

# ISYS 224 Database Systems

## Assignment 2 — Relational Database Design & Implementation

Due: 6 pm, Tuesday, 2 October, 2012 (Week 8)

Worth 20% of Course Mark

### 1 Problem Description

The objective of this assignment is to:

(1) enhance your understanding of Relational Database Design & Implementation using CASE tools (e.g. Rational Rose, or Power Designer), and

(2) understand SQL DDL and DML.

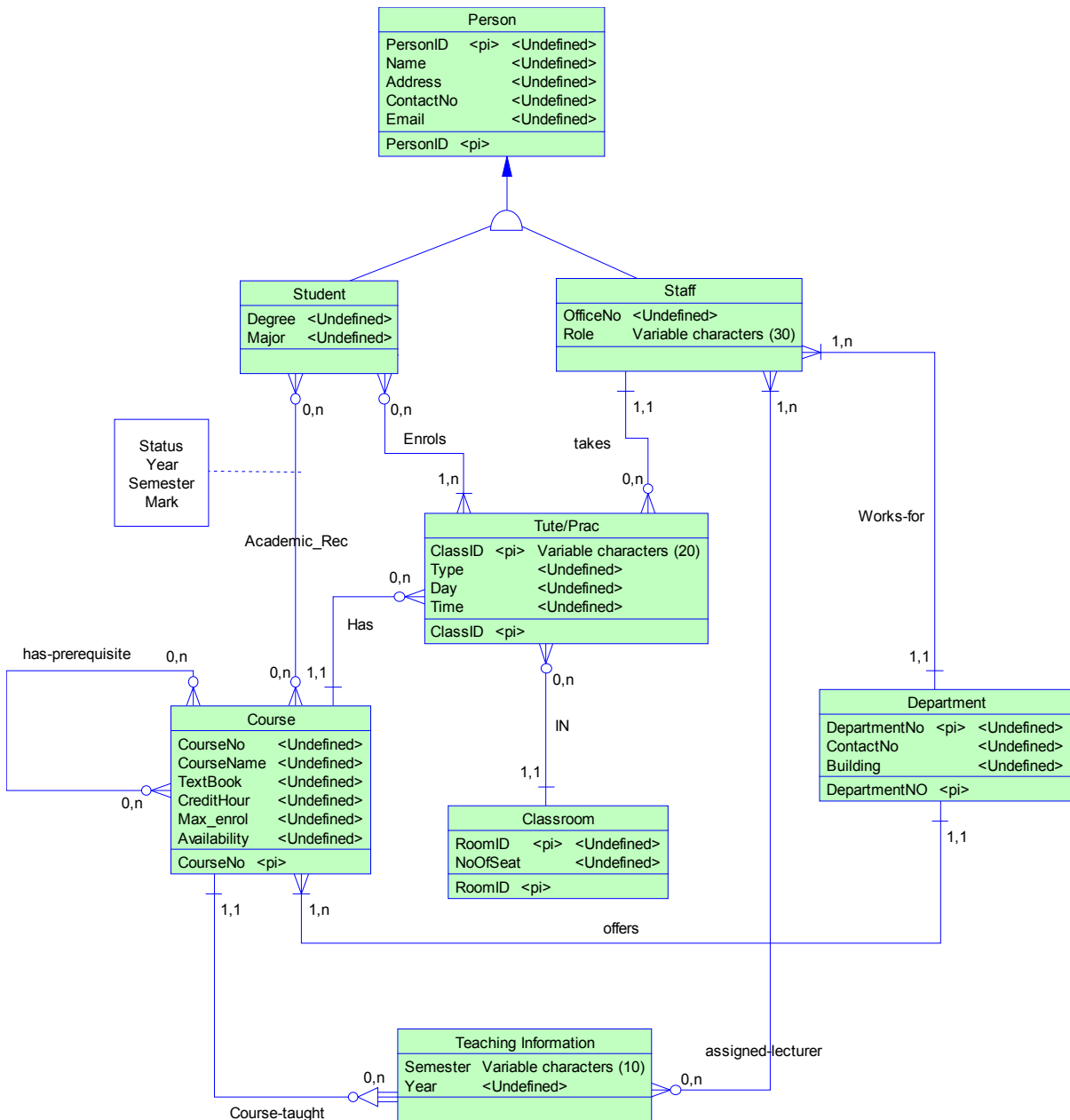
The assignment will consist of four (4) tasks.

- Task **one** will provide a *relational database* implementation of the sample solution from the first assignment. This should be done using CASE software (the choice will be up to you). Sybase's Powerdesigner™ or Rational's RationalRose™ are both possible choices. Note, the diagrams *cannot* be hand-drawn. The diagram will be pasted into a document.
- Task **two** will be forward engineering the model to produce DDL (Data Definition Language) scripts. Alternatively you may choose to code the DDL's yourself (see previous practical examples). Make sure the primary keys and foreign keys are properly stated.
- Task **three** will involve the population of tables with sample records through insert table statements. Again the CASE tool may be able to help you here. Alternatively you may choose to write your own scripts (see previous practical examples).
- Task **four** will involve writing and executing SQL queries.

### Methodology

- Study the chapters from Connolly and Begg and go over the practical exercises so far.
- Study the sample solution from assignment 1.
- Using CASE, create the DDL/SQL script file to create the tables and attributes (dropping them all beforehand obviously). Place the model with DDL statements into your report.
- Write the SQL script file to insert the records (at least ten records per table) into the tables
- Individually run and test each SQL statement in Oracle to check for errors.
- Refer to the Oracle documentation files when necessary
- Place the separate SQL scripts into one script
- Place the SQL statements and results into your report.

## The EER diagram for Task One from Assignment 1



## The Relational data model/schema for Task Two from Assignment 1

Person (PersonID, Name, Address, ContactNo, Email)  
 Primary Key: PersonID

Department (DepartmentNo, ContactNo, Building)  
 Primary Key: DepartmentNo

/\* the value of attribute Role can be either "lecturer" or "tutor"  
 Staff (StaffNo, OfficeNo, Role, DeptNo)  
 Primary Key: StaffNo  
 Foreign Key: StaffNo refers to PersonNo in Person;  
 DeptNo refers to DepartmentNo in Department

Student (StudentID, Name, Degree, Major)

Primary Key: StudentID

Foreign Key: StudentID refers to PersonNo in Person

Course (CourseNo, CourseName, Credit, MaxEnrol, DeptNo)

Primary Key: CourseNo

Foreign Key: DeptNo refers to DepartmentNo in Department

Classroom (RoomID, NoOfSeats)

Primary Key: RoomID

Tut\_Prac (ClassID, type, Day, Time, CourseNo, RoomID, StaffID)

Primary Key: ClassID

Foreign Key: CourseNo refers to CourseNo in Course;  
RoomID refers to RoomID in Classroom;  
StaffID refers to StaffID in Staff

/\* for modelling many-to-many \*: \* relationship between Student and Course \*/

AcademicRec (StudentID, CourseNo, Semester, Year, Mark, Status)

Primary Key: StudentID, CourseNo

Foreign Key: StudentID refers to StudentID in Student  
CourseNo refers to CourseNo in Course

/\* for modelling many-to-many \*: \* relationship Prerequisite between Course \*/

Course-Prerequisite (CourseNo, PrerequisiteID)

Primary Key: CourseNo, PrerequisiteID

Foreign Key: CourseNo refers to CourseNo in Course;  
PrerequisiteID refers to CourseNo in Course

/\* for modelling many-to-many \*: \* relationship between Student and Tut\_Prac \*/

Enrol(StudentID, ClassID)

Primary Key: StudentID, ClassID

Foreign Key: StudentID refers to StudentID in Student  
ClassID refers to ClassID in Tut\_Prac

/\* for modelling many-to-many \*: \* relationship between Staff and Course \*/

Teaching(StaffID, CourseNo, Semester, Year)

Primary Key: StaffID, CourseNo

Foreign Key: StaffID refers to StaffID in Staff  
CourseNo refers to CourseNo in Course

## 2 Task Specifications

### Task 1. [4 marks]

Develop the EER diagram for the sample solution in Powerdesigner™ or Rational's RationalRose™. You will need to implement the referential integrity constraints as shown in the sample solution provided. Store/Paste the diagram into a file called **Assignment2.doc**.

### Task 2. [4 marks]

Create the DDL scripts to implement the tables in Oracle. Either do this through the CASE tool, or alternatively you may choose to create the DDL scripts yourself using a text editor and save them in a file named **Assignment2.sql**.

### Task 3. [4 marks]

Insert records into each of your tables (there should be a minimum of 8 records per table); when inserting records into the tables, make sure that the result of each SQL query below will have at least one record. The SQL statements for this part should also be saved in your **Assignment2.sql** file.

### Task 4. [8 marks]

Produce SQL query expressions / statements for the following queries (these will also be saved in your **Assignment2.sql** file):

- Q1 List the course names that have two prerequisites.
- Q2 List all the students whose average marks is above 65.
- Q3 List the names of tutors who only take tutorials not practicals.
- Q4 For course with lecturer(s) as tutor(s), list the course name and the number of prerequisites.

Note that the results of these SQL queries need to be stored in the **Assignment2.doc** file.

## 3 Submissions

### What to submit

*You are required to submit an electronic copy as well as a hard copy.*

1. **Electronic Submission** - You must submit all the work in two documents named **Assignment2.doc** and **Assignment2.sql**. The electronic submission site is on ilearn <https://ilearn.mq.edu.au/>
2. **Hard copy submission** - Your assignment must also be submitted in hard copy **in the assignment boxes** marked ISYS224 at E6A ground floor next to the computer labs. Note that hand-drawn diagrams are not acceptable. You must attach an assignment cover sheet to your hardcopy submission (first page of this document).
3. **Deadline for submission - Tuesday**, 6pm on 2 October (week 8)

### Notes:

If you changed your file after submission, you may re-submit your assignment again before the due date. If you make errors in the submission process, you may get zero marks.

The submission date is taken to be the date of electronic submission regardless of when the hardcopy was submitted within the allowed time.

## Marking Notes

Your submitted file `Assignment2.sql` may be executed in the marking process and also manually marked for clarity. Please note that:

- Any SQL statements containing syntax errors are not acceptable. It is your responsibility to ensure their correctness. If you make syntax errors in your SQL statements, you may get zero marks.
- One mark per day is deducted for late submissions for ***up to 5 calendar days***. The submission program will be disabled after 5 calendar days. Any assignments that are over 5 days late will not be marked (subject to any special considerations).