MEIC - Engenharia de Software – 2014/15
4th Practical class - UML modelling project - Part 1: Use case modelling

The aim of this class and the following 3 classes is to build, with the Enterprise Architect tool, a UML model describing the requirements and architecture of a software-based system. This document provides the instructions for the 1st part (1st week) of the modelling project.

The work must be performed in groups of two students attending the same class. For the final classification, the modelling project has a weight of 4 out of 20.

The end result is a UML model created with the Enterprise Architect tool (.eap file), to be submitted via Moodle until the 16th of November.

The system in question is a National Electronic Prescribing System (SNPEM), whose requirements are described on the following page. The UML model should cover the following two subsystems: the Prescriptions' Central System (SCP), under the responsibility of the Ministry of Health and the Electronic Prescribing Applications (PEM), under the responsibility of application vendors. The UML model should include not only the existing system, but also the extensions needed to completely eliminate paper along the circuit.

a) Develop a use case diagram for the electronic prescribing applications, with the system boundary, actors (users and external systems) and use cases. If appropriate, structure the diagram taking advantage of the "extends", "include" and generalization relationships.
Note: Start by creating a project in Enterprise Architect containing at least the "Use Case View". Then create a use case diagram within this view.

b) Write a brief description (one paragraph) of each actor and use case, using the notes field in the tool Enterprise Architect.

c) Describe the flow of events of a normal scenario and possible alternative scenarios of an act of prescribing medicines. Use the tab "Scenario" in the use case properties.

d) Describe the pre-conditions and post-conditions of an act of prescribing medicines. Use the tab "Constraints" in the use case properties.

Home work:

e) Develop a use case diagram for the Prescriptions' Central System (SCP).
Tip: create a package for each of the two subsystems (PEM applications and SCP), and another package for the actors (shared among subsystems).

f) Complete the model use cases with summary descriptions (1 or 2 paragraphs) of all actors and use cases.

National Electronic Prescribing System

In Portugal, electronic prescribing (PEM) is the procedure for issuing prescriptions via computer applications certified by the Central Administration of the Health System, IP (ACSS) (currently SPMS - Shared Services of the Ministry of Health, EPE), or under its responsibility, which is regulated by Decree nº 198/2011 of 18 May from the Ministry of Health. For further information, read the information contained in the following links (in Portuguese):

- Portaria nº 198/2011 de 18 de Maio do Ministério da Saúde http://www.portaldasaude.pt/NR/rdonlyres/952C2EB7-0778-4C7C-AF0B-B102FB9FABB5/0/portaria_198_2011.pdf
- Prescrição Eletrónica de Medicamentos e Produtos de Saúde: Especificação dos Serviços para integração com a Sistema Central de Prescrições, SPMS, Março de 2013 http://spms.min-saude.pt/wp-content/uploads/2012/12/PEM_ServicosPrescri%C3%A7%C3%A3o_ET-v1.72.pdf
- Página da SPMS sobre Prescrição Eletrónica de Medicamentos com mais informação: http://spms.min-saude.pt/categoria/tic/pem/
- Página do Infarmed sobre Prescrição Eletrónica de Medicamentos: http://www.infarmed.pt/portal/page/portal/INFARMED/MEDICAMENTOS_USO_HUMANO/PRESCRICAO_DISPENSA_E_UTILIZACAO/PRESCRICAO_ELECTRONICA_MEDICAMENTOS

Electronic prescribing applications should submit the prescriptions to the Prescriptions' Central System (SCP), that contains the National Database of Prescriptions (BDNP) and provides Web Services for the safe registration of prescriptions based on credentials (login and password) provided within the application certification process. All the prescriptions of a particular month should be sent to the SCP up to the second day of the following month. If possible, this submission should be made at the time of prescription. When the service returns an error or is unavailable, prescriptions must be resubmitted later. Prescriptions may be cancelled (by their authors) within 30 days after the date of prescription.

The prescription registration service (of the SCP) validates, among other, the following data: identification of the prescribing physician, by confronting with information provided periodically by the Medical Association; site identification prescription (health facility, clinic, etc.), user identification (in case of prescriptions to be partially paid by the National Health System -NHS), confronting with the database of the National Register of Users (RNU) of the NHS, drug identification, comparing with the database maintained by Infarmed (the national authority for medical drugs).

Users registered in the NHS (RNU) may request via the Health Portal credentials that allow them to consult not only their identification data as well as the prescriptions issued in their name.

The Centre for the Conference of Invoices (CCF) of the National Health Service accesses monthly the SCP to extract the information about prescriptions produced in the previous month, in order to compare this information with the information from invoices and prescriptions submitted by pharmacies.

Currently there are several dozens of certified electronic prescribing applications from different vendors, for different environments: Software as a Service (SaaS) Web applications (not requiring installation), applications for installation on personal computers and applications for installation on mobile devices (such as iPAD).
These applications typically offer the following features to their users (doctors):

- electronic prescribing (involving site selection, user selection, drug selection, dosage and other information; submit and print) ;
- consultation , cancellation and reprint of previously issued prescriptions ;
- export prescriptions issued to the BDNP (when not performed immediately on prescription);
- access to the National Register of Users of the NHS (RNU), via a Web Service, to obtain all the information of a new user based solely on the number, avoiding manual entry of information;
- access to the database of medical drugs maintained by Infarmed (via a Web Service) in real time at the point of prescribing , or for download (and offline usage).

In the future, we intend to achieve complete dematerialization of prescriptions and invoices. For that purpose, through certified applications, pharmacies may have access to the SCP for dispensing prescriptions for a particular user, as well as access to the CCF for sending electronic invoices. These features should be considered in the UML model to build.