Databases:
Practice activities

How to Use this User Guide

This handbook accompanies the taught sessions for the databases course series.

The Exercises

Some exercises, particularly those within the same section, assume that you have completed earlier exercises.

Text Conventions

A number of conventions are used to help you to be clear about what you need to do in each step of a task.

- In general, the word **press** indicates you need to press a key on the keyboard. **Click**, **choose** or **select** refer to using the mouse and clicking on items on the screen. If you have more than one mouse button, click usually refers to the left button unless stated otherwise.

- Names of keys on the keyboard, for example the Enter (or Return) key, are shown like this: ENTER.

- Multiple key names linked by a + (for example, CTRL+Z) indicate that the first key should be held down while the remaining keys are pressed; all keys can then be released together.

- Words and commands typed in by the user are shown `like this`.

- Labels and titles on the screen are shown `like this`.

- Drop-down menu options are indicated by the name of the options separated by a vertical bar, for example `File|Print`. In this example you need to select the option `Print` from the `File` menu or tab. To do this, click when the mouse pointer is on the `File` menu or tab name; move the pointer to `Print`; when `Print` is highlighted, click the mouse button again.

- A button to be clicked will look `like this`.

- The names of software packages are identified *like this*, and the names of files to be used `like this`.

Software Used

Access 2013 or similar

These exercises were designed using *Access 2010*, but you will be able to do most if not all the activities using other version of *Access*.

Files Used

`CarSchedule.xlsx`

`MeetingRoomBookings.xlsx`

`IntEx_StaffCars_01.accdb`

`IntEx_StaffCars_02.accdb`

`IntEx_StaffCars_03.accdb`

`IntEx_StaffCars_04.accdb`

`IntEx_MeetingRooms01.accdb`

`IntEx_MeetingRooms02FewRecords.accdb`

`IntEx_MeetingRooms03ImportedData.accdb`

Revision Information

Version	Date	Author	Changes made
1.0	April 2012	Pamela Stanworth	Created
2.0	October 2014	Pamela Stanworth	Updated

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Contents

1   Introduction

Welcome to the *Databases: Practice activities*!

These exercises are intended to provide extra practice for anyone who has participated in the series of database courses taught by the IT Learning Centre.

If you are away from the class, you can get help by email from your teacher or from help@it.ox.ac.uk.

1.1. What You Should Already Know

This session is one of a series that cover the important aspects of building and managing a database.

We will assume that you have already attended all the courses (or equivalent), and that you are familiar with creating tables with suitable fields, creating and editing a query, and creating basic forms or reports using the wizards. The exercises call on a variety of skills and techniques covered during the taught course series, not necessarily in the order that they are taught.

The computer network in our teaching rooms may differ slightly from that which you are used to in your College or Department; if you are confused by the differences please ask for help from the teacher or demonstrator(s).

1.2. Using the Practice Activities

Here we set a series of tasks, for you to carry out using your own copy of *Microsoft Access*.

If you are contemplating attending the taught courses, these tasks will give you an idea of what to expect. After attending the courses, you could use these tasks to assess yourself, or for extra practice or consolidation.

Bear in mind that there are often two or more ways of achieving a task, and you may well have hit upon an entirely sensible alternative to that suggested here.

This handbook sets out a series of tasks for you to tackle. There are not supposed to be any tricks – just take each step at face value. The tasks are deliberately worded rather vaguely, as is common in real projects. You will need to use your imagination and your judgement about some aspects.

On finishing, you must decide for yourself whether you are satisfied with your final product and the time/trouble it took you, or whether you need further help or training.

You may be interested to look at the sample files provided, which suggest some possible solutions to the tasks set.

1.3. Trusting the Database Files for the Exercises

Please note that *Access* only trusts files if they have been saved in a "Trusted Location". You may recall, from the taught courses, that in our teaching rooms the home `drive H:\` has been designated an Access Trusted Location. If you make copies of the files for these exercises, and save them on your own computer in a location that is not trusted, you may not be able to carry out all the activities described.

2 Exercise: Car Loans - Design a Database

2.1. Scenario

A department of the University has a small car, which members of staff may use for work purposes. They need a database to keep track of who uses the car and any related expenses they incur.

2.2. Design

Design a database for recording who books the departmental car and when, the car mileage and any claims for the cost of petrol, parking and similar related expenses.

Draw a freehand diagram showing the tables and fields needed, and the relationships between the tables.

Note: some expenses are not associated with a particular journey, such as paying for a windscreen to be replaced.

2.3. Build

Build the database in *Access*. Create all the tables, with suitable fields. Give the fields suitable properties. Create joins between the tables.

Print a copy of the Relationships Diagram.

2.4. Enter Some Data

Enter 2 or 3 records into each table, working in Table Datasheet View, to confirm that the table relationships work as required. Invent some plausible data values.

2.5. Sample Solution

`IntEx_StaffCars_01.accdb`

3 Exercise: Car Loans - Import From Flat File

3.1. Scenario

Further to the departmental car scenario mentioned in chapter 2 above, we discover that in the past the departmental administrator has been keeping a note of times when staff have used the car, and their expenditure. It would be useful to include this past information into your new database.

The previous data was managed using *Excel*.

3.2. Review the Data

Open `CarSchedule.xlsx` provided and examine the data in the three worksheets.

One worksheet gives the names and details of members of staff. One worksheet gives the occasions when members of staff used the departmental car. The other worksheet gives the claims that members of staff have made, for expenses related to using the car.

Think about how this data corresponds to your database design. Adjust your tables and fields if necessary. Adjust the spreadsheet data if necessary.

3.3. Import the Data

Import each worksheet into the database as a separate table. In the Import Wizard, take care over the data types of each field.

3.4. Integrate the New Data Into the Database Tables

Use **append queries** to append the data from each imported table to one of your tables (notice that the column headings in the *Excel* worksheet do not exactly match the field names in the *Access* tables).

You will need to match up some of the records from one table with corresponding records from another table.

3.5. Sample Solution

`IntEx_StaffCars_02.accdb`

4 Exercise: Car Loans - Queries, Forms and Reports

4.1. Build Forms

Build some forms to make it easier to enter data when someone borrows the departmental car.

You will need:

A form for adding information about each member of staff

A form where a member of staff can book the car for future use, or add details of a recent borrowing

A form where a member of staff can claim for expenses connected with using the departmental car

4.2. Build a Navigation Form

Some of the staff are not used to working with databases. Make your database simpler for them to navigate:

Create a welcome form

Make sure that they will see this when they first open the database

Provide some buttons for them to click, as an easy way to find each of the forms they need

Conceal the tables, queries and other database objects so they do not distract users

Remember you yourself will need a way of finding all the tables, forms, queries, reports etc so you can continue editing them!

4.3. Use the Forms

Now use your forms to work on the data:

to add another member of staff to the team

to book the car for the new person to use next week

to claim reimbursement for the petrol you bought recently

Invent some plausible data.

While you are working, you may notice improvements you want to make, so that your forms are more efficient and easy to use.

4.4. More Interactive Forms

Create and test a form which shows one member of staff at a time, with their expense claims appearing in a sub-form.

Create another form which lists all the members of staff, one below the other (hint: use a Tabular Layout and change the Default View of the form to be Continuous)

4.5. Protect Against Accidental Data Editing

Create a form for entering staff data, with a subform showing their expense claims (you may have done this in the previous part).

Lock and disable the text boxes for the Given Name and Family Name, so that these values cannot be edited accidentally.

Provide a button beside each locked text box, which displays a small form that pops up so the user can edit the value if they decide this really is necessary.

4.6. Build Queries

Create a query that shows all the times Douglas has used the car.

Create a query that shows all of Manuel's expenses.

Create a query that finds any expense claims where the date of the claim has not been entered. Include the person's phone number in the query output, so you can contact them to check the details.

Think of some more interesting queries to run on this data.

4.7. Build Reports

Create a report that lists all the occasions when the car has been booked/used, sorted in date order and in time order within each day.

Create another report listing all of the car bookings, each time giving the name of the person who used it and the mileage they covered.

Create a report that lists all the expenses claims, in date order.

Create another report giving the expenses claimed, this time grouping by member of staff and including the total claimed by each person as well as a grand total.

4.8. Sample Solution

`IntEx_StaffCars_03.accdb` and `IntEx_StaffCars_04.accdb`

5 Exercise: Meeting Rooms
- Collect Data From Filing Cards

5.1. Scenario

For some years, the receptionist has kept an eye on bookings for the various meeting rooms in her Department, using a box of filing cards.

Because some additional meeting rooms are now being equipped, she would like to manage the bookings using an *Access* database.

A blank card from the filing box looks like this:

<div style="border:3px solid black; padding:1em;">

Departmental meeting Room Booking Card
Please return the completed card to Reception

Date: Room:

From (time):   Until (time):

Will you require refreshments?

        Hot drinks: _____

        Light meal: _____

Name of staff requesting:

Contact tel num (internal):

</div>

5.2. Review the data

Look at the cards shown on the next pages, to see the way the Receptionist has been using them. Look out for extra information that people have written on some cards, for ideas of additional fields which should be included in the improved database design.

5.3. Design and Build

Design a database to manage this information.

Build the tables, fields, and properties using *Access*.

Set up relationships between the tables, using suitable fields.

Build some forms. Think about the data entry properties that would make the forms easy and safe to use.

5.4. Enter Some Sample Data

Enter data from the cards, for a few sample records into each of your tables. Do this early testing in Table Datasheet View.

5.5. Meeting Room Booking System - 6 Sample Data Cards

Departmental Meeting Room Booking Card

Please return the completed card to Reception

Date: *3/4/10*   Room: *Cromwell*

From (time): *10am*   Until (time): *noon*

Will you require refreshments?   *yes please* _____

       Hot drinks: *no thanks*_____

       Light meal: *can you make sure there is a video projector in the room?*

Name of staff requesting: *Alan Pilkington*

Contact tel num (internal):   *284685*

Departmental Meeting Room Booking Card

Please return the completed card to Reception

Date: *23/5/10*   Room: *Cromwell*

From (time): *1400*   Until (time): *1600*

Will you require refreshments?

       Hot drinks: ✓_____

       Light meal: *not sure yet* _____

Name of staff requesting: *Michelle Patterson*

Contact tel num (internal):   *282348*

Departmental Meeting Room Booking Card

Please return the completed card to Reception

Date: *23/5/10*   Room: *Patten*

From (time): *half past 3*   Until (time): *5*

Will you require refreshments?

       Hot drinks: ✓_____

       Light meal: ✓_____

                          and a projector again please

Name of staff requesting: *Alan Pilkington*

Contact tel num (internal):   *284685*

```
+--------------------------------------------------------------+
|           Departmental Meeting Room Booking Card             |
|          Please return the completed card to Reception       |
|                                                              |
|  Date: 27 and 28th June 2010       Room: Jenkins             |
|                                                              |
|  From (time): all day              Until (time):             |
|                                                              |
|  Will you require refreshments?                              |
|                                                              |
|              Hot drinks:      yes _____  |
|                                                              |
|              Light meal:          _____  |
|                                                              |
|  Name of staff requesting:        Doug Wilkinson             |
|                                                              |
|  Contact tel num (internal):      (2)06083                   |
+--------------------------------------------------------------+
```

```
+--------------------------------------------------------------+
|           Departmental Meeting Room Booking Card             |
|          Please return the completed card to Reception       |
|                                                              |
|                                    Room: Wellesley if there  |
|                                    is level access           |
|  Date: 30/7/2010                   for my colleague who      |
|                                    doesn't do stairs –       |
|                                    can you check please?     |
|                                                              |
|                                    Until (time): 11 but let  |
|                                    me know if you            |
|  From (time): 9am                  need us to finish sooner  |
|                                                              |
|  Will you require refreshments?                              |
|                                                              |
|              Hot drinks:      no _____   |
|                                                              |
|              Light meal:      no _____   |
|                                                              |
|  Name of staff requesting:        Alice S                    |
|                                                              |
|  Contact tel num (internal):      257981                     |
+--------------------------------------------------------------+
```

```
+--------------------------------------------------------------+
|           Departmental Meeting Room Booking Card             |
|          Please return the completed card to Reception       |
|                                                              |
|                                    Room: Wellesley – or      |
|                                    whichever room is         |
|  Date: 24/12/2010                  big enough to seat 15     |
|                                                              |
|  From (time): 3                    Until (time): 5:15        |
|                                                              |
|  Will you require refreshments?                              |
|                                                              |
|              Hot drinks:      for 15 people _____  |
|                                                              |
|              Light meal:      for 10 people, 2 vege,         |
|                               1 gluten-free__                |
|                                                              |
|  Name of staff requesting:        Michelle again            |
|                                                              |
|  Contact tel num (internal):                                 |
+--------------------------------------------------------------+
```

5.6. Sample Solutions

`IntEx_MeetingRooms01.accdb` and
`IntEx_MeetingRooms02FewRecords.accdb`

6 Exercise: Meeting Rooms
- Import and Re-organise Data From a Flat File

6.1. Scenario

For a short while, the room booking requests were managed in a flat spreadsheet file, using *Excel*. You are asked to bring all this old data into your new database, without re-typing it.

6.2. Review the Data

Look at `MeetingRoomBookings.xlsx`. This data is of the same form as your database, but it is arranged differently. Identify which columns in the spreadsheet correspond to the fields in your *Access* tables.

There is some data redundancy in the flat file, so you will have some work to do in collecting and relating the data in the *Access* database.

6.3. Import the Data

Import the whole of the spreadsheet data and create a new separate table inside the Meeting Room database.

6.4. Retrieve the Staff Details

The names and phone numbers of the staff are given in the imported data, but some are mentioned several times.

Create a query which collects the information relating to staff members (names and phone numbers). Use Totals to group together all records for the same person, so that each person is shown just once.

Use this query to append the staff member data to the table you built earlier for staff. Check that each field of imported data is sent to the appropriate field in the existing table.

After running the query, save it as a record of what you have done.

6.5. Retrieve the Room Booking Details

The dates and arrangements for the room bookings are given in the imported data, but the staff and the rooms are given by name - an *Access* database requires ID numbers (or similar) for the primary keys of the Staff and Room tables.

Create a select query which collects fields relating to the bookings (dates and times, catering and similar requirements) from the imported table.

In the query, join the table of staff members to the imported table using Family Name, and display the Staff ID primary key number. Also join the table of rooms to the imported table using Room Name, and display the Room ID primary key number.

Use this query to append the booking data to the table you build earlier for bookings. Check that each imported field is associated with the appropriate field in the existing table.

6.6. Housekeeping

After running the query, save it as a record of what you have done. You would probably archive (or even delete) the imported data as it will not be needed again in the *Access* database.

Take care not to run the append queries multiple times, as you would be appending repeat sets of imported data onto the working tables. You can safely examine an action query by right-clicking the query name then choosing Design View.

6.7. Sample Solution

Look at **IntEx_MeetingRooms03ImportedData.accdb** for one possible way of managing this process.

7 Further information

7.1. Getting extra help

7.1.1. Clinics

The IT Learning Centre offers bookable clinics where you can get pre- or post-course advice.

7.1.2. About Lynda.com

Lynda.com is free to all members of the University. Visit courses.it.ox.ac.uk/lynda and sign in with your Single Sign-On (SSO) credentials. Some courses recommend pre- and/or post-course playlists of Lynda.com videos to support your learning. You can watch these anywhere, anytime, and even download them on to a tablet or smartphone for off-line viewing.

If you need a quiet place to work through playlists away from distractions, the IT Learning Centre offers frequent Lynda Labs that you can book onto.

7.1.3. About the ITLC Portfolio online

Many of the resources used in the IT Learning Centre courses and workshops are made available as Open Educational Resources (OER) via our Portfolio website at http://portfolio.it.ox.ac.uk.

7.2. About the IT Learning Centre

The IT Learning Centre delivers over 100 IT-related classroom-based courses, and gives you access to thousands of on-line course through Lynda.com.

Our team of teachers have backgrounds in academia, research, business and education and are supported by other experts from around the University and beyond.

Our courses are open to all members of the University at a small charge. Where resources allow, we can deliver closed courses to departments and colleges, which can be more cost effective than signing up individually. We can also customize courses to suit your needs.

Our fully-equipped suite of seven teaching and training rooms are available for hire for your own events and courses.

For more information, contact us at courses@it.ox.ac.uk

7.3. About Academic IT Services

The IT Learning Centre is part of Academic IT Services (AcIT). AcIT engages with the University in all aspects of the use of IT for teaching, learning and outreach, including the development of the University's Virtual Learning Environment (WebLearn), research data management advice, technology enhanced learning, and digital media services including the Replay lecture capture service. If you think AcIT can help you, contact us at academicit@it.ox.ac.uk