CSE 503: Spring 2004; Assignment #1

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1) Patent Monitoring Problem

A)

Entities:
Analog Monitoring Device
Patient
Database
Computer (Machine)
Medical Staff[1]
Nurses' Station

B)

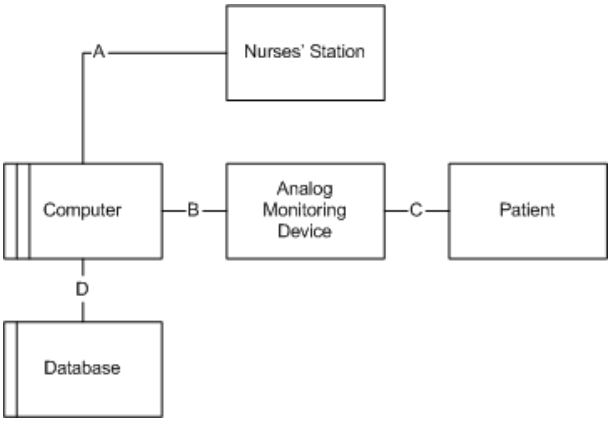

Figure 1: Context Diagram

[1]The medical staff might not have to be represented here since they only enter what factors that should be monitored and so they can be seen as the same entity as the nurses' station.

Context	Type
Analog Monitoring Device	Causal
Patient	Causal
Database	Lexical
Computer (Machine)	Machine
Nurses' Station	Causal

Phenomena	Description
A	The nurses' station will be notified if factor falls outside a patient's safe range, or if an analog device fails.
B	The machine constantly reads the factors monitored by the analog monitoring device.
C	The analog monitoring device constantly monitors certain factors, such as pulse and temperature, on the patient.
D	The data read from the analog device is stored in the database.

C) Yes, I choose to omit the medical staff. The nurses can be seen as the same entity as the nurses' station or at least a part of it. To keep things more simple I choose to omit this part.

D) Firstly, I will illustrate my three pictures of problem frames and then discuss the requirements, the phenomena and how each domain fit in to the problem frame.

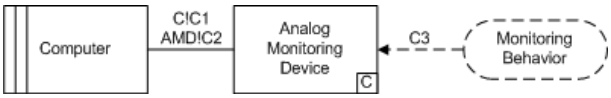

Figure 2: Problem Frame 1 - Simple Behavior

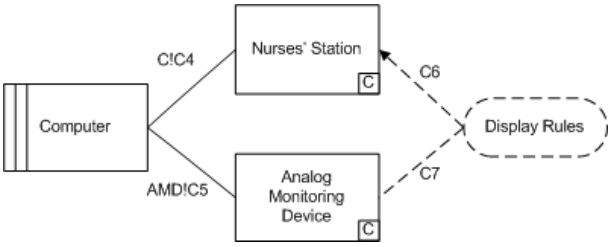

Figure 3: Problem Frame 2 - Information Display

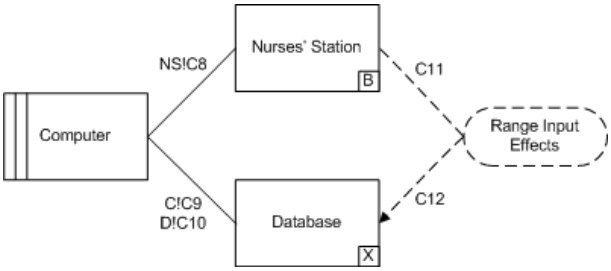

Figure 4: Problem Frame 3 - Simple Workpieces

Requirement	Description
C3	The analog monitoring device has to monitor certain given factors such as pulse, temperature, blood pressure and skin resistance.
C6	It has to be displayed in the nurses' station when a factor falls outside a patient's safe range, or if an an analog device fails.
C7	The analog monitoring device has to notify the computer when a factor falls outside a patient's safe range. Also, some notification has to be made if the device fails in some way.
C11	The medical staff have to be able to input factors to be measured and ranges for these. (Due to my simplification this is done via the nurses' station.)
C12	The state-reactive database have to be able to change its state when for instance new factors are to be measured or new ranges are given.

Problem frame 1 illustrates the monotoring behavior in a simple behavior problem frame. The computer is naturally the control machine and it controls the controlled domain, the analog monitoring device, and the device is partly responsive to the phenomena C1. The device fits perfectly describes a causal domain since its properties are essentially causal relationships. The phenomena shared by the computer and the device are C1 and C2. The device, like I earlier wrote, is party responsive to C1. More specifically C1 is the event that the computer, on a periodic basis, reads the factors monitored by the device. It also checks to see that the device is functioning correctly. C2 describes the feedback gives by the device to the computer, such as the data monitored by the device.

Problem frame 2 describes the computer, the nurses' station and the analog monitoring device in an information display problem frame. The device is still a causal domain and describes the real world. The computer is still the machine and is in this problem frame a display machine. Finally, the nurses' station acts as a causal domain and is the information display. In this case I refer to the nurses' station as the "hardware" in the station and not the medical staff. Hence, the station is a causal domain and not a biddable domain. In general the problem frame works in the following manner; the device reports that either a factor has fallen outside a patient's safe range or that it is malfunctioning to the computer via the phenomena C5. The computer hen alerts the nurses' station via the shared phenomena C4 and the information gets displayed according to the display rules.

Finally, problem frame 3 illustrates the specification of ranges and factors to be monitored in a simple workpieces problem frame. In this case the nurses' station acts as the operation requests and is a biddable domain. The reason for this is that I in this case refer to the nurses' station as being the medical staff in the station. The computer is the tool that is used to modify the state in the workpiece, i.e. the database. The medical staff enter the data and send it to the computer via the shared phenomena C8. The computer then tries to modify the database as wanted by the medical staff via C9. The state C10 will then be changed according to the given data.