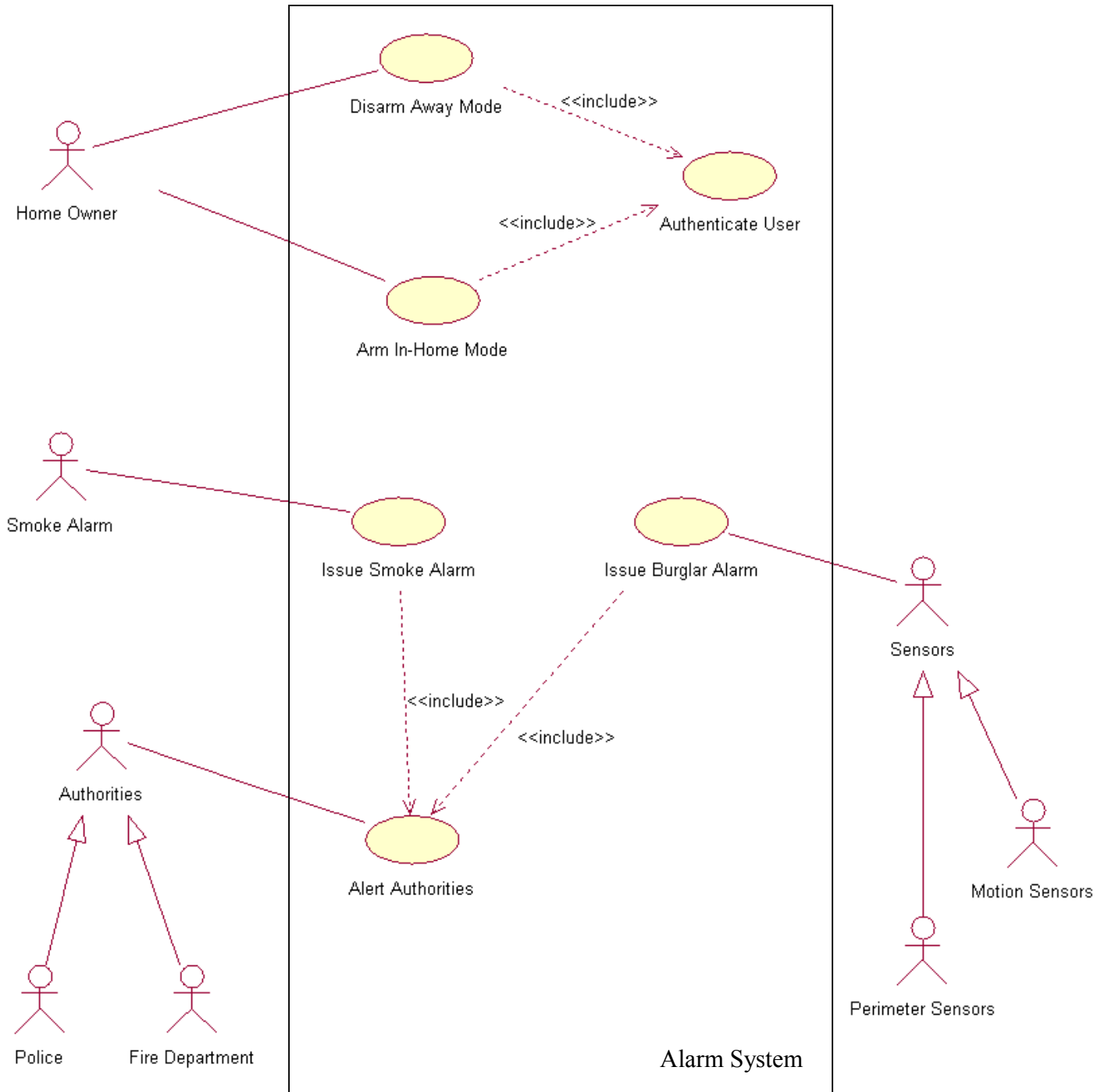## Use Case Diagram: Home Security System

Use Case #1: Issue Smoke Alarm

Primary Actor: Smoke detector

Goal in Context: Smoke detector detects smoke and expects alarm system to issue smoke alarm.

Scope: Alarm system

Level: User goal

Stakeholders and Interests:

Home owners – want alarm issued and authorities notified.

Authorities – want to be notified of alarm so they can respond.

Precondition: Alarm system and smoke detector are powered on.

Minimal Guarantee: Smoke detection event logged for future inspection.

Success Guarantee: Alarm tripped, authorities notified, event logged.

Trigger: Smoke detector detects smoke.

Main Success Scenario:

1. Smoke detector detects smoke.
2. Smoke detector notifies alarm system.
3. System sounds audible alarm.
4. System alerts authorities.

Extensions:

1a. Smoke clears:

    1a1. Smoke detector sends updated information to alarm system.

2a. Communication fails:

    2a1. Smoke detector sounds its own audible alarm.

3a. Audible alarm damaged:

    3a1. Note in log and continue.

4a. Authorities cannot be reached:

    4a1. Call backup number.

Technology and Data Variations List: None

Priority: High

Releases: All

Response Time: Small

Frequency of Use: Rare (1 time / 5 years)

Channel to Primary Actor: Wireless technology

Secondary Actors: Authorities

Channels to Secondary Actors: Phone, pager

Open Issues:

What does the alarm system do when notified of the smoke clearing?

How can a smoke alarm be cancelled?

How does a user temporarily disable the smoke detector?

Use Case #2: Disarm Away Mode

Primary Actor: Home owner

Goal in Context: Home owner disarms the system, expects to be able to enter the house without causing an alarm.

Scope: Alarm system

Level: User goal

Stakeholders and Interests:

Home owners – want to be able to access house without causing an alarm

Precondition: Alarm system is on and armed in away mode.

Minimal Guarantee: Disarm attempt logged.

Success Guarantee: System disarmed, event logged, system ready for next command.

Trigger: Home owner enters house.

Main Success Scenario:

1. Sensor detects intrusion and begins countdown to alarm.

2. Home owner gives disarm command.

3. System <u>authenticates user.</u>

4. System switches to at-home mode.

Extensions:

1a. Countdown reaches zero:

    1a1. Alarm triggers. User can resume sequence at step 2 to silence alarm.

2a. Disarm command never initiated:

    2a1. Alarm triggers. User can resume sequence at step 2 to silence alarm.

3a. Authentication fails:

    3a1. System <u>authenticates user</u> up to two additional times. If all three attempts fail, user is locked out for 1 minute and alarm sounds.

4a. User can specify alternate mode.

Usage Narrative:

John, a home owner, arrives home from work and parks his car in the garage. Using his key, he unlocks and opens the front door. Not wanting to cause an alarm to go off, he enters his validation code on the keypad located inside the door. The alarm system responds with a

green light and a display of the status of the system on its LCD. John quickly reads the status display to make sure that nothing unusual occurred during the day. He then proceeds to read his daily newspaper as the alarm automatically engages its at-home mode. John likes the quick interaction with the system as well as the automatic switch it makes to at-home mode because he is usually tired after work and doesn't want to have to deal with complex codes or complicated mode settings.

Use Case #3: Issue Burglar Alarm

Primary Actor: Sensors

Goal in Context: System detects a burglar and issues an alarm.

Scope: Alarm system

Level: User goal

Stakeholders and Interests:

Home owners – want alarm issued and authorities notified.

Authorities – want to be notified of alarm so they can respond.

Precondition: Alarm system is on and set to a monitoring mode.

Minimal Guarantee: Event logged along with sensor(s) that were tripped.

Success Guarantee: Alarm issued, authorities notified, event logged in detail.

Trigger: Sensors detect intrusion.

Main Success Scenario:

1. Sensors detect intrusion.
2. Sensors notify alarm system of intrusion.
3. System sounds audible alarm.
4. System alerts authorities.

Extensions:

1a. If specific threshold is not reached, intrusion event is discarded.

2a. Communication link to alarm severed:

    2a1. Alarm realizes severed link and triggers alarm.

3a. Audible alarm damaged:

    3a1. Event logged.

3b. If system is disarmed, audible alarm is stopped.

4a. Authorities cannot be reached:

    4a1. Call backup number.

4b. If system is disarmed, authorities notified of false alarm.

Use Case #4: Arm In-Home Mode

Primary Actor: Home owner

Goal in Context: Home owner arms the system, expects protection without causing an alarm from motion detectors in a specific portion of the house.

Scope: Alarm system

Level: User goal

Stakeholders and Interests:

Home owners – want protection while at home without false alarms.

Precondition: Alarm system is on and set to perimeter monitoring.

Minimal Guarantee: Arming attempt logged.

Success Guarantee: System armed according to request, event logged.

Trigger: Home owner decides to engage mode.

Main Success Scenario:

1. Home owner engages in-home mode.
2. System authenticates user.
3. User selects rooms he/she will use.
4. System begins activation countdown.
5. System arms all zones except for rooms specified in (3).

Extensions:

1a. In-home mode already set:

    1a1. Process continues to set a new in-home mode.

2a. Authentication fails:

    2a1. System allows two additional attempts to authenticate user. If both fail, system locks user out for 1 minute and triggers alarm.

3a. No rooms are selected:

    3a1. System shows error message and returns to normal operation.

3b. All rooms are selected:

    3b1. System enters normal perimeter in-home mode.

4a. User still in room when countdown reaches zero:

    4a1. System triggers alarm.

5a. Arming fails due to tripped sensor:

    5a1. System issues warning. If event is uncorrected in 1 minute, system triggers alarm.

Use Case #5: Authenticate User

Primary Actor: System

Goal in Context: System authenticates user to allow for access to system settings.

Scope: Alarm system

Level: Subfunction

Stakeholders and Interests:

Home owners – want authentication through an easy process.

Precondition: Alarm system is powered on.

Minimal Guarantee: Authentication attempt logged.

Success Guarantee: User granted access to system, event logged.

Trigger: Change in alarm system setting desired.

Main Success Scenario:

1. System compares entered code against valid code.

2. System notes result of comparison.

Extensions:

1a. No code entered:

    1a1. System prompts user to enter code again.

Use Case #6: Alert Authorities

Primary Actor: System

Goal in Context: System alerts authorities so they can respond to the alarm.

Scope: Alarm system

Level: Subfunction

Stakeholders and Interests:

Home owners – want proper authorities notified quickly.

Authorities – want to be notified quickly with detailed information.

Precondition: Alarm system is on and triggering an alarm.

Minimal Guarantee: Authorities notified of alarm, event logged.

Success Guarantee: Authorities notified of alarm, provided with details, event logged.

Trigger: Alarm initiated.

Main Success Scenario:

1. System contacts proper authorities.
2. System sends house address to authorities.
3. System sends alarm information to authorities.

Extensions:

1a. System unable to determine proper authorities:

   1a1. System contacts police.

2a. Authorities do not receive the address:

   2a1. What do we do here?

3a. Alarm information unavailable:

   3a1. System sends generic alarm message.