

# Course 1-02-322: Database Systems

## Semester Project

### Active Database

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**Due January 17, 2010**

Having designed the relations and views in the previous phase, your job now is to enhance the database's functionality by adding triggers, constraints, and stored procedures. The addition of these features makes your database more intelligent, along the lines of the "active database" concept we have spoken about in class.

The goals of this phase are as follows:

**Constraints** In class we discussed ways of writing complex constraints over tables. Constraints can be part of the table schema using the `CHECK` statement. Assertions are similar, but are not supported by MS SQL Server.

Think about the constraints that should be included in your database to ensure that the information in the tables is logical and accurate. You do not need to add a constraint for each table, but find at least **three** (3) reasonable places where you can add a constraint (*e.g.* checking that ages and salaries are not less than 0, that an employee ID has five digits, etc.)

**Triggers** Triggers are fired by events in the database which require some action under certain conditions. If your database as designed does not need triggers, expand its requirements slightly to include **three**. Each trigger should do one of three things:

- Perform logging of important events (*e.g.* track when an employee's salary is raised more than 10%)
- Prevent events which violate some policy (*e.g.* prevent a command from raising an employee's salary more than 10%)
- Perform some additional action related to the event (*e.g.* give an employee a 10% raise when added to the "Excellent Employees" list)

Your triggers may do any or all of the above tasks.

**Stored Procedures** We discussed in class how stored procedures can be added to a database to automate processes and make application logic simpler to implement.

Write **three** stored procedures that will take care of database input from applications. Make sure to perform integrity checks on the variables passed in before writing them to the database.

The stored procedures must have the following properties:

- At least two (2) must take and use parameters for input.
- At least one must perform some change on the database (update, insert, delete)
- At least one must present a parameterized view (*e.g.* show all of the departments that employee 22 works in)

# 1 What you must turn in by January 17

You must turn in the following materials by January 17 :

1. Updated SQL table definitions for any tables which you added CHECK constraints to. For each constraint or assertion explain it **in words and explain its purpose**.
2. MS SQL code for stored procedures as mentioned above. For each stored procedure, explain its purpose and what it is supposed to do in words.
3. MS SQL code for the triggers as mentioned above. For each trigger, explain its purpose and what it is supposed to do in words. If you make any assumptions about how the trigger will run (*e.g.* it works only when updating one employee's salary at a time), explain and justify your assumptions.