Notes on homework:

Dr. Anderson,

Please note that I used Use Case templates provided by Alistair Cockburn on his use cases web site:

Use case diagrams:

```
<<Actor>>

Smoke detector

Notify of smoke

<<Use Case>>

Smoke Detection

<<includes>>

Stakeholders

Notify Stakeholders

<<Actor>>

Motion detector

Notify of intrusion

<<Use Case>>

Intrusion Detection

<<includes>>

Stakeholders

Notify Stakeholders
```
Disarm Alarm system

Owner

Sets perimeter up

Set Up perimeter

Owner
Exercise in Use case and Actors Hierarchy

<<Actor>>

<<Actor>>

<<Actor>>

Smoke Detector

Motion Detector

<<Actor>>

<<Actor>>

<<Actor>>

Stakeholder

Proximal

Remote

<<Use Case>>

Detection

<<Use Case>>

Smoke detection

Motion Detection

<<Use Case>>

<<Use Case>>

Alarm Detection

Alarm Report Detector

Report Alarm Condition
Use Case: Smoke detection

CHARACTERISTIC INFORMATION
Goal in Context: To inform stakeholders of the fire in the house.
Scope: Alarm system.
Level: Primary task
Preconditions: Alarm system is armed and active. Detector is working. Communication means are functioning.
Success End Condition: Stakeholder is informed.
Failed End Condition: Stakeholder are not informed of smoke. Fire destroys monitored property.
Primary Actor: Smoke detector.
Trigger: Detection of smoke.

MAIN SUCCESS SCENARIO
<put here the steps of the scenario from trigger to goal delivery, and any cleanup after>
1. One of the smoke detector signals smoke presence.
2. System identifies smoke detector location by its comm. port.
3. System informs stakeholders via phone line and the a/v speaker.

RELATED INFORMATION (optional)
Priority: Top priority.
Performance Target: Stakeholders should be notified within 5 seconds.
Frequency: Rarely. Only in extreme cases of fire, or strong smoke concentration.
Subordinate Use Cases: Notify Stakeholders
Channel to primary actor: Simplex, one way, Electric wire.
Secondary Actors: Stakeholders – Authorities and Owners
Channel to Secondary Actors: Phone line, Speaker

OPEN ISSUES (optional)
1. How the system will recognize that someone is cooking food that generates smoke.

SCHEDULE
Due Date: Version 1.0 release.
Table format:

<table>
<thead>
<tr>
<th>USE CASE #</th>
<th>Notify Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal in Context</td>
<td>To notify all the stakeholders that are interested in home security.</td>
</tr>
<tr>
<td>Scope &amp; Level</td>
<td>Alarm notification, dial-in system and data protocol, audio/visual means.</td>
</tr>
<tr>
<td>Preconditions</td>
<td>Alarm system is armed and active. Stakeholders are identified and their contact info is known. Communication means (phone lines and a/v equipment) are working.</td>
</tr>
<tr>
<td>Success End Condition</td>
<td>Stakeholders were notified.</td>
</tr>
<tr>
<td>Failed End Condition</td>
<td>Notification has failed.</td>
</tr>
<tr>
<td>Primary, Secondary Actors</td>
<td>Stakeholder – Remote: Owners direct phone, Authorities phone answering system, Proximal: by standers (owners, neighbors, police) who can hear alarm signal.</td>
</tr>
<tr>
<td>Trigger</td>
<td>Invocation with alarm signal details by alarm system</td>
</tr>
</tbody>
</table>

**DESCRIPTION**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Notification is invoked with alarm signal.</td>
</tr>
<tr>
<td>2</td>
<td>Remote stakeholders are notified by calling in with pre-recorded message.</td>
</tr>
<tr>
<td>3</td>
<td>Proximal stakeholders are notified with A/V signal.</td>
</tr>
</tbody>
</table>

**EXTENSIONS**

<table>
<thead>
<tr>
<th>Step</th>
<th>Branching Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a</td>
<td>Phone line is busy. Notify alternate stakeholder answering system or phone.</td>
</tr>
</tbody>
</table>

**SUB-VARIATIONS**

<table>
<thead>
<tr>
<th>Step</th>
<th>Branching Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2b</td>
<td>Second line is paging service. Notify alternate stakeholder with prerecorded numerical code sequence.</td>
</tr>
</tbody>
</table>

**RELATED INFORMATION**

<table>
<thead>
<tr>
<th>Notify Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority:</td>
</tr>
<tr>
<td>Performance</td>
</tr>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>Channels to actors</td>
</tr>
</tbody>
</table>

**OPEN ISSUES**

1. What if owner does not have a working phone
2. What is fire has damaged wires.
3. How to differentiate alarm codes for paging purposes.

**Due Date**

Release 1.0

**...any other management information...**

Developers for module that notifies authorities should be bonded for integration testing.

**Superordinates**

Smoke detection, Intrusion detection

**Subordinates**

None
### USE CASE # Disarm Alarm System

**Goal in Context**
Quick, safe and straightforward disarming of the alarm system.

**Scope & Level**
Authentication and system disabling  
Primary Task

**Preconditions**
Alarm system is armed and active. User knows disarming procedure and remembers password.

**Success End Condition**
System is disarmed.

**Failed End Condition**
System goes off.

**Primary, Secondary Actors**
House owner

**Trigger**
Enter of numerical password sequence

**DESCRIPTION**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>User enters 4 digit password</td>
</tr>
<tr>
<td>2</td>
<td>System recognizes password and disarms.</td>
</tr>
<tr>
<td>3</td>
<td>User disables alarm system</td>
</tr>
</tbody>
</table>

**EXTENSIONS**

<table>
<thead>
<tr>
<th>Step</th>
<th>Branching Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Timeout</td>
</tr>
<tr>
<td></td>
<td>Timeout starts with first numerical entry to the system while it is armed. Timeout lasts 15 seconds. If main system is not authenticated then timeout will notify system to go off. Timeout resets after expiration.</td>
</tr>
</tbody>
</table>

**SUB-VARIATIONS**

<table>
<thead>
<tr>
<th>Branching Action</th>
</tr>
</thead>
</table>

**RELATED INFORMATION**

<table>
<thead>
<tr>
<th>Disarm alarm system</th>
</tr>
</thead>
</table>

**Priority:**
High priority

**Performance**
Disarming process has to occur within 15 seconds.

**Frequency**
At least 3 times a day. Every time user leaves the house.

**Channels to actors**
Interactive – LCP and display.

**OPEN ISSUES**
1. Is 15 seconds enough for all environments, and should that be made variable.

**Due Date**
Release 1.0

...any other management information...
N/A

**Superordinates**
N/A

**Subordinates**
Timeout – For simplicity I did not model this as a use case.
Use Case: Disarm Alarm System.

Narative:

User A has to go to grocery store. She leaves the house and arms the system. When she comes back she wants to have time to enter the house with groceries, drop them and quickly enter her 4 digit numerical password before the alarm goes off. She also wants to be given a chance to make a password mistake and re-enter the right one. She also does not like complicated long and alphanumeric passwords. However, she is afraid that someone can break in the house and break the simple password with multiple attempts. For that reason buffer time between entry to monitored premises and alarm activation should be short enough to allow user to get ready to enter password, maybe make a mistake or two, but to disallow numerous trials in order to break the password code through 4 digit combinations.
### USE CASE # Intrusion detection

**Goal in Context**
To inform stakeholders of intrusion into premises.

**Scope & Level**
Primary Task

**Preconditions**
Alarm system is on and armed. Detector is working. Communication means are functioning.

**Success End Condition**
Stakeholders are informed.

**Failed End Condition**
Stakeholders are not informed of intrusion, and premises are compromised.

**Primary, Secondary Actors**
- Intrusion detector
- Stakeholders

**Trigger**
Intrusion detector reports intrusion.

### DESCRIPTION

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motion sensor reports motion</td>
</tr>
<tr>
<td>2</td>
<td>Await 15 seconds to allow authentication of the motion</td>
</tr>
<tr>
<td>3</td>
<td>Receive timeout and report intrusion to stakeholders</td>
</tr>
</tbody>
</table>

### EXTENSIONS

<table>
<thead>
<tr>
<th>Step</th>
<th>Branching Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Motion is authenticated</td>
</tr>
<tr>
<td></td>
<td>Use case: Disarm Alarm system</td>
</tr>
</tbody>
</table>

### RELATED INFORMATION

<table>
<thead>
<tr>
<th>Intrusion Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Priority:</strong> Top priority</td>
</tr>
<tr>
<td><strong>Performance:</strong> Detection instant, 15 seconds for positive intrusion identification</td>
</tr>
<tr>
<td><strong>Frequency:</strong> Rarely, every time that intrusion occurs</td>
</tr>
<tr>
<td><strong>Channels to actors:</strong> Electric wire, Phone lines, A/V</td>
</tr>
</tbody>
</table>

**OPEN ISSUES**
1. Should 15 seconds buffer be disallowed for areas other then entrance.

**Due Date**
Release 1.0

**...any other management information...**
N/A

**Superordinates**
<optional, name of use case(s) that includes this one>

**Subordinates**
- Notify Stakeholders, Timeout
<table>
<thead>
<tr>
<th>USE CASE #</th>
<th>Activate perimeter monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal in Context</td>
<td>To have one part of the house monitored for alarm conditions, and other Part available for use.</td>
</tr>
<tr>
<td>Scope &amp; Level</td>
<td>Alarm system, coverage area and system reaction. Sub-function</td>
</tr>
<tr>
<td>Preconditions</td>
<td>System is disarmed. User is trained to use this feature.</td>
</tr>
<tr>
<td>Success End Condition</td>
<td>System is armed for the perimeter area while the rest of the house is available for use.</td>
</tr>
<tr>
<td>Failed End Condition</td>
<td>Perimeter area is not set. System goes off.</td>
</tr>
<tr>
<td>Primary,</td>
<td>Owner of the house</td>
</tr>
<tr>
<td>Secondary Actors</td>
<td></td>
</tr>
<tr>
<td>Trigger</td>
<td>Actor selects to set perimeter monitoring.</td>
</tr>
<tr>
<td>DESCRIPTION</td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Action</td>
</tr>
<tr>
<td>1</td>
<td>Actor selects to set perimeter area monitoring</td>
</tr>
<tr>
<td>2</td>
<td>Actor selects rooms to be monitored</td>
</tr>
<tr>
<td>3</td>
<td>Actor activates the system for monitoring, system activates</td>
</tr>
<tr>
<td>EXTENSIONS</td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Branching Action</td>
</tr>
<tr>
<td>2a</td>
<td>Perimeter area is not selected, but system is activated.</td>
</tr>
<tr>
<td></td>
<td>Notify the user that perimeter mode can be set without some rooms selected for exemption</td>
</tr>
<tr>
<td>2b</td>
<td>System is ready to be programmed for perimeter monitoring, but nothing is selected for monitoring. Timeout after 30 seconds and return to stand by state.</td>
</tr>
<tr>
<td>SUB-VARIATIONS</td>
<td>Branching Action</td>
</tr>
</tbody>
</table>

**RELATED INFORMATION**

- Intrusion detection

**Priority:**
- This is optional feature available on more expensive models.

**Performance**
- Respond to user input immediately.

**Frequency**
- Once a week to once a day.

**Channels to actors**
- Interactive: buttons, LED, display

**OPEN ISSUES**
- Should this function be available from armed mode, so that owners can selectively disarm alarm.

**Due Date**
- Release 1.0

**...any other management information...**

**Superordinates**

**Subordinates**