

# ANALYSIS MODEL FOR SAFE HOME SYSTEM



**VERSION 1.0**

**TEAM 3**

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## 1) Introduction

This document describes analysis model for SafeHome system. The role of analysis model is extremely important in all software projects. “The analysis model is the first technical representation of a system. Analysis modeling uses a combination of text and diagrams to represent software requirements (data, function, and behavior) in an understandable way. Building analysis models helps make it easier to uncover requirement inconsistencies and omissions”<sup>(7)</sup>.

From Requirement Specification, we already know that SafeHome system gives the homeowner a full control of his or her house by controlling many types of sensor and camera. SafeHome system provides both Security and Surveillance feature and allows the homeowner manage the house easily, quickly and efficiently even when he or she has to go out for a long time.

In this document, we will describe SafeHome system by using use cases, use-case diagram and swimlane diagram:

- ❖ “Use cases are a way to capture system functionality and requirements in Unified Modeling Language (UML). Use case diagrams consist of named pieces of functionality (use cases), the persons or things invoking the functionality (actors), and possibly the elements responsible for implementing the use cases (subjects)”<sup>(5)</sup>.
- ❖ Swimlane diagram can be built from activity diagram. Swimlane diagram is an advanced activity modeling by showing an activity partition with two parallel lines, either horizontal or vertical. Swimlane diagram is used to depict what or who is working on a particular subset of a process.

For more information about UML, use cases, use-case diagram, swimlane diagram, please refer to some references listed at the end of this material or you can try by searching many useful resources on the Internet.

This document is the 1<sup>st</sup> version.

2) Use-case diagrams

2.1) Use-case diagrams for Security feature

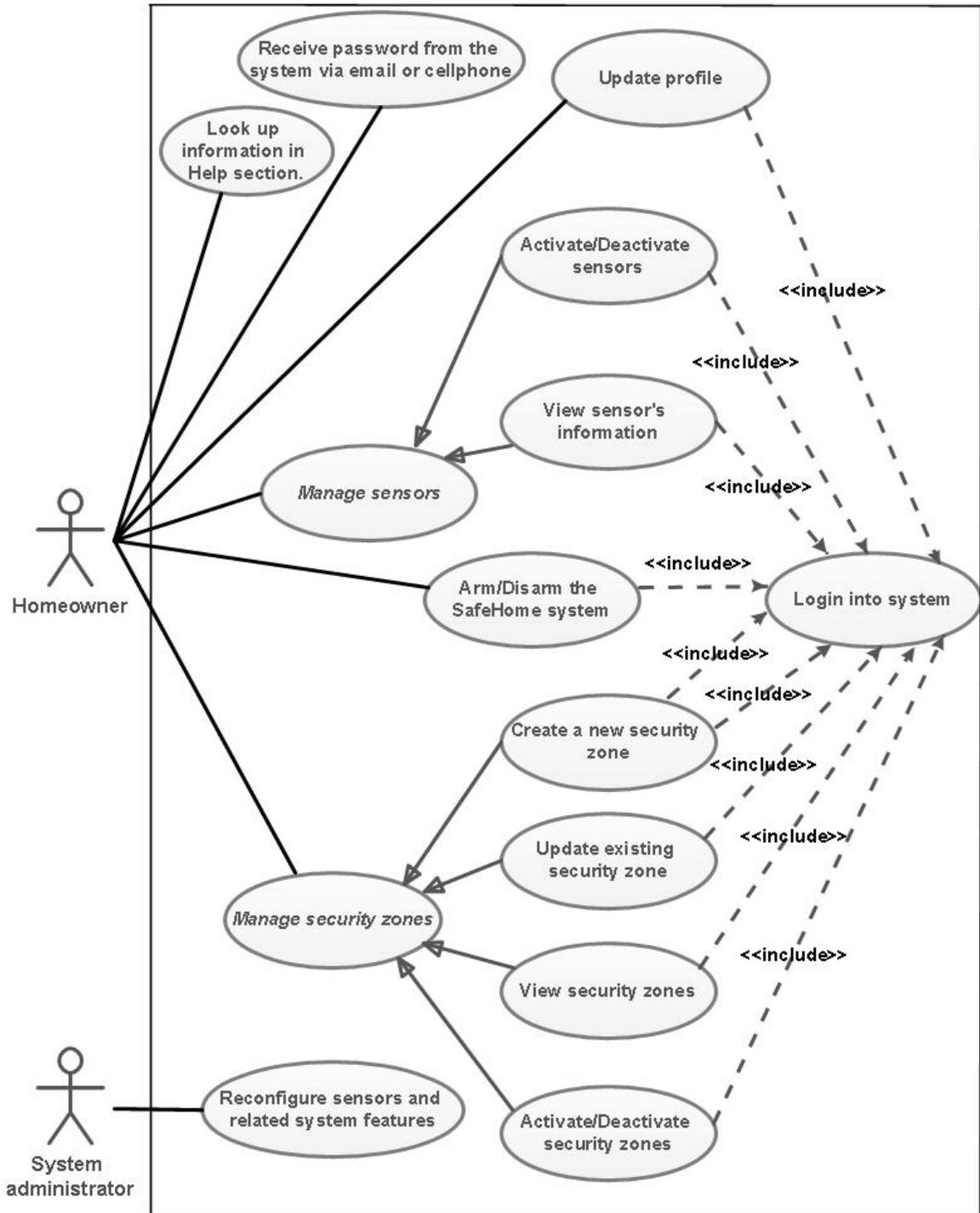


Figure 1: Use-case diagram for security feature (homeowner and system administrator are actors)



**Figure 2: Use-case diagram for Security feature (SafeHome system and sensor are actors)**

2.2) Use-case diagrams for Surveillance feature

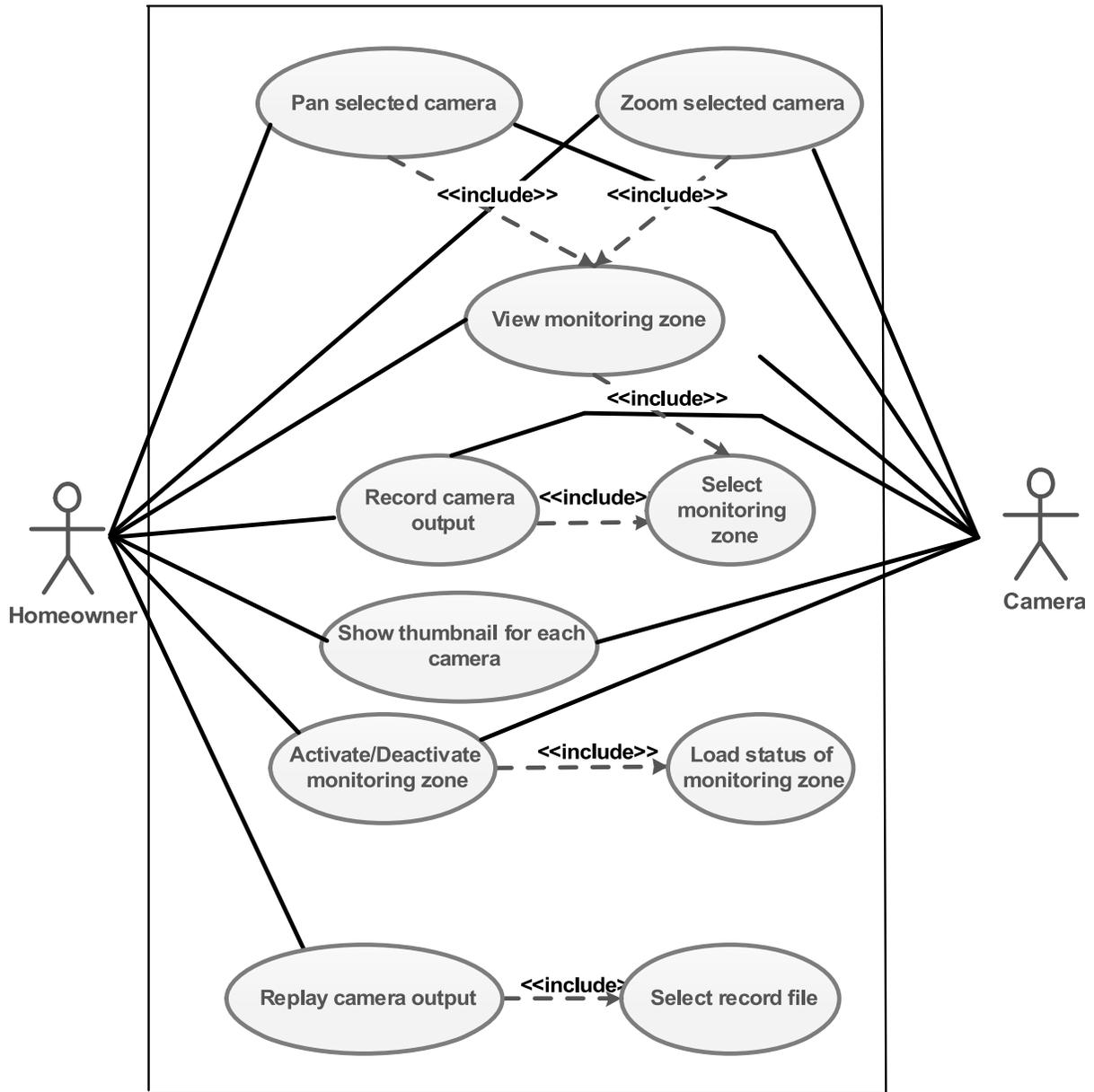


Figure 3: Use-case diagram for Surveillance feature

## 3) Use cases in SafeHome system

### 3.1) Use cases for Security feature

#### 3.1.1) Use case 1: Validate user ID and password

|                                      |  |
|--------------------------------------|--|
| <b>USE-CASE:</b>                     | Validate user ID and password.   |
| <b>PRIMARY ACTOR:</b>                | SafeHome system.   |
| <b>GOAL IN CONTEXT:</b>              | To validate user ID and password that the user types.  |
| <b>PRECONDITIONS:</b>                | 1) SafeHome system is configured and it operates well.   |
| <b>TRIGGER:</b>                      | The user decides to login into SafeHome web system.  |
| <b>SCENARIO:</b>                     | 1) The homeowner opens SafeHome web system.<br>2) The homeowner types user ID and password.<br>3) SafeHome system validate user ID and password.   |
| <b>EXCEPTIONS:</b>                   | 1) If the user ID and password are appropriate, SafeHome system allows the user to enter.<br>2) If the user ID and password are not appropriate, SafeHome system shows error message and does not allow the user to enter. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.   |
| <b>SECONDARY ACTOR:</b>              | None.  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | None.  |
| <b>OPEN ISSUES:</b>                  | 1) User ID and password must be encrypted before sending. What encrypt method is appropriate?  |

#### 3.1.2) Use case 2: Update homeowner's profile

|                         |  |
|-------------------------|--|
| <b>USE-CASE:</b>        | Update Profile   |
| <b>PRIMARY ACTOR:</b>   | The homeowner.   |
| <b>GOAL IN CONTEXT:</b> | To update the homeowner's profile.                     |
| <b>PRECONDITIONS:</b>   | 1) SafeHome system is configured and it operates well. |

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|                                      |   |
|--------------------------------------|---|
|                                      | 2) Appropriate user ID and password must be obtained.   |
| <b>TRIGGER:</b>                      | The homeowner decides to update his or her profile.   |
| <b>SCENARIO:</b>                     | <ol style="list-style-type: none"> <li>1) The homeowner logs into SafeHome system.</li> <li>2) The homeowner enters user ID and password.</li> <li>3) The homeowner clicks “Security” menu.</li> <li>4) The homeowner clicks “Update user’s profile” sub-menu.</li> <li>5) The homeowner views his or her current profile</li> <li>6) The homeowner changes his or her profile.</li> <li>7) The homeowner views all information again to indicate that the profile has been changed.</li> </ol>                     |
| <b>EXCEPTIONS:</b>                   | <ol style="list-style-type: none"> <li>1) The homeowner types wrong user ID and password from 1 to 4 times: he or she can reenters user ID and password.</li> <li>2) The homeowner types wrong user ID and password for 5 times: he or she has to wait 30 minutes to login again.</li> <li>3) The homeowner forgets password: he or she can recover password (see use case “ReceivePassword”).</li> <li>4) If the information the homeowner declares is not appropriate, he or she has to declare again.</li> </ol> |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              | System administrator.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line, email.  |
| <b>OPEN ISSUES:</b>                  | 1) Should the user have to type verification code before updating profile to avoid flooding attack from bad people?   |

### 3.1.3) Use case 3: Require the homeowner to change password

|                  |                           |
|------------------|---------------------------|
| <b>USE-CASE:</b> | Require Changing Password |
|------------------|---------------------------|

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|                                      |   |
|--------------------------------------|---|
| <b>PRIMARY ACTOR:</b>                | SafeHome system.  |
| <b>GOAL IN CONTEXT:</b>              | To require user to change password after each 90 days for security purpose.   |
| <b>PRECONDITIONS:</b>                | 1) SafeHome system is configured and it operates well.<br>2) The homeowner does not change his or her password for 90 days.   |
| <b>TRIGGER:</b>                      | SafeHome system realizes that the homeowner does not change his or her password for 90 days.  |
| <b>SCENARIO:</b>                     | 1) SafeHome web system shows a warning windows and request the homeowner to change his or her password.<br>2) SafeHome web system shows a window form to allow the homeowner to change password if he or she agrees to changes.   |
| <b>EXCEPTIONS:</b>                   | 1) If the new password is the same with the old password, the system requires the homeowner to type another password.<br>2) If the password length is smaller than 8, the system requires the homeowner to type another password.<br>3) SafeHome web system still displays a warning window for the next time the homeowner logs into the system if the homeowner does not want to change password and also not choose “Don’t ask me anymore” option.<br>4) SafeHome web system never shows the warning window again if the homeowner does not want to change password and also choose “Don’t ask me anymore” option. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Not regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              | None.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | None.   |
| <b>OPEN ISSUES:</b>                  | 1) Should SafeHome system has a function to calculate the “strength” of the password that the homeowner types?  |

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|  |  |
|--|--|
|  | 2) Should SafeHome system give some hints for the homeowner to set new password? |
|--|--|

### 3.1.4) Use case 4: Receive password via email or cell phone

|                                      |  |
|--------------------------------------|--|
| <b>USE-CASE:</b>                     | Receive Password   |
| <b>PRIMARY ACTOR:</b>                | The homeowner  |
| <b>GOAL IN CONTEXT:</b>              | To receive current password.   |
| <b>PRECONDITIONS:</b>                | 1) SafeHome system is configured and it operates well.   |
| <b>TRIGGER:</b>                      | The homeowner forgets his or her password and wants to get it back.  |
| <b>SCENARIO:</b>                     | 1) The homeowner opens SafeHome system.<br>2) The homeowner clicks “Forget your password” link.<br>3) The homeowner types user ID and then click “Send password” button.<br>4) The homeowner receives his or her current password via email or cell phone. |
| <b>EXCEPTIONS:</b>                   | 1) If the homeowner types wrong user ID, he or she has to declare again.   |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Not regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.   |
| <b>SECONDARY ACTOR:</b>              | System administrator.  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line, email.   |
| <b>OPEN ISSUES:</b>                  | 1) Should the password be encrypted during the flow over network to ensure security?   |

### 3.1.5) Use case 5: Activate/Deactivate sensors

|                         |                                 |
|-------------------------|---------------------------------|
| <b>USE-CASE:</b>        | Activate/Deactivate Sensors     |
| <b>PRIMARY ACTOR:</b>   | The homeowner                   |
| <b>GOAL IN CONTEXT:</b> | To activate/deactivate sensors. |

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|                                      |   |
|--------------------------------------|---|
| <b>PRECONDITIONS:</b>                | <ol style="list-style-type: none"> <li>1) SafeHome system is configured and it operates well.</li> <li>2) SafeHome system recognizes all sensors.</li> <li>3) Appropriate user ID and password must be obtained.</li> </ol>   |
| <b>TRIGGER:</b>                      | The homeowner decides to activate/deactivate sensors.   |
| <b>SCENARIO:</b>                     | <ol style="list-style-type: none"> <li>1) The homeowner logs in to SafeHome system.</li> <li>2) The homeowner enters user ID and password.</li> <li>3) The homeowner clicks “Security” menu.</li> <li>4) The homeowner clicks “Manage sensors” sub-menu.</li> <li>5) The homeowner chooses the type of sensor to view and then presses “Display” button.</li> <li>6) The homeowner: view all sensors for selected type and then activate/deactivate the sensors he or she wants by setting sensor’s status to “Enabled” or “Disabled”.</li> </ol> |
| <b>EXCEPTIONS:</b>                   | <ol style="list-style-type: none"> <li>1) The homeowner types wrong user ID and password from 1 to 4 times: he or she can reenters user ID and password.</li> <li>2) The homeowner types wrong user ID and password for 5 times: he or she has to wait 30 minutes to login again.</li> <li>3) The homeowner forgets password: he or she can recover password (see use case “ReceivePassword”).</li> <li>4) If SafeHome system cannot recognize some or all sensors, an error message will appear.</li> </ol>                                      |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              | System administrator, sensor.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line, email.<br>Sensor: wireless interface.   |
| <b>OPEN ISSUES:</b>                  | None.   |

### 3.1.6) Use case 6: View sensor’s information

|                  |                           |
|------------------|---------------------------|
| <b>USE-CASE:</b> | View Sensor’s Information |
|------------------|---------------------------|

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|                                      |   |
|--------------------------------------|---|
| <b>PRIMARY ACTOR:</b>                | The homeowner   |
| <b>GOAL IN CONTEXT:</b>              | To view sensor's information.   |
| <b>PRECONDITIONS:</b>                | <ol style="list-style-type: none"> <li>1) SafeHome system is configured and it operates well.</li> <li>2) SafeHome system recognizes all sensors.</li> <li>3) Appropriate user ID and password must be obtained.</li> </ol>   |
| <b>TRIGGER:</b>                      | The homeowner wants to view information relate to one sensor.   |
| <b>SCENARIO:</b>                     | <ol style="list-style-type: none"> <li>1) The homeowner: logins in to SafeHome system.</li> <li>2) The homeowner: enters user ID and password.</li> <li>3) The homeowner: clicks "Security" menu.</li> <li>4) The homeowner: clicks "Manage sensors" sub-menu.</li> <li>5) The homeowner: chooses the type of sensor to view and then presses "Display" button so that the system displays all sensors for selected type.</li> <li>6) The homeowner: clicks "View" link associated with each sensor to view its information.</li> </ol> |
| <b>EXCEPTIONS:</b>                   | <ol style="list-style-type: none"> <li>1) The homeowner types wrong user ID and password from 1 to 4 times: he or she can reenters user ID and password.</li> <li>2) The homeowner types wrong user ID and password for 5 times: he or she has to wait 30 minutes to login again.</li> <li>3) The homeowner forgets password: he or she can recover password (see use case "ReceivePassword").</li> <li>4) If SafeHome system cannot recognize some or all sensors, an error message will appear.</li> </ol>                            |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              | System administrator, sensor.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line, email.<br>Sesnor: wireless interface.   |
| <b>OPEN ISSUES:</b>                  | None.   |

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## 3.1.7) Use case 7: Arm/Disarm SafeHome system

|                                      |  |
|--------------------------------------|--|
| <b>USE-CASE:</b>                     | Arm/Disarm System  |
| <b>PRIMARY ACTOR:</b>                | The homeowner  |
| <b>GOAL IN CONTEXT:</b>              | To arm/disarm the system.  |
| <b>PRECONDITIONS:</b>                | 1) SafeHome system is configured and it operates well.<br>2) SafeHome system recognizes all sensors.<br>3) Appropriate user ID and password must be obtained.  |
| <b>TRIGGER:</b>                      | The homeowner wants to arm/disarm the system.  |
| <b>SCENARIO:</b>                     | 1) The homeowner logs in to SafeHome system.<br>2) The homeowner enters user ID and password.<br>3) The homeowner clicks “Security” menu.<br>4) The homeowner clicks “Arm/Disarm system” sub-menu.<br>5) The homeowner chooses “Arm the system” option to arm the system or chooses “Disarm the system” option to disarm the system.   |
| <b>EXCEPTIONS:</b>                   | 1) The homeowner types wrong user ID and password from 1 to 4 times: he or she can reenters user ID and password.<br>2) The homeowner types wrong user ID and password for 5 times: he or she has to wait 30 minutes to login again.<br>3) The homeowner forgets password: he or she can recover password (see use case “ReceivePassword”).<br>4) If SafeHome system cannot recognize some or all sensors, an error message will appear. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.   |
| <b>SECONDARY ACTOR:</b>              | System administrator, sensor.  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line, email.<br>Sensor: wireless interface.  |
| <b>OPEN ISSUES:</b>                  | None.  |

## 3.1.8) Use case 8: Create a new security zone

|                          |  |
|--------------------------|--|
| <b>USE-CASE:</b>         | Create New Security Zone   |
| <b>PRIMARY ACTOR:</b>    | The homeowner  |
| <b>GOAL IN CONTEXT:</b>  | To create a new security zone.   |
| <b>PRECONDITIONS:</b>    | <ol style="list-style-type: none"> <li>1) SafeHome system is configured and it operates well.</li> <li>2) SafeHome system recognizes all sensors.</li> <li>3) Appropriate user ID and password must be obtained.</li> </ol>  |
| <b>TRIGGER:</b>          | The homeowner wants to arm/disarm the system.  |
| <b>SCENARIO:</b>         | <ol style="list-style-type: none"> <li>1) The homeowner logs in to SafeHome system.</li> <li>2) The homeowner enters user ID and password.</li> <li>3) The homeowner clicks “Security” menu.</li> <li>4) The homeowner clicks “Manage security zones” sub-menu.</li> <li>5) The homeowner clicks “Create a new security zone” sub-menu.</li> <li>6) The homeowner types the name of a new security zone; adds sensors to security zone and then presses “Create” button.</li> </ol>  |
| <b>EXCEPTIONS:</b>       | <ol style="list-style-type: none"> <li>1) The homeowner types wrong user ID and password from 1 to 4 times: he or she can reenters user ID and password.</li> <li>2) The homeowner types wrong user ID and password for 5 times: he or she has to wait 30 minutes to login again.</li> <li>3) The homeowner forgets password: he or she can recover password (see use case “ReceivePassword”).</li> <li>4) If SafeHome system cannot recognize some or all sensors, an error message will appear.</li> <li>5) The name of a new security zone must be different from other security zones and also cannot be left empty.</li> <li>6) One security zone has at least one sensor.</li> </ol> |
| <b>PRIORITY:</b>         | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>   | First increment.   |
| <b>FREQUENCY OF USE:</b> | Not regularly.   |

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|                                      |   |
|--------------------------------------|---|
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              | System administrator, sensor.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line, email.<br>Sensor: wireless interface. |
| <b>OPEN ISSUES:</b>                  | None.   |

### 3.1.9) Use case 9: Update existing security zone

|                         |  |
|-------------------------|--|
| <b>USE-CASE:</b>        | Update Existing Security Zone  |
| <b>PRIMARY ACTOR:</b>   | The homeowner  |
| <b>GOAL IN CONTEXT:</b> | To update an existing security zone.   |
| <b>PRECONDITIONS:</b>   | 1) SafeHome system is configured and it operates well.<br>2) SafeHome system recognizes all sensors.   |
| <b>TRIGGER:</b>         | The homeowner wants to arm/disarm the system.  |
| <b>SCENARIO:</b>        | 1) The homeowner logs in to SafeHome system.<br>2) The homeowner enters user ID and password.<br>3) The homeowner clicks “Security” menu.<br>4) The homeowner clicks “Manage security zones” sub-menu.<br>5) The homeowner clicks “Update security zone” sub-menu.<br>6) The homeowner chooses the security zone from the list and then opens it by clicking “Show” link.<br>7) The homeowner updates selected security zone with new settings.  |
| <b>EXCEPTIONS:</b>      | 1) The homeowner types wrong user ID and password from 1 to 4 times: he or she can reenters user ID and password.<br>2) The homeowner types wrong user ID and password for 5 times: he or she has to wait 30 minutes to login again.<br>3) The homeowner forgets password: he or she can recover password (see use case “ReceivePassword”).<br>4) If SafeHome system cannot recognize some or all sensors, an error message will appear.<br>5) If the homeowner wants to change the name of security |

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|                                      |   |
|--------------------------------------|---|
|                                      | zone, new name must be different from other security zones. Besides that, the name cannot be left empty.<br>6) One security zone must have at least one sensor. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              | System administrator, sensor.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line, email.<br>Sensor: wireless interface.   |
| <b>OPEN ISSUES:</b>                  | None.   |

### 3.1.10) Use case 10: Activate/Deactivate security zone

|                         |   |
|-------------------------|---|
| <b>USE-CASE:</b>        | Activate/Deactivate Security Zone   |
| <b>PRIMARY ACTOR:</b>   | The homeowner   |
| <b>GOAL IN CONTEXT:</b> | To activate/deactivate an existing security zone.   |
| <b>PRECONDITIONS:</b>   | 1) SafeHome system is configured and it operates well.<br>2) SafeHome system recognizes all sensors.<br>3) Appropriate user ID and password must be obtained.   |
| <b>TRIGGER:</b>         | The homeowner wants to activate/deactivate an existing security zone.   |
| <b>SCENARIO:</b>        | 1) The homeowner logs in to SafeHome system.<br>2) The homeowner enters user ID and password.<br>3) The homeowner clicks “Security” menu.<br>4) The homeowner clicks “Manage security zones” sub-menu.<br>5) The homeowner clicks “Activate/Deactivate security zone” sub-menu.<br>6) The homeowner chooses the security zone from the list and then set its status to “Enabled” or “Disabled”. |
| <b>EXCEPTIONS:</b>      | 1) The homeowner types wrong user ID and password from 1 to 4 times: he or she can reenters user ID and password.   |

## SAFEHOME SYSTEM

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|                                      |  |
|--------------------------------------|--|
|                                      | <p>2) The homeowner types wrong user ID and password for 5 times: he or she has to wait 30 minutes to login again.</p> <p>3) The homeowner forgets password: he or she can recover password (see use case “ReceivePassword”).</p> <p>4) If SafeHome system cannot recognize some or all sensors, an error message will appear.</p> |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.   |
| <b>SECONDARY ACTOR:</b>              | System administrator, sensor.  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line.<br>Sensor: wireless interface.   |
| <b>OPEN ISSUES:</b>                  | None.  |

### 3.1.11) Use case 11: View security zone

|                         |   |
|-------------------------|---|
| <b>USE-CASE:</b>        | View Security Zone  |
| <b>PRIMARY ACTOR:</b>   | The homeowner   |
| <b>GOAL IN CONTEXT:</b> | To view an existing security zone.  |
| <b>PRECONDITIONS:</b>   | <p>1) SafeHome system is configured and it operates well.</p> <p>2) SafeHome system recognizes all sensors.</p> <p>3) Appropriate user ID and password must be obtained.</p>  |
| <b>TRIGGER:</b>         | The homeowner wants to activate/deactivate an existing security zone.   |
| <b>SCENARIO:</b>        | <p>1) The homeowner logs in to SafeHome system.</p> <p>2) The homeowner enters user ID and password.</p> <p>3) The homeowner clicks “Security” menu.</p> <p>4) The homeowner clicks “Manage security zones” sub-menu.</p> <p>5) The homeowner clicks “View security zone” sub-menu.</p> <p>6) The homeowner views the security zone by clicking “View” link associated with each security zone.</p> |

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|                                      |   |
|--------------------------------------|---|
| <b>EXCEPTIONS:</b>                   | <p>1) The homeowner types wrong user ID and password from 1 to 4 times: he or she can reenters user ID and password.</p> <p>2) The homeowner types wrong user ID and password for 5 times: he or she has to wait 30 minutes to login again.</p> <p>3) The homeowner forgets password: he or she can recover password (see use case “ReceivePassword”).</p> <p>4) If SafeHome system cannot recognize some or all sensors, an error message will appear.</p> |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              | System administrator, sensor.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line.<br>Sensor: wireless interface.  |
| <b>OPEN ISSUES:</b>                  | None.   |

### 3.1.12) Use case 12: Contact the homeowner in an emergency

|                         |  |
|-------------------------|--|
| <b>USE-CASE:</b>        | Contact The Homeowner  |
| <b>PRIMARY ACTOR:</b>   | SafeHome system.   |
| <b>GOAL IN CONTEXT:</b> | To contact the homeowner in case of emergency.   |
| <b>PRECONDITIONS:</b>   | <p>1) SafeHome system is configured and it operates well.</p> <p>2) SafeHome system recognizes all sensors.</p> <p>3) There is an unauthorized access or an abnormality with fire, smoke, toxic gases or water level...</p> <p>4) Email and cell phone number of the homeowner must be obtained.</p> |
| <b>TRIGGER:</b>         | SafeHome system detects an unauthorized access or an abnormality with fire, smoke, toxic gases or water level...   |
| <b>SCENARIO:</b>        | <p>1) SafeHome system raises alarm.</p> <p>2) SafeHome system calls the homeowner and sends an email to him or her.</p>  |

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|                                      |                                 |
|--------------------------------------|---------------------------------|
| <b>EXCEPTIONS:</b>                   |                                 |
| <b>PRIORITY:</b>                     | Essential, must be implemented. |
| <b>WHEN AVAILABLE:</b>               | First increment.                |
| <b>FREQUENCY OF USE:</b>             | Not regularly.                  |
| <b>CHANNEL TO ACTOR:</b>             | Via email or cell phone.        |
| <b>SECONDARY ACTOR:</b>              | None.                           |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | None.                           |
| <b>OPEN ISSUES:</b>                  | None.                           |

### 3.1.13) Use case 13: Contact the police in an emergency

|                                      |  |
|--------------------------------------|--|
| <b>USE-CASE:</b>                     | ContactPolice  |
| <b>PRIMARY ACTOR:</b>                | SafeHome system.   |
| <b>GOAL IN CONTEXT:</b>              | To contact the police in case of emergency.  |
| <b>PRECONDITIONS:</b>                | 1) SafeHome system is configured and it operates well.<br>2) SafeHome system recognizes all sensors.<br>3) There is an unauthorized access detected by motion sensors and camera.<br>4) Telephone number of the police station must be obtained. |
| <b>TRIGGER:</b>                      | SafeHome system detects an unauthorized access.  |
| <b>SCENARIO:</b>                     | 1) SafeHome system raises alarm.<br>2) SafeHome system calls the police.   |
| <b>EXCEPTIONS:</b>                   |  |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Not regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via telephone.   |
| <b>SECONDARY ACTOR:</b>              | None.  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | None.  |

## SAFEHOME SYSTEM

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|                     |       |
|---------------------|-------|
| <b>OPEN ISSUES:</b> | None. |
|---------------------|-------|

### 3.1.14) Use case 14: Contact emergency services in an emergency

|                                      |   |
|--------------------------------------|---|
| <b>USE-CASE:</b>                     | Contact Emergency Services  |
| <b>PRIMARY ACTOR:</b>                | SafeHome system.  |
| <b>GOAL IN CONTEXT:</b>              | To contact emergency services in case of emergency.   |
| <b>PRECONDITIONS:</b>                | 1) SafeHome system is configured and it operates well.<br>2) SafeHome system recognizes all sensors.<br>3) There is an abnormality with fire, smoke, toxic gases or water level...<br>4) Telephone number of emergency services must be obtained. |
| <b>TRIGGER:</b>                      | SafeHome system detects an abnormality with fire, smoke, toxic gases or water level...  |
| <b>SCENARIO:</b>                     | 1) SafeHome system raises alarm.<br>2) SafeHome system calls corresponding emergency services.  |
| <b>EXCEPTIONS:</b>                   |   |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Not regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via telephone.  |
| <b>SECONDARY ACTOR:</b>              | None.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | None.   |
| <b>OPEN ISSUES:</b>                  | None.   |

### 3.1.15) Use case 15: Look up information in Help section

|                         |  |
|-------------------------|--|
| <b>USE-CASE:</b>        | Lookup Information In Help Section                     |
| <b>PRIMARY ACTOR:</b>   | The homeowner  |
| <b>GOAL IN CONTEXT:</b> | To look up information in Help section to learn to use |

## SAFEHOME SYSTEM

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|                                      |   |
|--------------------------------------|---|
|                                      | SafeHome system in a correct way.   |
| <b>PRECONDITIONS:</b>                | 1) SafeHome system is configured and it operates well.  |
| <b>TRIGGER:</b>                      | The homeowner wants to activate/deactivate an existing security zone.   |
| <b>SCENARIO:</b>                     | 1) The homeowner clicks “Help” menu.<br>2) The homeowner chooses “User’s manual” or “FAQ” sub-menu.<br>3) The homeowner looks up information he or she wants. |
| <b>EXCEPTIONS:</b>                   |   |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              | System administrator.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line, email.  |
| <b>OPEN ISSUES:</b>                  | 1) Should the Help section allow the homeowner to search content easily and quickly?  |

### 3.2) Use cases for Surveillance feature

#### 3.2.1) Use case 16: View monitoring zone

|                         |  |
|-------------------------|--|
| <b>USE-CASE:</b>        | View Monitoring Zone   |
| <b>PRIMARY ACTOR:</b>   | Homeowner  |
| <b>GOAL IN CONTEXT:</b> | To view selected Monitoring Zone.  |
| <b>PRECONDITIONS:</b>   |  |
| <b>TRIGGER:</b>         | The selected camera operates to show Monitoring Zone.  |
| <b>SCENARIO:</b>        | 1) Homeowner: logs in to SafeHome system.<br>2) Homeowner: enters user ID and password.<br>3) Homeowner: clicks “Surveillance” menu.<br>4) Homeowner: clicks “Display” sub-menu.<br>5) Homeowner: clicks “Monitoring Zone” sub-menu. |

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|                                      |   |
|--------------------------------------|---|
|                                      | 6) Homeowner: double-click a camera that he/she wants.<br>7) Homeowner: checks the displaying image.  |
| <b>EXCEPTIONS:</b>                   | 1) User ID and password are not correct: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering system again.<br>2) Selected camera is not activating: SafeHome displays the error message that selected camera is not activating. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              | System administrator.   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> | System administrator: phone line.   |
| <b>OPEN ISSUES:</b>                  |   |

### 3.2.2) Use case 17: Pan selected camera

|                         |   |
|-------------------------|---|
| <b>USE-CASE:</b>        | Pan Selected Camera   |
| <b>PRIMARY ACTOR:</b>   | Homeowner   |
| <b>GOAL IN CONTEXT:</b> | To observe more broad surveillance zone through the camera.   |
| <b>PRECONDITIONS:</b>   | 1) There is a camera that the homeowner selected.   |
| <b>TRIGGER:</b>         | The selected camera pans to show the extensive Monitoring Zone.   |
| <b>SCENARIO:</b>        | 1) Homeowner: logs in to SafeHome system.<br>2) Homeowner: enters user ID and password.<br>3) Homeowner: clicks "Surveillance" menu.<br>4) Homeowner: clicks "Display" sub-menu.<br>5) Homeowner: clicks "Monitoring Zone" sub-menu.<br>6) Homeowner: double-click a camera that he/she wants.<br>7) Homeowner: checks the displaying image.<br>8) Homeowner: drags candle bar to he/she wanted |

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|                                      |  |
|--------------------------------------|--|
|                                      | position either left or right on the bottom of display monitoring zone window web application pan UI.  |
| <b>EXCEPTIONS:</b>                   | <p>1) User ID and password are not correct: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering system again.</p> <p>2) Selected camera is not activating: SafeHome displays the error message that selected camera is not activating.</p> |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Not regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.   |
| <b>SECONDARY ACTOR:</b>              |  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> |  |
| <b>OPEN ISSUES:</b>                  |  |

### 3.2.3) Use case 18: Zoom selected camera

|                         |  |
|-------------------------|--|
| <b>USE-CASE:</b>        | Zoom Selected Camera   |
| <b>PRIMARY ACTOR:</b>   | Homeowner  |
| <b>GOAL IN CONTEXT:</b> | To observe a surveillance zone more in detail through the camera   |
| <b>PRECONDITIONS:</b>   | 1) There is a camera that the homeowner selected.  |
| <b>TRIGGER:</b>         | The selected camera zooms to show the detailed Monitoring Zone.  |
| <b>SCENARIO:</b>        | <p>1) Homeowner: logs in to SafeHome system.</p> <p>2) Homeowner: enters user ID and password.</p> <p>3) Homeowner: clicks “Surveillance” menu.</p> <p>4) Homeowner: clicks “Display” sub-menu.</p> <p>5) Homeowner: clicks “Monitoring Zone” sub-menu.</p> <p>6) Homeowner: double-click a camera that he/she wants.</p> <p>7) Homeowner: checks the displaying image.</p> <p>8) Homeowner: drags candle bar to he/she wanted</p> |

## SAFEHOME SYSTEM

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|                                      |   |
|--------------------------------------|---|
|                                      | position either left or right on the bottom of display monitoring zone window web application zoom UI.  |
| <b>EXCEPTIONS:</b>                   | 1) User ID and password are not correct: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering system again.<br>2) Selected camera is not activating: SafeHome displays the error message that selected camera is not activating. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Not regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              |   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> |   |
| <b>OPEN ISSUES:</b>                  |   |

### 3.2.4) Use case 19: Show thumbnail for each camera

|                         |   |
|-------------------------|---|
| <b>USE-CASE:</b>        | Show Thumbnail for each camera  |
| <b>PRIMARY ACTOR:</b>   | Homeowner   |
| <b>GOAL IN CONTEXT:</b> | To observe the status of all cameras.   |
| <b>PRECONDITIONS:</b>   |   |
| <b>TRIGGER:</b>         | All cameras display to show the Monitoring Zone.  |
| <b>SCENARIO:</b>        | 1) Homeowner: logs in to SafeHome system.<br>2) Homeowner: enters user ID and password.<br>3) Homeowner: clicks "Surveillance" menu.<br>4) Homeowner: clicks "Display" sub-menu.<br>5) Homeowner: clicks "Thumbnail" sub-menu.<br>6) Homeowner: checks the displaying images. |
| <b>EXCEPTIONS:</b>      | 1) User ID and password are not correct: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering system again.  |

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|                                      |  |
|--------------------------------------|--|
|                                      | 2) Some camera is not activating: SafeHome displays the image that “No image”. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Not regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.   |
| <b>SECONDARY ACTOR:</b>              |  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> |  |
| <b>OPEN ISSUES:</b>                  |  |

### 3.2.5) Use case 20: Record camera output

|                         |  |
|-------------------------|--|
| <b>USE-CASE:</b>        | Record Camera Output   |
| <b>PRIMARY ACTOR:</b>   | Homeowner  |
| <b>GOAL IN CONTEXT:</b> | To record a view of camera in real-time.   |
| <b>PRECONDITIONS:</b>   | 1) There is a free space to record the image.<br>2) There is a camera that the homeowner selected.   |
| <b>TRIGGER:</b>         | The selected camera operates to record the current images of Monitoring Zone.  |
| <b>SCENARIO:</b>        | 1) Homeowner: logs in to SafeHome system.<br>2) Homeowner: enters user ID and password.<br>3) Homeowner: clicks “Surveillance” menu.<br>4) Homeowner: clicks “Display” sub-menu.<br>5) Homeowner: clicks “Monitoring Zone” sub-menu.<br>6) Homeowner: right-click on the camera.<br>7) Homeowner: clicks “Record” side-menu.   |
| <b>EXCEPTIONS:</b>      | 1) User ID and password are not correct: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering system again.<br>2) Some camera is not activating: SafeHome displays the image that “No image”.<br>3) There is not available space to save the recorded |

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|                                      |   |
|--------------------------------------|---|
|                                      | image: If the free space remains less than 500MB, then display warning message, “You should check the free space.” If the free space remains less than 200MB, then display error message, “There is not available space to record”. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>               | First increment.  |
| <b>FREQUENCY OF USE:</b>             | Not regularly.  |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.  |
| <b>SECONDARY ACTOR:</b>              |   |
| <b>CHANNELS TO SECONDARY ACTORS:</b> |   |
| <b>OPEN ISSUES:</b>                  |   |

### 3.2.6) Use case 21: Replay camera output

|                         |  |
|-------------------------|--|
| <b>USE-CASE:</b>        | Replay Camera Output   |
| <b>PRIMARY ACTOR:</b>   | Homeowner  |
| <b>GOAL IN CONTEXT:</b> | To see recorded moving images via the web application or the PC.   |
| <b>PRECONDITIONS:</b>   | 1) There exists at least one saved files in the File Server.   |
| <b>TRIGGER:</b>         | SafeHome system replays the saved Monitoring Zone in the Streaming Server via the web application or the PC.   |
| <b>SCENARIO:</b>        | <ol style="list-style-type: none"> <li>1) Homeowner: logs in to SafeHome system.</li> <li>2) Homeowner: enters user ID and password.</li> <li>3) Homeowner: clicks “Surveillance” menu.</li> <li>4) Homeowner: clicks “Replay” sub-menu.</li> <li>5) Homeowner: chooses the file that he/she wants.</li> <li>6) Homeowner: input file password.</li> <li>6) Homeowner: checks the output image.</li> </ol> |
| <b>EXCEPTIONS:</b>      | 1) User ID and password are not correct in the login page: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering   |

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|                                      |  |
|--------------------------------------|--|
|                                      | system again.<br>2) File password is not correct: SafeHome system displays error message and not allowed replay image. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Not regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.   |
| <b>SECONDARY ACTOR:</b>              |  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> |  |
| <b>OPEN ISSUES:</b>                  |  |

### 3.2.7) Use case 22: Activate/Deactivate monitoring zone

|                         |   |
|-------------------------|---|
| <b>USE-CASE:</b>        | Activate/Deactivate Monitoring Zone   |
| <b>PRIMARY ACTOR:</b>   | Homeowner   |
| <b>GOAL IN CONTEXT:</b> | To activate or deactivate camera selectively.   |
| <b>PRECONDITIONS:</b>   |   |
| <b>TRIGGER:</b>         | SafeHome system gathers the status of cameras.  |
| <b>SCENARIO:</b>        | <ol style="list-style-type: none"> <li>1) Homeowner: logs in to SafeHome system.</li> <li>2) Homeowner: enters user ID and password.</li> <li>3) Homeowner: clicks “Surveillance” menu.</li> <li>4) Homeowner: clicks “Status” sub-menu.</li> <li>5) Homeowner: selects camera status that he/she wants either activation or deactivation.</li> <li>6) Homeowner: checks configured status of cameras.</li> </ol> |
| <b>EXCEPTIONS:</b>      | <ol style="list-style-type: none"> <li>1) User ID and password are not correct: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering system again.</li> <li>2) Some camera is not activating: that camera is not a activation to select either activate camera or not.</li> </ol>              |
| <b>PRIORITY:</b>        | Essential, must be implemented.   |

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|                                      |                                |
|--------------------------------------|--------------------------------|
| <b>WHEN AVAILABLE:</b>               | First increment.               |
| <b>FREQUENCY OF USE:</b>             | Not regularly.                 |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface. |
| <b>SECONDARY ACTOR:</b>              |                                |
| <b>CHANNELS TO SECONDARY ACTORS:</b> |                                |
| <b>OPEN ISSUES:</b>                  |                                |

### 3.2.8) Use case 23: Select recorded file

|                          |   |
|--------------------------|---|
| <b>USE-CASE:</b>         | Select Recorded File  |
| <b>PRIMARY ACTOR:</b>    | Homeowner   |
| <b>GOAL IN CONTEXT:</b>  | To load the saved file to replay the image.   |
| <b>PRECONDITIONS:</b>    | 1) There exists at least one saved files in the File Server.<br>2) Homeowner already selects the “Replay” sub-menu.   |
| <b>TRIGGER:</b>          | SafeHome system loads the list of the saved file in the File Server.  |
| <b>SCENARIO:</b>         | 1) Homeowner: logins in to SafeHome system.<br>2) Homeowner: enters user ID and password.<br>3) Homeowner: clicks “Surveillance” menu.<br>4) Homeowner: clicks “Replay” sub-menu.<br>5) Homeowner: chooses the saved record image file.<br>6) Homeowner: checks the replaying image.          |
| <b>EXCEPTIONS:</b>       | 1) User ID and password are not correct: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering system again.<br>2) File is not open: SafeHome system display error message. |
| <b>PRIORITY:</b>         | Essential, must be implemented.   |
| <b>WHEN AVAILABLE:</b>   | First increment.  |
| <b>FREQUENCY OF USE:</b> | Not regularly.  |
| <b>CHANNEL TO ACTOR:</b> | Via web application interface.  |

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|                                      |  |
|--------------------------------------|--|
| <i>SECONDARY ACTOR:</i>              |  |
| <i>CHANNELS TO SECONDARY ACTORS:</i> |  |
| <i>OPEN ISSUES:</i>                  |  |

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### 3.2.9) Use case 24: Load status of monitoring zone

|                                      |  |
|--------------------------------------|--|
| <b>USE-CASE:</b>                     | Load Status of Monitoring Zone   |
| <b>PRIMARY ACTOR:</b>                | Homeowner  |
| <b>GOAL IN CONTEXT:</b>              | To load status information of camera and the saved condition about each Monitoring Zone.   |
| <b>PRECONDITIONS:</b>                | 1) Homeowner already selects “Status” sub-menu.  |
| <b>TRIGGER:</b>                      | SafeHome system gather information of camera through wireless network connected with cameras and the saved list activation/deactivation camera.  |
| <b>SCENARIO:</b>                     | 1) Homeowner: logs in to SafeHome system.<br>2) Homeowner: enters user ID and password.<br>3) Homeowner: clicks “Surveillance” menu.<br>4) Homeowner: clicks “Status” sub-menu.<br>5) Homeowner: checks the status of cameras. |
| <b>EXCEPTIONS:</b>                   | 1) User ID and password are not correct: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering system again. |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Not regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.   |
| <b>SECONDARY ACTOR:</b>              |  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> |  |
| <b>OPEN ISSUES:</b>                  |  |

### 3.2.10) Use case 25: Select monitoring zone

|                         |   |
|-------------------------|---|
| <b>USE-CASE:</b>        | Select Monitoring Zone                                  |
| <b>PRIMARY ACTOR:</b>   | Homeowner   |
| <b>GOAL IN CONTEXT:</b> | To decide the Monitoring Zone that he/she wants to see. |
| <b>PRECONDITIONS:</b>   | 1) Homeowner already selects “Display → Monitoring      |

## SAFEHOME SYSTEM

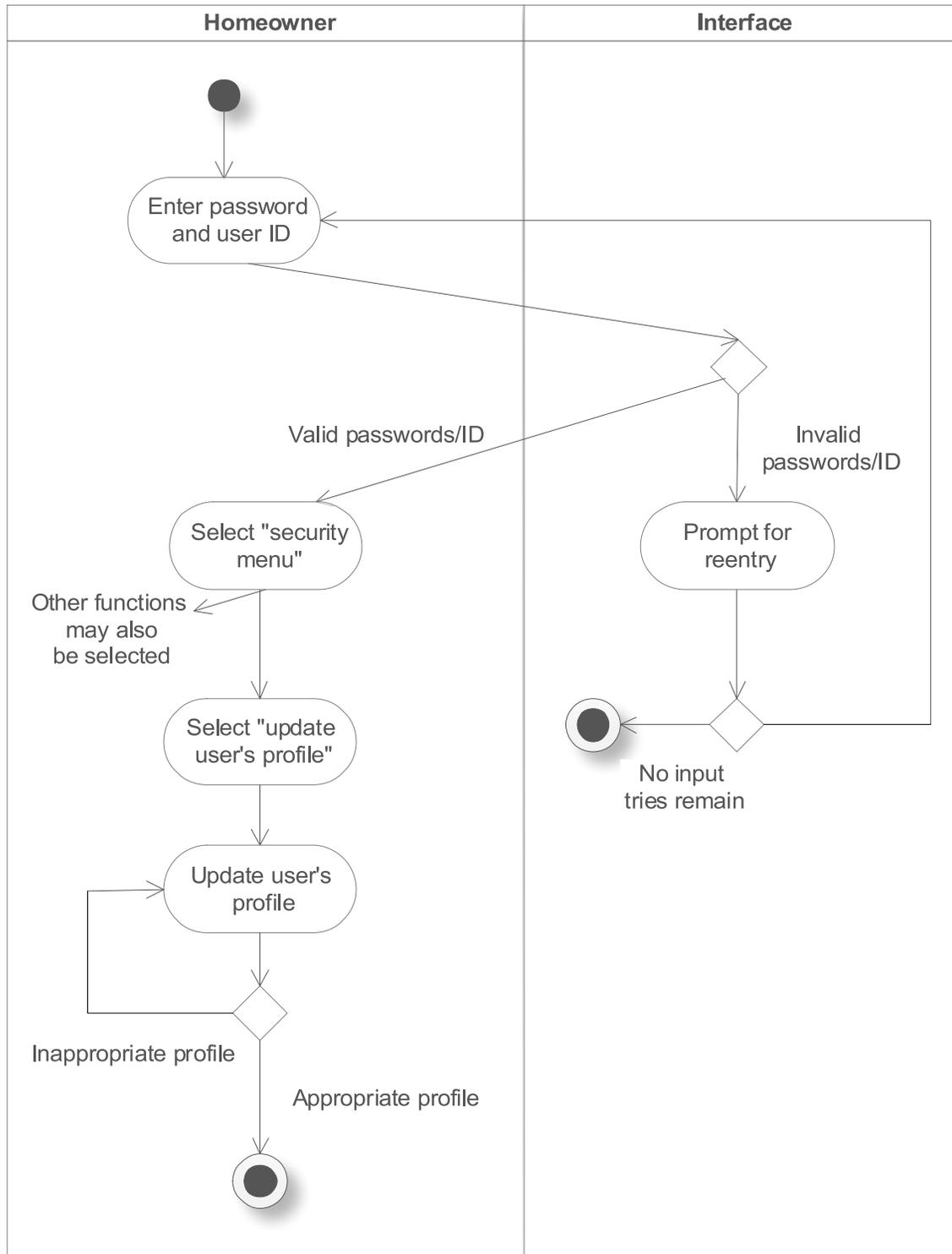
---

|                                      |  |
|--------------------------------------|--|
|                                      | Zone”.   |
| <b>TRIGGER:</b>                      | SafeHome system loads the floor plan image that introduces the location of Monitoring Zone.  |
| <b>SCENARIO:</b>                     | <ol style="list-style-type: none"> <li>1) Homeowner: logs in to SafeHome system.</li> <li>2) Homeowner: enters user ID and password.</li> <li>3) Homeowner: clicks “Surveillance” menu.</li> <li>4) Homeowner: clicks “Display” sub-menu.</li> <li>5) Homeowner: clicks “Monitoring Zone” sub-menu.</li> <li>6) Homeowner: checks the floor plan image.</li> <li>7) Homeowner: double-click the camera that he/she want to see.</li> </ol> |
| <b>EXCEPTIONS:</b>                   | 1) User ID and password are not correct: homeowner has to reenter user ID and password. If the homeowner types wrong password for 5 times, the system requires him or her to wait for 30 minutes before entering system again.   |
| <b>PRIORITY:</b>                     | Essential, must be implemented.  |
| <b>WHEN AVAILABLE:</b>               | First increment.   |
| <b>FREQUENCY OF USE:</b>             | Regularly.   |
| <b>CHANNEL TO ACTOR:</b>             | Via web application interface.   |
| <b>SECONDARY ACTOR:</b>              |  |
| <b>CHANNELS TO SECONDARY ACTORS:</b> |  |
| <b>OPEN ISSUES:</b>                  |  |

## **4) Swimlane diagrams**

### **4.1) Swimlane diagrams for Security feature**

#### **4.1.1) Swimlane diagram for Update homeowner's profile**



**Figure 4: Swimlane diagram for Update homeowner's profile**

4.1.2) Swimlane diagram for Require changing password

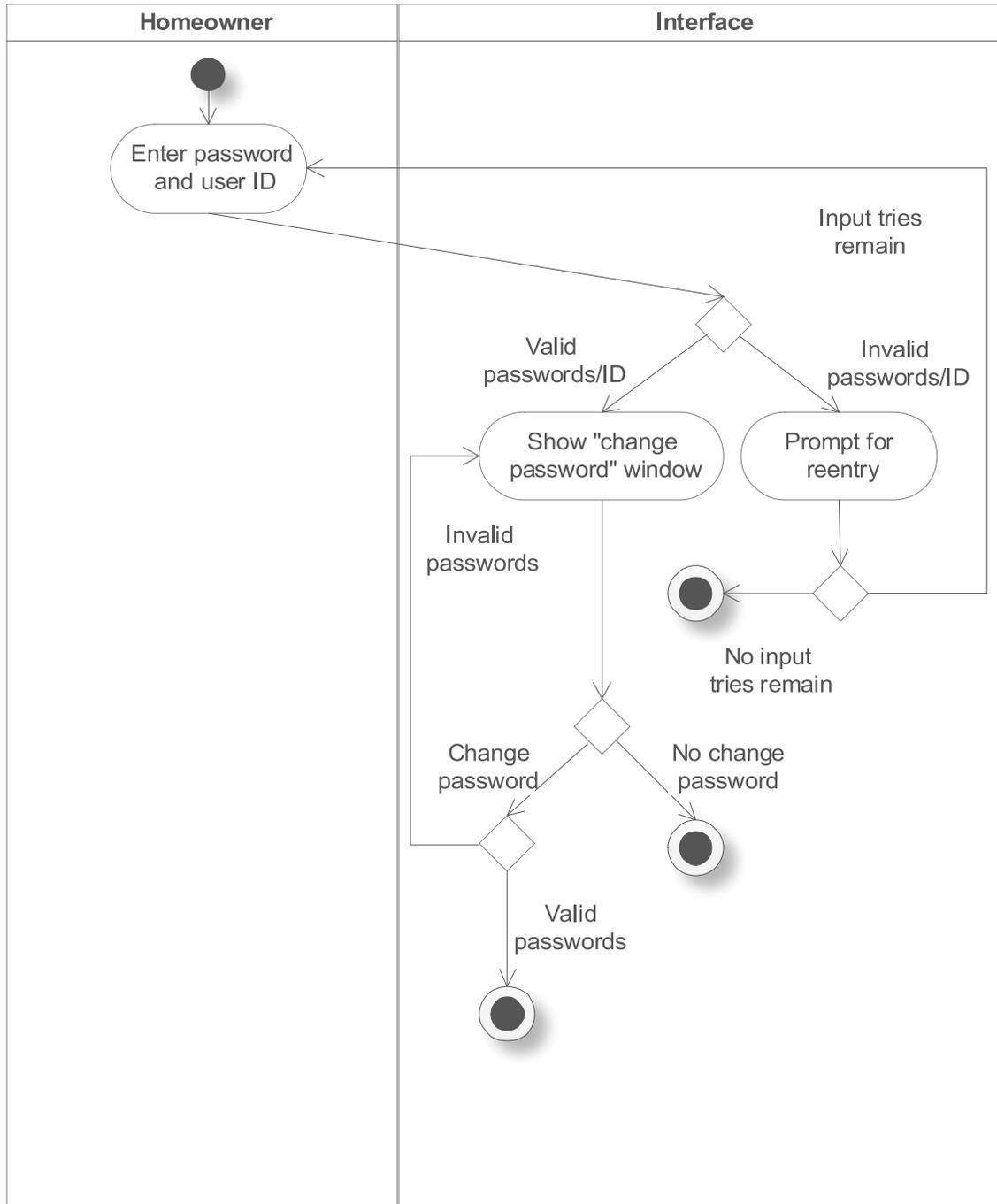
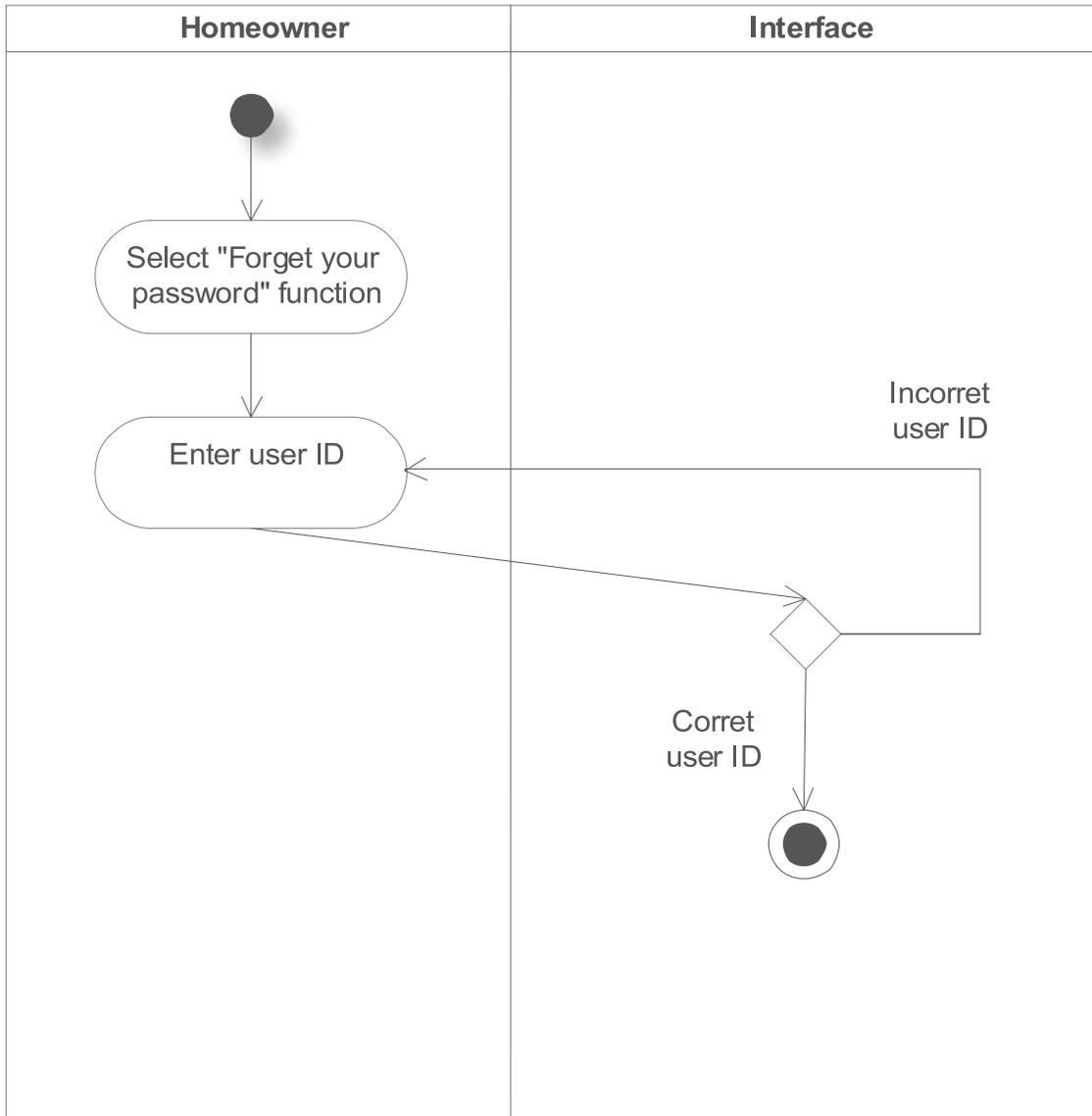


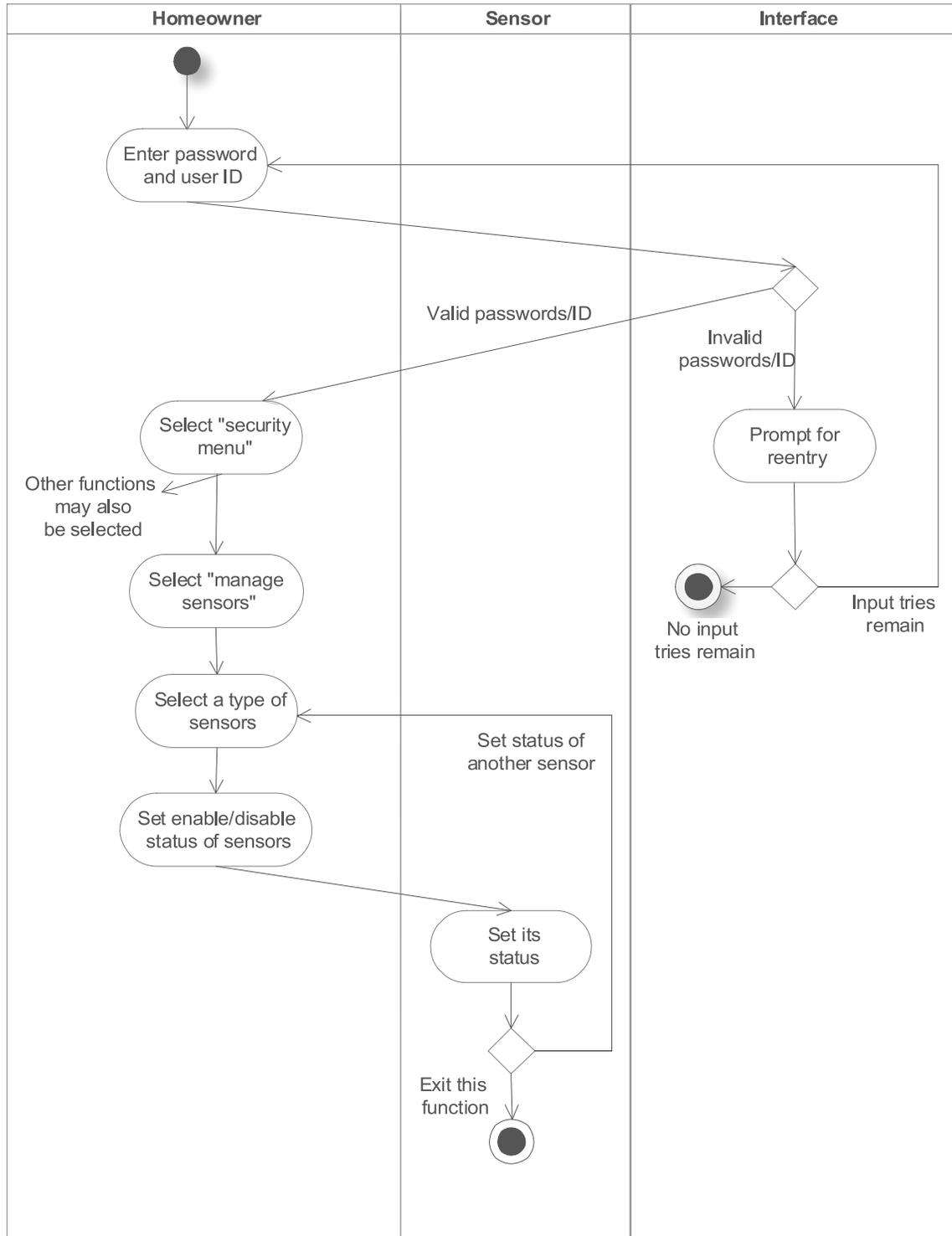
Figure 5: Swimlane diagram for Require changing password

## 4.1.3) Swimlane diagram for Receive password via email or cell phone



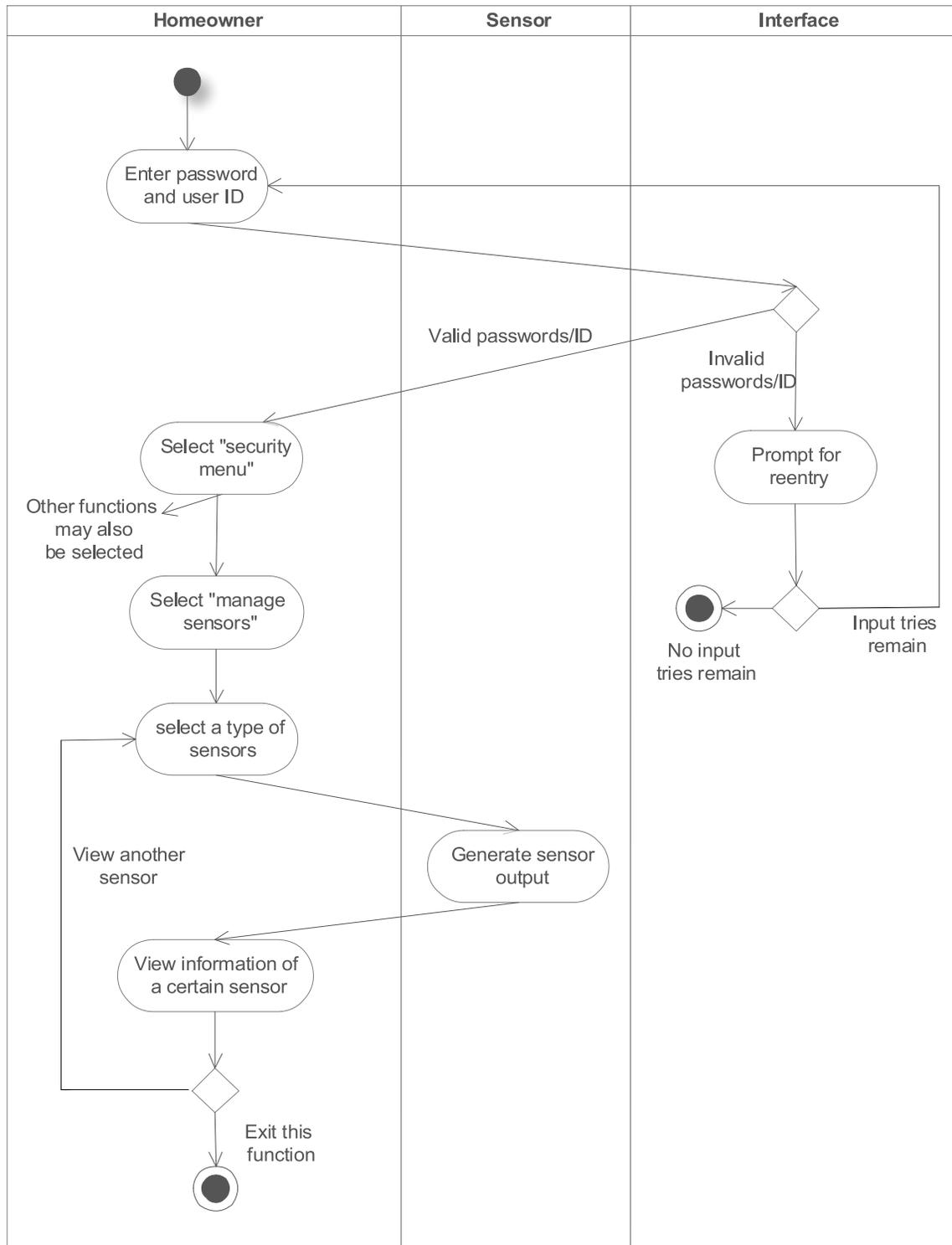
**Figure 6: Swimlane diagram for Receive password via email or cell phone**

## 4.1.4) Swimlane diagram for Activate/Deactivate sensors



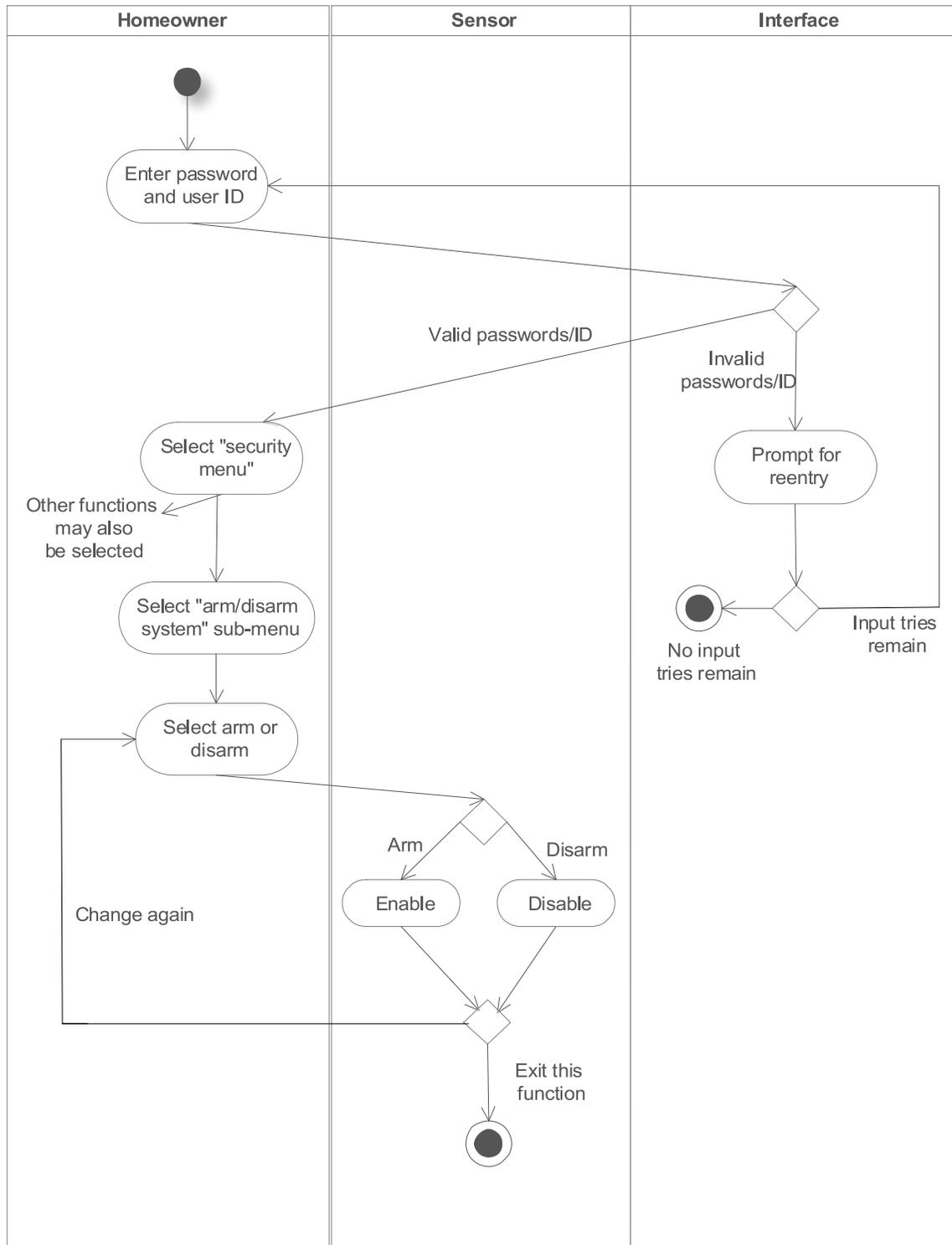
**Figure 7: Swimlane diagram for Activate/Deactivate sensors**

## 4.1.5) Swimlane diagram for View sensor's information



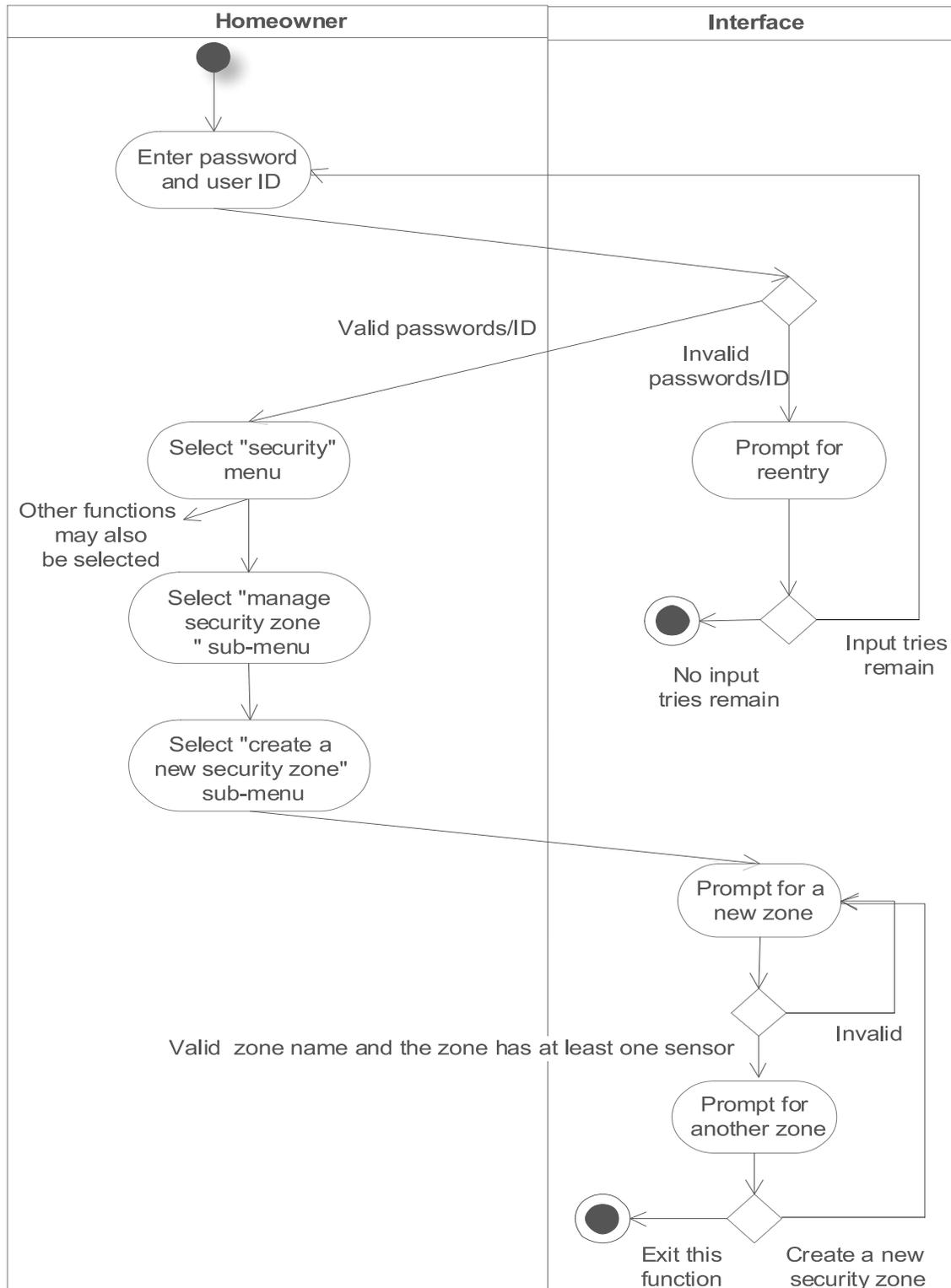
**Figure 8: Swimlane diagram for Activate/Deactivate sensors**

## 4.1.6) Swimlane diagram for Arm/Disarm SafeHome system



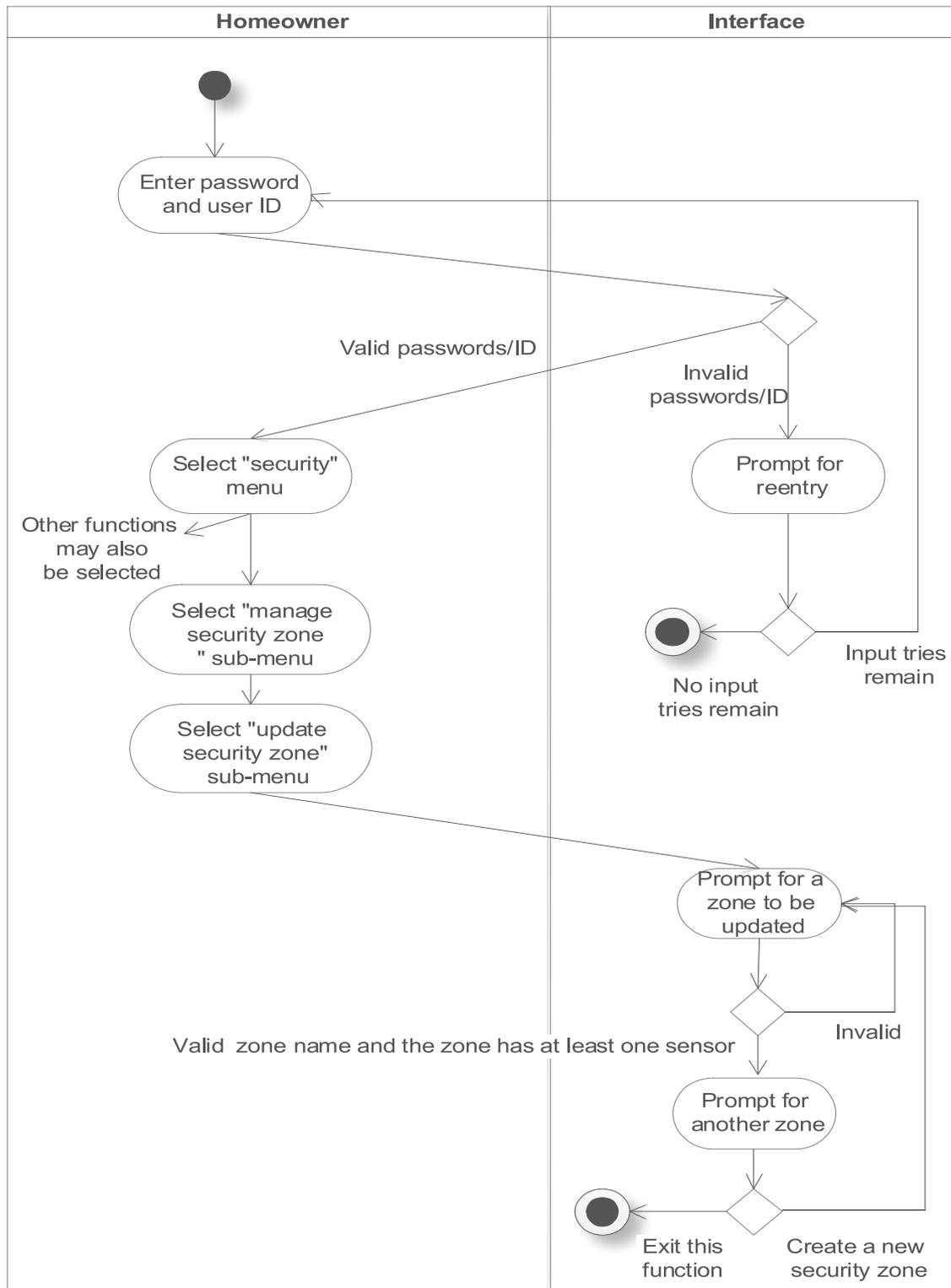
**Figure 9: Swimlane diagram for Arm/Disarm SafeHome system**

## 4.1.7) Swimlane diagram for Create a new security zone



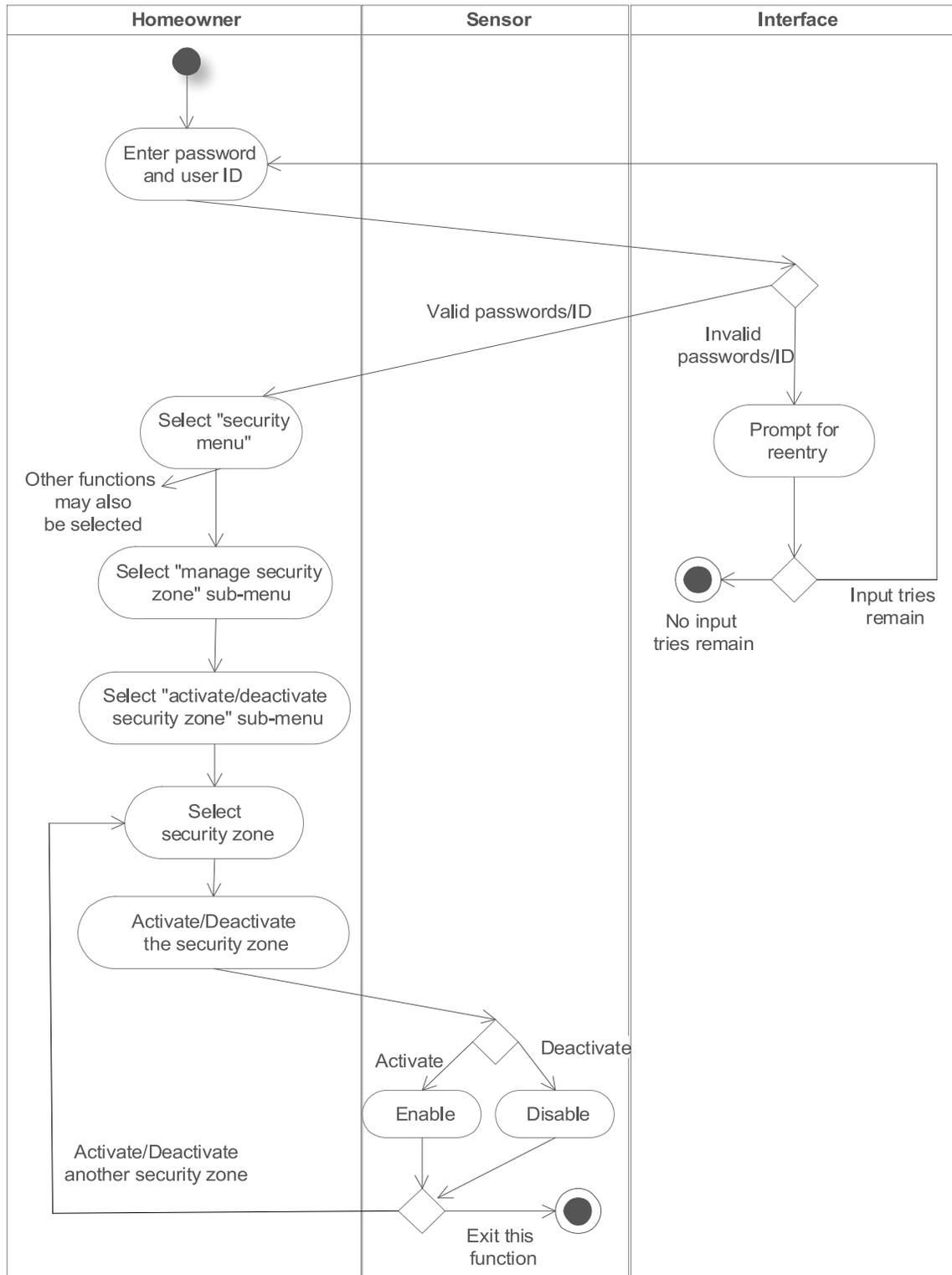
**Figure 10: Swimlane diagram for Create a new security zone**

## 4.1.8) Swimlane diagram for Update existing security zone



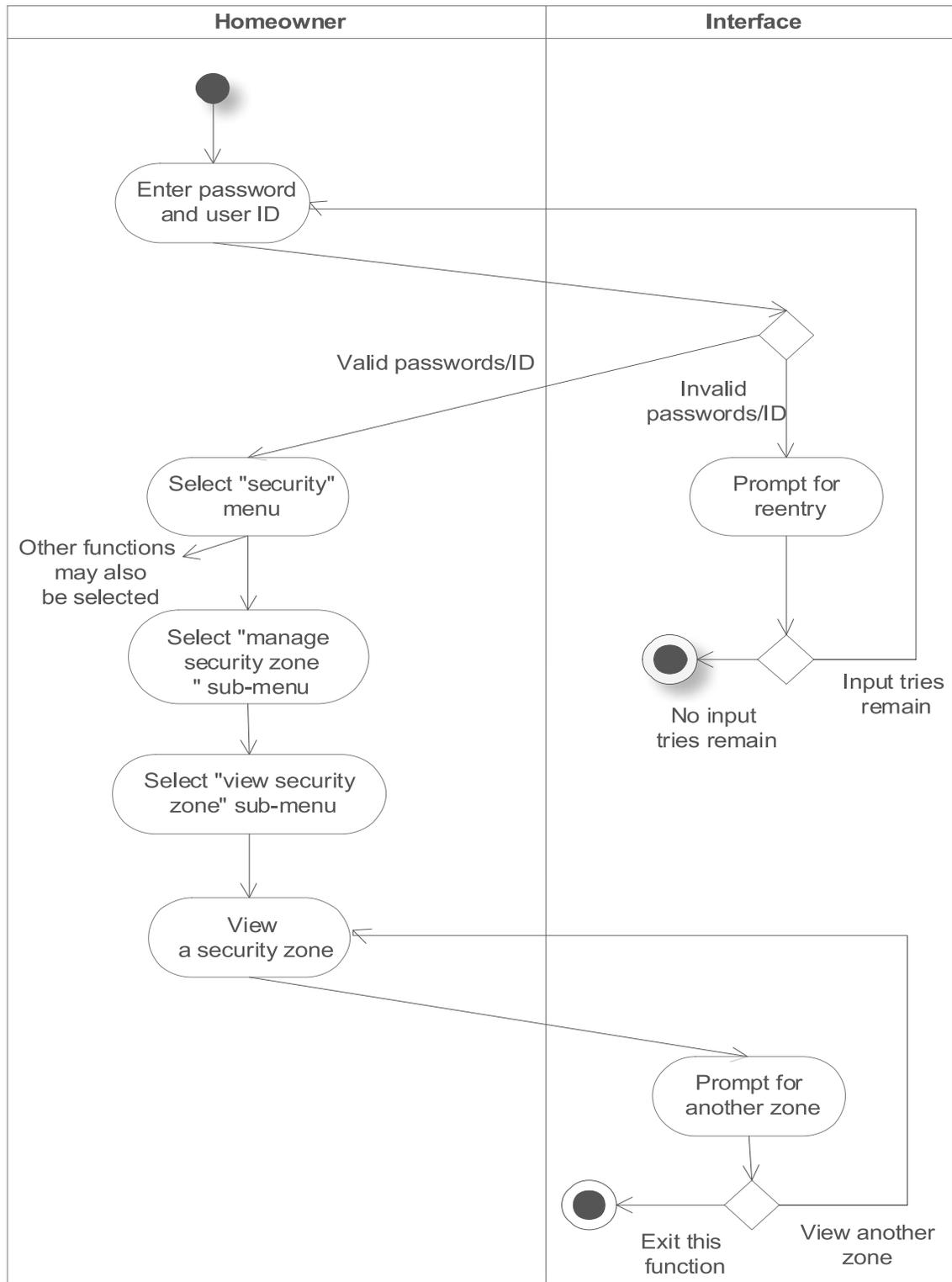
**Figure 11: Swimlane diagram for Update existing security zone**

## 4.1.9) Swimlane diagram for Activate/Deactivate security zone



**Figure 12: Swimlane diagram for Activate/Deactivate security zone**

## 4.1.10) Swimlane diagram for View security zone



**Figure 13: Swimlane diagram for View security zone**

## 4.1.11) Swimlane diagram for Contact the homeowner

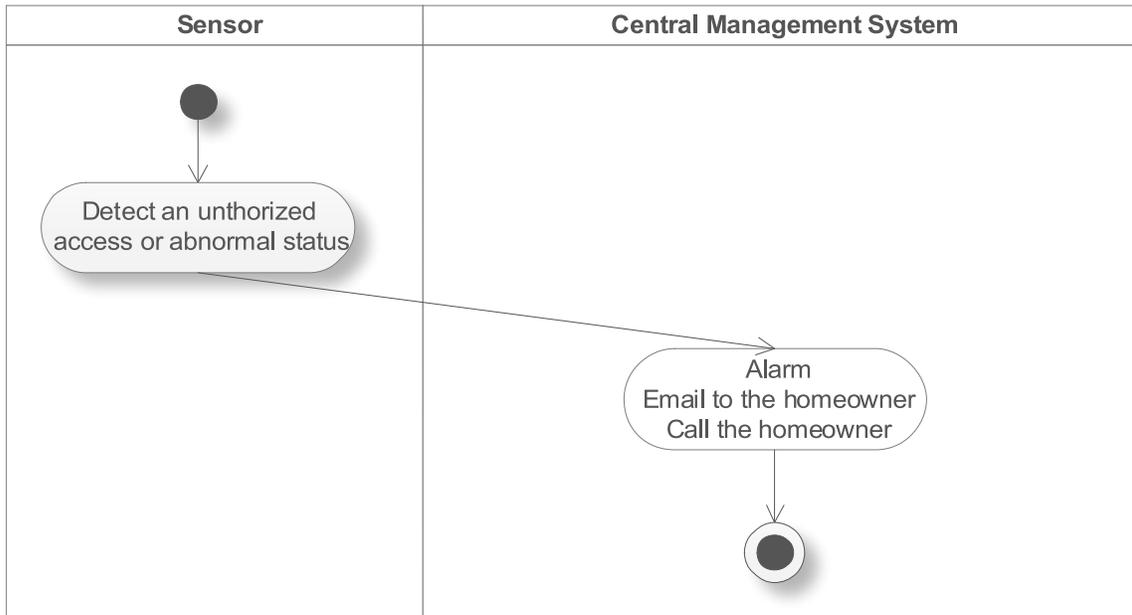


Figure 14: Swimlane diagram for Contact the homeowner

## 4.1.12) Swimlane diagram for Contact the police

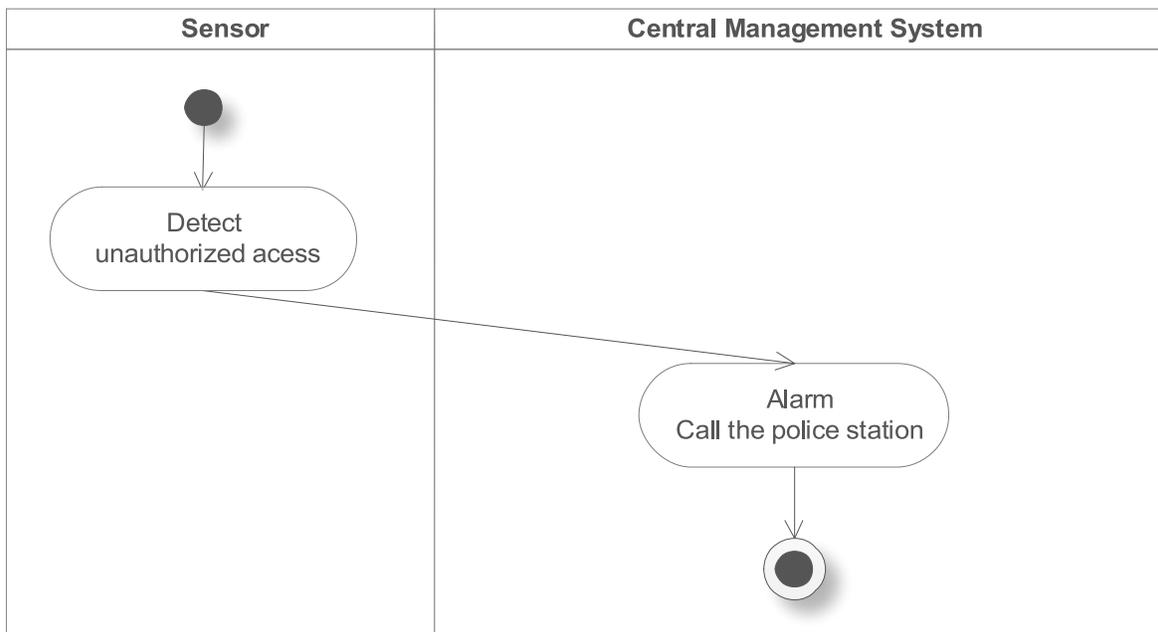
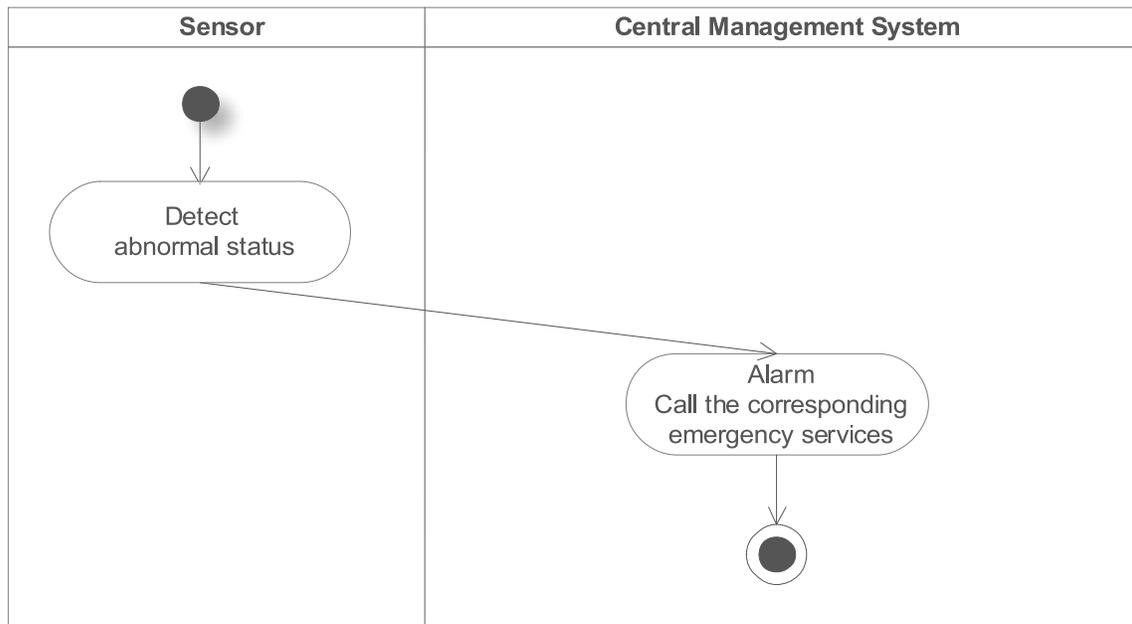


Figure 15: Swimlane diagram for Contact the police

## 4.1.13) Swimlane diagram for Contact emergency services



**Figure 16: Swimlane diagram for Contact emergency services**

## 4.2) Swimlane diagrams for Surveillance feature

### 4.2.1) Swimlane diagram for View monitoring zone

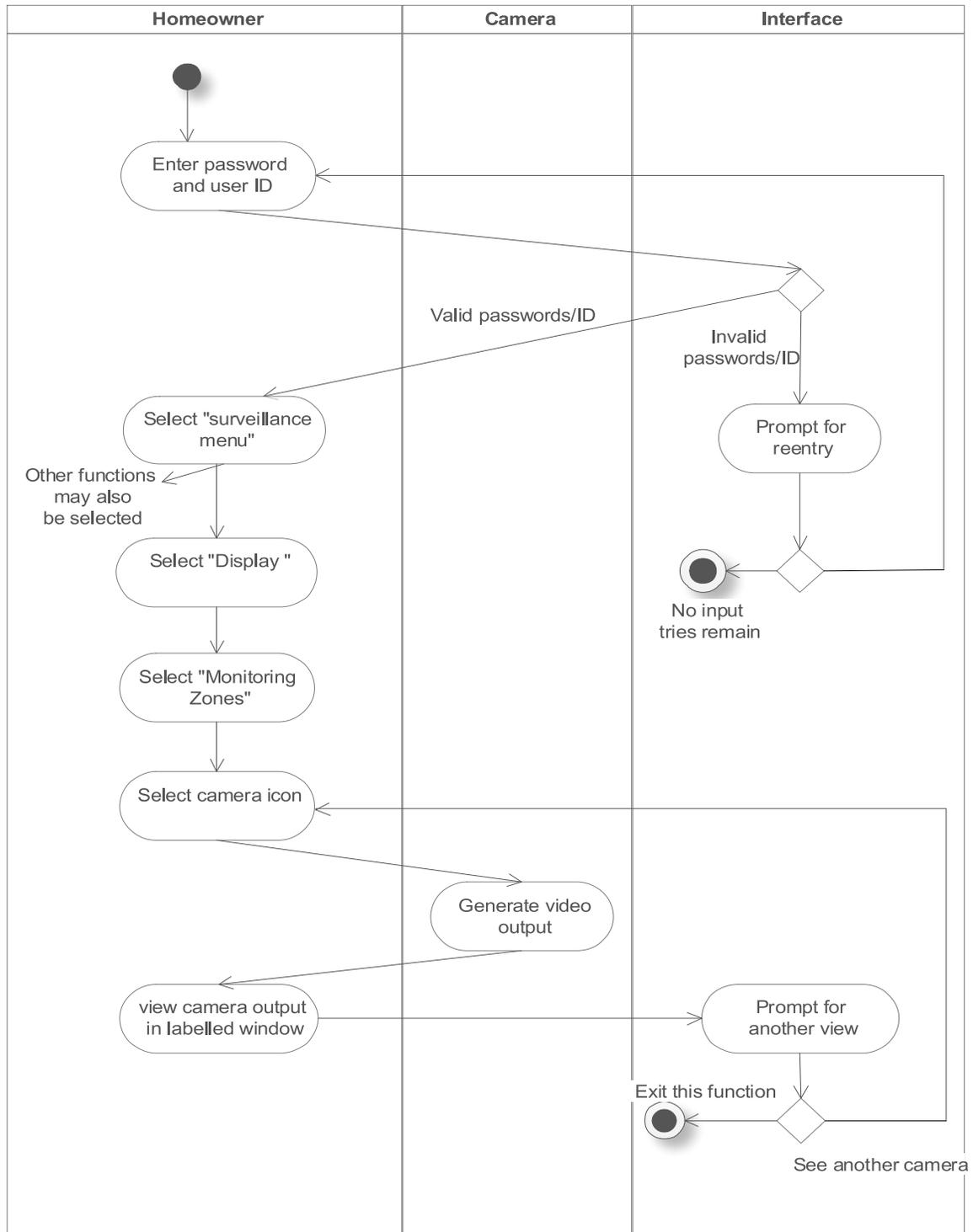


Figure 17: Swimlane diagram for View monitoring zone

4.2.2) Swimlane diagram for Pan selected camera

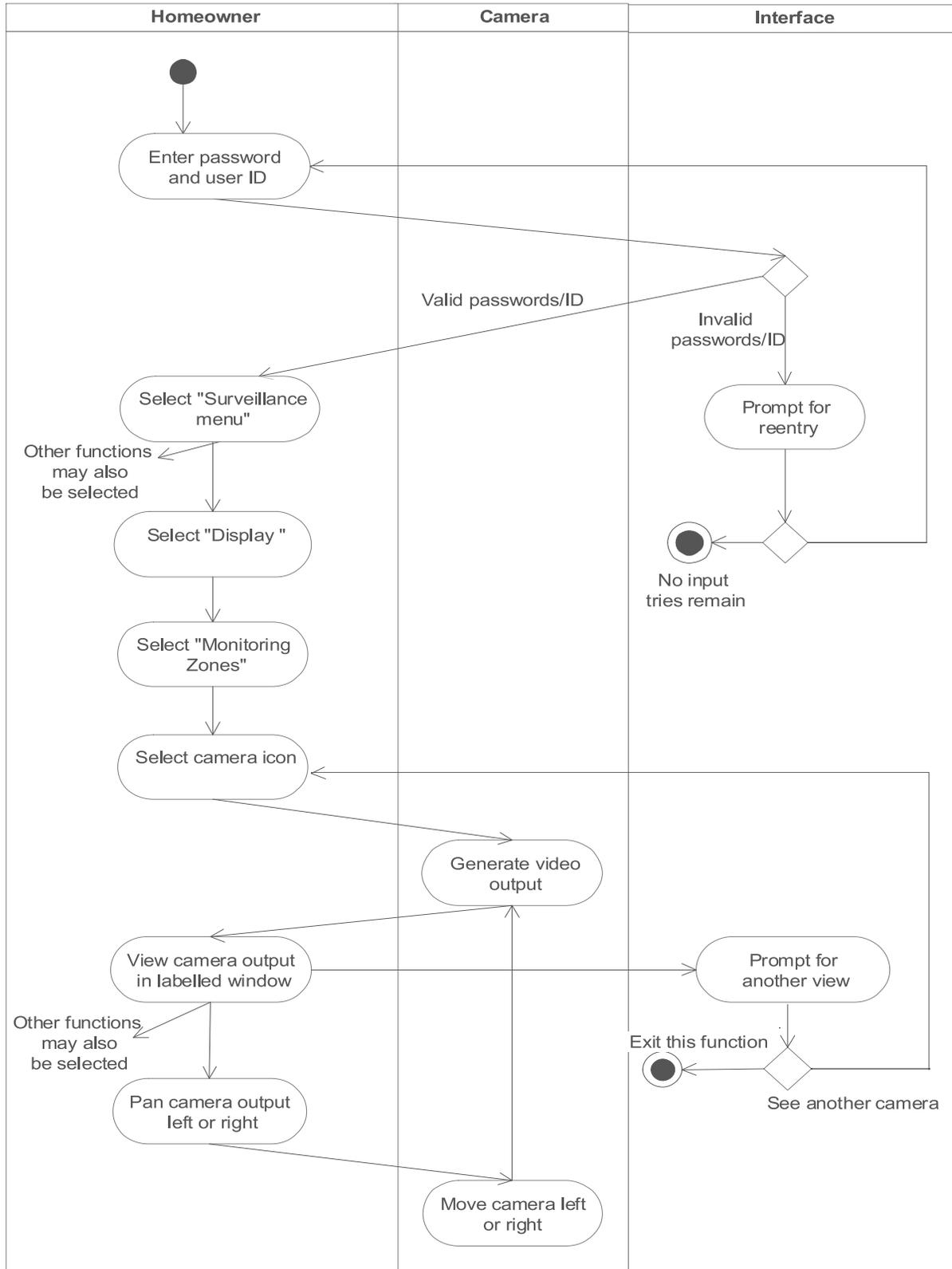


Figure 18: Swimlane diagram for Pan selected camera

4.2.3) Swimlane diagram for Zoom selected camera

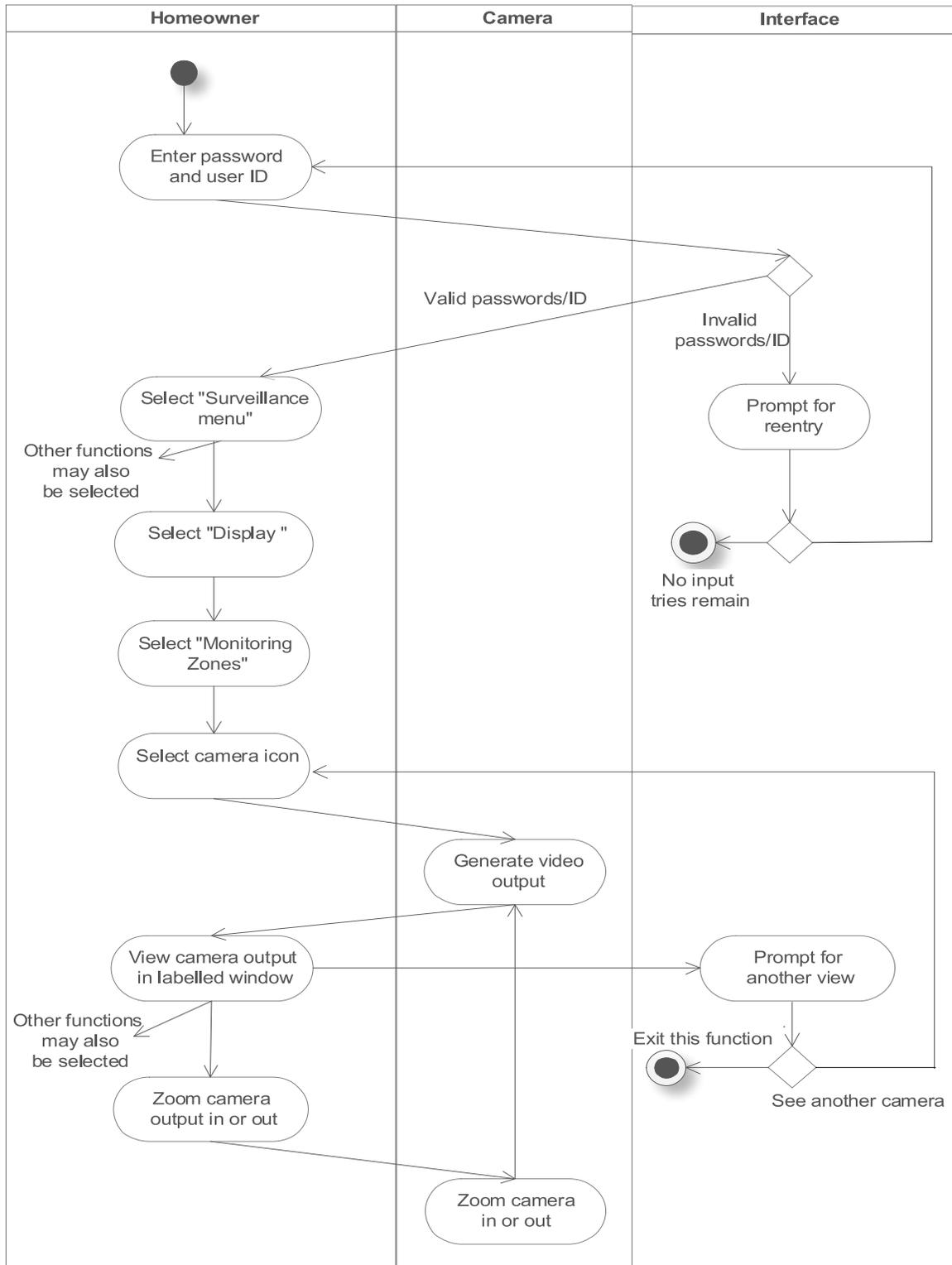
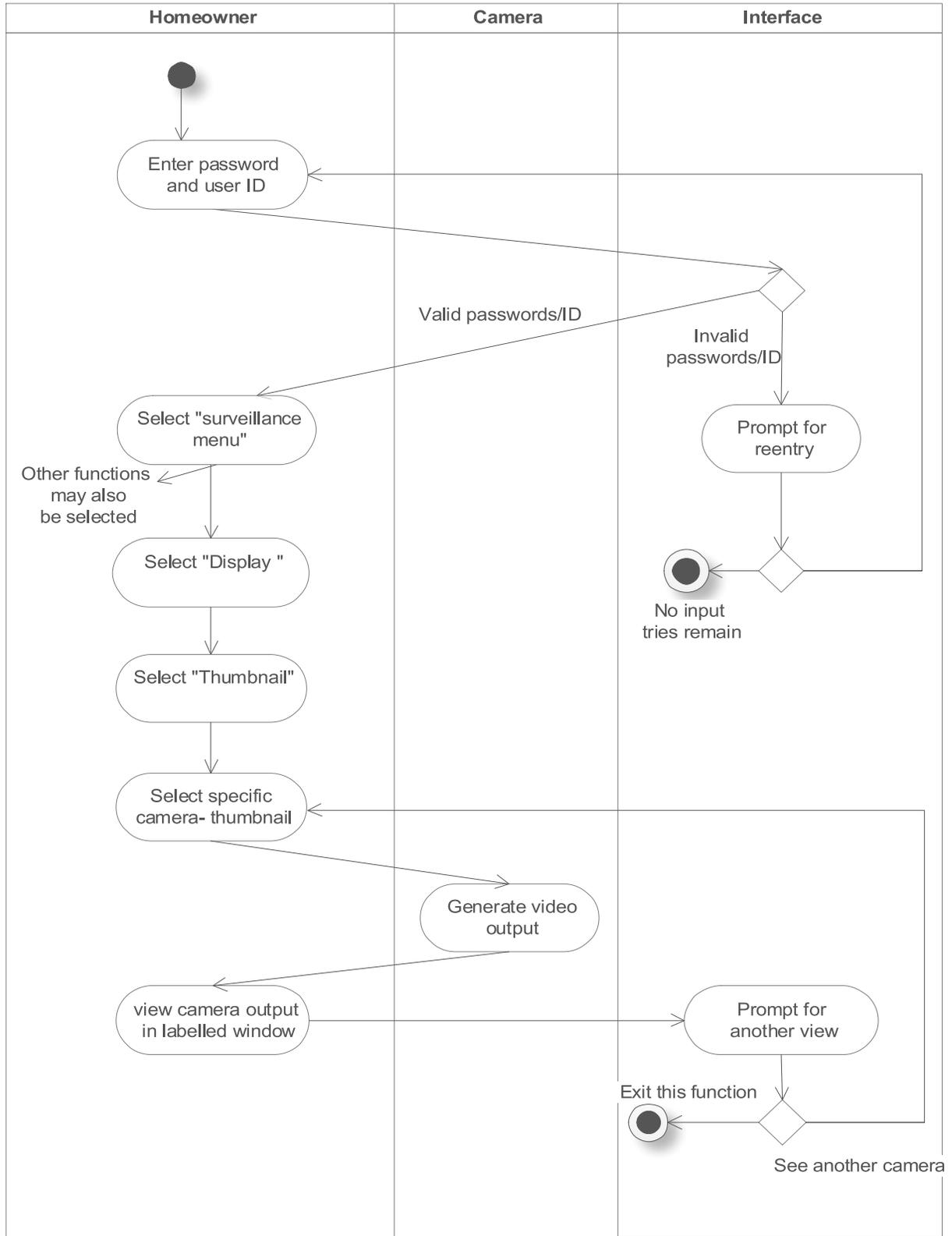


Figure 19: Swimlane diagram for Zoom selected camera

## 4.2.4) Swimlane diagram for Show thumbnail for each camera



**Figure 20: Swimlane diagram for Show thumbnail for each camera view**

4.2.5) Swimlane diagram for Record camera output

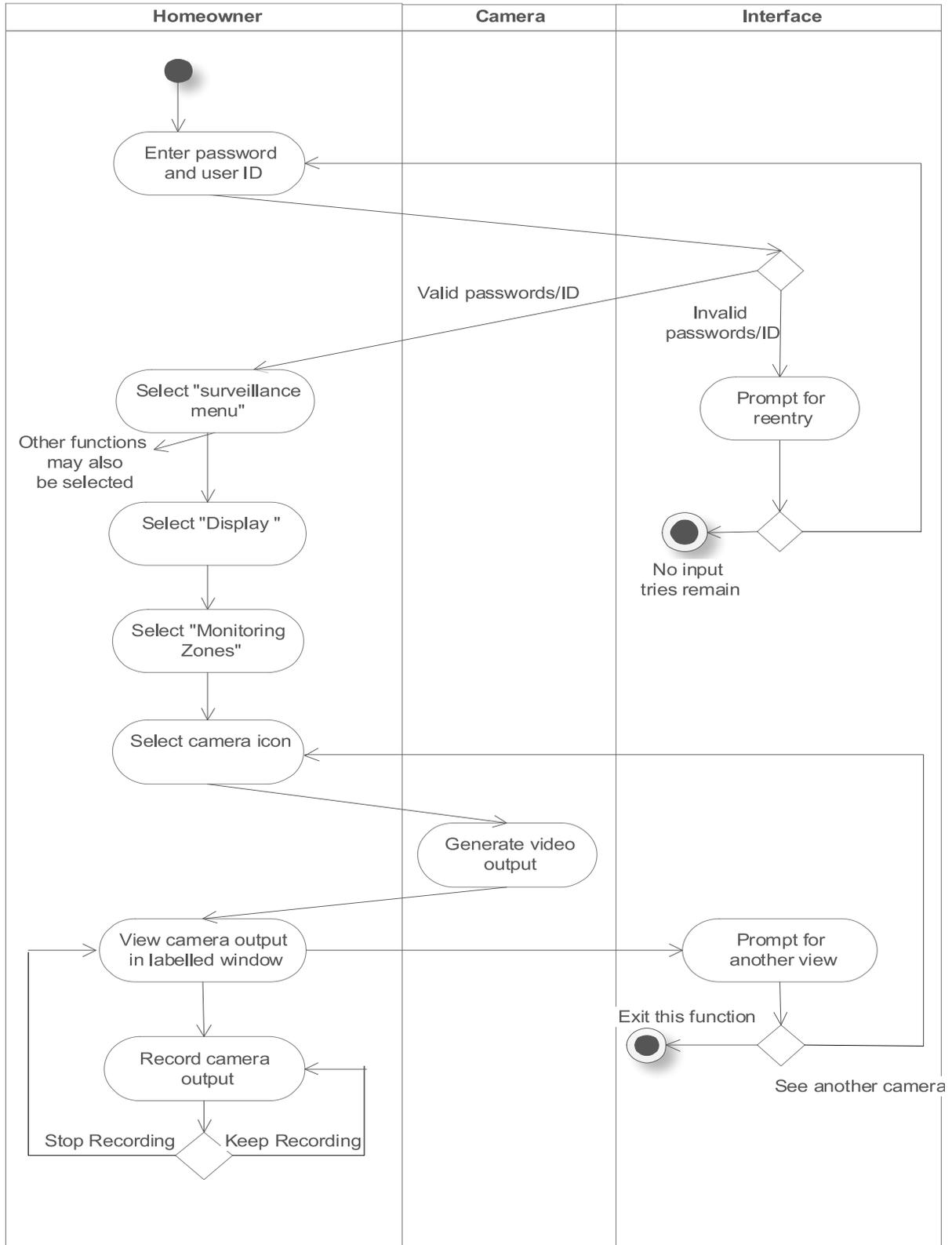


Figure 21: Swimlane diagram for Record camera output

4.2.6) Swimlane diagram for Replay camera output

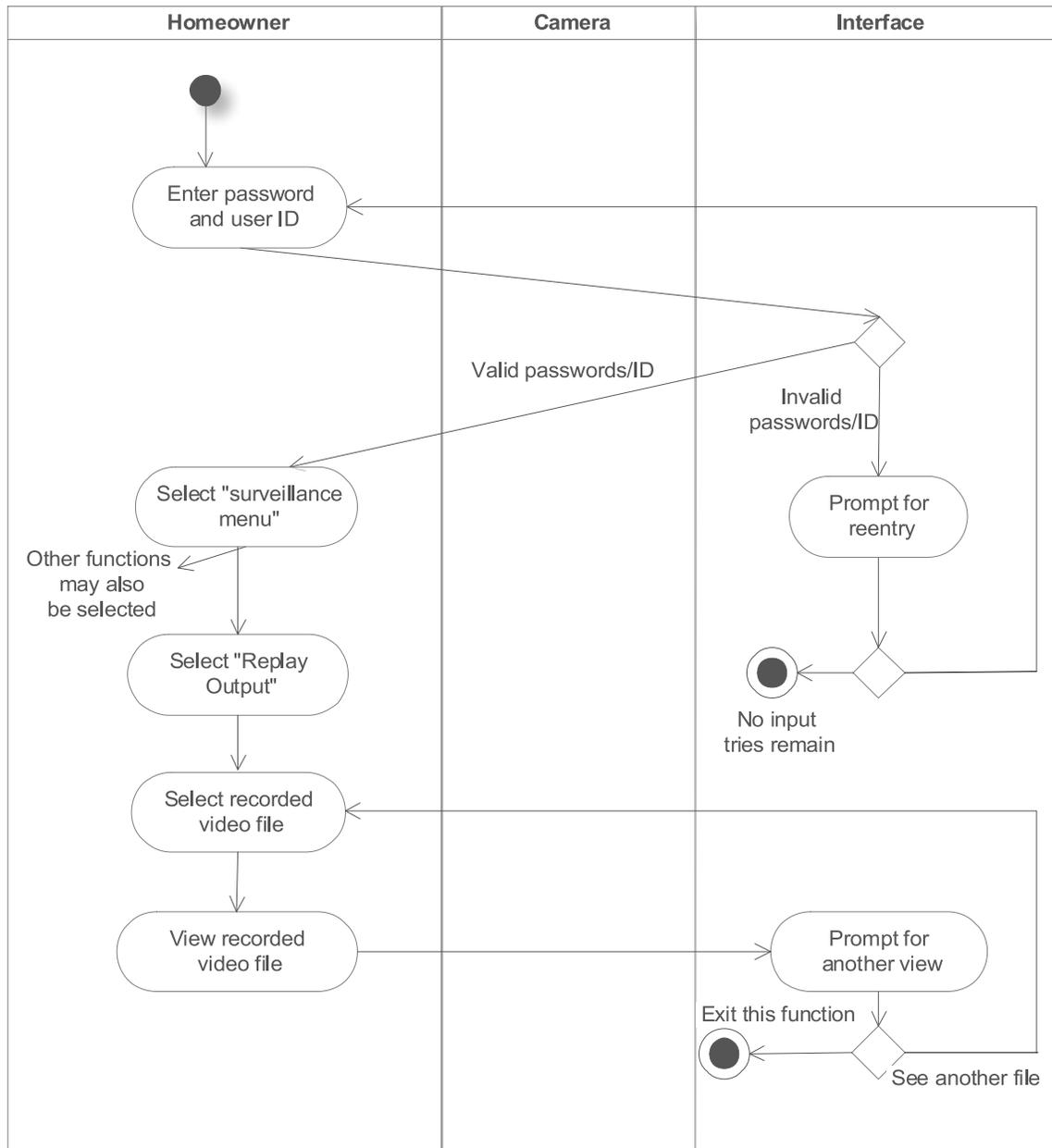


Figure 22: Swimlane diagram for Replay camera output

4.2.7) Swimlane diagram for Activate/Deactivate monitoring zone

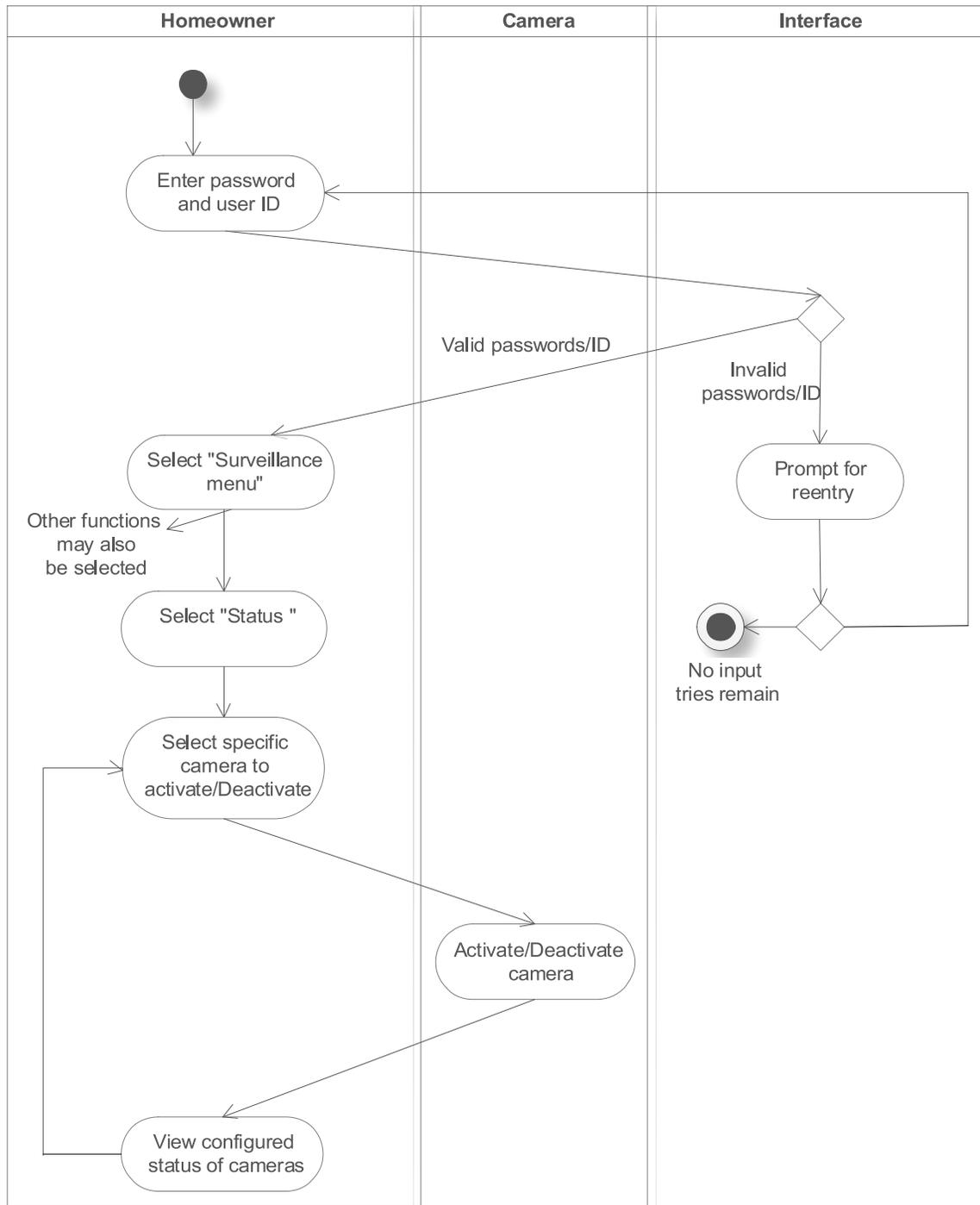


Figure 23: Swimlane diagram for Activate/Deactivate monitoring zone

4.2.8) Swimlane diagram for Select recorded file

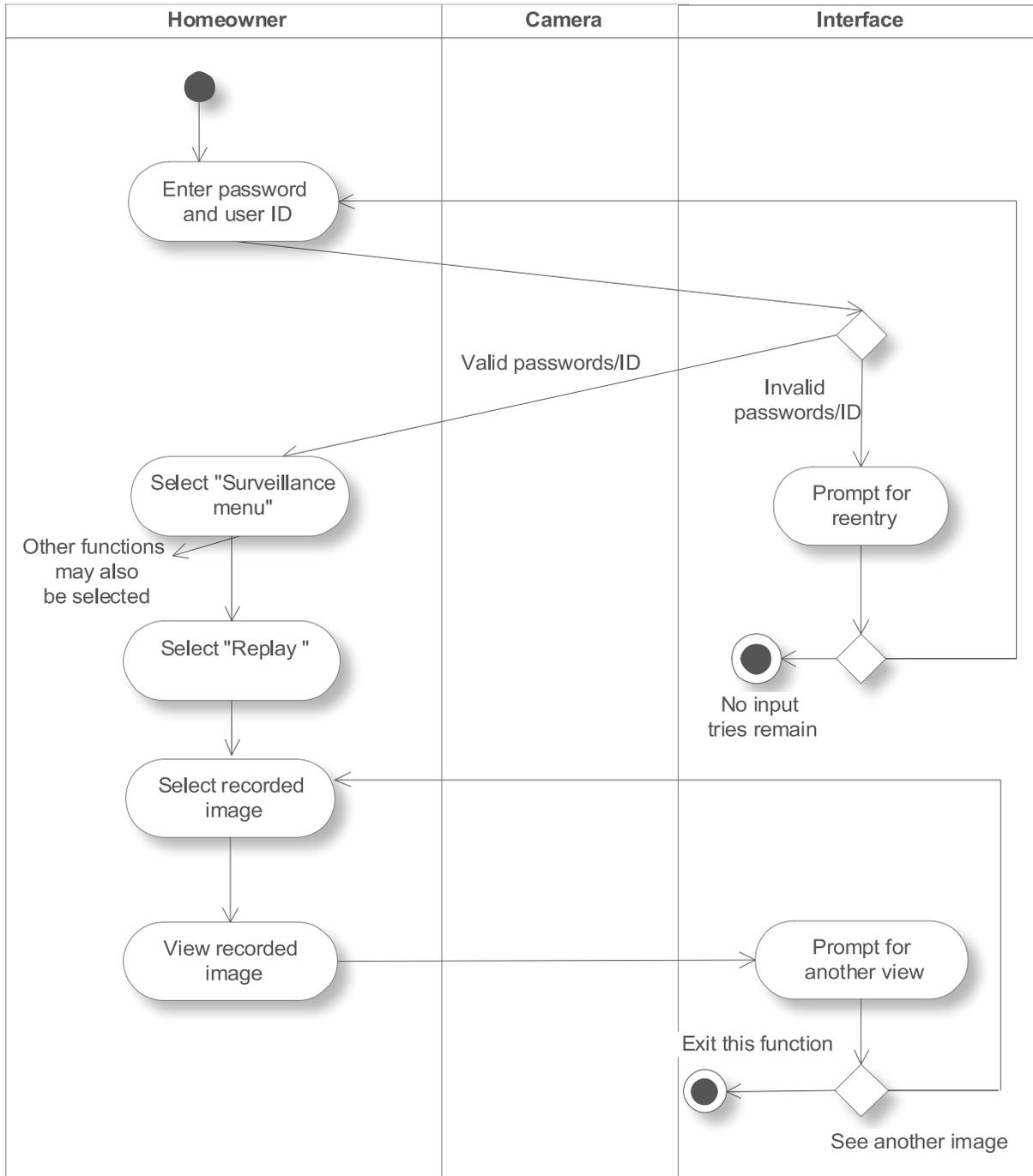


Figure 24: Swimlane diagram for Select recorded file

4.2.9) Swimlane diagram for Load status of monitoring zone

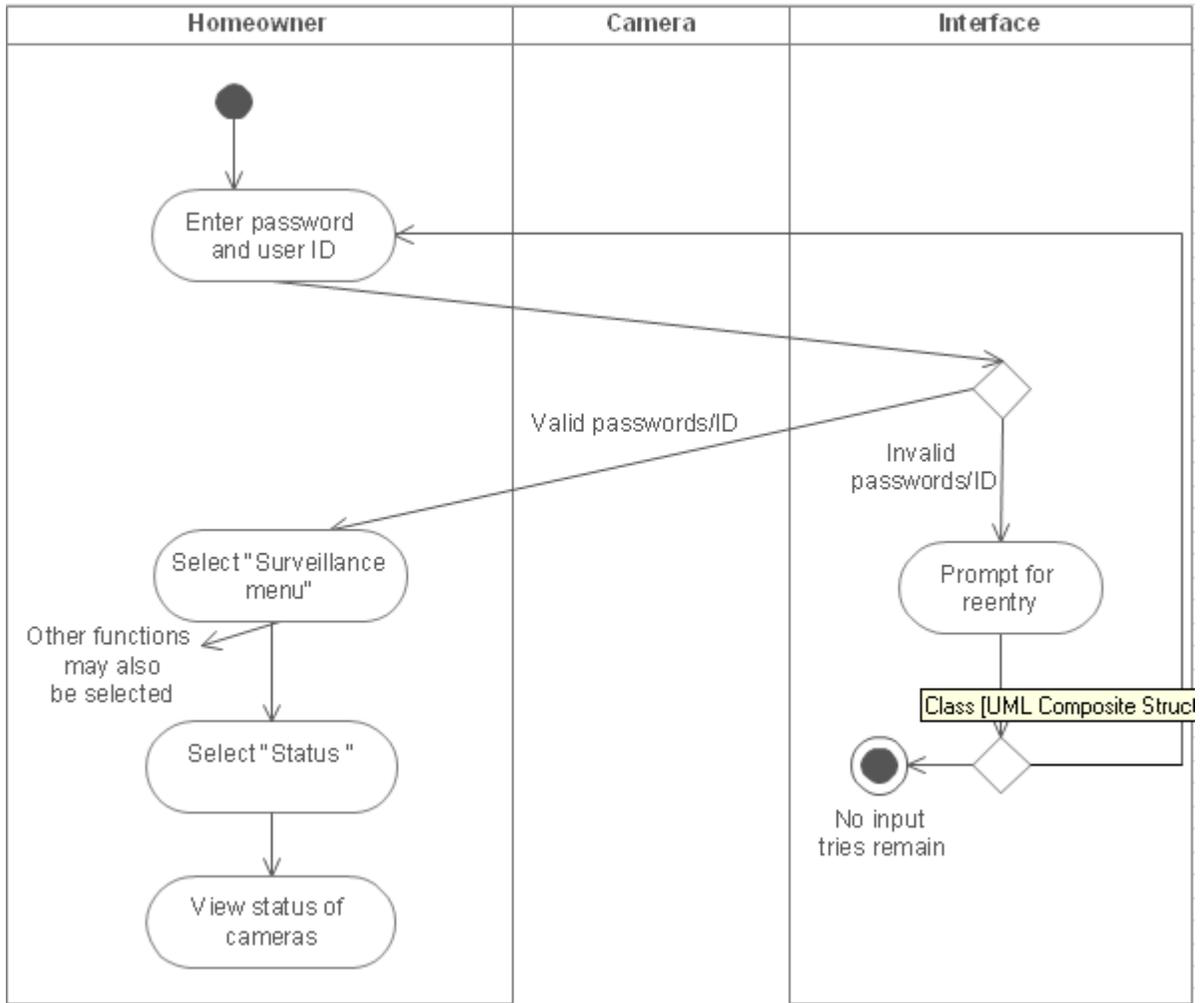


Figure 25: Swimlane diagram for Load status of monitoring zone

4.2.10) Swimlane diagram for Select monitoring zone

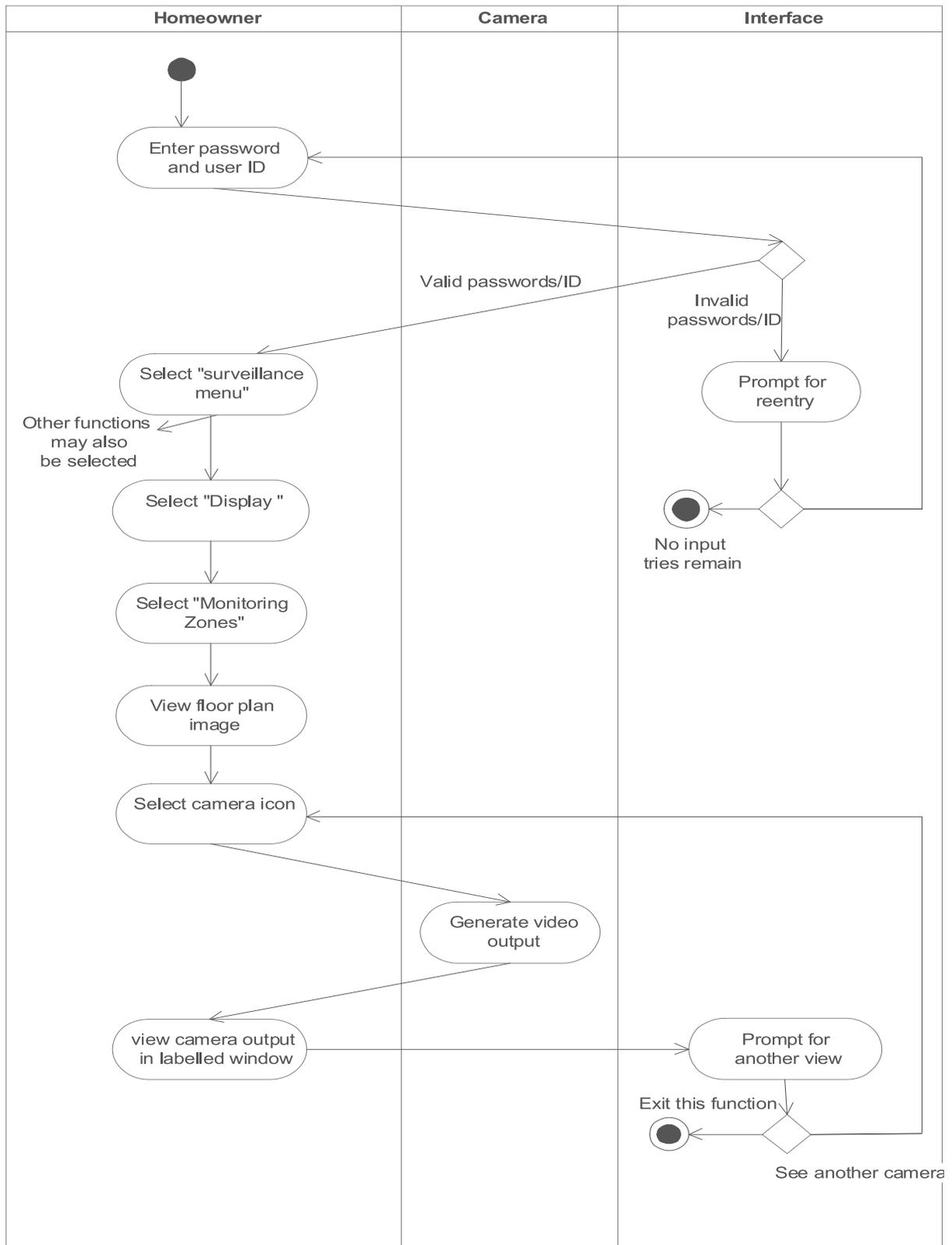


Figure 26: Swimlane diagram for Select monitoring zone

## APPENDIX A: GLOSSARY

❖ **Activity diagram**

The activity diagram (one kind of UML diagrams) is often seen as part of the functional view of a system because it describes logical processes, or functions. Each process describes a sequence of tasks and the decisions that govern when and how they are performed.

❖ **Actor**

Someone or something that must interact with the system.

❖ **Camera**

A optical device that records video data.

❖ **Channel to actor**

The way the actor interact with the system.

❖ **Exception**

Special cases, not common cases.

❖ **Floor plan**

Floor plan is an arrangement of four elements which are walls which is only for visual purpose, rooms associated with surveillance cameras, external entrances associated with security sensors.

❖ **Homeowner**

The user who has the house and purchases SafeHome product.

❖ **Monitoring zone**

The observed area for each camera

❖ **Priority**

Importance level in the system.

❖ **Scenario**

A sequence of steps happens in one context.

❖ **Security zone**

A group of some sensors in seven types: window sensor, door sensor, smoke sensor, motion detector, temperature sensor, toxic gases sensor and water-level sensor.

❖ **Swimlane diagram**

A diagram, sometimes called a cross-functional diagram, is a process flowchart that provides richer information on who does what.

- ❖ **System administrator**  
Someone from SafeHome company who can help the homeowner in using SafeHome system.
- ❖ **Thumbnail**  
Snapshots provided by SafeHome system to let users know the content of the video file.
- ❖ **Trigger**  
The condition that makes use case happens.
- ❖ **UML**  
The Unified Modeling Language (UML) is a standard language for specifying, visualizing, constructing, and documenting the artifacts of software systems, as well as for business modeling and other non-software systems.
- ❖ **Use case**  
A behavior or coherent set of behaviors triggered by events sent to the system by human user(s), other systems, hardware components, or an internal clock.
- ❖ **Use-case diagram**  
A diagram which describes what the system will do at a high-level.

## APPENDIX B: TERM INDEX

| <b>Term</b>      | <b>Pages</b> |
|------------------|--------------|
| Activity diagram | 5            |
| Actor            | 5            |
| Swimlane diagram | 5            |
| UML              | 5            |
| Use case         | 5            |
| Use-case diagram | 5            |

## APPENDIX C: MEETING RECORDS

- ❖ Date : 2009. 03. 12
- ❖ Time : 14:00 – 15:00
- ❖ Meeting activities:
  - Decide document template for analysis model
  - Decide drawing tool for analysis model
    - ◆ Giang proposed to use ConceptDraw for our major tool
    - ◆ Giang taught us how to use Concept Draw tool
  
- ❖ Date : 2009. 03. 17
- ❖ Time : 14:00 – 15:00
- ❖ Meeting activities:
  - Divide the project's task to each member
    - ◆ Changki Hong : Requirement specification revision, Swimlane diagram for surveillance features
    - ◆ Le Truong Giang : Use cases and use case diagrams for security features
    - ◆ Seulki Lee : Use cases and use case diagrams for surveillance features
    - ◆ Jongjoo Kim : Requirement specification revision, Swimlane diagram for security features
  
- ❖ Date : 2009. 03. 26
- ❖ Time : 14:00 – 15: 00
- ❖ Meeting activities :
  - Review first draft version for each member's task
  - Clarify some misunderstanding points and ambiguous things
  
- ❖ Date : 2009. 03. 27
- ❖ Time : 22:00 – 23:00
- ❖ Meeting activities:
  - Divide the project's task again to each member
    - ◆ Changki Hong : Appendix for meeting record, term index, traceability matrix
    - ◆ Le Truong Giang : Combine all the documents and write references
    - ◆ Seulki Lee : Complete use cases for surveillance feature

◆ Jongjoo Kim : Appendix for glossary, term index, authorships

- ❖ Date : 2009. 03. 29
- ❖ Time : 10:00 – 17:00
- ❖ Meeting activities:
  - Review analysis model document
  - Prepare for the presentation

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## APPENDIX F: AUTHORSHIP

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| 2.2) Use-case diagrams for Surveillance feature                 | Seulki Lee      |
| 3) Use cases in SafeHome system                                 | Le Truong Giang |
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| 3.1.3) Use case 3: Require the homeowner to change password     | Le Truong Giang |
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# SAFEHOME SYSTEM

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|  |                 |
|--|-----------------|
| in an emergency  | Jongjoo Kim     |
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| APPENDIX F: AUTHORSHIP   | Changki Hong    |
| APPENDIX G: REFERENCES   | Le Truong Giang |

## APPENDIX G: REFERENCES

- 1) Software Engineering: A Practitioner's Approach (SEPA)" by R. S. Pressman, McGraw-Hill, 6<sup>th</sup> Edition
- 2) Fundamentals of Software Engineering by C.Ghezzi, M.Jazayeri and D.Mandrioli, Prentice Hall, 2<sup>nd</sup> Edition.
- 3) UML Distilled: A Brief Guide to the Standard Object Modeling Language by Martin Fowler, Addison Wesley, 3<sup>rd</sup> Edition
- 4) Applying UML and Patterns ” by C.Larman, Prentice Hall, 3<sup>rd</sup> edition
- 5) UML 2.0 in a Nutshell by Dan Pilone, Neil Pitman, O'Reilly
- 6) Fast Track UML 2.0 by Kendall Scott , Apress
- 7) SEPA Homepage at:  
[http://higherred.mcgraw-hill.com/sites/0072853182/student\\_view0/index.html](http://higherred.mcgraw-hill.com/sites/0072853182/student_view0/index.html)