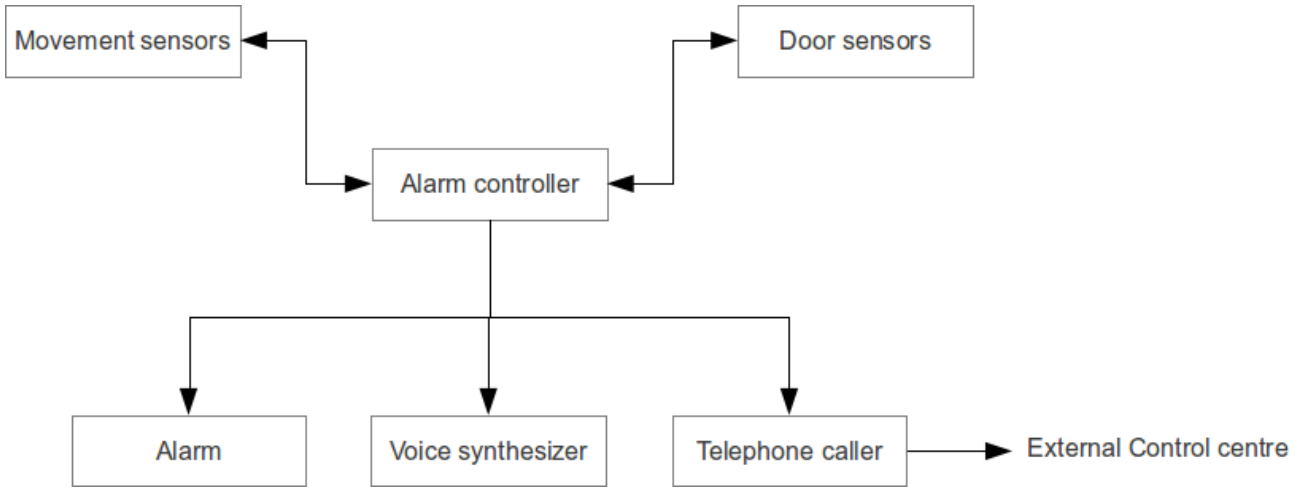
Ministry of Higher Education and Scientific Research		
Salahaddin University / Erbil		***Subject: Systems Analysis and Design***
College of Engineering		***Date: ---***
Dept. of Software Engineering	***Mid Year Exam 2011-2012***	***Time: 90 Minutes***
		Lecturer: Amanj Sherwany

The highest obtainable mark is 17, the minimum passing mark is 8.5

Q1: (2 points)

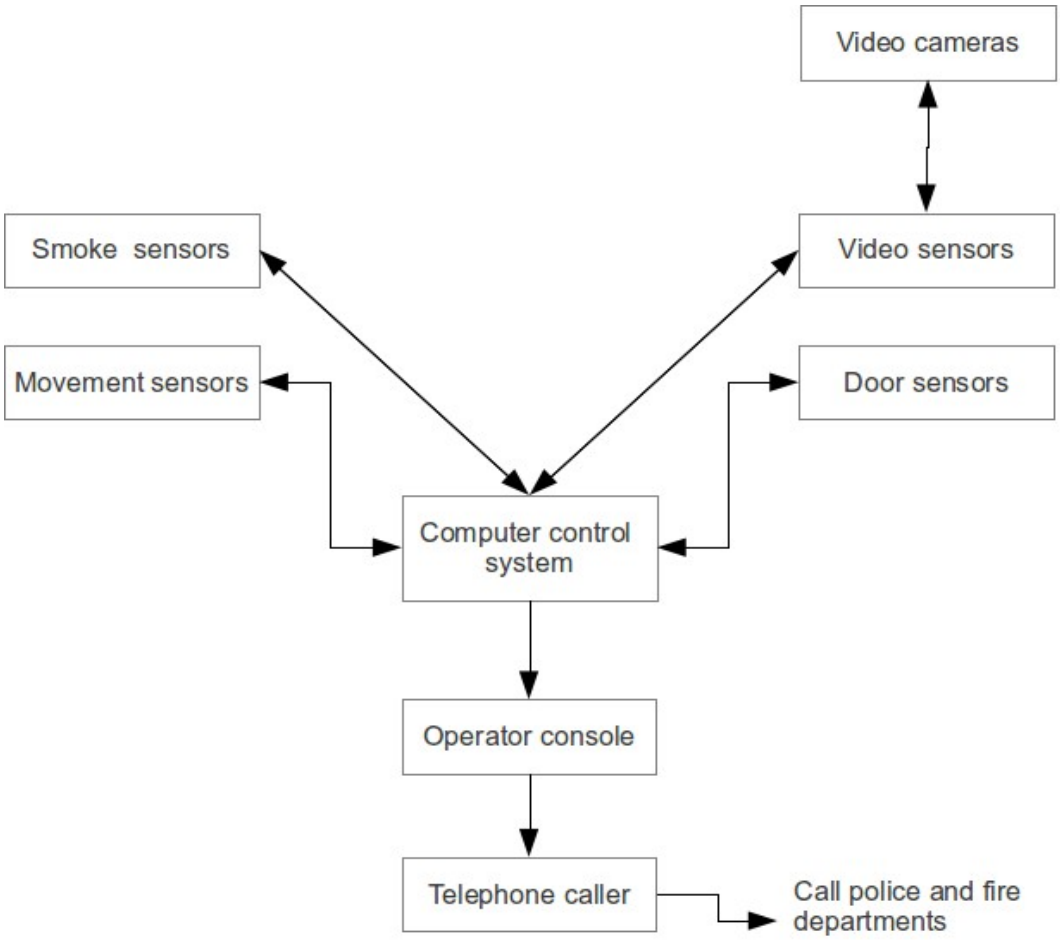
Consider a security system that is an extended of the system shown in the following figure:



Which is intended to protect against intrusion and to detect fire. It incorporates smoke sensors, movement sensors, door sensors, video sensors, video cameras under computer control, located at various places in the building, an operator console where the system status is reported, and external communication facilities to call the appropriate services such as the police and fire departments. Draw the block diagram of a possible design for such a system.

Answer

Something like:



* * *

Q2: (3 points)

As an expert in computer security, you have been approached by an organization that campaigns for the rights of torture victims and have been asked to help the organization gain unauthorized access to the computer systems of an American company. This will help them confirm or deny that this company is selling equipment that is used directly in the torture of political prisoners. Discuss the ethical dilemmas that this request raises and how you would react to this request.

Answer

This question has more than one correct answer, the point behind it is to learn how to argue your opinions. The ideal answer should discuss both sides of the dilemma (that the prisoners might be tortured and that the hacking is not an ethical act). After that you have to build your own reaction.

Q3: (4 points)

Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems:

- A system to control *Anti-Lock Braking System (ABS)* in car.

Answer

This is a critical system, since passengers' and drivers' life depends on this feature, so the best software process model for implementing this feature is Waterfall model.

- An *MIPS(x86) CPU* emulator for studying purposes.

Answer

Maybe exploratory software process model will be a good choice, as we can build a half baked system and use it, while the other parts are still in development.

- A *university accounting system* that replaces the existing system.

Answer

Most likely the system will be in service for decades, so the best software process model for that kind of systems is waterfall.

- An interactive system that allows railway passengers to find train times from terminals installed in stations.

Answer

The requirements might be a bit not clear for a computer scientist, so we might use prototyping to understand the requirements.

* * *

Q4: (4 points)

You have got the following *system requirement* about the *borrowing* functionality of the Library system (LIBSYS) that you are developing:

> *"The LIBSYS should allow users to borrow books, after they prove that they are students. Students may not borrow too many books at the same time. The time between pressing the* ***borrow*** *button and processing the order should be* ***less than 3 seconds****, although if something went wrong the system should alert the user."*

In the above paragraph:

- Find two ambiguous requirements. **(2 points)**

Answer

1. *This requirement "The LIBSYS should allow users to borrow books, after they prove that they are students" is ambiguous since it does not give any details on how the user should prove its identity.*
2. *This requirement "Students may not borrow more than 3 books at the same time." is ambiguous since it does not give any details about what amount of borrowed books is too many.*
3. *The requirement "If something went wrong the system should alert the user" is ambiguous since it does not give any details about what can go wrong, and how it also does not specify the kind of alert that the system must produce.*

- Extract the possible functional and non-functional requirements. **(2 points)**

Answer

Functional Requirements:

- *The LIBSYS should allow users to borrow books, after they prove that they are students*
- *Students may not borrow more than too many books at the same time.*
- *If an error happened during the borrowing of a book, a dialog window should appear saying:"Sorry something went wrong"*

Non-functional Requirements:

- *The time between pressing the borrow button and processing the order should be less than 3 seconds*

Q5: (4 points)

Suggest who might be stakeholders in *department's examination committee system*. Explain why it is almost inevitable that the requirements of different stakeholders will conflict in some way.

Answer

- *The head of the committee*
- *The committee members*
- *The examination hall director*
- *The head of the department.*
- *The teachers.*

- *The Observers*
- *The Deanery.*
- *The University.*
- *And more*

Different stakeholders usually have different needs, understandings and expectations for the system being developed, as a result their requirements may sometimes conflict with other stakeholders' requirements.

For example, The head of the committee might see it is not important to record the finishing time of examinations, while the head of the department might see it as a necessary information.

Good Luck