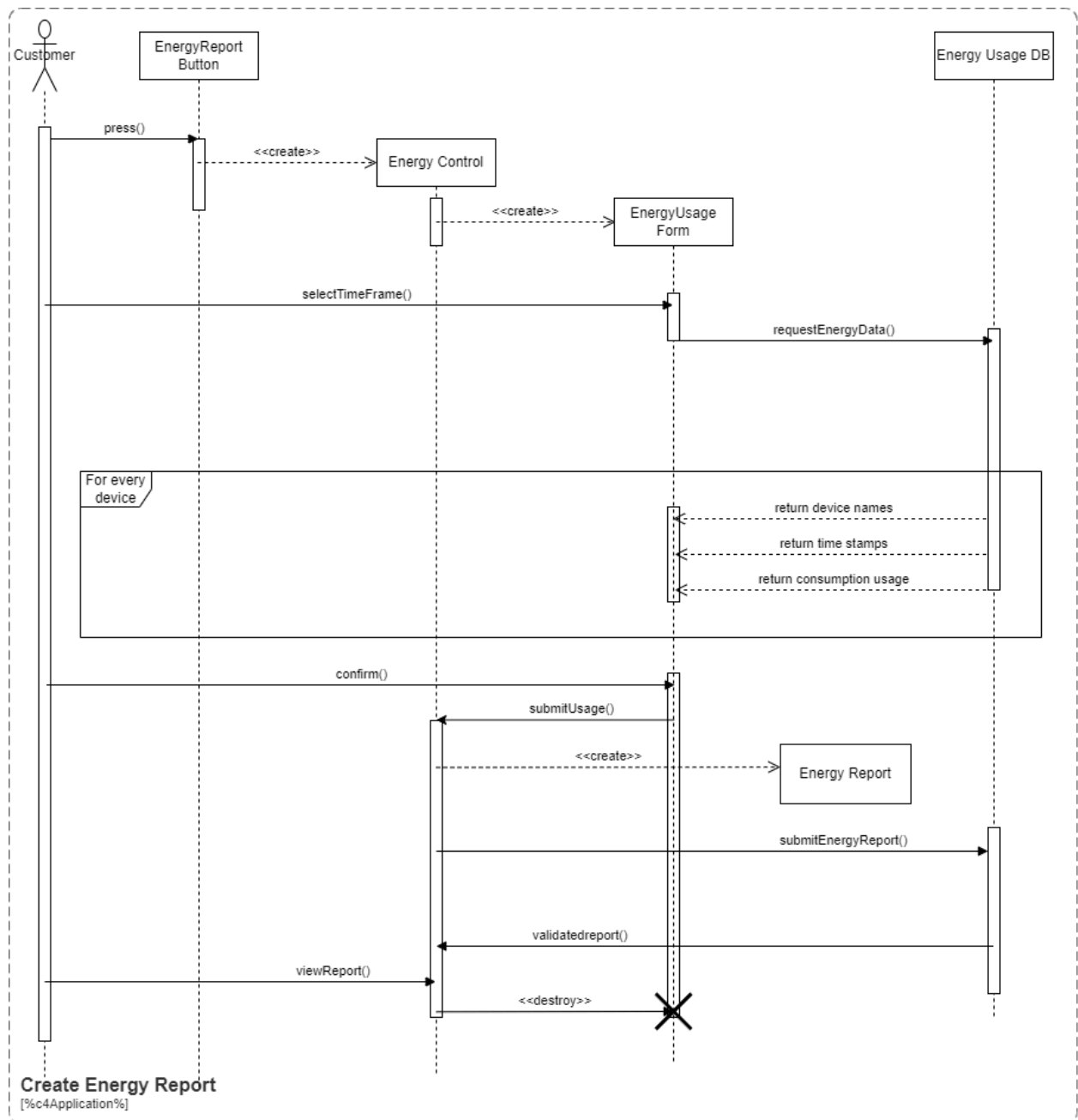


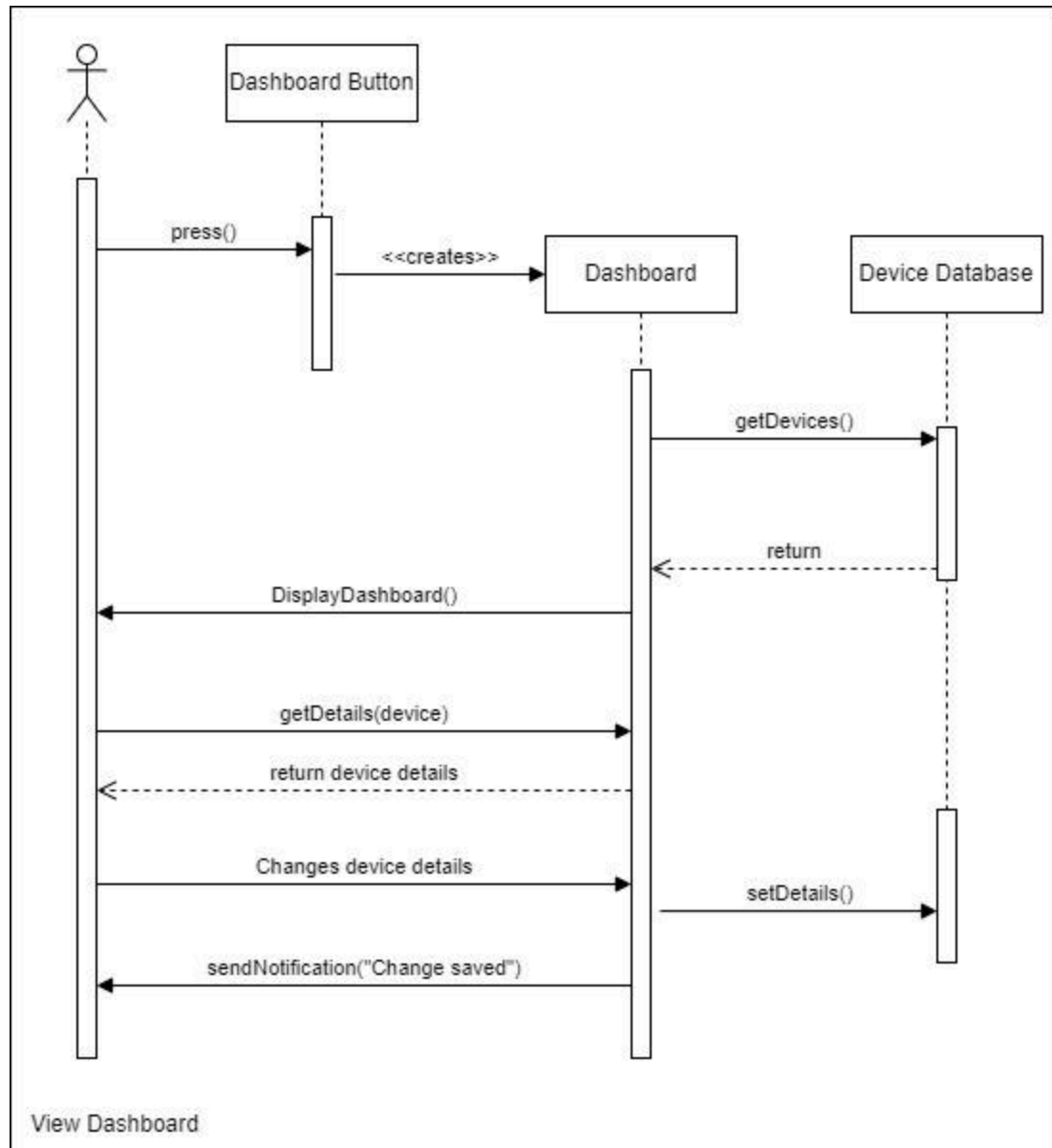
Sequence Diagrams:

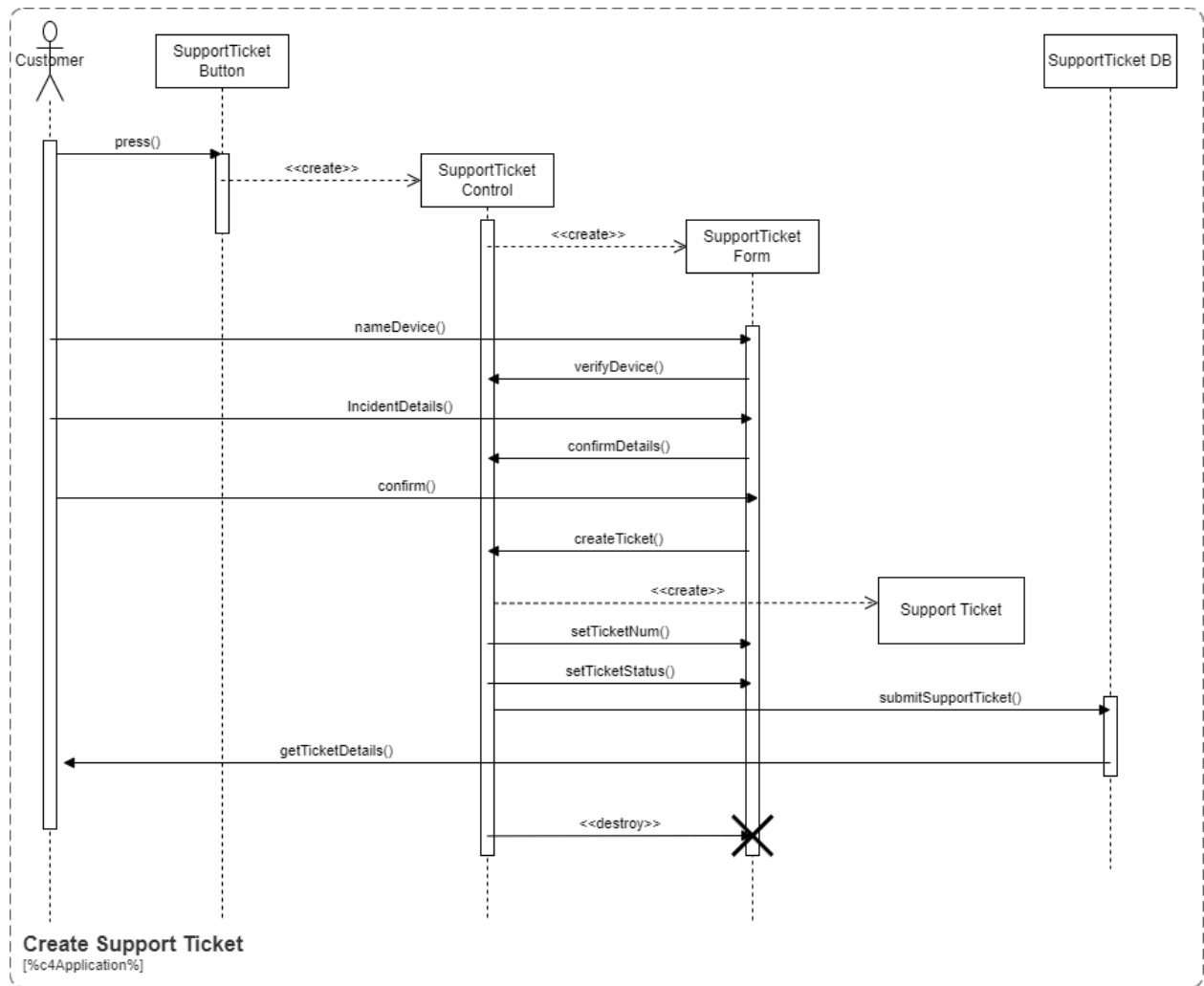












Glossary

Device Database: Stores details of the device (names, room, readings) to be accessed and managed by the user.

Schedule Subsystem: Internal scheduling system that monitors selected devices and performs specific actions when a time threshold is reached.

Security Subsystem: Responsible for arming or disarming any security-class devices around the house. The system then sends alerts to authorities or admin users if any of the security devices are activated.

Support Ticket Subsystem: Able to send detailed diagnostic reports to our support team when critical errors have occurred. Also allows for general tickets to be sent if needed.

Alert Subsystem: Automatically alerts select users to their phone or device when specific unwanted scenarios happen.

Connectivity Subsystem: Allows for all devices to connect over a unified network. Identifies devices and catalogs features presenting them through a unified interface.

User: Profile for customer stakeholders. Allows access to specified methods based on the profile's admin rights.

Button: An on-screen prompt the user can press to initiate the desired process.

Dashboard: Accesses the device database and displays the data to the user so that they can manage their device details easily.

Room: An add-on of the Home class, allows the user to customize their preferences and helps the system process diagnostic data collected by specific devices throughout the home.

Home: A grouping of users, rooms, and devices- made to represent an actual home. Each home allows for a unique setup and permissions.

Schedule: Linked to specific devices. Allows for specific actions to take place on a said device when the internal clock reaches a selected time.

Device: Broad smart tools placed throughout the home. Linked to each room, these devices can be diagnostic or recreational. Example are temperature controller, security scanner, and smart TV.

Notification: Alerts and messages delivered to users' preferences with details of issues or confirming actions.

Ticket: support system cases with details of issues, delivered to the central repository for action by support agents.