In this assignment you will be creating structural and behavioral models for MISys. You will start by creating a class diagram for MISys. Note that your class diagram must cover all the goals, actors, and interactions that you identified in your use-case diagram in HW3. Then you will create sequence diagrams for three use cases and state diagrams describing the behavior of two interacting objects involved in the sequence diagrams. Consistency and traceability between all 3 types of diagrams will be essential. Remember, iteration is important for all modeling activities.

Here are additional details about the features of MISys that your system should address; this information should be included in your class diagram and subsequent diagrams:

1. (Security) All the users of MISys are required to login through a username and a password. Each username is mapped to personal attributes of the user: (1) name, (2) period of employment, and (3) position Upon login MISys determines group membership of the user (doctors, nurses, etc) and authorizes him/her based on access permissions defined next.

2. (Access authorization)

   2.1. The receptionist is not able to modify the history of diagnoses, prescriptions, and tests. However, he/she is able to read them. In addition, the receptionist should be able to modify other fields of patient’s record such as personal attributes and appointments.

   2.2. Similarly, the radiologist and pharmacist are only authorized to modify their respective, specialty-related information.

   2.3. Doctors and nurses have full access to the systems.

3. (Transaction traceability) MISys should keep track of all transactions (e.g., appointments, tests, etc.). A transaction comprises its (1) date, (2) time, (3) username of the person involved who begins the transaction, (4) the old and new data record, and (5) reason for change.
Assignment Requirements:

Work with your partner from the previous homework to complete the following assignment. Use your revised use case diagram as the starting point.

Structural Modeling

1- Using ArgoUML, create a class diagram for MISys.

2- Attach a copy of the use-case diagram upon which you created your class diagram. (Include as much documentation from your use case description to understand the class diagram entities.)

3- Create a data dictionary entry for each class. Use the below data dictionary template.

4- Be sure to include prose description for all of your diagram elements, in addition to the information provided in the data dictionary.

Behavioral Modeling

5- Choose 3 use-cases of the system and create their corresponding sequence diagrams. Make sure that you include annotations in the left column. Note that the set of objects in your sequence diagram should be consistent with your class diagram (above). However, as you analyze your sequence diagram, you may find new classes and/or new attributes and operations for your existing classes that you missed in your class diagram. Thus, it may be necessary to augment your class diagram with the new entities. At the end of the overall modeling process, one should be able to use visual inspection to establish traceability between your class diagram and the sequence diagrams.

6- Develop 2 state diagrams that participate in at least 2 sequence diagrams developed in the previous step. Again, ensure traceability and consistency between the sequence diagrams, the state diagrams, and class diagram.
**Class data dictionary entry template:**

<table>
<thead>
<tr>
<th><strong>Class</strong></th>
<th><strong>Description (responsibilities)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td><strong>Export control (public: yes/no)</strong></td>
</tr>
<tr>
<td><strong>Relationships</strong></td>
<td>Associations:</td>
</tr>
<tr>
<td></td>
<td>Aggregations:</td>
</tr>
<tr>
<td></td>
<td>Generalization:</td>
</tr>
<tr>
<td></td>
<td><strong>List of attributes and their primitive types</strong></td>
</tr>
<tr>
<td></td>
<td><strong>List of operations (include parameters and results)</strong></td>
</tr>
</tbody>
</table>