**Application Engineering**

# Exam II

# Fall 2010

**(Two Hours)**

**Prof K. Bugrara**

The purpose of this exam is to assess your software engineering skills and determine how much you have learned working on homework assignments.

Please answer the exam questions to the best of your abilities. **If something is not clear to you then make whatever reasonable assumptions you see appropriate and be sure to clearly explain your assumptions.** The exam proctor will not answer any exam questions whatsoever.

Please be clear and concise. Follow the same format you used for the homework exercises.

1. (25pt) Consider the blood supply model we study in class. The model includes a common work model that enables the design and the java implementation programs for different roles like the receptionist office, nurse work area supporting nurses, lab work, and inventory management. The model incorporates ideas for donor definition and donation action. Draw a precise UML class definition of the model we studied in class with all inheritance and connection relationships. Please be clear with all your naming conventions and drawings.
2. (25pt) Suppose we want to include the donor registration process into the model above, explain how you extend the model support donor registration. Justify your answers and make whatever assumptions you find reasonable and necessary.
3. (25pt) We discussed a way of linking users to work areas related to their specialty or role without the need for multiple if statements. The work area class keeps track of the jpanel associated with nurse work responsibilities. For example, during user account creation a user account with the role of nurse is attached to a work area that knows how to display the nurse work area. After a successful login, the jpanel associated with the nurse is displayed in the tabbedpane on the right. Show how to use abstract classes to implement a solution that does not require multiple if statements to display the right work area for the login user role. Provide java implementation of the key classes of your solution. Include any relevant attributes and methods. Do this for at least two separate roles.
4. (25pt) As a follow up to question 3 above, suppose we want to model the work responsibilities as attributes of the work area class. This will allow us to define a generic work area class independent of the role. The work area class takes a list of work responsibilities and make them available as action buttons on the jpanel screen without the need of defining role-base jpanels. A generic work area japnel object will take a work area object as input and use it to retrieve the work responsibilities from the work area object. The strings retrieved are painted as the labels for buttons on the screen. This is a dynamic way of configuring display work areas using one generic jpanel.
   1. Write a java class to show how work responsibilities can be included in the work area class using a hashmap implementation along with any access and set methods to support the capabilities above.
   2. Assume the workareajpanel has a method called “addWorkResponsibility” which takes a string and creates a button with the string as a label to the button. Assume the button will be placed in a good spot. During the workareajpanel creation, the constructor takes workarea object as described above and creates buttons for all work responsibilities. Write java code implementing the constructor for the jpanel class.