NTNU
Department of Computer
and Information Science

Examination in

TDT4210 – Health Informatics

Thursday 24 October 2013, Hours 09:00 - 16:00

Assignments prepared by teacher Pieter Toussaint. Contact person during the examination is Pieter Toussaint (cell phone 40646586)
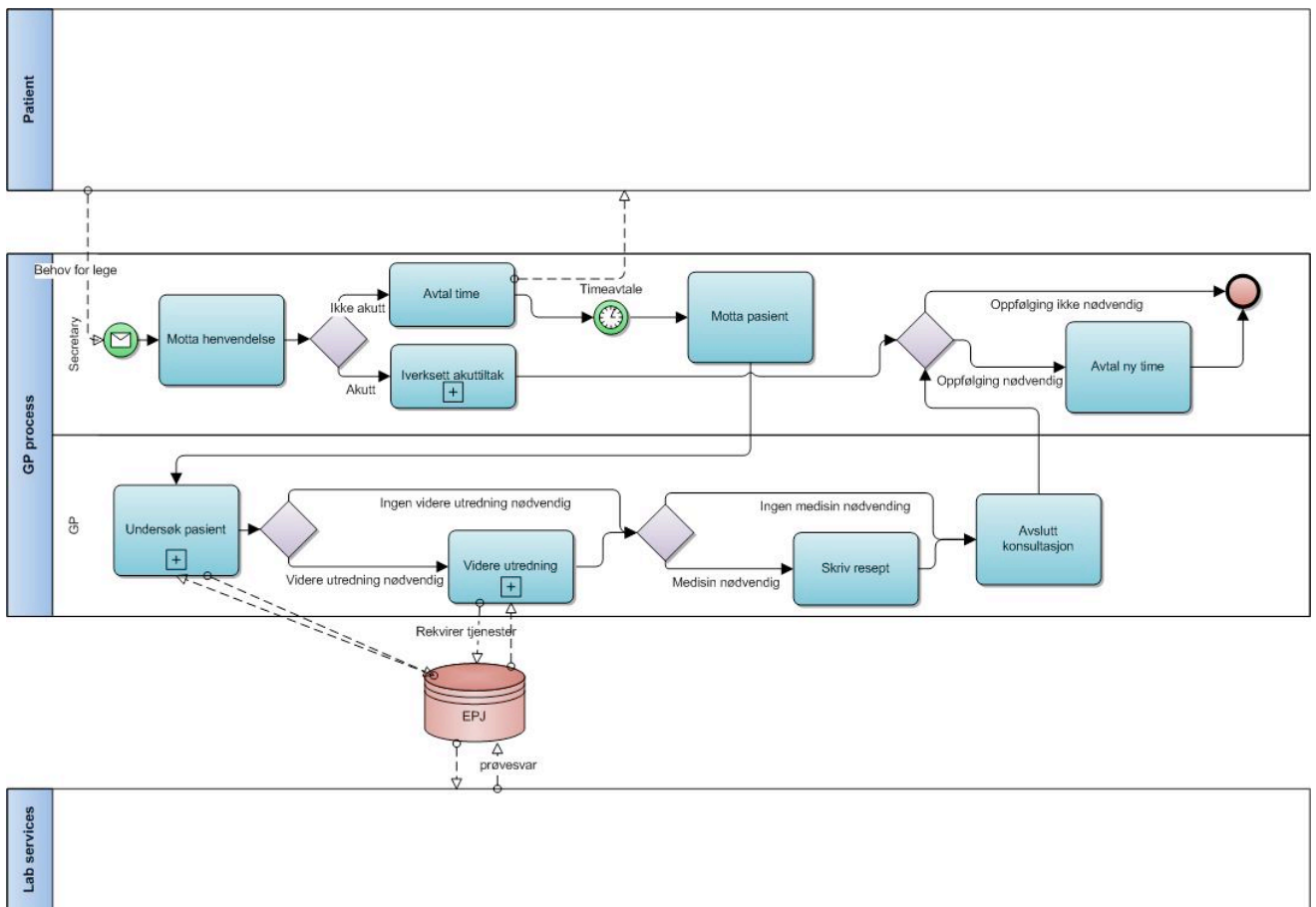
Language: English
Allowed aids: Dictionary

Read the text of each assignment carefully. Make sure that you understand the assignment.

If you consider the information given in an assignment *incomplete* or *inaccurate*, then make a note of the assumptions you find it necessary to make in order to solve the assignment.

Task 1

a) Comment on the process model given above.

Task 2

Which of the definitions of Medical Informatics (MI), given below, is the one proposed by Hasman et al.:

    a. MI is the discipline concerned with the systematic processing of data, information and knowledge in medicine and health care.

    b. MI is a scientific discipline that concerns itself with the cognitive, information processing and communication tasks of health care practice, education and research, including the information science and technology to support these tasks.

    c. MI is the discipline concerned with the design and implementation of informations systems for health care.

Task 3

Which of the following reasons is *not* usually considered a good reason for creating an ontology?
    a. To model a domain of knowledge in the one correct way so that it can be applied on all conceivable applications
    b. To share a common understanding of the structure of information among software agents
    c. To make domain assumptions explicit so that they can easier be understood and updated

Task 4

In the current situation there are two main logistical challenges with respect to the execution of the operation plan in the hospital.

1. **Floating start times** - Due to many factors, operations often don't start at the time they were scheduled to start. A reason can be that the preparation at the ward takes longer than planned, that an operation before is delayed or that an emergency operation had to be done. It happens that patients are brought to the Operation Room but have to be taken back again, or that they were given pre-med while the operation is cancelled. But it also happens that the people at the operation room are waiting for a patient that does not show up.
2. **Floating end times** - Delays and changes in duration are main reasons for a change in a planned end time of an operation. Often complications arise during an operation which cause the operation to take longer or shorter than planned. For both the cleaning service and the recovery it is important to know about these changes in end time with respect to their own work planning.

It is decided to develop an information system that informs all the stakeholders involved about changes in start en end times. The system will not just inform that start en end times have changed, but will also give an indication of new times. The information system offers the following functionality:

1. By means of their hospital smart phone, hospital staff can subscribe to specific operations in the schedule they want to be informed about.
2. If start and/or end times change for a specific operation, a notification is send to the smart phone of all users that subscribed to this operation.
3. The user can ask for an indication of new times. These indications are based on either planned new times or estimates derived from the analysis of historical data (a large number of previous operations).

a) Describe the information system using Alter's framework.

b) Describe briefly three evaluation studies that could have been performed during the life cycle of the information system. Indicate for each study: the objective, in which phase of the life cycle it was performed and whether the effects you want to measure/observe are outcome or process measures.

Task 5

a) In his lecture, Professor Klein gave a model for clinical decision support. Present and explain this model.

b) Computer-based protocol systems, as described by Coiera in chapter 13 of his book, are examples of decision support systems. Coiera describes two ways in which these systems can be applied in clinical practice. How do these two ways relate to the Klein's model?

Task 6

In Part 6 of the book Coiera discusses communication systems in healthcare. The concept of an 'interruption' is mentioned. Are all interruptions necessarily bad? What would the consequence be of a 'no interruption' policy in a busy clinical setting?