

# Informatics 1 Data & Analysis

## Tutorial 4

Week 6, Semester 2, 2012–2013

- You must prepare for the tutorial by attempting the questions on this worksheet in advance. Bring with you a copy of your work, including printouts of code and other results.

If you cannot do some questions, write down what it is that you find challenging and use this to ask your tutor in the meeting.

It's important both for your learning and other students in the group that you come to tutorials properly prepared. If you have not attempted the exercise sheet, then you may be sent away from the tutorial to do it elsewhere.

- Some exercise sheets contain material marked with a star ★. These are optional extensions.
- Data & Analysis tutorial exercises are not assessed, but they are a compulsory and important part of the course. If you do not do the exercises then you are unlikely to pass the exam.
- Attendance at tutorials is obligatory: if you are ill or otherwise unable to attend one week then email your tutor, and if possible attend another tutorial group in the same week.
- *Related Reading*: Chapter 5 (SQL) of *Database Management Systems*, Raghu Ramakrishnan and Johannes Gehrke, 2003.

## 1 Introduction

In the previous tutorial you constructed some queries around a set of relational tables dealing with air travel. In this tutorial, you will formulate queries in SQL for the same application domain, with similar (but not identical) tables.. You will also interact with a database using *LibreOffice Base* using the queries you have formulated.

### 1.1 LibreOffice Base

In this tutorial, you will be using *LibreOffice Base*. To set up the program on a DICE machine, you need to follow these steps:

- (a) Download `travel.odb` from the course webpage: <http://www.inf.ed.ac.uk/teaching/courses/inf1/da>
- (b) From the desktop, choose `Applications -> Office -> LibreOffice Base`
- (c) When the *Database Wizard* window appears, choose '*Open an existing database file*'.
- (d) Click `<Open>`.
- (e) Locate `travel.odb` and click `<Open>`.
- (f) In the *Database* column on the left-hand side, click *Tables*.

Alternatively, at a command line in a terminal window in the appropriate directory type:

```
libreoffice travel.odt
```

The air travel data is now loaded and you are ready to start the tutorial. Make sure you regularly save any data you wish to keep, and print out results to bring to tutorials.

If you wish to try the tutorial on a non-DICE machine then you may want to install your own copy of LibreOffice from <http://www.libreoffice.org/>. Versions are available for Linux, Windows and Mac. You can also try the very similar *OpenOffice Base* on Windows machines in the open access computer labs (not the ones in the AT café area, though).

## 1.2 SQL Details

Recall the following SQL syntax points from lectures:

- SQL keywords are not case sensitive; identifiers like table or field names may or may not be. Keywords are often written in upper case, and it is good practice to maintain a consistent approach to the cases used in table and field names.
- SQL keywords never contain spaces and never require quotation; SQL identifiers can be quoted using double quotation marks "like this" and if quoted can contain spaces.
- Strings in SQL usually are case sensitive, and must always be quoted, using single quotation marks 'like this'.

## 2 Queries in SQL

The tables in this database have the same design as the last tutorial. There are four tables — Airport, Booking, Flight and Seat. For each of the questions do the following:

- Formulate the specified query in SQL;
- Run the query on the `travel` database;
- Print out the SQL query and the result table.

To run the query on the Comp database, you need to follow the following steps:

- Click on **Queries** in the left column on the `travel`-window.
- In the **Tasks**-view, choose *Create Query in SQL View*.
- Enter your query in the white space in the window that opens.
- Save the query (Ctrl+S) as with the name of your choice.
- Go back to the `travel`-window and double-click on the query name. Results will be displayed in a new window.
- To edit the query, right click on it in the `travel`-window and choose *Edit in SQL View*.

To print the result of a query, open a new *LibreOffice Writer* document, and drag the query from the `travel` window into the new document. You'll be given the option to choose some columns: it's simplest to click the >> button to keep all of them.

To print the SQL source of a query, edit it in SQL view then select all text and again drag it to a *LibreOffice Writer* document, or the editor of your choice.

When editing queries, you will notice that LibreOffice generously puts quotation marks around every identifier in sight.

## Questions

- (a) Retrieve all the rows in `Airport` table for all the airports in London. The schema of the output table should be same as that of the `Airport` table.
- (b) Retrieve all bookings by British and French passengers. The schema of the output table should be same as that of the `Booking` table.
- (c) Retrieve the names of all the passengers.
- (d) Retrieve the flight number with departure and arrival airports of all British Airways flights.
- (e) Retrieve the name of every passenger together with their flight number and the associated flight company.
- (f) Retrieve all flights from all airports in London. The output schema should be same as that of the `Flight` table.
- (g) Retrieve the ticket numbers and names of all passengers departing from London.
- (h) Retrieve the flight number and flight company of all flights from London to Paris.
- ★ (i) Retrieve the ticket numbers and names of all passengers travelling in Business class.
- ★ (j) Retrieve the names and nationalities of all the Business class passengers travelling from London to Paris.

## 3 Tutorial Discussion

So far in this course you have used Relational Algebra, Tuple-Relational Calculus and SQL to formulate queries on tables. From your experience, is SQL more similar to Relational Algebra or Tuple-Relational Calculus? Why have a purpose-built practical query language such as SQL rather than use a theoretically clean language such as Relational Algebra or Tuple-Relational Calculus?

## ★ 4 Extension

The *LibreOffice Base* tool has a graphical user interface to generate and execute queries, with its *Design View* and query creation *Wizard*.

Explore the use of this GUI to create queries; in particular, all of the queries presented earlier. Look at the SQL generated, and compare it to what you created by hand.