FIT9132 Introduction to Databases

Week 8 Tutorial Activities

SQL Part 1 (SQL Basic)

FIT Database Teaching Team

Complete the week 8 activities:

8.1 The UNIVERSITY Database -- Class Discussion

8.2 SQL Statement and Date Format -- Class discussion

8.3 Writing SQL Statement to Retrieve Data from a Database

8.3.1 Part A - Retrieving data from a single table

8.3.2 Part B - Retrieving data from multiple tables

FIT9132 2021 S2

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Important

Remember before starting any lab activity which involves working with files, first use SQL Developer to pull from the FIT GitLab server so as to ensure your local files and the FIT Git Lab server files are in sync. *During this activity, you will be creating a set of sql scripts and output files which **MUST** be pushed to the FITGit Lab server.*

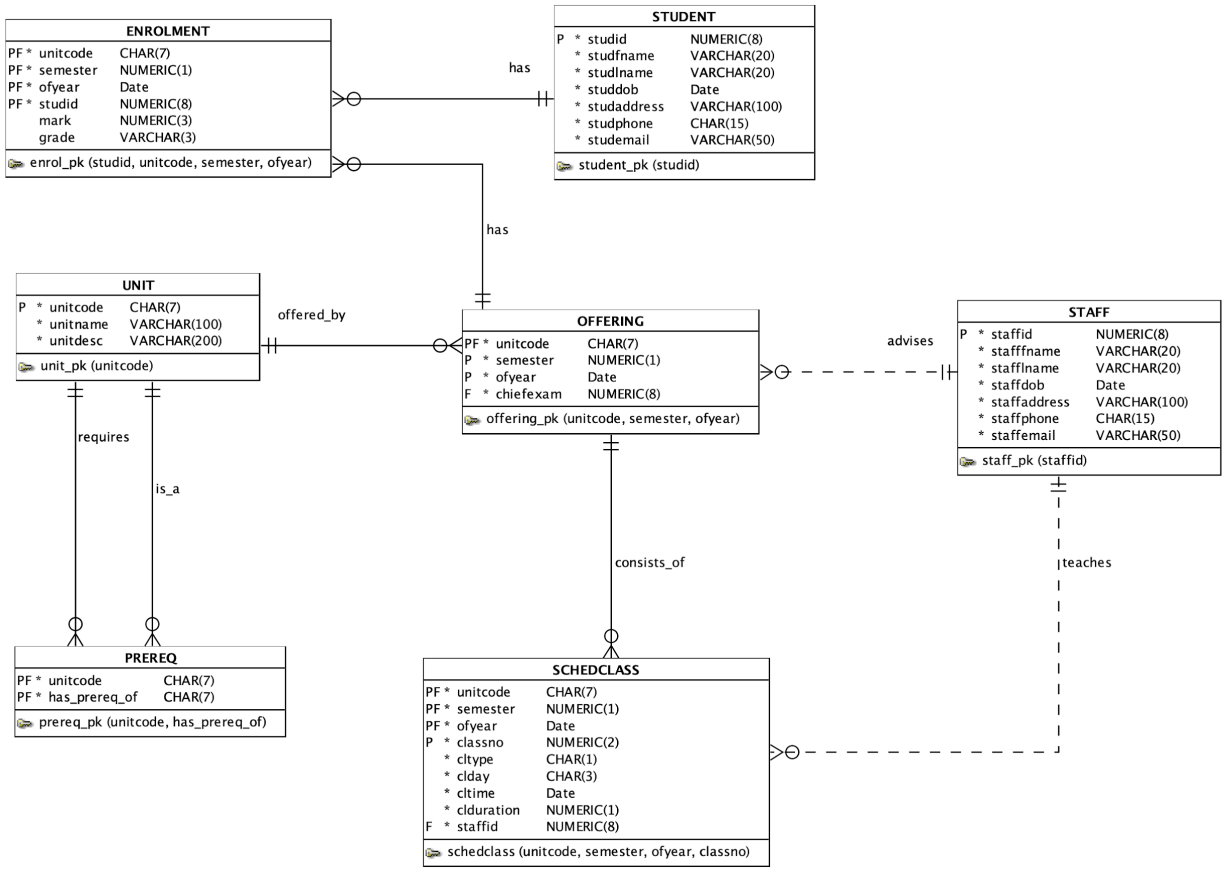
Learning Objectives

- be able to read graphical representation of relational database
- be able to perform simple SQL statements on a single table.
- be able to perform SQL statements that use rows from more than a single table using different types of JOIN operation
- be able to write SQL SELECT statements to select rows based on different conditions.
- be able to write SQL SELECT statements to retrieve data from two or more tables.
- be able to use ORACLE's date data type in SQL statements correctly.
- be able to create aliases for tables and columns.
- be able to sort the retrieved data in different order

8.1 The UNIVERSITY Database -- Class Discussion

The following exercises will allow you to be familiar with writing basic SQL statements.

Use the UNIVERSITY set of tables to complete the exercises. The figure below depicts a data model for the UNIVERSITY set of tables:



University Data model

In the Monash Oracle database, this UNIVERSITY set of tables has been created under the user "UNI". To use these tables you need to add the prefix "UNI" to the table names that you use in an SQL statement. For example, if you want to show the table details/structure you need to write:

```
desc uni.unit;
```

and if you want to retrieve data from UNIT table you need to write:

```
SELECT
    unitcode,
    unitname
FROM
    uni.unit;
```

and not

```
SELECT
    unitcode,
    unitname
FROM
    unit;
```

8.2 SQL Statement and Date Format -- Class discussion

This week we will make use of Oracle dates - to use these correctly you should note the following:

- The Oracle date data type contains both date and time, however, you can choose to use just a date, just a time, both or parts of a date depending on the format strings used
- **to_date**: converts from a string to a date according to a format string

```
SELECT
    *
FROM
    uni.student
WHERE
    studdob < TO_DATE('30/04/1992', 'dd/mm/yyyy')
ORDER BY
    studid;
```

- **to_char**: converts from a date to a string according to a format string

```
SELECT
    to_char(sysdate, 'dd/mm/yyyy hh24:mi:ss') AS server_date
FROM
    dual;

SELECT
    to_char(sysdate+10/24, 'hh24:mi:ss') AS current_melbourne_time
FROM
    dual;
```

From this point in your work for this unit you are REQUIRED to make use of to_date/to_char whenever working with any date type attribute.

The Oracle documentation links are:

- Format models
- to_date
- to_char

Retrieving data from a single table:

1. List all students and their details. Order the output by student id.
2. List the student's details for those students who have a surname starting with the letter "S". In the display, rename the columns studfname and studlname to firstname and lastname. Order the output by student first name.

Retrieving data from multiple tables

3. List full name of all students who have marks in the range of 80 to 100 in FIT9132 semester 2 of 2019. Order the output by full name.
4. List the unit code, unit name and the unit code and unit name of the prerequisite units of all units in the database. Order the output by unit code and prerequisite unit code.

8.3 Writing SQL Statement to Retrieve Data from a Database

8.3.1 Part A - Retrieving data from a single table

Download week8_sqlbasic_part_a.sql from the Week 8 block in Moodle, place this file in your working directory in the Tut08 folder. Write your answers for question A1-A7 in the provided area. Make sure that you include a semicolon ';' at the end of each select statement. Test the select statements one by one by clicking the Run Statement icon.

A1. List all units and their details. Order the output by unit code.

A2. List all students' details who live in Caulfield. Order the output by student first name.

A3. List the student's surname, first name and address for those students who have a surname starting with the letter 'S' and first name which contains the letter 'i'. Order the output by student id.

A4. Assuming that a unit code is created based on the following rules:

- The first three letters represent the faculty abbreviation, e.g. FIT for the Faculty of Information Technology.
- The first digit of the number following the letter represents the year level. For example, FIT2094 is a unit code from the Faculty of IT (FIT) and the number 2 refers to a second year unit.

List the unit details for all first year units in the Faculty of Information Technology. Order the output by unit code.

A5. List the unit code and semester of all units that are offered in 2019. Order the output by unit code, and within a given unit code order by semester. To complete this question you need to use the Oracle function to_char to convert the data type for the year component of the offering date into text. For example, to_char(ofyear,'yyyy') - here we are only using the year part of the date.

A6. List the year, semester, and unit code for all units that were offered in either semester 1 of 2019 or semester 1 of 2020. Order the output by year and semester then by unit code. To display the offering year correctly in Oracle, you need to use the to_char function. For example, to_char(ofyear,'yyyy').

A7. List the student id, unit code and mark for those students who have failed any unit in semester 2 of 2019. Order the output by student id then order by unit code.

8.3.2 Part B - Retrieving data from multiple tables

Download week8_sqlbasic_part_b.sql from the Week 8 block in Moodle, place this file in your working directory in the Tut08 folder. Write your answers for question B1-B7 in the provided area. Make sure that you include a semicolon ';' at the end of each select statement. Test the select statements one by one by clicking the Run Statement icon.

For this unit, students are required to use ANSI JOINs, *placing the join in the where clause is not acceptable and will be* ***marked as incorrect for all assessment purposes****.*
You are free to use:

- ON
- USING, or
- NATURAL

in your ANSI join clauses. We suggest ON since this is the general form which always works (the other two forms depend on declared PK/FK's and/or attribute naming)

B1. List all the unit codes, semesters and name of chief examiners for all the units that are offered in 2020. Order the output by semester then by unit code.

B2. List all unit codes, unit names and their year and semester of offering. Order the output by unit code then by offering year and then semester.

B3. List the student name (firstname and surname) as one attribute and the unit name of all enrolments for semester 1 of 2020. Order the output by unit name, within a given unit name, order by student id.

B4. List the unit code, semester, class type (lecture or tutorial), day and time for all units taught by Windham Ellard in 2020. Sort the list according to the unit code.

B5. Create a study statement for Friedrick Geist. A study statement contains unit code, unit name, semester and year the study was attempted, the mark and grade. If the mark and/or grade is unknown, show the mark and/or grade as 'N/A'. Sort the list by year, then by semester and unit code.

B6. List the unit code and unit name of the prerequisite units of the 'Introduction to data science' unit. Order the output by prerequisite unit code.

B7. Find all students (list their id, firstname and surname) who have received an HD for FIT2094 in semester 2 of 2019. Sort the list by student id.

B8. List the student full name, unit code for those students who have no mark in any unit in semester 1 of 2020. Sort the list by student full name.

Important

You need to get into the habit of establishing this as a standard FIT9132 workflow - Pull at the start of your working session, work on the activities you wish to/are able to complete during this session, add all (stage), commit changes and then Push the changes back to the FIT GitLab server