

Smart Home Simulator v1.0

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1.0 Introduction

Smart Home Simulator, commonly known as *SHS*, is an application that allows users to run simulations of real-life activity in and around their homes. Having ownership of a house is not a requirement for using the *SHS* software. However, end users must have access to either a smartphone or personal computer to launch the program; secondly, users need appropriate data required for the software to produce and customize the simulation modules according to an imported house's blueprint; lastly, users must create a valid profile to log into and control the simulation. When a house layout is loaded into the software, core controls are generated to allow registered users to automatically execute common household commands, such as opening windows, doors, and lights, modifying outdoor and indoor temperatures, and more, provided that they are granted the appropriate permissions by administrator accounts. *SHS* makes this possible even when users are away from home. In addition, users may edit the background of simulations, as well as set up options for effective security measures around the house against malicious activity, such as the presence of intruders. Furthermore, users may configure a household's temperature settings and heating systems. For instance, the triggering of a certain change in temperature could be automatically preset to be dependent on the population of a specific area in the house. *SHS* provides users with an interface that allows for convenient monitoring of household activity and configuring of everyday at-home commands from the tip of their fingers, from any location.

1.1 Deliverable 1 Scope

In *Smart Home Simulator v1.0* users may only start simulations after logging into the system and importing a valid house layout to generate simulation control modules. Users may log in as either a Parent, Child, Guest, or Stranger; there are no special permissions required for controlling the parameters for general household actions. Before beginning a simulation, users may configure the geographical location of the house being simulated as well as the date and time of the simulation. While a simulation is active, these configurations cannot be modified, and the user who is currently logged in is not permitted to log out, delete, nor edit its profile. However, inactive registered profiles may be modified or deleted under this condition, and new profiles may also be created. But these profiles are prevented from logging in until the current active profile logs out. At their convenience, users may start and stop a simulation as many times as desired. When the simulation is active, users may access the SHC module to configure the state of lights, doors, windows, air conditioners, and motion detectors in any room in the house. Also, if a logged in user wishes to edit the context of the simulation, they

may modify the outdoor temperature, block the motion of windows of their choice, or relocate themselves or other inactive profiles to different rooms around the house.

2.0 Use Cases

Use Case #1	Start and Stop Simulator
Level	User level
Brief description	Starting and stopping the Smart Home Simulator software
Preconditions	User has the software installed on its system (smartphone or personal computer)
Triggering event	User launches the Simulator software
Main flow	1. User has successfully started the Simulator 2. User stops the Simulator by pressing either the X button on the window frame or the “Stop Simulation” toggle button.
Extensions	--
Postconditions	The software is correctly closed and not running in the background.

Use Case #2	Manage Profiles: Adding a New Profile
Level	User level
Brief description	Add a new user profile
Preconditions	User has launched the application.
Triggering event	User clicks on the “Add new profile” button.
Main flow	1. Simulation gives the appropriate user interface for adding a new profile. 2. User inputs the type of profile to be created. 3. User clicks on the “Add new Profile” button. 4. The application creates the new profile, along with the options to delete, edit, or login with it.
Extensions	The profile is not correctly created.
Postconditions	The profile is added to the profile management U.I.

Use Case #3	Manage Profiles: Editing or Removing a Profile
Level	User level
Brief description	Edit or remove a user profile.
Preconditions	1. User has launched the application. 2. The Simulation must not be running.
Triggering event	User clicks on the “Delete” or “Edit” button next to the profile hyperlink.
Main flow	1. Simulation gives the appropriate user interface for editing and removing the profile. 2. User inputs the new profile type or deletes the profile. 3. User clicks the “Confirm” button to accept the changes. 4. The application shows the profile changes on the user interface.
Extensions	The profile is not correctly edited or removed.
Postconditions	The edited profile is either modified or removed.

Use Case #4	Logging in
Level	User level
Brief description	Logging in to an existing user profile.
Preconditions	User has created a valid profile.
Triggering event	User clicks on the “Login” button upon clicking the profile hyperlink.
Main flow	1. Simulation alerts the user that a profile was logged in. 2. The software window says the name of the logged profile.
Extensions	The profile is not correctly created.
Postconditions	The profile is added to the profile management U.I.

Use Case #5	Read and Load a House Layout File
Level	User level
Brief description	Load a text file that will be used to display a house layout.
Preconditions	The simulation must not be running.
Triggering event	User selects a text file with information about a house and its rooms.
Main flow	<ol style="list-style-type: none"> 1. The application prompts the user to select a text file. 2. The user imports a text file for the house layout. 3. The application renders a display of the house. 4. The SHC module is generated with household controls.
Extensions	The house layout text file is not properly read.
Postconditions	The application renders the appropriate house layout.

Use Case #6	Simulation Environment Settings: Modify Date and Time
Level	User level
Brief description	Modifying the date and time of the simulation.
Preconditions	<ol style="list-style-type: none"> 1. User has logged in with a valid profile. 2. The simulation must not be running.
Triggering event	User clicks on the SHS tab, and inputs a date and time of its choice.
Main flow	<ol style="list-style-type: none"> 1. The SHS tab prompts the user to input a date and time. 2. The user confirms the new date and time.
Extensions	The date and time are not set correctly.
Postconditions	The date and time is now set correctly from the user's input.

Use Case #7	Set User House Location
Level	User level
Brief description	Move the user to a different room, or outside the house.
Preconditions	User has loaded a house layout. User has logged in with a valid profile.
Triggering event	User clicks a link that represents the destination room.
Main flow	1. The user selects the “Edit Context” button. 2. The user selects a link of a room in the house, or outside. 3. The user is relocated into the chosen room.
Extensions	The new location of the user did not render.
Postconditions	1. The population of the new room is incremented. 2. The population of the origin room is decremented. 3. The user profile’s new location is the selected room.

Use Case #8	Move People
Level	User level
Brief description	Move people around the house.
Preconditions	1. The user has created at least two valid profiles. 2. The user logs in with one of the profiles.
Triggering event	Users select as many inactive (not logged in) profiles and a single room to move them to.
Main flow	1. The user clicks the “Edit Context” and “More...” button. 2. The user checks off profiles and a single room. 3. The user clicks on “Relocate Profile(s)” to move profiles.
Extensions	The selected profiles were not properly relocated.
Postconditions	1. The users are relocated to the chosen room. 2. The populations of the origin and destination rooms of each relocated user must be modified appropriately.

Use Case #9	Simulation Environment Settings: Modify Temperature
Level	User level
Brief description	Modify the temperature outside the house.
Preconditions	<ol style="list-style-type: none"> 1. User has loaded a house layout. 2. User has logged in with a valid profile.
Triggering event	User clicks “Edit Context”, inputs a new temperature value (in Celcius), and confirms the new temperature setting.
Main flow	<ol style="list-style-type: none"> 1. User clicks “Edit Context”. 2. User types in the new temperature. 3. User clicks the “Confirm” button.
Extensions	The temperature is not properly modified or set.
Postconditions	<ol style="list-style-type: none"> 1. The temperature is set to the new input. 2. “Outdoor Temp” label in the main dashboard is changed.

Use Case #10	Block Window Movement
Level	User level
Brief description	Blocking the movement of a window by placing an arbitrary object in its path.
Preconditions	<ol style="list-style-type: none"> 1. User has logged in with a valid profile. 2. User has loaded a house layout.
Triggering event	User selects windows that it would like to block or unblock.
Main flow	<ol style="list-style-type: none"> 1. The user clicks the “Edit Context” button. 2. In the bottom section, the user checks off windows to block them.
Extensions	The selected windows remain unblocked.
Postconditions	When a user attempts to open or close blocked windows, they should remain in their current state (open/closed).

3.0 Application Diagrams

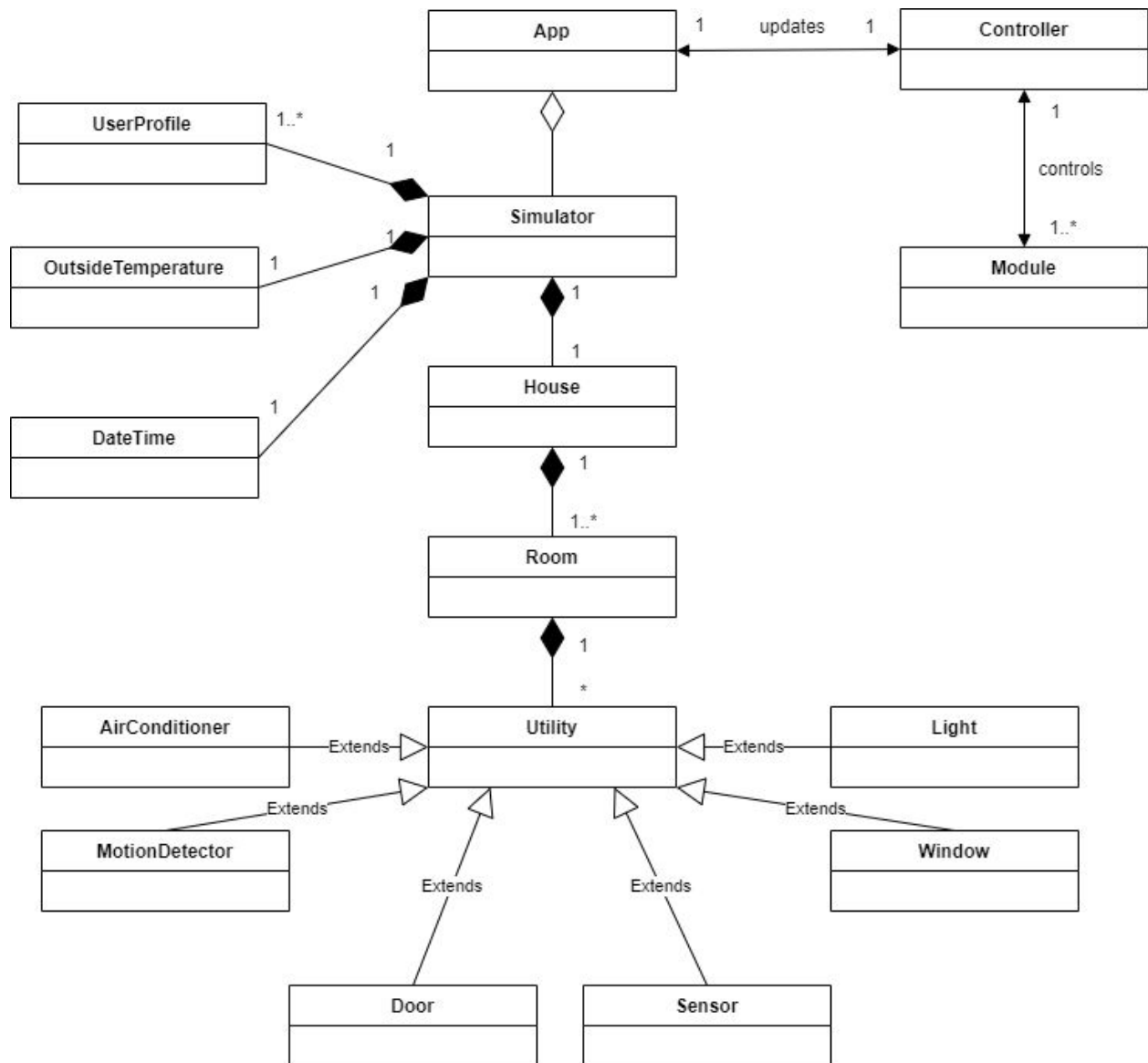


Figure 1: Domain model class diagram

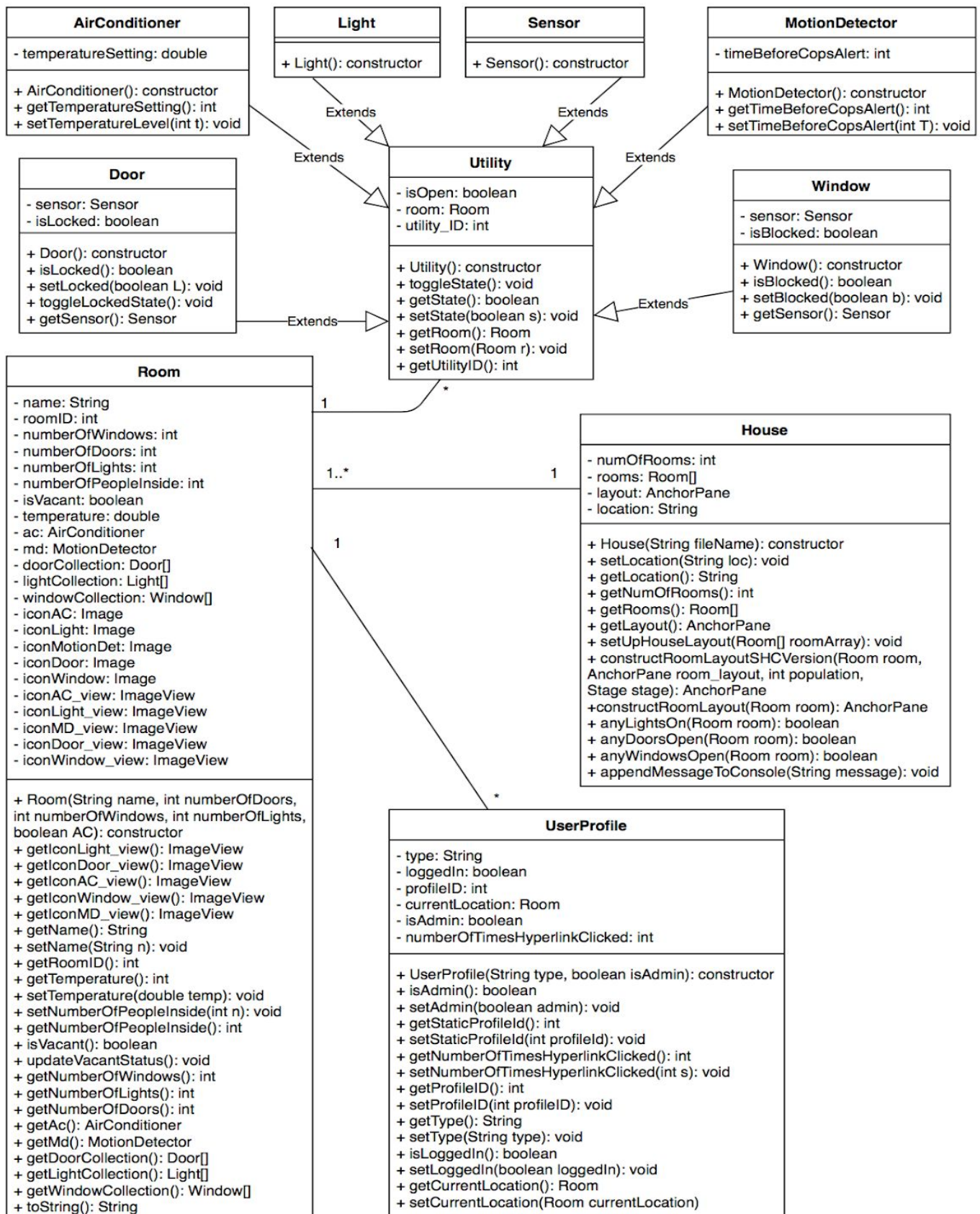


Figure 2: Class diagram

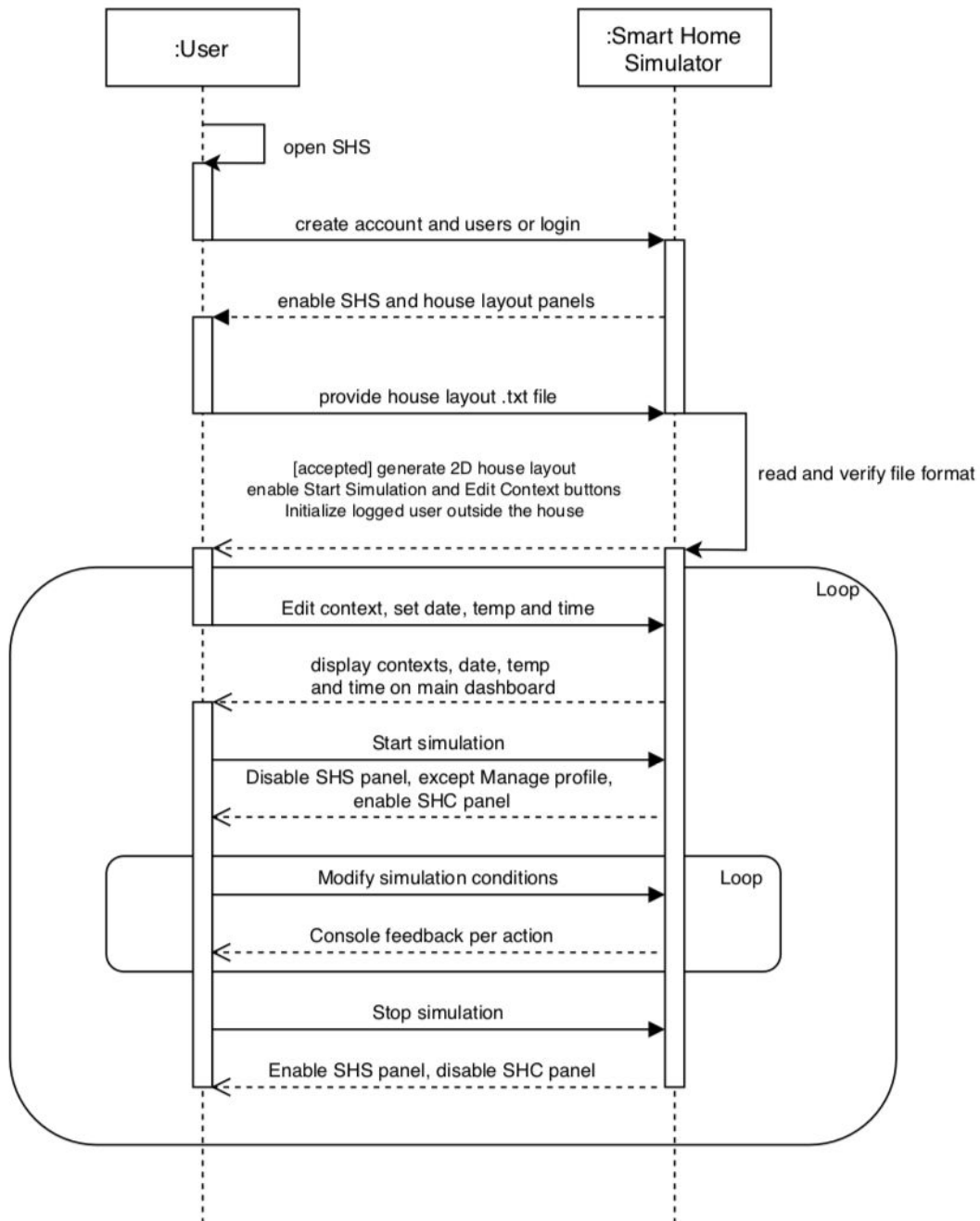


Figure 3: Sequence diagram to start/stop simulation & modify temperature, date and time

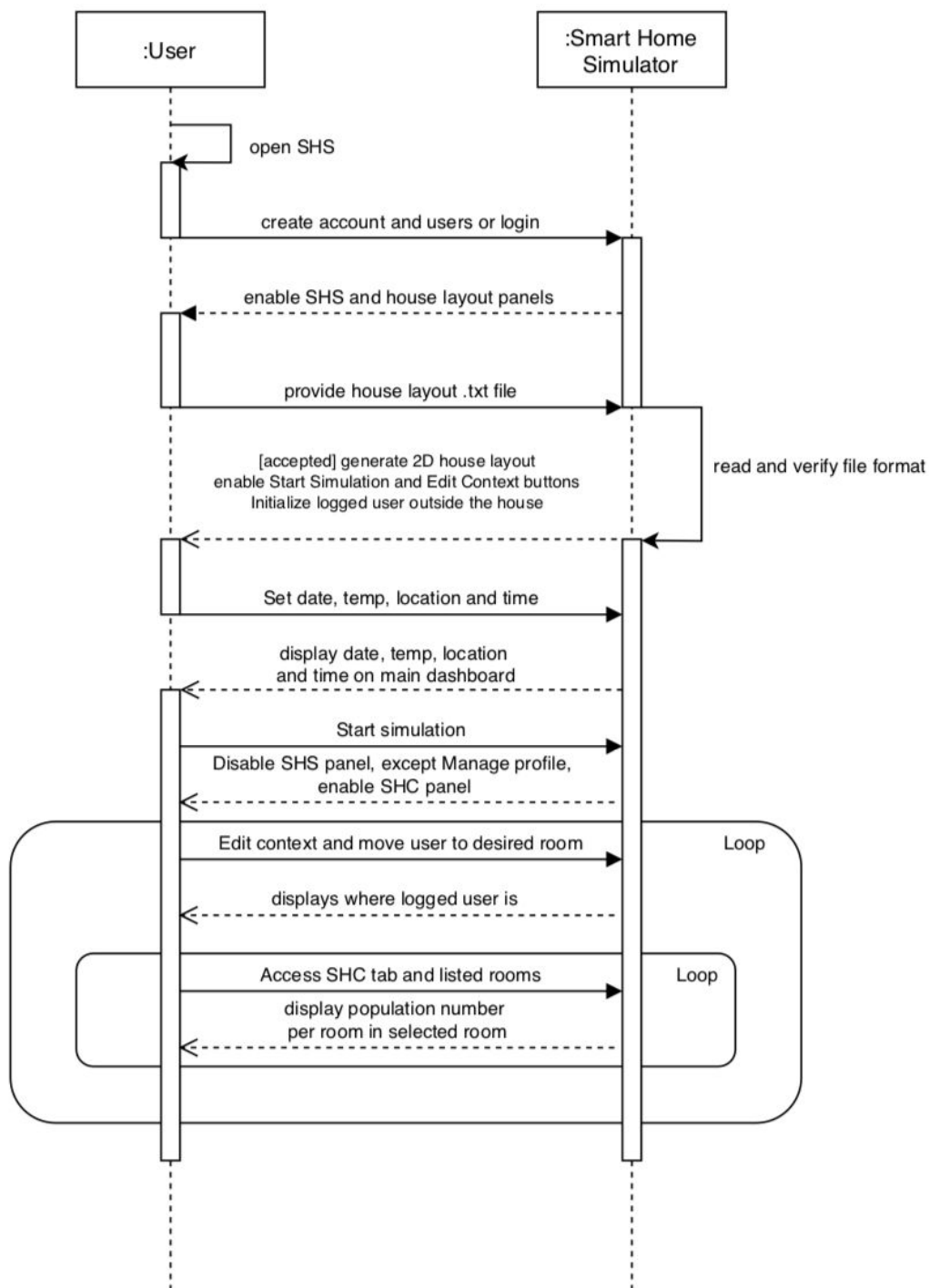


Figure 4: Sequence diagram for moving a logged user

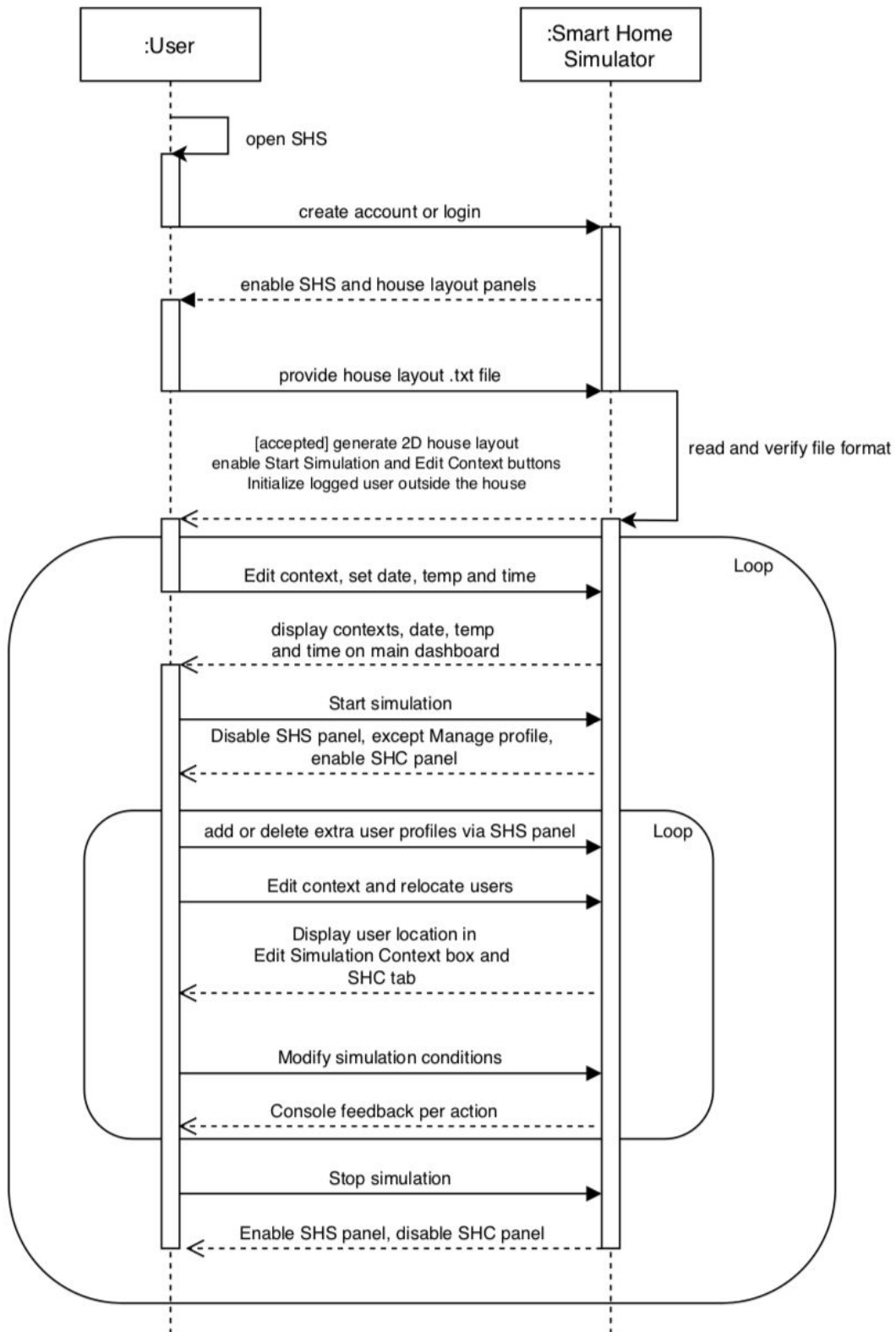


Figure 5: Sequence diagram for placing people in different rooms

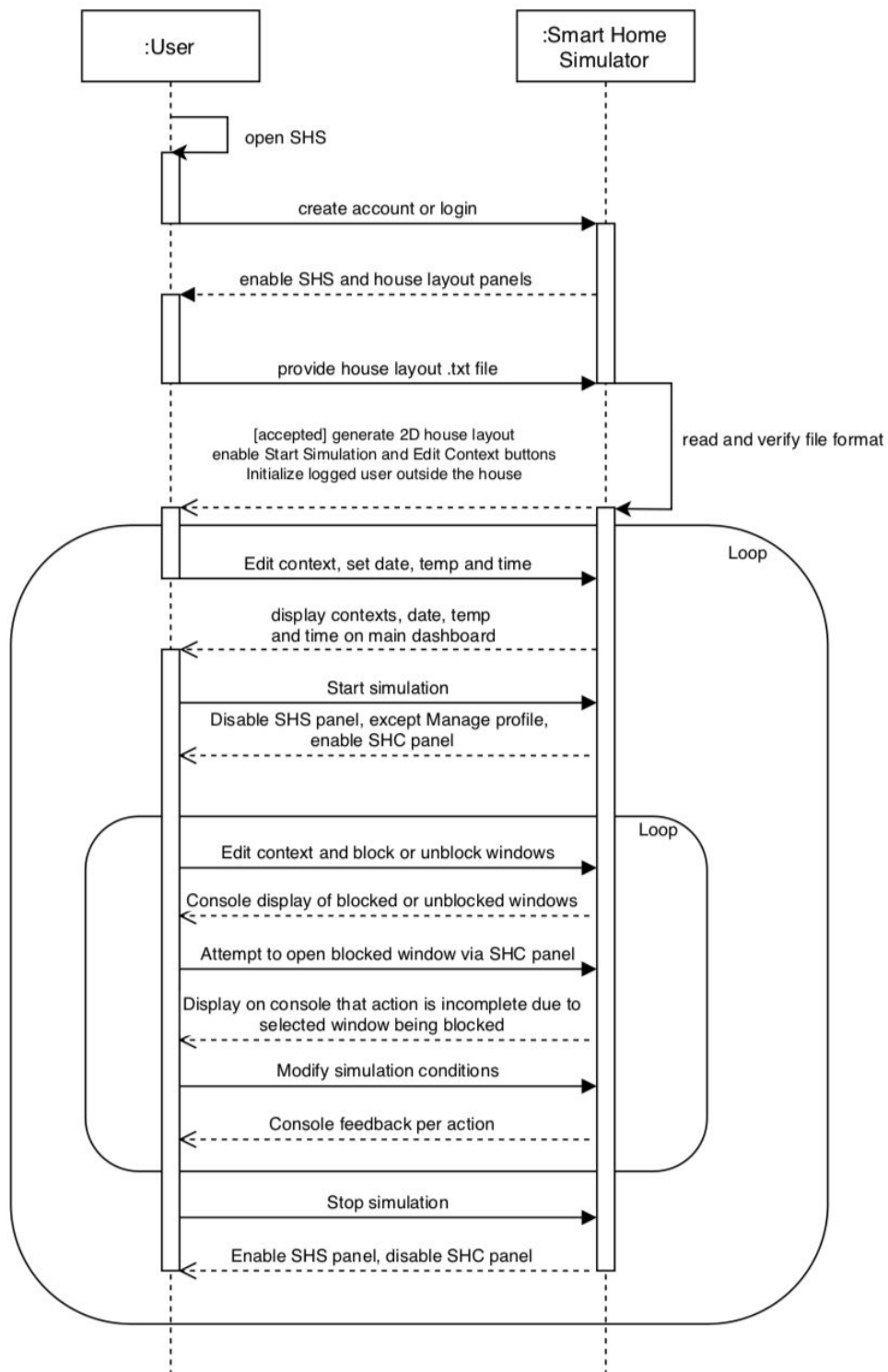


Figure 6: Sequence diagram for blocking windows