SIT725 Software Engineering

Week 6: Use case description and sequence diagram

Use Enterprise Architect for this practical.

There is no submission requirement. Once you finish, show your tutor.

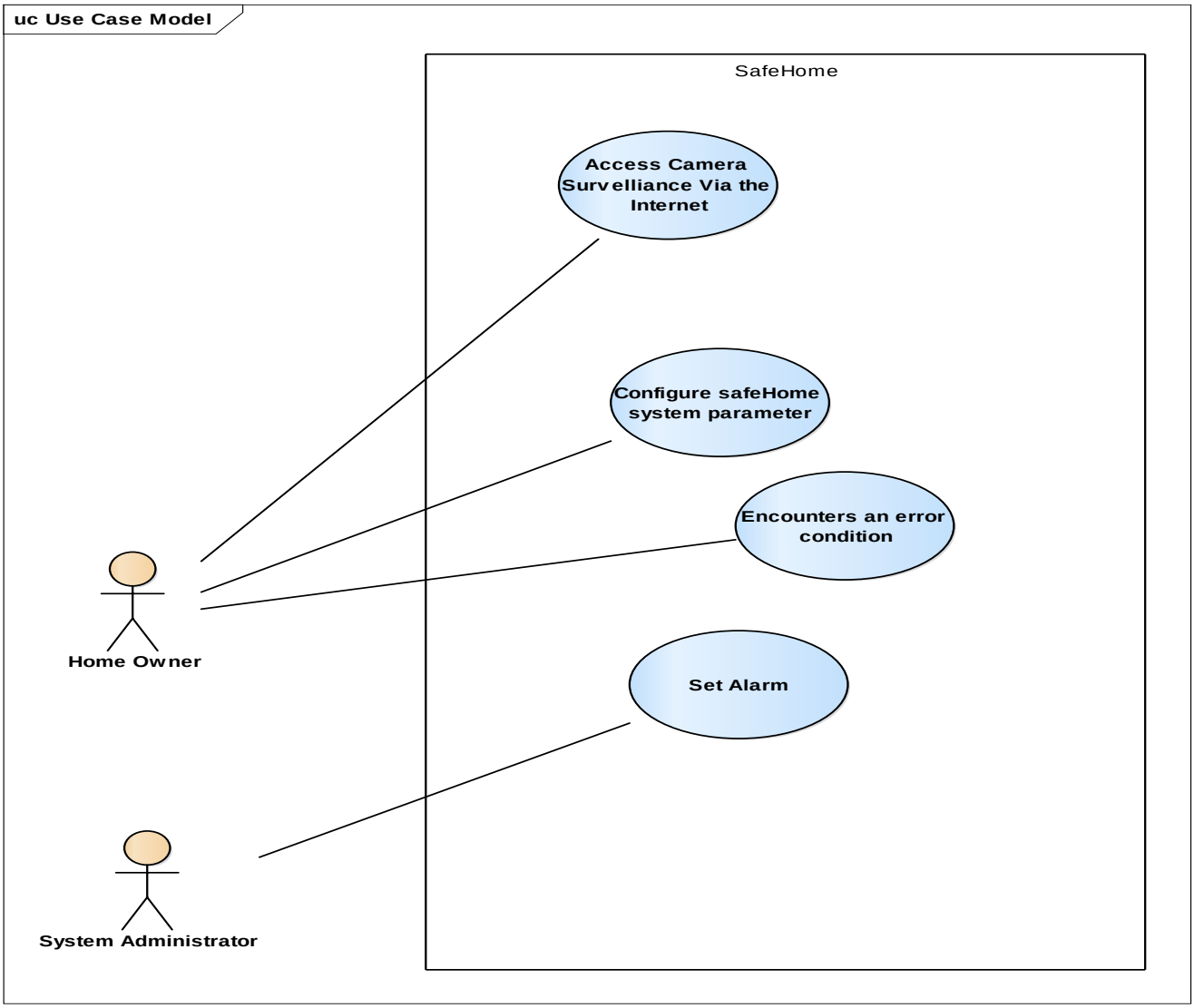
Safe Home case study [Reference]

The SafeHome security function enables the homeowner to configure the security system when it is installed, monitors all sensors connected to the security system, and interacts with the homeowner through the Internet, a PC, or a control panel.
During installation, the SafeHome PC is used to program and configure the system. Each sensor is assigned a number and type, a master password is programmed for arming and disarming the system, and telephone number(s) are input for dialing when a sensor event occurs.
The homeowner receives security information via a control panel, the PC, or a browser, collectively called an interface. The interface displays prompting messages and system status information on the control panel, the PC, or the browser window.

For basic *SafeHome* requirements, we define actors: homeowner (a user), setup manager (likely the same person as homeowner, but playing a different role). For the purposes of this example, we consider only the homeowner actor. The homeowner actor interacts with the home security function in a number of different ways using either the alarm control panel or a PC:

- Initiate Monitoring via control panel.
- Inquires about the status of a security zone.
- Inquires about the status of a sensor.
- Presses the panic button in an emergency.
- Activates/deactivates the security system
- Access cameral surveillance system via internet
- Configure System
- View thumbnail snapshots for all cameras
- Configure floor plan
- Encountered an Alarm

#Task-1: Partial use case Diagram has been developed using EA and provided here, complete the diagram:



Use case description:

Use case: Access camera surveillance via the Internet—display camera views (ACS-DCV)

Iteration: 2, last modification: date , name.

Primary actor: Homeowner.

Goal in context: To view output of camera placed throughout the house from any remote location via the Internet.

Preconditions: System must be fully configured; appropriate user ID and passwords must be obtained.

Trigger: The homeowner decides to take a look inside the house while away.

Scenario:

1. The homeowner logs onto the *SafeHome Products* website.
2. The homeowner enters his or her user ID.
3. The homeowner enters two passwords (each at least eight characters in length).
4. The system displays all major function buttons.
5. The homeowner selects the “surveillance” from the major function buttons.

6. The homeowner selects “pick a camera.”

7. The system displays the floor plan of the house.

8. The homeowner selects a camera icon from the floor plan.

9. The homeowner selects the “view” button.

10. The system displays a viewing window that is identified by the camera ID.

11. The system displays video output within the viewing window at one frame per second.

Exceptions:

1. ID or passwords are incorrect or not recognized—see use case **Validate ID and passwords.**

2. Surveillance function not configured for this system—system displays appropriate error message; see use case **Configure surveillance function.**

3. Homeowner selects “View thumbnail snapshots for all camera”—see use case **View thumbnail snapshots for all cameras.**

4. A floor plan is not available or has not been configured—display appropriate error message and see use case **Configure floor plan.**

5. An alarm condition is encountered—see use case **Alarm condition encountered.**

Priority: Moderate priority, to be implemented after basic functions.

When available: Third increment.

Frequency of use: Moderate frequency.

Channel to actor: Via PC-based browser and Internet connection.

Secondary actors: System administrator, cameras.

Channels to secondary actors:

1. System administrator: PC-based system.

2. Cameras: wireless connectivity.

Open issues:

1. What mechanisms protect unauthorized use of this capability by employees of *SafeHome Products*?

2. Is security sufficient? Hacking into this feature would represent a major invasion of privacy.

3. Will system response via the Internet be acceptable given the bandwidth required for camera views?

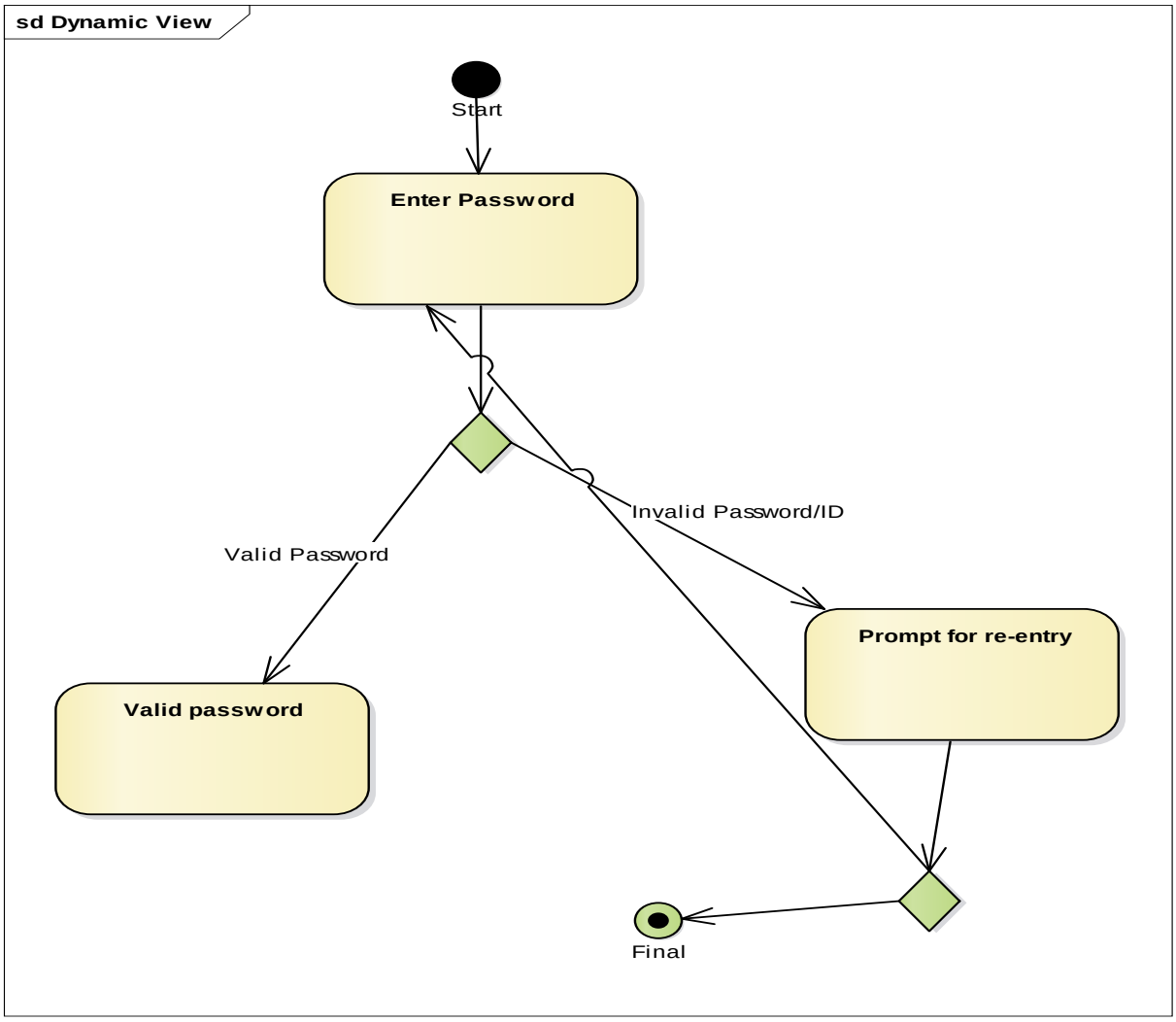
4. Will we develop a capability to provide video at a higher frames-per-second rate when high bandwidth connections are available?

##Task-2

Complete the Activity Diagram using EA based on the use case description. Partial activity diagram has been done for you. You need to complete the rest.

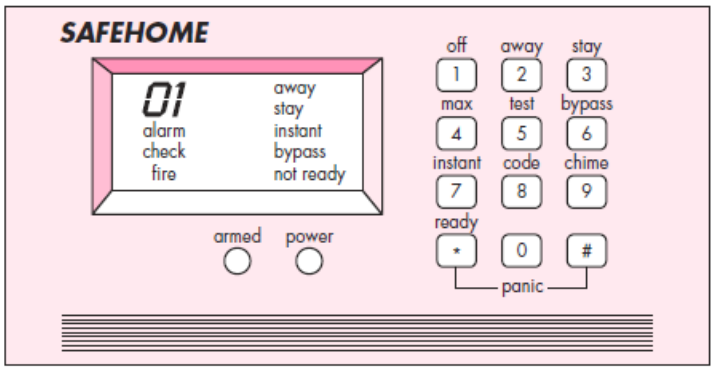
Steps:

1. Create Project
2. Select models (use case, class)
3. Go to the model root note at the project browser
4. Right click >add>add a model using Wizard
5. In the model wizard dialogue, Right side, select dynamic views
6. Use activity tool box to complete the activity diagram



Task-3: Sequence diagram

Considering the situation in which the homeowner uses the control panel, the use case description for system activation follows



Detailed use case description

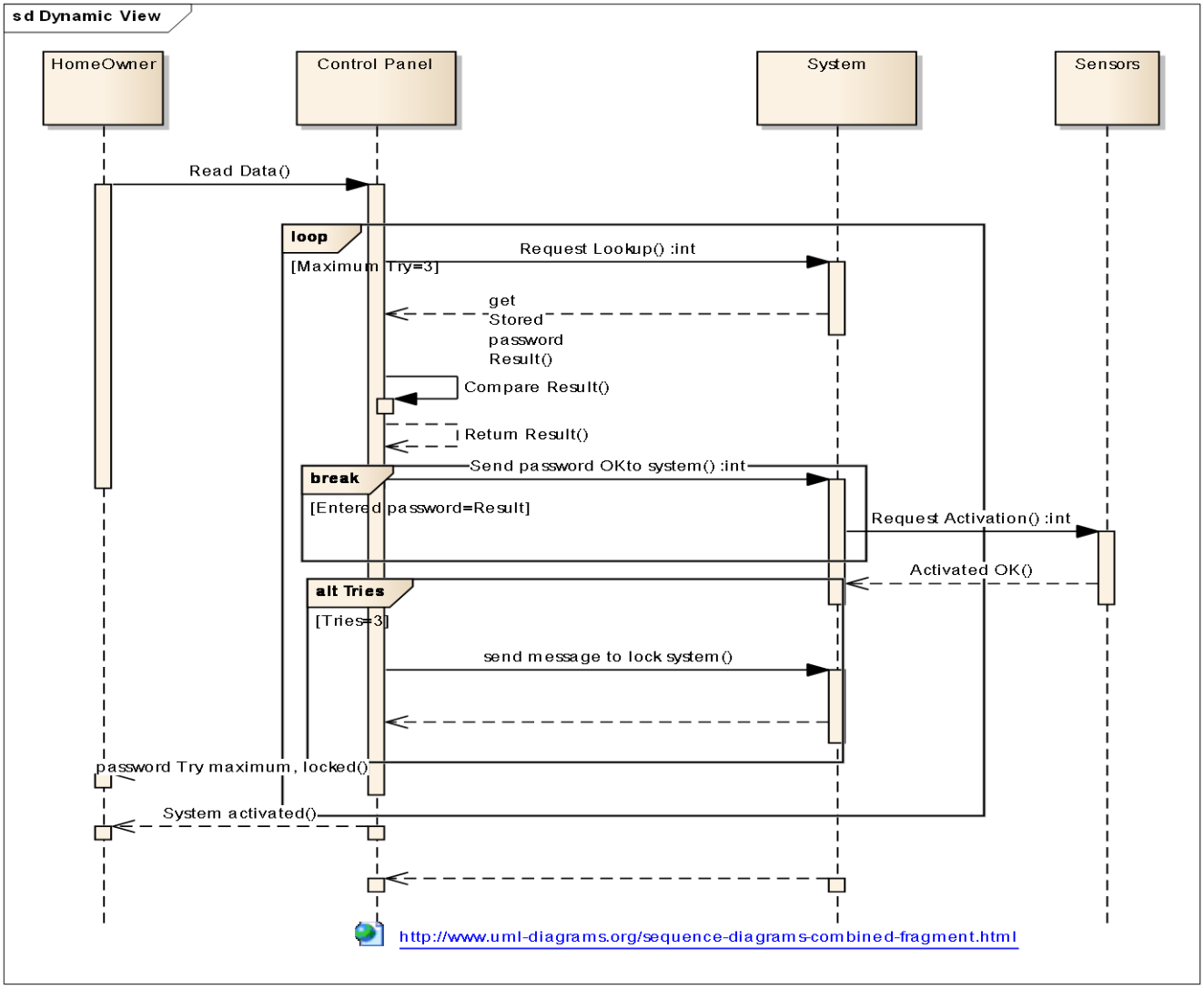
Use case: *InitiateMonitoring (System Activation)*
Primary actor: Homeowner.
Goal in context: To set the system to monitor sensors when the homeowner leaves the house or remains inside.
Preconditions: System has been programmed for a password and to recognize various sensors.
Trigger: The homeowner decides to "set" the system, i.e., to turn on the alarm functions.
Scenario:
1. Homeowner: observes control panel
2. Homeowner: enters password
3. Homeowner: selects "stay" or "away"
4. Homeowner: observes read alarm light to indicate that *SafeHome* has been armed
Exceptions:
1. Control panel is *not ready:* homeowner checks all sensors to determine which are open; closes them.
2. Password is incorrect (control panel beeps once): homeowner re-enters correct password.
3. Password not recognized: monitoring and response subsystem must be contacted to reprogram password.
4. *Stay* is selected: control panel beeps twice and a *stay* light is lit; perimeter sensors are activated.
5. *Away* is selected: control panel beeps three times and an *away* light is lit; all sensors are activated.
Priority: Essential, must be implemented
When available: First increment
Frequency of use: Many times per day
Channel to actor: Via control panel interface
Secondary actors: Support technician, sensors
Channels to secondary actors:
Support technician: phone line
Sensors: hardwired and radio frequency interfaces
Open issues:
1. Should there be a way to activate the system without the use of a password or with an abbreviated password?

2. Should the control panel display additional text messages?
3. How much time does the homeowner have to enter the password from the time the first key is pressed?
4. Is there a way to deactivate the system before it actually activates?

Steps:

a. Evaluate all use cases to fully understand the sequence of interaction within the system.
b. Derive the analyses classes from the use case description,
c. Identify events that drive the interaction sequence and understand how these events relate to specific objects. attributes and operation
d. Develop an analyses class model which will be UML class models
e. Develop the sequence diagram as below
f. Enterprise Architect Menu Procedure
    i. right click on Project Browser->root node (model)
    ii. select “add view”
    iii. select “dynamic” and give it the name “Dynamic View”
        1. a new icon should now appear in the project browser
    iv. Select “Dynamic View” icon, right click
        1. Add diagram
        2. UML Behavioral in “Select From”
        3. Sequence in “Diagram Types”
        4. Give a name
    v. click Ok
    vi. You should now have a new workspace called “Sequence”

The sequence diagram has been developed using Enterprise Architect. You need to reproduce this.



Reference: Roger A Pressman , “Software Engineering: A Practitioners’ Approach”, Chapter-5,6, pp. 130-140