CMSC 461 Project Description and Requirements

Hospital Database Application

System description: You are to implement a database application to support the basic functions of a hospital: Patients are admitted to the hospital and assigned beds, and discharged once their treatment is completed. Patients are treated by doctors and nurses. Doctors may recommend tests for each patient to be conducted in labs performed by other doctors who are specialists. Each test conducted would show results, which would be tracked. Patients and their insurance companies may be charged fees for various services rendered, including consultations with the doctor, tests conducted, and the stay at the hospital. You are required to set up and track a billing account for each patient for each visit. You may propose reasonable extensions to this basic set of functions, such as tracking the medications prescribed, tracking outpatients, and departmental information for doctors and nurses indicating their respective specializations.

Test data: You must generate and load appropriate, consistent data, such as patient and doctor information, labs and possible tests that can be conducted in each, the tests conducted on patients, and so on, into the database to support your functions.

Query reports: You must design and develop at least five query reports. Three of them must be: (1) a patient bill generated on demand, showing both the summary and the details of charges for a patient and the insurance company (2) a report on the use of lab tests, showing the five most frequently conducted tests, the labs in which they are conducted, and the percentage of times each of the tests are conducted, and (3) the maximum, minimum, and average of the duration of hospital stay for each type of diagnosis. You are to plan, design and develop other two reports.

Assumptions: Make reasonable assumptions and list them. For instance, you may require that each patient be assigned a primary care physician and other specialists as needed, or that each patient, after some tests, be diagnosed with one specific illness.

Implementation: You are to implement the system on UMBC's Oracle server -- Oracle accounts are set up for you by the OIT. You are to design the table structure, including all needed attributes for each table (such as, for instance, a patient's name, address, sex, social security number, and so on). You are to design and code SQL queries as you need them. You will develop SQL and shell scripts as needed for your DDL statements, including creation of tables, constraints, triggers, and other database objects as needed. You are to include at least five constraints on your tables. The system you develop must include a fully functional user interface using Java – text-based or GUI. Using the interface, you must be able to demonstrate the basic functions of your system.

Deliverables:

1. **Teams.** By *February 27*, you are to form teams of two and not more than three students. Let Dr. Mundur know if you cannot join a team by then.
2. **Initial design and E-R diagram.** On *March 15*, you will submit an initial design document for your project that includes the basic functions supported by your application and the five query reports that you plan to generate, an E-R diagram of the system, and the collection of tables that you plan to produce for the application. (15%)
3. **Interim implementation document.** On *April 12*, you will submit a document listing the DDL and DML statements that support your system, including the definition of tables, triggers, constraints, and other database objects, and SQL queries that support various functions and reports. (25%)

4. **Work log.** As you work on your project you are to maintain a work log that clearly indicates the tasks performed by each team member. The work log will be due along with your final report.

5. **Final project report and demo.** During the week of *May (~~12~~) 15*, Dr. Mundur will arrange for each team to demo their project. At the demo you are required to demonstrate the complete working of your project -- be prepared to show source code as evidence of your implementation effort. Your final project report will be due at the same time. The final report will include an updated version of the first two documents – design and interim -- and your work log. Details of the demo will be announced prior to the last week of classes. (60%)

Demo details and schedule:
- There are about 25 or so project groups from both sections. Each group will present a 20 minute demo to one of the 2 TAs or Dr. Mundur.
- The bulk of the demo will be scheduled on the 15th, 16th, 17th; however, if any group wants to demo their project sooner, they may do so. A sign in sheet will be distributed in class on Monday, the 8th and each group will pick a time slot for their demo.
- Submit your final project report at the time of the demo. It should contain updated version of your design and interim documents: 1) ER diagram possibly updated 2) List of tables in your final implementation and typical constraints in your table structure – you may provide SQL statements for this 4) code for at least one working trigger 5) SQL statements for the 5 queries.
- Work log – minute details unnecessary but a rough estimate of who did what and how much of the project credit goes to each member of the team.

Grade Distribution: Design – Deliverable 2 & 3(40%), Implementation -- Deliverable 5 (50%), Demo -- Deliverable 5 (10%)