CSCI910 – Software Requirements, Specifications and Formal Methods

Tutorial 5 & 6

Objectives

- Help you to familiar with the informal and formal specification techniques in project development.

Background:

This project contains three parts, you are asked to understand the background information about the project and complete the requirement specification analysis.

This project tries to model a general process happening in a hospital and contains three modules, i.e., the patient administration module, the doctor diagnosis module, and the medicine administration module. The descriptions of each module are given as follows.

Patient Administration Module

Assume Patient P gets sick/injured, and he/she goes to a hospital. First, Patient P comes to the reception, asking Nurse N for triage to get a further diagnosis. At the reception, Nurse N records Patient P's personal information (e.g., name, gender, symptom, etc.) in the Health Care System (HCS) through a computer, and leads the patient to a doctor for an inspection. After the inspection, Patient P will go back to the reception, and Nurse N will lead the patient to inpatient department or pharmacy based on the patient's final prescription given by the doctor.

Case 1: Without Hospitalization

If no need of hospitalization, Patient P will leave the hospital after getting the medicine.

Case 2: With Hospitalization

If Patient P needs hospitalization, Nurse N will lead the patient to the inpatient department for treatment. During the hospitalization, Doctor D will regularly check Patient P's condition. Patient P will leave the hospital after getting approval from Doctor D. If so, Doctor D will log in to HCS to update the patient's medical record to complete the medical case.

Doctor Diagnosis Module

Assuming Doctor D serves Patient P, the doctor first logs in to HCS and checks the patient's medical record through the computer in the diagnosis room. Doctor D then conducts a diagnosis of the patient to conclude the diagnosis result. During the process, Doctor D might ask the patient for an inspection (i.e., the patient goes to an inspection room, and Nurse N will perform the inspection). After the inspection, Nurse N will submit the diagnosis result in HCS through a computer in the inspection room, and the patient will go back to Doctor D. When Doctor D is available to serve Patient P again, Doctor D will log in to HCS to check the diagnosis result of Patient P by typing in Patient P's personal information in HCS. After that, Doctor D will provide the final diagnosis result and submit the prescription to HCS to complete the treatment.

Medicine Administration Module

Case 1: Assume Patient P does not need hospitalization, Nurse N will deliver the medicine to the patient directly. To do so, Nurse N needs to log in to HCS first by typing in the patient's personal information and checking the prescription given by the doctor. Then, Nurse N updates the patient's medicine delivery record to complete the medical journey of the patient.

Case 2: Assume Nurse N would like to deliver medicine to patient P who is currently in the hospital by putting the medicine into a medicine tray first. Nurse N firstly enters the medicine room. In the medicine room, there is a computer that provides HCS that contains a medicine administration module. In the module, a list of patients whom the nurse provides care to will appear on the computer when Nurse N logs in. Each patient has his/her own's corresponding medicine trays. A button of 'Medicine Plan' will be displayed on the taskbar, and clicking on the button makes patient P's medicine plan appear on the display. According to the medical plan, Nurse N puts the medicine into Patient P's medicine tray and leaves the medicine room. Nurse N is logged out when leaving the medicine room. Then, Nurse N takes the medicine tray to deliver the medicine to Patient P who lies in bed. Finally, Nurse N goes back to the medicine room to acknowledge the completion of the medicine delivery in HCS through the computer.

The brief description of the general process in a hospital given above just captures one specific scenario. In the real world, there are a number of other scenarios to take into consideration. For instance, one or more patients come to the hospital at the same time; nurses and doctors must serve different patients simultaneously; medicine might be delivered by more nurses for more patients, for some regular rounds of a 24-hour period, or in an ad-hoc way; two or more nurses might do the medicine administration work simultaneously, etc.

Tasks:

1. Analyse the background information and three modules: specify the potential stakeholders, the domain requirements, and the functional and non-functional requirements of the project.
2. Draw a level 0 Data Flow Diagram for the project.
3. Draw a Finite State Machine (FSM) for the project. Please also complete the state table.