CSE 4361/5322 SOFTWARE DESIGN PATTERNS

April 3, 2023

Homework 3, 15%

Due: 04/13/2021 11:59PM

1 Introduction

The Intensive Care Unit (ICU) of a hospital wants to develop a software application or app for monitoring a patient's temperature, blood pressure and pulse. Each patient wears a small device, which periodically collects measurements of these parameters and sends them to a center server. A nurse can set the lower limit and upper limit of each of these parameters. When any of these parameters falls outside of the limits, the center server issues a warning message and sends it to all computers and mobile devices of healthcare providers of the hospital that are registered to receive the warning. The software running on any of these computers or mobile devices, upon receiving the warning message, may retrieve the patient's data from the center server, process the data, and take appropriate action to inform the healthcare provider, such as displaying a message, sounding an alarm or doing nothing.

2 What Needs to Be Done

This individual homework assignment requires the student to do the following:

1. (15%) Identify design problems you would encounter when developing the software. Briefly explain each of these design problems.
2. (15%) Identify exactly two situation-specific (i.e., Gang-of-Four patterns) that can solve some or all of the design problems you identify in the last bullet. Explain how each of the two patterns solves a design problem. Note: GRASP patterns do not count. If you apply more than two patterns, then you must indicate which two of the GoF patterns are to be graded; if you do not indicate these, then the GTA will grade the two patterns of their choice, which may result in a lower score.
3. (35%) Draw a design class diagram (in UML) to show the classes of the patient monitoring software including the participants of the patterns identified in bullet 2. Describe the roles and responsibilities of the classes in the design class diagram.
4. (35%) Draw a design sequence diagram to show object interaction in the patient monitoring system. Base on the design sequence diagram, explain how objects interact with each other to accomplish the functions of the patient monitoring system.

2.1 How To Submit

Submit your solution in a Word or PDF document. The document must not exceed 8 pages of font size at least 11 points. However, you are not required to write 8 pages; your solution can be fewer than 8 pages. Name your file as follows, where xxxx is either 4361 or 5322:

Lastname_Firstname_CSExxxx_S23_HW3.pdf, or
Lastname_Firstname_CSExxxx_S23_HW3.doc(x)

Additional submission instructions may be given by the GTA.