Health Informatics and Health ICT 2016/2017 - Assignment #1

Published on 2017.02.24 - Due on 2017.03.09 13:00 on Fenix.

Expected length of answers: About ½ page per answer. Never more than 1 page per answer. Each answer on a separate page identified by your student number, name and degree (see template).

Answers should include: i) justifications for all the assessments ii) bibliographic/web resources used to answer the questions in the written assignment

If you want feedback: Please hand in a printed copy later in the class (three/four sheets, stapled)

Q1. One of the major difficulties of handling medical data is its „*double nature*", having to collect and integrate in the same record heterogeneous elements related to high and low level processes, such as i) lab tests, ii) images, iii) genetic data, iv) family's medical history and v) appraisals of emotional states. Please indicate the data types and/or representation formats that you would use for each of the above five information elements.

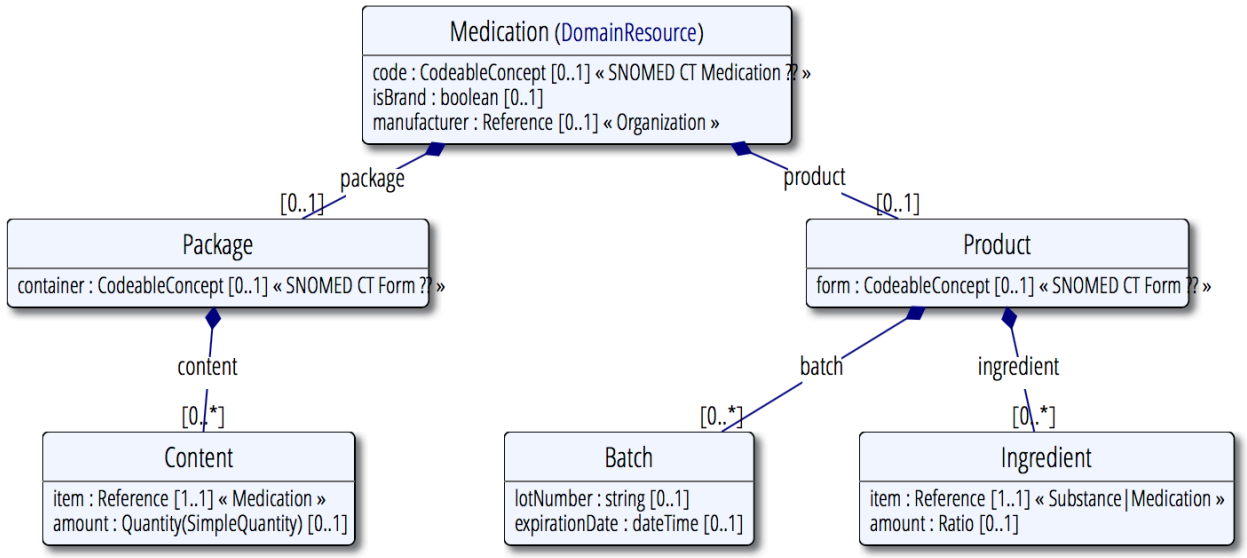
Q2. Given the imprecision of many medical terms, why do you think that serious instances of miscommunication among health care professionals are not more common? Explain also, in your own words, why is greater standardization of terminology necessary if computers rather than humans are to manipulate patient data?

If you are a Biomedical Engineering Student:

Q3BM. Discuss the role of HL7 in the context of exchanging clinical information between hospitals and ambulatory care facilities. Specifically, how can HL7 improve continuity of care for previously hospitalized patients who have been discharged and are now being followed up by their primary physicians?

If you are a ICT in Health Student:

The *HL7 Fast Healthcare Interoperability Resources* (FHIR[1]) standards framework is build on a set of modular resources that can easily be assembled into working systems. For instance the *medication*[2] resource covers the ingredients and the packaging for a medication. The FHIR website gives a detailed description for the medication resource, detailing how the information can be encoded in different formats (e.g., XML or JSON). The corresponding UML diagram is as follows.



Q3CS. Present an Entity-Relationship (ER) model of the medication resource. Convert also the ER model to the relational model, and implement the database in a database management system of your choice (**suggestion**: *sqlite*[3]). Your answer should contain (i) the ER model, and (ii) the SQL instructions to define the relational schema of the database.

Q4CS. Write a program to populate the relational database from JSON files encoding medication resources according to the HL7-PHIR format (**suggestion**: use Python with the sqlite library[4]).

[1] https://www.hl7.org/fhir/
[2] https://www.hl7.org/fhir/medication.html
[3] https://www.sqlite.org
[4] https://docs.python.org/2/library/sqlite3.html