COMP201: Software Engineering I

Assignment 1.1 (2023/2024)
(100% mark for Assignment 1.1 is 15% of COMP201 grade)

Deadline for Assignment 1.1: 14th of November 2023, 17:00

OBJECTIVE

This assignment is mainly about "Requirements Engineering" and will consist of various stages to produce parts of a requirements document for a given scenario based on a "proposed building security system" detailed on page 2.

Assignment number	1 of 2
Weighting	15 %
Assignment Circulated date provided to class	25/9/2023
Deadline Day & Date & Time	14th of November 2023 at 17:00 (5 PM)
Submission Mode	Electronic submission on Canvas (pdf)
Learning outcome assessed	1. Realise the problems in designing and building significant computer systems 2. Understand the need to design systems that fully meet the
	requirements of the intended users 3. Be able to apply these principles in practice

Submission necessary in order to satisfy Module requirements	No
Purpose of assessment	To assess the students' ability to analyse, generate and document user requirements
Marking criteria	See end of document
Late Submission Penalty	Standard UoL Policy

Instructions

- All tasks refer to the scenario outlined on page 4 so, before you begin, **read the scenario carefully**.

- You may **make some reasonable assumptions** about how the system should work (without inventing new functionality).

- **There is no "right answer" to modelling a system**, different solutions can be equally good.

- It may be helpful to refer to the course textbooks "Software Engineering", Addison-Wesley, by I. Sommerville and "Using UML", Addison-Wesley, by P. Stevens.

Task 1 (80%)
(20% for use-case diagram, 60% for use-case descriptions)

All tasks for this assignment refer to the given scenario "**proposed building security system**" (overleaf on page 2).

Produce a **UML use-case model** (i.e., **both** a use-case diagram **and** usecase descriptions) and identify as many actors as you can in your model that are within the scope of the system.

For the use-case diagram part of the model, you may use any method to draw it, including a hand-drawn diagram or ArgoUML software (available on the departmental computers (click start and then type ArgoUml into the search

box) or download free via the internet). The demonstrators will be able to help you with using this program. There is also app.genmymodel.com which is easy to use and free online (for public projects), so it is convenient if you are not in the lab.

For the model diagram, if you find that using one diagram is not sufficient or becomes overly complex, feel free to produce multiple diagrams. This is encouraged if the diagram has become difficult to read. Keep all text easy to read and all fonts at least 14pt.

Please use the following template for your use case descriptions:

ID	Id if use case, example UC1
Actors	List of relevant Actors
Name	Short name for use case
Description	Description of purpose of use case
Pre-conditions	What must be true to allow use case to happen
Event flow	Line by line detailed events for the use case
Post-condition	Any changes to the systems internal state due to use case executing
Includes	Any use cases which make up this use case
Extensions	Any optional use cases that are part of initial case
Triggers	What might trigger use case

Task 2 (20%)

Identify and list 10 **non-functional** requirements of the "**proposed building security system**" below, using the description of the scenario (you can make some assumptions about the system not detailed in the requirement description).

Each requirement must have an appropriate criterion so it can be verified. So, it needs to be possible to objectively test each requirement in your list.

Proposed building security control system

Your company has been commissioned to design a building control system for a bank which will be used to protect buildings against robbery, theft and fire. The system will be a series of sensors, buttons and outputs as follows:

- Window sensors: will be activated if a window is opened
- Door sensors: will be activated if a door is opened
- Floor sensor: will be activated if a floor area is stepped on
- Smoke sensors which detect smoke
- Heat sensors which detect if the temperature exceeds a certain value
- Fire alarm buttons
- Panic alarm buttons
- Fire door release solenoids
- Fire alarm bell
- Burglar alarm speaker
- Card readers
- Flashing lights
- Console speaker

General operation

Any user of the system must access the system with both a swipe card and access code. Each card has its own access codes configured. There are two system access codes per card, one for fire and one for burglary protection operation. So the swipes their card, then enters the code, if they enter the burglary code then can configure the burglar alarm if they enter the fire code they will be can configure the fire alarm function.

When accessing the system, for configuration if the user enters an incorrect code wrong 3 times, they are locked out of the system and a tamper alarm sounds (from the console speaker) and their card is disabled.

Fire alarm operation

The fire alarm is always active 24 hours a day. The fire alarm system will be triggered in the following circumstances:

1) If any of the heat sensors detect a temperature great than TC (Temperature Critical) where TC is calibrated by recommendations from the fire brigade.
2) If any of the smoke detectors detect smoke for a time greater than 'Time Critical' (a value also calibrated by recommendations from the fire brigade).
3) If a fire alarm button is pressed

If a fire is triggered the following actions happen:

1) The fire brigade is summoned automatically via an automatic calling system
2) All fire alarm bells are sounded and lights are flashed throughout the building

Resetting fire alarm

To stop the fire alarm, a fire disable code has to be input on the system console as well as a valid card swiped.

Burglar alarm operation

The burglar alarm is activated at specific times. On and off activation times can be added for each day of the week, Monday to Sunday. There is also the option to put the system into the activated state for a fixed number of days, this is to allow for holidays where the alarm will be active all the time (24 hours a day).

The burglar alarm will be triggered in the following circumstances:
1) If a door is opened (detected via door sensor) and the system is active
2) If a window (detected via window sensor) is opened and the system is active
3) If floor sensor is detected and the system is active
4) If a panic button is pressed and the system is active or inactive

Any sensor (door, floor or window sensor) can be designated as always on. These sensors will trigger the alarm immediately even if the system is not active. This is because some doors, windows or the floor need protection 24 hours/day. Entry to these areas is controlled by swipe cards near the doors and floors which deactivate the alarm for a short length of time so the card swipe is used to both unlock the door and deactivate the alarm.

To allow entry and exit through the building a number of the doors can be assigned as designated entry points. These doors are to allow entry to the building by authorised staff. If these doors are opened when the system is activated, the console issues an audio warning and a countdown begins. If the burglar alarm system is not disabled before the countdown timer reaches zero then the alarm will be triggered.

If the burglar alarm is triggered, a warning sound and flashing lights are activated also the police are sent a message. To de-activate the alarm or disable the alarm, a code has to be entered into the alarm console as well as a valid card presented. The alarm code has to be used to allow the operator to configure the burglar alarm.

Card readers

There are two sets of card readers. Readers for on the security system panel allowing users to authenticate themselves for configuration. Readers on doors to allow access to high security areas.

Marking Criteria

Part	A++ to A 70%+	B 60-69%	C 50-59	D 40-49	E+ 35-39	E- to G <35
1	Correct notation used throughout, wellchosen set of use cases and all case descriptions present.	Good set of use cases but some descriptions missing or minor case missing or some minor notation problem	Poor set of use cases or significant problems with notation. Level of detail not sufficient for problem	Some critical use cases missing or use case descriptions missing.	Shows some correct requirements analysis of the problem.	No clear evidence that the requirements have been understood at all or no clear attempt at use case diagram or descriptions.
2	All nonfunction elements identified and verification explained.	Good answers but confusion between functional and nonfunctional requirements.	Missing one or two nonfunctional requirements.	Missing up to three requirement descriptions.	Only 2 or 3 correct requirements present or incorrectly defined.	Requirements don't make sense.