

CSE 564

Software Design Project

School of Computing, Informatics, and Decision Systems Engineering

March 28, 2018

Description

The purpose of this assignment is to practice the semi-formal object-oriented as well as formal component-based software design concepts and methods for an Isolette system [1]. This system has a thermostat, a temperature sensor, a heat source, and an operator interface that collectively control air temperature for infants. As a time and safety critical system, the thermostat must operate under a strict set of requirements.

For this project, a rigorous design that satisfies normal operation, configuration, and maintain a temperature range of the Isolette is to be developed using appropriate component-based design concepts and methods [1]. The scope of the project is limited to software components mimicking a nurse and an infant. Similarly, object-oriented design needs to be developed for the thermostat, temperature sensor, air, operator interface, and heat source. The air and heat source component can have simple behaviors. The design should be based on the Synchronous Reactive Component modeling approach. The designs are then mapped to appropriate UML classes and interfaces. Next, the resulting UML classifiers and their relationships are implemented using the Java Programming Language. Experiments should be developed to show the design and its implementation satisfy the normal operation, configuration, and temperature maintenance use-case scenarios are to be developed. The experiments must be repeatable which means the implementation uses logical time (round).

Timeline

- Topic and the Requirements Engineering Management Handbook was introduced and released on March 12.
- The project is to be completed by April 27, 2018.

Deliverables

- A report using the provided template document.
- Software: Source code, readme file, and anything else that is needed to run the software.

Software

- Software must run on Windows OS and JRE 1.8.
- Source code can be implemented only using the Java programming language.
- Please do not include any compiled code or third party APIs.
- Make sure your code compiles and runs from command line (there is no dependency on IDEs or anything else that is specific to your software development environment; you may include Junit tests)
- J2SE must be used.
- You may use IDEs such as Eclipse and IntelliJ IDEA

Team

- Each project is to be carried out by two students
- Percent efforts are to be reported using the Rubric below.

Rubric (Software + Report + Presentation + Demonstration)

Parts	Points
Problem description	5
SRC design specifications with description	25
UML design specifications with description	25
Implementation	15
Experiments and results	20
Quality and documentations	10
Presentation	5
Demonstration	5
Total score	110

The total score includes 10 bonus points.

References

- [1] Requirements Engineering Management Handbook, (2009), DOT/FAA/AR-08/32, Air Traffic Organization NextGen & Operations Planning Office of Research and Technology Development, Washington, DC 20591