

ORDS: An Introduction

How to Use this User Guide

This handbook accompanies the taught sessions for the course. Each section contains a brief overview of a topic for your reference. Most sections also contain one or more exercises.

Exercises are arranged as follows:

- A title and brief overview of the tasks to be carried out;
- A numbered set of tasks, together with a brief description of each;
- A numbered set of detailed steps that will achieve each task.

Some exercises, particularly those within the same section, assume that you have completed earlier exercises. Your teacher will direct you to the location of files that are needed for the exercises. If you have any problems with the text or the exercises, please ask the teacher or one of the demonstrators for help.

This book includes plenty of exercise activities – more than can usually be completed during the hands-on sessions of the course. You should select some to try during the course, while the teacher and demonstrator(s) are around to guide you. Later, you may attend follow-up sessions at ITLP called Computer8, where you can continue work on the exercises, with some support from IT teachers. Other exercises are for you to try on your own, as a reminder or an extension of the work done during the course.

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

Firefox or Chrome web browser

Microsoft Excel

Files Used

`Clubs_database.sql`

Revision Information

Version	Date	Author(s)	Changes made
1.0	November 2014	James A J Wilson & Meriel Patrick.	Created
1.1	November 2014	Meriel Patrick	Minor changes to exercises

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1 Introduction

Welcome to the *Online Research Database Service (ORDS)* training course!

This booklet accompanies the course delivered by Oxford University's IT Learning Programme. Although the exercises are clearly explained so that you can work through them independently, you will find that it will help if you also attend the taught session where you can get advice from the teacher, demonstrator(s) and even each other.

If at any time you are not clear about any aspect of the course, please make sure you ask your teacher or demonstrator for some help. 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

No previous knowledge of the *ORDS* is expected. If you are already familiar with relational databases then you will find the examples used in this course easier to understand; those with no experience should be able to acquire a basic understanding of how relational databases work during the session, although it is recommended that they follow this up by attending the course *Databases: Concepts of database design*.

We will assume that you are familiar with opening files from particular folders and saving them, perhaps with a different name, back to the same or a different folder.

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. What will you learn?

This course will help you learn to use the *ORDS* to create, edit, and share databases.

In this session we will cover the following topics:

- Setting up projects, adding collaborators, and assigning permissions
- Creating new databases from scratch
- Importing existing databases and data
- Designing and restructuring databases
- Viewing and editing data
- Querying data and saving the results
- Exporting datasets and databases

1.3. What is the ORDS?

The *Online Research Database Service (ORDS)* is a recently-launched service for researchers based at the University of Oxford, and their collaborators. It was developed in-house by IT Services and is supported by the Research Support Team and Systems Development Team. It offers researchers a place to host relational databases along with online tools to edit and share their data.

1.4. Why use the ORDS?

There are a number of reasons why the *ORDS* might be preferred to other relational database management systems.

- All data in the *ORDS* is stored on university infrastructure and backed-up nightly, reducing the risk of data loss
- Enables easy collaboration both with Oxford colleagues and partners at other institutions
- No need to set up servers oneself for hosting online databases
- No confusion over different versions of the same database – all collaborators edit the current up-to-date version by default
- Data can easily be shared either between named project associates or with the wider public
- Easy to publish subsets of databases whilst keeping the full database private
- Shared datasets may be ‘static’ (fixed at the point of publication) or ‘dynamic’ (updating as the underlying database is edited)
- Pre-existing *Access* databases can be uploaded for wider sharing or continued development
- Data in spreadsheets can be uploaded and stitched together to create full relational databases
- Databases can be exported in an open format (PostgreSQL) and imported into other systems if circumstances change – users are not tied in
- Simple data editing interface
- In-house support
- Free (up to 20 GB)

Development of the *ORDS* is on-going. Requests for additional features may be sent to ords@it.ox.ac.uk, where they will be reviewed and, if deemed appropriate, prioritized for future development.

If you are unsure whether the *ORDS* would be the most appropriate solution for your research, the support team will be happy to advise.

1.5. Where do I find the ORDS?

The *ORDS*, as its name suggests, is an online service. You can access the *ORDS* from <https://app.ords.ox.ac.uk/>. It should work in any web browser, although testing has focussed on *Firefox* and *Chrome*. Supplementary information about the service, along with documentation and how-to guides are available from <http://ords.ox.ac.uk/>.

Editing data hosted in the *ORDS* offline is possible using third-party database management software such as *Microsoft Access*, although users will need to connect to the *ORDS* database they wish to edit before going offline. Data will then need to be re-uploaded to the *ORDS* once the user has an internet connection again. The process for uploading data edited offline is only semi-automated at present, so users wishing to edit data offline should contact *ORDS* support staff in advance via ords@it.ox.ac.uk to indicate that this is what they are intending to do.

2 Getting started with the ORDS

Before you can start to use the *ORDS* you will need to complete the online registration process. Please note that logging in to the *ORDS* and registering to use the *ORDS* are separate processes.

- Logging in to the *ORDS* is the process of gaining access to your *ORDS* account by entering your username and password. You will do this every time you use the *ORDS* system.
- Registering to use the *ORDS* is a one-off process which adds your details to the list of registered *ORDS* users. You need to do this only on the first occasion that you use the *ORDS*.

2.1. Registering to use the ORDS

To start using the *ORDS* system, you will need to log in using a username and password and then register. The credentials you use will vary depending on your status.

2.1.1. Members of the University of Oxford and virtual card holders

For members of the University of Oxford, logging in to the *ORDS* is done via the SSO (single sign-on) service. This is the same username and password that you use to access your Nexus email account.

To log in using SSO, go to the *ORDS* home page: <https://app.ords.ox.ac.uk/>.

Click the **Log in using SSO** button.


The screenshot shows the ORDS home page. The header is dark blue with the 'ORDS' logo on the left, a search bar in the center, and the University of Oxford crest on the right. Below the header, there's a 'Welcome to ORDS' section with a description of the service. To the right is a 'Search for projects' box. The main content area is titled 'Log in' and contains instructions for different user types. At the bottom of the 'Log in' section, there are two buttons: 'Log in using SSO' (highlighted with a red box) and 'Log in via UK Access Management Federation'. Below this is an 'ORDS in numbers' section showing statistics.

You will be prompted to enter your University of Oxford SSO username and password. When you have done this, **click** the **Login** button, then **click** the **✓ Continue** button on the confirmation page that follows.

If this is the first time you have used the *ORDS* system, you will now be prompted to register. If you have already registered, you will be taken to the *ORDS* welcome page.

2.1.2. ORDS users from outside the University of Oxford

The *ORDS* is also accessible to researchers from outside Oxford who have been invited to join a project. Non-Oxford users cannot be an ‘owner’ of an *ORDS* project, but they can otherwise participate in project with the same permissions as members of the University.

If the non-Oxford user is a member of a university or other institution that is part of the UK Access Management Federation, then they will be able to log in using their institution’s equivalent of an SSO username and password, via clicking on the  button and selecting their institution from the list.

If the non-Oxford user does not belong to an institution that is a member of the UK Access Management Federation then they will need to request a Virtual University Card before they are able to log in. A request for an application form should be sent to ords@it.ox.ac.uk. It can take a few weeks to process an application for a Virtual Card.

Note that the UK Access Federation, despite its name, includes several non-UK educational institutions.

2.1.3. Registration

The first time you log in to the *ORDS*, you will be presented with the registration page. This is where you can choose the email address to which messages from the *ORDS* will be sent, and how you wish to be referred to within the system.

If you logged in with your SSO account you should find that your name and email address have been completed automatically. Check that they are appearing correctly and edit them if necessary.

If you have been invited to join an *ORDS* project by a colleague, you should register with the email address they sent the invitation to, otherwise the system will not recognize that you should be added as a member of the project you were invited to join. You can change your email address to something preferable later.

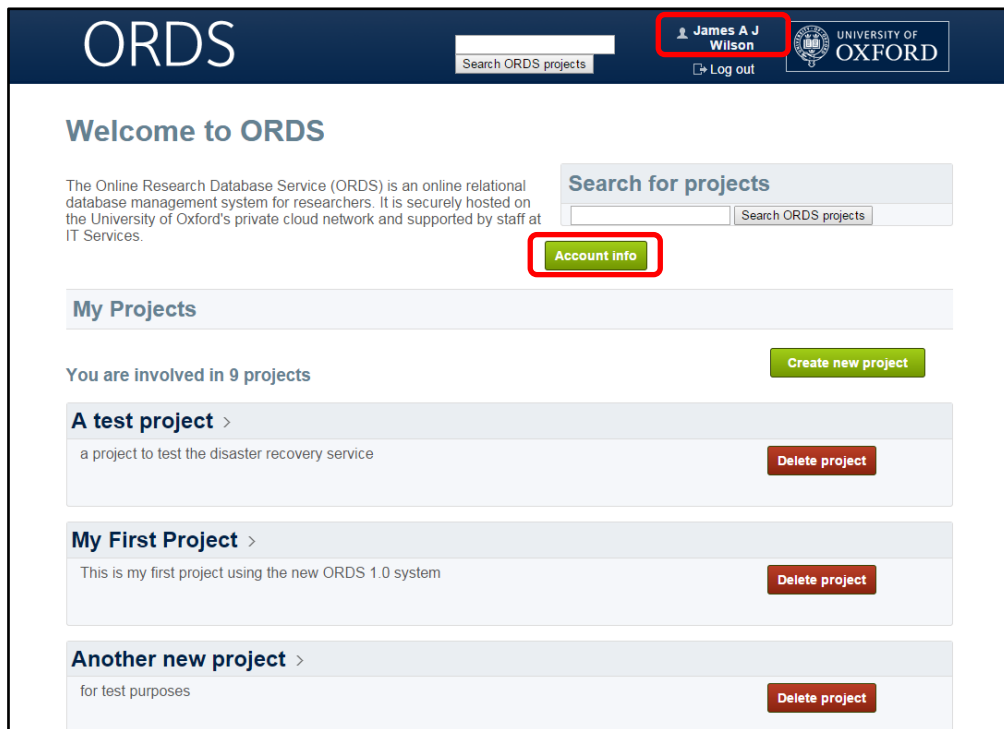
When you are happy that your name and email address are correct, **click** the **Register** button. This will trigger a confirmation email, which will be sent to the email address you have just entered. That email will contain a link that will allow you to verify your *ORDS* account.

If you do not receive the email, it may be worth checking your spam or junk mail folder (to ensure that you can receive notifications from ORDS in the future, you may also wish to add ords@it.ox.ac.uk to your email program's whitelist, or list of approved senders). If you have not received the message after an hour or so, please contact the *ORDS* help desk by emailing ords@it.ox.ac.uk.

2.2. Your account

Once you have logged in and registered, you will be taken to your projects list. This lists all of the projects of which you are currently a member, and, if you are a member of the University of Oxford, the **Create new project** button. Before learning how to create a new project, it is worth taking a quick look at your account page.

To access your account information, click the **Account info** button or on your name in the *ORDS* title bar



Your account screen is where you can change the name by which you are known within the *ORDS*, edit your email address, and indicate that you would like a project to be accessible via an ODBC connection. ODBC connections are used if you wish to edit or display *ORDS* data using third-party software or via a website. This is discussed in a little more detail in section 6. To return to your projects page, **click** your browser's **Back** button, or on the *ORDS* logo in the title bar at the top-left of your screen. Clicking the logo always returns you to your projects list, or to the main app page if you are not logged in.

2.3. Creating a new project

Only registered *ORDS* users who are members of the University of Oxford can create new projects. A project may be thought of as an electronic container for one or more databases. Each project has a project owner, who is the user with primary responsibility for it. By default, the user who creates a project is its owner.

To create a project, **click** the **Create new project** button. You will be taken to the **Create a New Project** form, where you are prompted to enter some information about the project.

ORDS

Search ORDS projects

James A J Wilson
Log out

Create a New Project

The project you are about to create is a trial project.

Trial projects are subject to some limitations. You will not be able to add more than a hundred records to any database table (you can upload tables of over a hundred records, but will not be able to add any further records to these), and you will not be able to make your data publicly available by creating and publishing datasets.

Once you have created the project, you will be able to request that the project be converted to a full project, without these limitations.

Name ★ A name for the project (minimum 2 characters).

Description ★ Please give a brief description of the project. This will appear in your project list, and, if you have not chosen to hide the project's metadata, in publicly viewable ORDS project search results.

Start date The date the project started

End date The actual or anticipated end date of the project

☐ **Hide project metadata?**
If this box is checked, no information about this project will be publicly accessible via ORDS

☐ **ODBC access for project**
If this box is checked, project members will be able to access project data via ODBC (Open Database Connectivity) and potentially bypass the ORDS interface completely. Only check this box if you are sure this is what you want

Cancel **Create**

As a minimum, you are required to give your project a name and a description. If you choose to make your project discoverable by others, it is this information that they will be able to search, see, and use to get a sense of what it is that you are researching.

You can hide the project from appearing in searches by selecting the **Hide project metadata** box. If you hide the project metadata you will also be unable to expose any datasets you create within the project – if you want to be able to share any data you should leave this box unticked. You can, however, go back and change this setting (and all others) later.

The **Start date** and **End date** are for information only. Your project will not be deleted just because you have exceeded the given end date.

You should tick **ODBC access for project** if you would like project members to be able to edit *ORDS* data using third-party software. This is discussed in a little more detail in section 6.

Once you have completed the form, **click** **Create**. The *ORDS* should return you to your projects list, and you should be able to see your newly created project there.

In order to access a project from your list, simply **click** on its title.

My Projects > My First Project

Project: My First Project

This is my first project using the new ORDS 1.0 system

[Add new ORDS database](#)

Databases

Name	Description	No. of database versions
Demographics	A database of demographic information, derived from the Mondial database	1
Mondial	The usual Mondial database for testing purposes	1
Thame probate inventories	For testing purposes only	1

[Add new member](#)

Project Members

Member name	Role	Edit	Delete
James A J Wilson	owner		

[Edit project details](#) [View audit for project](#)

Project Details

Description	This is my first project using the new ORDS 1.0 system
Start date	31/07/2014
End date	31/07/2019
Can the public search this project?	yes

The project page is where project administration is carried out. It consists of four main sections. At the top there is the title and description. Then there is a list of databases in the project. When a project is first created this will be empty. Next there is a list of the project members. Finally, there is a summary of the project metadata.

Some sections of the project page may not be visible unless your role on a project is owner or project administrator.

2.3.1. Trial projects and full projects

When you create a project in the *ORDS* system, it will initially have the status of a trial project. Trial projects have a number of restrictions. They are intended to allow you to get a feel for how the *ORDS* system works and whether it is suitable for use in your research.

In a trial project, you can:

- Import existing database files
- Create databases from scratch using the *ORDS* schema designer
- View, edit, and query data
- Work collaboratively by inviting other people to become members of your *ORDS* project

However, in a trial project, you cannot

- Add more than a hundred records to any database table

- (You can import database tables which contain over a hundred records to see how the data looks in the *ORDS*, but you will not be able to add any further records to these)
- Make your data publicly available by creating and publishing *ORDS* datasets (sets of saved query results)

If you decide that you would like to continue using the *ORDS* for your research, and wish to convert your trial project into a full project, please contact the *ORDS* help desk by emailing ords@it.ox.ac.uk.

There is no charge for upgrading test projects, but you may be invited to come into IT Services for a brief chat about your project, to ensure that the *ORDS* is indeed an appropriate tool for your work.

Please note that tables in full projects are currently restricted to a maximum of 500,000 records. If your total data storage requirements are likely to be greater than 20GB (including saved datasets), please raise this as an issue when contacting *ORDS* staff.

2.4. Project members and their permissions

If you are the project owner or a project administrator, you can see a list of the project's current members on the project page. Information is given about each member's current role.

There are four roles that members of *ORDS* projects may have. Roles determine members' permission levels – that is, what they can and cannot do within the project.

The **project owner** is the *ORDS* member with primary responsibility for a project. By default, the person who creates an *ORDS* project is its owner.

Project administrators have all the permissions that project owners have, except for the ability to delete the project.

Contributors can view, edit, and query data, define datasets, and export data, but they can't alter the structure of a database nor edit the project or database metadata.

Viewers can view and query data, export data, and view datasets created by others, but they cannot edit any data themselves.

The permissions of the different roles are summarized in the table below:



	Project Owner	Project Administrator	Contributor	Viewer
Delete project	✓	✗	✗	✗
Add / remove / edit project member	✓	✓	✗	✗
Create / delete database	✓	✓	✗	✗
Create / delete database versions	✓	✓	✗	✗
Edit project / database metadata	✓	✓	✗	✗

Restructure database	✓	✓	✗	✗
Add / edit / delete database record	✓	✓	✓	✗
Create and save dataset	✓	✓	✓	✗
View database tables	✓	✓	✓	✓
Query database and export results	✓	✓	✓	✓

Permissions are assigned at the project level. In other words, if someone is a project administrator they will have project administrator permissions for every database within that project. There is at present no way to restrict permissions to a particular database.


2.4.1. Adding and removing project members


To add new members to a project you need to be the project owner or a project administrator.

To add a new member to a project, simply **click** , then enter their email address and the role you would like them to have in the project. The role can be changed later. If the person with that email address is already registered with the *ORDS*, they will be added immediately. If they have not registered, they will be sent an email inviting them to register and join the project. **Click**  once you're sure you're using the most appropriate email address.

Invited project members must register with the ORDS using the same email address as they were invited with, otherwise the system will not recognize that they should be added as a project member.

To edit members' roles, you also need to be the project owner or a project administrator.

Find the member whose role you wish to edit in the **Project Members** section of the project page. **Click** the  button that appears next to their name.

You will be taken to the **Edit Project Member** form. Select the desired new role from the drop-down list, and **click** .

To delete a project member, simply **click** on the  button next to their name. You will be asked to confirm this action before it is processed. Again, only project owners and project administrators can remove project members.

2.5. Project audit trail

The *ORDS* system allows the project owner and project administrators to view the past audit record of a project. The audit record is a history of all the significant events that have happened within that project's life – details of the project's creation, adding and removal of members, creation and editing of databases, and so forth. It also allows you to see when each action occurred, and who performed it.

To view the audit record, find the **Project Details** section of the project page.

Click the  button.

After viewing the audit record, use your browser's **Back** button to return to the project page.

2.6. Editing project information

If you wish to update the information you entered about your project during its creation, you can do so. Simply **click** , edit the project metadata as required, and then **click** .

Exercise 1: Registering to use the ORDS

Now look at this exercise (page 52).

3 Creating databases

At the heart of the *ORDS* is the database. The *ORDS* enables you to import existing database in *Microsoft Access* format or as PostgreSQL dumps. You can also import data from spreadsheets if you export it as a comma-separated values file (with the file name extension .csv). Once you have imported a database or spreadsheet, you can then edit it, query it, and share it more widely (provided you have appropriate permissions).

You can, of course, also design databases from scratch using the *ORDS*'s database designer tool.

However you wish to create your database, the first step is always to define a new empty database.

Whether or not you have already defined any databases, you should always be able to see the **Add new ORDS database** button on every project page.

The screenshot shows the ORDS web interface for a project named 'My First Project'. The header includes the ORDS logo, a search bar, and user information for James A J Wilson. The main content area is titled 'Project: My First Project' and includes a description: 'This is my first project using the new ORDS 1.0 system'. A red rectangle highlights the 'Add new ORDS database' button in the top right corner. Below this, there is a 'Databases' section with a table listing existing databases. Further down is the 'Project Members' section with a table showing the project owner, James A J Wilson. At the bottom is the 'Project Details' section with a table containing project metadata.

Name	Description	No. of database versions
Demographics	A database of demographic information, derived from the Mondial database	1
Mondial	The usual Mondial database for testing purposes	1
Thame probate inventories	For testing purposes only	1

Member name	Role	Edit	Delete
James A J Wilson	owner		

Description	This is my first project using the new ORDS 1.0 system
Start date	31/07/2014
End date	31/07/2019
Can the public search this project?	yes

Click this to go to the **Add Database to Project** form.

ORDS

Search ORDS projects

James A J Wilson
UNIVERSITY OF OXFORD
Log out

Add Database to Project

Please enter details of the database below. Once you have done this, you will be able to create your database's tables, or upload an existing database. The fields on this page can be used to store contextual information about the database and the data it contains. You will be able to edit or add to this information later if you wish.

Name *

A name for the database.
This will appear on the project and database pages.

Description *

Please give a brief description of the database.
This will appear on the project and database pages.
This field can be used to describe the content and scope of the database, or to supply any other information that may be useful to project members, or to other researchers who might use the data in the future.

Created on

The date when this database was created

Data sources

This field can be used to record where the data in the database came from.
This might include details of print material that has been digitized, or of multiple sources that have been combined to produce the current dataset.

Data gathering process

This field can be used to record the processes used to collect the data in the database for example, through experiments, interviews, or selection and digitization of print materials.

Cancel Add

As with the **Create New Project** form, the **Add Database to Project** form asks you for information that will help others find and understand your database in future. Even if you never intend to share the database, it is still good practice to record what it is, how the data was obtained, and where it came from – if for no other reason than to ensure that you do not forget this yourself a few years down the line.

Two fields in the form are mandatory: **Name** and **Description**.

The database **Name** can be whatever you choose, providing it is at least two characters long and does not include parentheses.

The database name and description will appear in the list of databases you and other project members see on the project page.

When you are happy with the contents of the form, **click** **Add** to create the database.

You will be taken back to the project page, and should see a message confirming that the database has successfully been created.

The name of the new database will now appear in the list of *ORDS* databases for the project. Note that because this is as yet an empty database, the number of database versions is currently zero.

Click on the database name to access the database page.

It should look something like this:

ORDS

Search ORDS projects

James A J Wilson

Log out

My Projects > My First Project > New database

Database Name: New database

Database Details

Name	New database
Description	A database, as yet empty.
Database type	Relational
Created on	13/11/2014
Data sources	To be added
Data gathering process	To be added

Delete database

Edit database details

Main database version information

This area provides details of the main version of your database.

You haven't uploaded a database yet.

Upload existing database

Create new database

From this page, you can manage your ORDS database. You can have up to three copies of each database: the main or live version, a milestone version (to preserve a snapshot of the database as it was at a particular point), and a test version (which allows you to try out changes before making these in the live version).

Use the buttons below to upload, create, or edit a database version.

3.1. Importing an existing database

The *ORDS* allows you to upload existing databases either in *Microsoft Access* format or as PostgreSQL. If you wish to upload pre-existing databases that are in other formats, you will first need to find software that can convert them into one of the two formats that the *ORDS* accepts, or alternatively save the database as a set of comma-separated value files (.csv).

To begin uploading a database, click

Upload existing database

.

Upload a Database to ORDS

Database file *

Allowed file types: CSV, SQL (PostgreSQL) and Microsoft Access (ACCDB and MDB).

Data in other formats (e.g. Microsoft Excel spreadsheets) will need to be converted to one of these before it can be uploaded to the ORDS - the most straightforward method is usually to save the file as CSV. A step-by-step example can be found in the [ORDS documentation](#) - see *How to import a database*. If you need further advice or assistance, please contact the ORDS help desk on ords@it.ox.ac.uk.

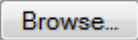

Only a single SQL or Microsoft Access file can be uploaded into each ORDS database. However, if a CSV file is uploaded, it will be possible to add further files in the same format - these will form separate tables within the database.

Browse...

No file selected.

Cancel

Upload

Click  to select the file you would like to upload (the labelling of this button may vary depending on the browser you are using). Then click  to begin the actual upload process.

When you upload a database into *ORDS*, it is automatically converted to PostgreSQL format. This can take a few minutes, so the system will email you once the upload and conversion are complete.

PostgreSQL is stricter than programmes such as *Microsoft Access* in terms of what it regards as a valid database. The *ORDS* checks for some of the common problems encountered when recreating an *Access* database as a PostgreSQL database, but it can't catch everything, so you might sometimes receive an email saying that the upload process has failed. If this happens, the *ORDS* support team might be able to fix the original database to enable it to upload smoothly. Feel free to contact the team at ords@it.ox.ac.uk.

If you click the database name to return to the database page before the upload process has completed, you will see a message confirming that the database is still in the process of being uploaded. Once the upload has finished, the database page will look more like this:

Database Name: New database

Database information edited successfully

Database Details

Name	New database
Description	A database, now with a database structure and some data.
Database type	Relational
Created on	13/11/2014
Data sources	To be added
Data gathering process	To be added

Delete database
Edit database details

From this page, you can manage your ORDS database. You can have up to three copies of each database: the main or live version, a milestone version (to preserve a snapshot of the database as it was at a particular point), and a test version (which allows you to try out changes before making these in the live version).

Use the buttons below to upload, create, or edit a database version.

Main database version information

This area provides details of the main version of your database.

Original file name: mondial_fixed.accdb

Original file size: 928 Kbytes

View and edit database structure
View, edit, and query data
Export database
Set as milestone version
Delete

Milestone database version information

You can set your main database version to become a milestone database version at any time.

A milestone database version may be considered to be the "best so far" within this part of your project, or a snapshot of the data at a particular point.

Test database version information

You can create a test version of the database to work on. This allows you to try different ideas (changes to the database structure, for example) without compromising the integrity of your main database.

Once you have finished working with the test database version, you can either set it to be the main database version, or simply delete it.

Create new test version

Note that the buttons under the **Main database version information** heading have changed, and there are now sections for a **Milestone database** and a **Test database**.

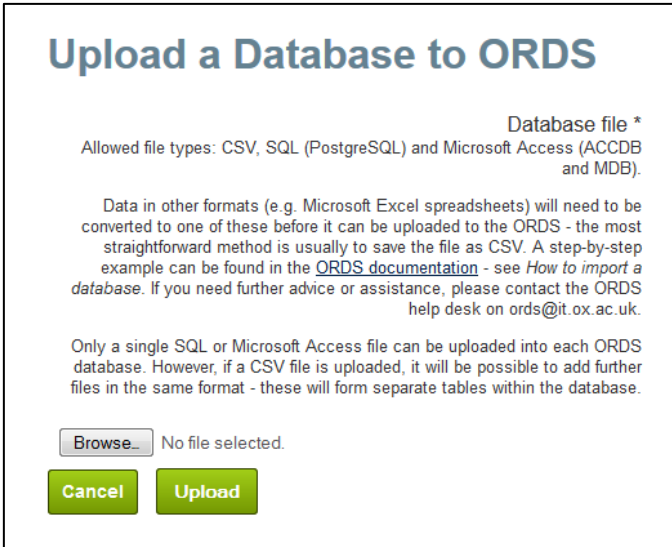
3.2. Importing data in spreadsheets

Before you try to upload a .csv file, you need to ensure that it is in a form that the *ORDS* can understand.

If you created your data in *Microsoft Excel* or other commonly-used spreadsheet software, you may need to delete any extraneous information from your spreadsheet before exporting it as .csv. The first row of your spreadsheet should contain the column (or field) names, listed horizontally from column 1 to n. Your data should be entered in the rows numbered 2 to n, immediately below the column headers. You should not leave any blank rows or columns. Empty cells within your data grid are fine – they will be interpreted as null values when uploaded. Remove any ‘extraneous’ information from your spreadsheet such as titles, notes, calculations off to one side of the main table, and that sort of thing. Only once you have a ‘pure’ table remaining should you export your data as a comma-separated value (.csv) file. Don’t worry about losing the contextual information, you can add notes about each of your fields once you’ve got them into the *ORDS*.

Importing spreadsheets works slightly differently from importing databases, although you should follow the same process to begin with.

To begin uploading a database, **click** .



Upload a Database to ORDS

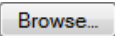

Database file *

Allowed file types: CSV, SQL (PostgreSQL) and Microsoft Access (ACCDB and MDB).

Data in other formats (e.g. Microsoft Excel spreadsheets) will need to be converted to one of these before it can be uploaded to the ORDS - the most straightforward method is usually to save the file as CSV. A step-by-step example can be found in the [ORDS documentation](#) - see *How to import a database*. If you need further advice or assistance, please contact the ORDS help desk on ords@it.ox.ac.uk.

Only a single SQL or Microsoft Access file can be uploaded into each ORDS database. However, if a CSV file is uploaded, it will be possible to add further files in the same format - these will form separate tables within the database.

No file selected.

Click  to select the .csv file you would like to upload, and then  to begin the actual upload process.

As before, the system will email you once the upload and conversion has completed.

You can only upload one spreadsheet at a time, but once the first spreadsheet has finished uploading, you can then repeat the process to upload multiple spreadsheets into a single database. Each spreadsheet will become a separate table within the database. You can later create relationships between the separate tables to turn your spreadsheets into a proper relational database, if you so choose.

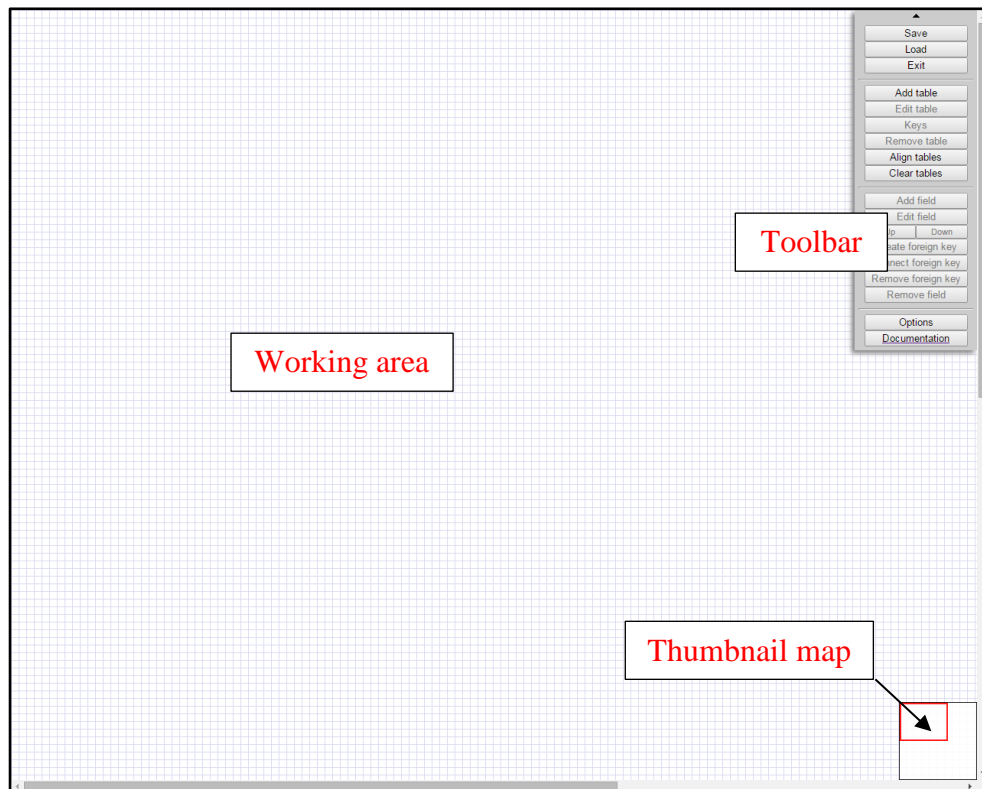
After loading the first spreadsheet, you can upload additional spreadsheets by **clicking** [Upload another CSV file as a new table](#), as illustrated below:

The screenshot shows the ORDS web interface. At the top, there's a header with the ORDS logo, a search bar, and user information for James A J Wilson. Below the header, a breadcrumb trail shows 'My Projects > My First Project > gravestones'. The main section is titled 'Database Name: gravestones' and 'Database Details'. It contains a table with fields: Name (gravestones), Description (Another test exercise, this time involving upload multiple spreadsheets), Database type (Relational), Created on, Data sources, and Data gathering process. To the right of this table is a yellow box with instructions on managing the database. Below the table are buttons for 'Delete database' and 'Edit database details'. Further down, there are three columns: 'Main database version information', 'Milestone database version information', and 'Test database version information'. In the 'Main database version information' column, the link 'Upload another CSV file as a new table' is highlighted with a red rectangle. Below this link are several buttons: 'View and edit database structure', 'View, edit, and query data', 'Export database', 'Set as milestone version', and 'Delete'.

Be aware that you cannot upload both a database file and .csv files into the same *ORDS* database. If you need to do this, ask the *ORDS* team for assistance (ords@it.ox.ac.uk).

3.3. Using the database schema editor

To access the database schema editor, click **Create new database** if you wish to create a new database from scratch, or **View and edit database structure** if you have already uploaded a pre-existing database. You will then be taken to the database schema designer, which will look a bit like this:



If you are working with an existing database, the structure of the database will be uploaded into the working area by default. If you are creating a new database from scratch, it will be empty, as in the illustration above.

Using the schema editor, you can add and delete tables, add and remove fields within tables, change field names and types, and express relationships between tables. Remember to **Save** any changes you make, otherwise they will be lost when you leave the designer and your database will revert to the form it was previously in.

If you make any changes to your database structure that are not permitted by the rules of PostgreSQL, you will receive an error message. The system will also complain if you try to change a field type to something which conflicts with data already in that field in the database – so, for instance, if you try to make a field into one that can only accept whole numbers (known as an ‘integer’ field), but some of the data in that field is textual, you will receive an error message.

IF YOU REMOVE A FIELD OR TABLE AND THEN SAVE THE NEW SCHEMA, ANY DATA THAT WAS IN THAT FIELD OR TABLE WILL BE DELETED!

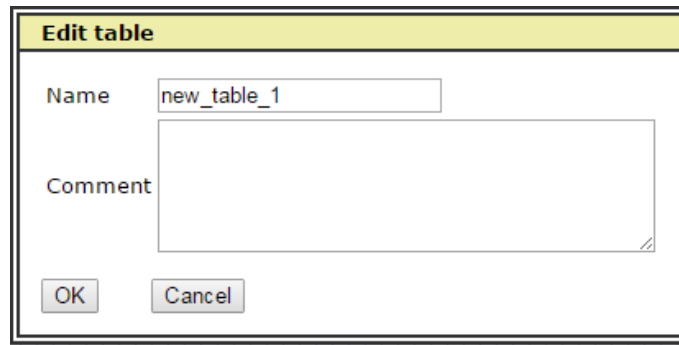
You will be warned before this happens, but once the data is gone, it is gone. It is a good idea to create a ‘test’ version of your database before doing any re-design work that might result in data loss; that way, if you make a mistake, you will be able to restore your test version to the live version. Clicking CTRL+Z will not work. For more about versions of database, see section 3.4.

3.3.1. Adding and removing tables

To add a new table, **Click** the **Add table** button on the toolbar. The mouse pointer will change from an arrow to a cross.

Click the place on the working area where you would like the table to appear. You will be able to move it later if you wish.

The new table will appear, and the **Edit table** dialogue box will open.




You will see that the table has been given a placeholder name – **new_table** followed by a number. Replace this with the name you would like the table to have.

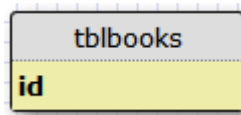
The *ORDS* system supports the use of spaces in table names, but this is not true of all database systems. If you are likely to want to export the data for use in other systems later on, it may be worth bearing this in mind.

It is also usually best to avoid punctuation marks or other special characters in table names, as these can sometimes cause problems. One exception to this is the underscore: these can be used safely in most systems, and are often used as a replacement for spaces.

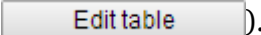
Some people like to follow the convention of beginning every table name with the letters **tbl** – this can be done or not, according to personal preference.

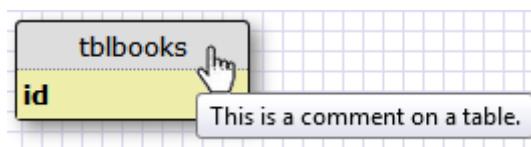
You also have the option of adding a comment about the database table. This can be used to record metadata or notes about the table contents. Comments can be added or edited later.

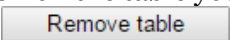
Click  to close the dialogue box. You will see that your table has been automatically populated with a field called **id**.



This will be the primary key field for the table – the field that provides a unique identifier for each record. The name of the primary key in an *ORDS* table is shown in bold type. You can change the field name if you wish.

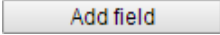
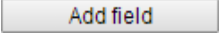
To view a comment on a table, hover the mouse pointer over the table header. (You can also click the appropriate field to select it, and then click ).



To delete a table, simply **click** on the table you wish to delete (so that it is highlighted) and then **click** .

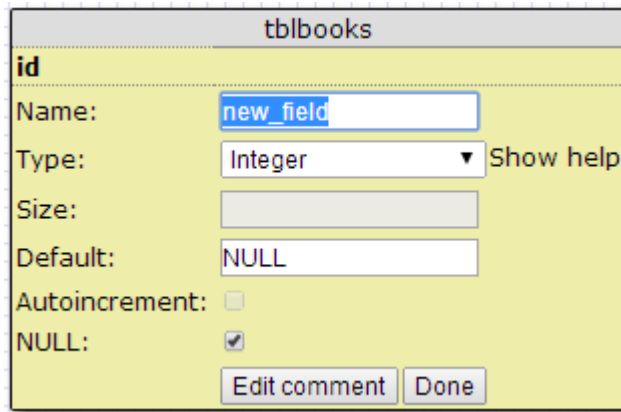
3.3.2. Adding and removing fields

To add a new field to a database table, select the table you wish to add a field to by clicking its header. The border of the selected table will change colour, and the rectangle representing the table in the thumbnail map will turn orange.

Now click the  button in the toolbar. (If no table is selected, the  button will be greyed out.)

The table will expand to show the options available when adding a new field.

The field will have the placeholder name of `new_field`. Replace this with a name of your choice. As with table names, it is generally best to avoid special characters (other than underscores) in field names, and you may wish to avoid spaces if you are likely to want to export the data for use elsewhere.



The screenshot shows a dialog box titled 'tblbooks'. Inside, there's a section for 'id'. Below it, there are several input fields and checkboxes: 'Name' with 'new_field', 'Type' with a dropdown set to 'Integer', 'Size' with an empty field, 'Default' with 'NULL', 'Autoincrement' with an unchecked checkbox, and 'NULL' with a checked checkbox. To the right of the 'Type' dropdown is a 'Show help' link. At the bottom are 'Edit comment' and 'Done' buttons.

The remaining fields in the dialogue box allow you to select a data type, and to set a number of other options.

3.3.3. Data types

Like most database software, the *ORDS* expects each field within each database table to be of a defined type. Some fields, for instance may be defined such that they will only accept numerical data. Others may be text fields, into which users can enter any text (including numbers). The type of field you define will affect how people can search your data. If you define a field as numeric, people will be able to search it by criteria such as only showing results where the data in that field is greater than a hundred; if you enter numbers into a text field searches such as this will not work because the system will treat the number as though it is a string of text.

By choosing an appropriate data type for your data, you can prevent people from adding inappropriate data to your database. For example, you may wish to specify that a 'date of birth' field can only contain a date. Database editors will be able to enter a date in a number of different formats (which will all be converted to a single comparable format behind the scenes), but if they try to enter something that the system cannot recognize as a date at all, it will refuse to accept that input.

The full list of *ORDS* data types is given below, although in practice many databases will only use a handful of different data types – **Integer** and **Text** being the most common.

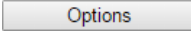
ORDS basic data types	
Integer	<p>A whole number, negative or positive.</p> <p>This data type can be used for numbers between -2,147,483,648 and 2,147,483,647.</p>
Decimal	<p>A number (negative or positive) which may include a decimal point.</p> <p>This field type can store numbers with up to 131072 digits before the decimal point, and up to 16383 digits after it, so is recommended for cases where a high degree of accuracy is required.</p> <p>It is possible to specify a maximum number of digits before and after the decimal point. This is done by entering two figures, separated by a comma, in the Size field in the <i>ORDS</i> schema designer.</p> <p>In some cases, it may be desirable to restrict the number of digits after the decimal point, but not before. This effect can be achieved by using an arbitrarily large number – e.g. 100 or 1000 – before the comma, and the required number of decimal places after it. So, for example, for a field designed to display an amount of money given in pounds and pence, one might enter ‘1000,2’ in the Size field. This would allow up to 1000 digits before the decimal point (for the number of pounds), but only 2 after it (for the number of pence).</p>
Text	<p>Fields with this data type can contain text, numbers, or a combination of these.</p> <p>This is the most flexible data type, so is often the best option if you are uncertain exactly what a field may need to contain. The length of Text fields is not restricted.</p>
All <i>ORDS</i> numeric data types (coloured yellow)	
Integer	<p>A whole number, negative or positive.</p> <p>This data type can be used for numbers between -2,147,483,648 and 2,147,483,647.</p>
Big integer	<p>A whole number, negative or positive.</p> <p>This data type can be used for numbers between -9,223,372,036,854,775,808 and 9,223,372,036,854,775,807. Use when the range permitted for the Integer data type is not sufficient.</p>
Decimal	<p>A number (negative or positive) which may include a decimal point.</p> <p>This field type can store numbers with up to 131072 digits before the decimal point, and up to 16383 digits after it, so is recommended for cases where a high degree of accuracy is required.</p> <p>It is possible to specify a maximum number of digits before and after the decimal point. This is done by entering two figures, separated by a comma, in the Size field in the <i>ORDS</i> schema designer.</p> <p>In some cases, it may be desirable to restrict the number of digits after the decimal point, but not before. This effect can be achieved by using an arbitrarily large number – e.g. 100 or 1000 – before the comma, and the required number of decimal places after it. So, for example, for a field designed to display an amount of money given in pounds and pence, one might enter ‘1000,2’ in the Size field. This would allow up to 1000 digits before the decimal point (for the number of pounds), but only 2 after it (for the number of pence).</p>

Single precision	<p>A number (negative or positive) which may include a decimal point.</p> <p>Although this type of field (known as a floating point type) can be used to store very large or very small numbers, the precision (i.e. the number of significant figures, before or after the decimal point) is limited to 6 digits. In practice, this means that rounding of large or small numbers may occur.</p> <p>This data type is included chiefly for compatibility with other database systems. When creating a new field, it will generally be preferable to use the data type Decimal.</p>
Double precision	<p>A number (negative or positive) which may include a decimal point.</p> <p>Although this type of field (known as a floating point type) can be used to store very large or very small numbers, the precision (i.e. the number of significant figures, before or after the decimal point) is limited to 15 digits. In practice, this means that rounding of large or small numbers may occur.</p> <p>This data type is included chiefly for compatibility with other database systems. When creating a new field, it will generally be preferable to use the data type Decimal.</p>
All <i>ORDS</i> character (text) data types (coloured pink)	
Char	<p>Also known as Character, fields of this type can contain text, numbers, or a combination of these.</p> <p>Char fields have a fixed length, set by specifying a number of characters in the Size field in the <i>ORDS</i> schema designer. If the entry in a Char field is longer than the specified number of characters, it will cause an error; if it is shorter, the field will be padded out with spaces. If no field length is specified, the default is for the field to be limited to a single character.</p> <p>This data type is included chiefly for compatibility with other database systems. In some other systems, using the Char field type confers performance advantages. However, this is not true for PostgreSQL systems such as the <i>ORDS</i> (in fact, the padding will increase the file size), and hence for <i>ORDS</i> databases it will generally be better to use the Varchar or Text field types.</p>
Varchar	<p>Also known as Character varying, fields of this type can contain text, numbers, or a combination of these.</p> <p>It is possible (though not required) to set a maximum length for a Varchar field, by specifying a number of characters in the Size field in the <i>ORDS</i> schema designer. Entries which are longer than the specified number of characters will be truncated.</p> <p>In PostgreSQL database systems such as the <i>ORDS</i>, there is no practical difference between a Varchar field with no length limit and a Text field. In some other systems, however, these are handled differently, and hence both options are included to increase compatibility with other systems.</p>
Text	<p>Fields with this data type can contain text, numbers, or a combination of these.</p> <p>This is the most flexible data type, so is often the best option if you are uncertain exactly what a field may need to contain. The length of Text fields is not restricted.</p>

All <i>ORDS</i> date and time data types (coloured green)	
Date	A date consisting of a day, month, and year. Dates should be entered in the YYYY-MM-DD format. If you wish to display dates in other formats, use the Text data type.
Time	A time of day, consisting of hours, minutes, and seconds. Times should be entered in the format hh:mm:ss. If you wish to display times in other formats, use the Text data type.
Timestamp	A concatenation of a date and a time. Timestamps should be entered in the format YYYY-MM-DD hh:mm:ss.
<i>ORDS</i> miscellaneous data types (coloured purple)	
Boolean	Data entered in fields of this type is restricted to one of a pair of values. Depending on the context, the pair may be interpreted as true or false, yes or no, or 0 or 1. In an <i>ORDS</i> database table, a field with the Boolean data type will be displayed as a check box.
Binary data	Used for raw binary data (that is, data consisting of 0s and 1s), stored as hexadecimal strings. Images and audio files are examples of binary data.

It is worth noting that there are certain types of data which may at first sight appear to be numerical, but for which a field with the **Text** data type is actually more suitable. These include:

- Phone numbers. These generally begin with a zero, which will be ignored if the field has a numeric data type. They may also include other non-numeric characters, such as spaces or brackets.
- Number ranges – for example, page ranges in citations, or date ranges. These will include a dash or other non-numeric separator.
- Information which is chiefly numeric, but which may sometimes need to be qualified. For example, a 'Year' field might normally contain a single four-digit number. Occasionally, however, the precise date might be uncertain, and you may wish to indicate this by putting 'ca.' before the number.

The schema designer can be set to display the data type of each field. To turn on this feature, **click** the  button in the toolbar, and then **check** the **Show field data type in table design?** checkbox. Clicking this checkbox again will clear the tick and turn this feature off. **Click** to close the dialogue box. You will need to refresh your browser to see the data type labels (usually by pressing F5 on the keyboard).

3.3.4. Other *ORDS* field options

Size: Some *ORDS* data types also allow you to set the size of the field. This is done by entering a number (or for certain field types, two numbers separated by a comma) in the **Size** box, to specify a maximum number of characters. If it is not possible to specify a size, this field will be greyed out.

The schema designer can be set to display the size of each field for which a size has been set. To turn on this feature, click the **Options** button on the toolbar, and then click the **Show field size in table design?** checkbox so that a tick appears in it. Clicking this checkbox again will clear the tick and turn this feature off. Click **OK** to close the dialogue box. You will need to refresh your browser to see the size labels.

Default: This option allows you to specify what will appear in this field if no other data is added. When you first create a field, this will be set to **NULL**, indicating that the field is empty. You can change this to something else if you wish (for example, you might wish the default entry to be 'Not known').

Autoincrement: This option is only available for **Integer** fields. If this option is selected, then when a new record is added, the *ORDS* will automatically complete this field with the next available number.

*When you create a new table, the **id** field is set by default to be an autoincrement integer field. This is the most straightforward way of ensuring each record has a unique primary key value.*

Null: In a database, a field with a null value is one that is currently empty. (This should be distinguished from 0, which indicates that the field has been completed with a value of zero.) If this checkbox is selected, null values will be permitted in this field. If it is deselected, the field will be mandatory – the *ORDS* will not allow a record to be saved unless the field has been completed.

Comment: You can add a comment to an individual field. This can be used to store notes about the field or the data in it – for example, you might use it to explain an abbreviation in the field name, or to indicate a unit of measurement.

To add or edit a comment, click **Edit comment**, type your desired content in the dialogue box which appears, and then click **OK**. The comment will appear at the bottom of the field options dialogue box.

The screenshot shows a dialog box titled 'tblbooks' for editing the 'id' field. The field name 'id' is highlighted in a yellow bar at the top. Below it, the following options are visible:

- Name:** Title
- Type:** Text (with a dropdown arrow and a 'Show help' link)
- Size:** (empty text box)
- Default:** NULL
- Autoincrement:** ☐
- NULL:** ☒
- This is a comment:** Edit comment Done

To view a comment again later, hover the mouse pointer over the field. (You can also click the appropriate field to select it, and then click **Edit field**.)

Once you are happy with your field name and choice of options, click **Done**. Your new field will be shown at the bottom of the table.

tblbooks	
id	
>> Title	

3.3.5. Relationships between tables

Relationships lie at the heart of a relational database. Whilst you can use the *ORDS* simply as a way of hosting and querying multiple flat files (essentially spreadsheets), it is when you combine tables into a relational database that you can unlock the unique advantages of this more sophisticated structure.

Relationships are a way of linking database tables. Two types of relationships are commonly used: one-to-many, and many-to-many.

One-to-many relationships exist between a single entity of one kind, and multiple entities of another. For example, a child can only have one biological mother, but a mother may have many children. (Some mothers, of course, may only have one child, but this does not change the nature of the relationship – the important point is that it is possible for a mother to have multiple children.)

Many-to-many relationships exist between multiple entities of one kind and multiple entities of another. For example, a brother may have multiple sisters, and a sister may have multiple brothers. (Again, the fact that some brothers may have only one sister – or none at all – does not affect the nature of the relationship.)

It is also possible to have a one-to-one relationship within a database. In practice, however, these are rarely used. Within the *ORDS* system, a one-to-one relationship would be implemented in the same way as a one-to-many relationship, but no entity would be linked to more than one entity of the other type.

By expressing relationships between different types of entities, you can avoid typing in the same data into many different cells and avoid the scope for inconsistencies that this creates. Defined relationships also enable far more flexible and interesting ways of querying your data.

Adding one-to-many relationship in an ORDS database

Suppose that a database includes a table which has a number of fields for details of books in a collection. (The table shown below has the **Show field data type in table design?** option turned on – see **section 3.3.3 above for details.**)

tblbooks	
id	
Title	TEXT
Author	TEXT
Publisher	TEXT
Publication_year	INTEGER
Publication_place	TEXT
Edition	INTEGER
Shelfmark	TEXT
Physical_description	TEXT

Consider the **Publisher** field. Each book will have a single publisher, but each publisher is likely to have published many books. This is therefore a one-to-many relationship.

The first step is to create a second table, with fields for the information we would like to record about the publishers.

tblpublishers	
id	INTEGER
Name	TEXT
Location	TEXT
Date_founded	INTEGER

We now need to join the two together. It is best to think of a one-to-many relationship as linking the entries in one field in one table (in this case, the **Publisher** field in **tblbooks**) with whole records from another table (in this case, **tblpublisher**).

We will therefore create the link between the **Publisher** field in **tblbooks** and the **id** field in **tblpublishers**. The **id** field is used because as the primary key for the **tblpublishers**, this is what the *ORDS* uses to uniquely identify the records in that table. (The contents of the primary key field can be thought of as representing the record as a whole.)

A field that is linked to the primary key of another table is known as a foreign key. So in this case, the foreign key is the **Publisher** field.

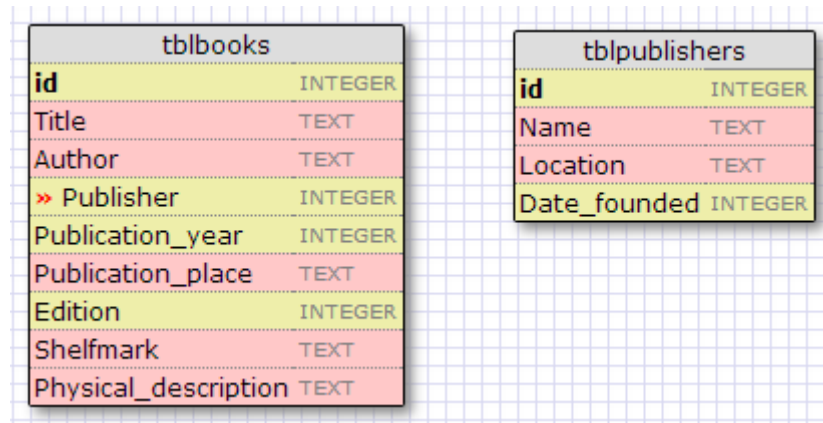
When creating the relationship, it will be helpful to have the two tables side by side in the schema designer. Tables can be moved by clicking the header, holding the mouse button down, and dragging the table to the chosen location.

tblbooks	
id	INTEGER
Title	TEXT
Author	TEXT
Publisher	TEXT
Publication_year	INTEGER
Publication_place	TEXT
Edition	INTEGER
Shelfmark	TEXT
Physical_description	TEXT

tblpublishers	
id	INTEGER
Name	TEXT
Location	TEXT
Date_founded	INTEGER

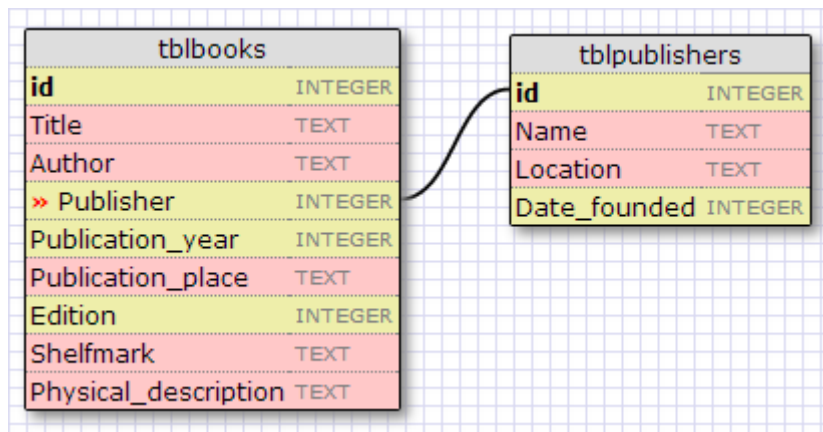
The next step is to ensure that the two fields to be linked have the same data type. This means we need to change the data type of the **Publisher** field to **Integer**. (If this seems counter-intuitive, remember that the **tblpublishers id** field represents the whole record: it is an **Integer** field representing a number of fields of various types.)

To do this, click the **Publisher** field to select it (two small red arrows will appear at the left-hand end of the field), and then click the **Edit field** button in the toolbar. Use the **Type** drop-down list to change the data type to **Integer**, then click **Done**.



Now click the **id** field of **tblpublishers** to select it. This will activate the **Connect foreign key** button on the toolbar; click this button.

To create the relationship, click the **Publisher** field in **tblbooks**. A curved line will appear, joining the two fields.

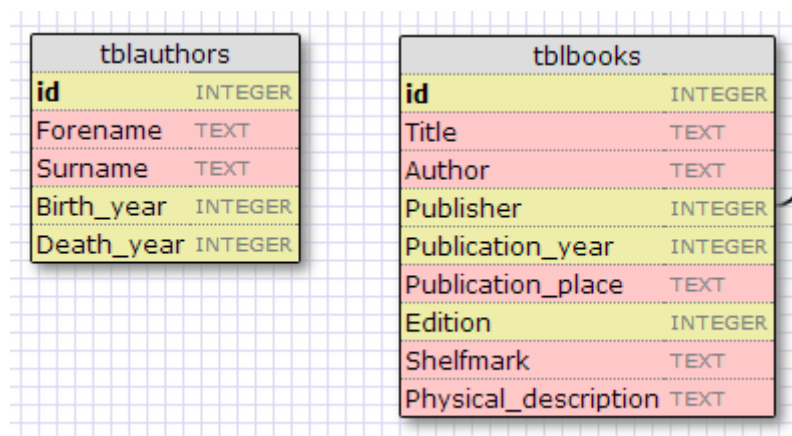


It is always a good idea to **Save** your database structure after establishing a relationship.

Adding many-to-many relationships

As in most database management systems, many-to-many relationships are handled in *ORDS* by creating a link table.

Suppose that we wanted to add a relationship between the **Author** field in **tblbooks** and another table listing author details. First, let's create the table itself.

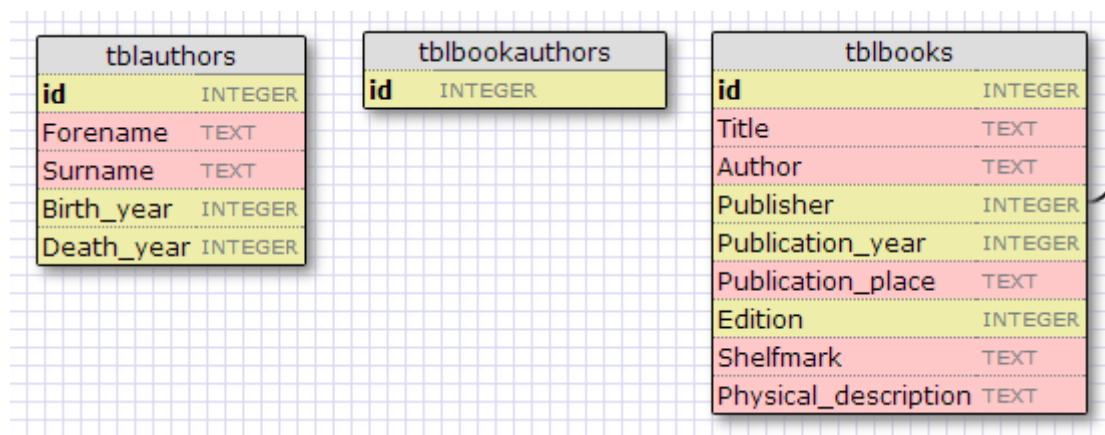


(For convenience, this table has been placed to the left of **tblbooks**. The arrangement of the tables in the schema designer working area does not change the database structure; tables can be moved around as desired.)

If a relationship was created between the **id** field in **tblauthors** and the **Author** field in **tblbooks**, this would be a one-to-many relationship: it would allow the possibility of each author having written multiple books, but it would only be possible to list a single author for each book. However, some books have multiple authors – this is therefore a many-to-many relationship.

To represent this many-to-many relationship, another table is needed. Records in this table will store combinations of authors and books. For example, if *A Natural History of Great Britain* was written by Smith, Jones, and Brown, three records would be added to this table, one for each author-book combination.

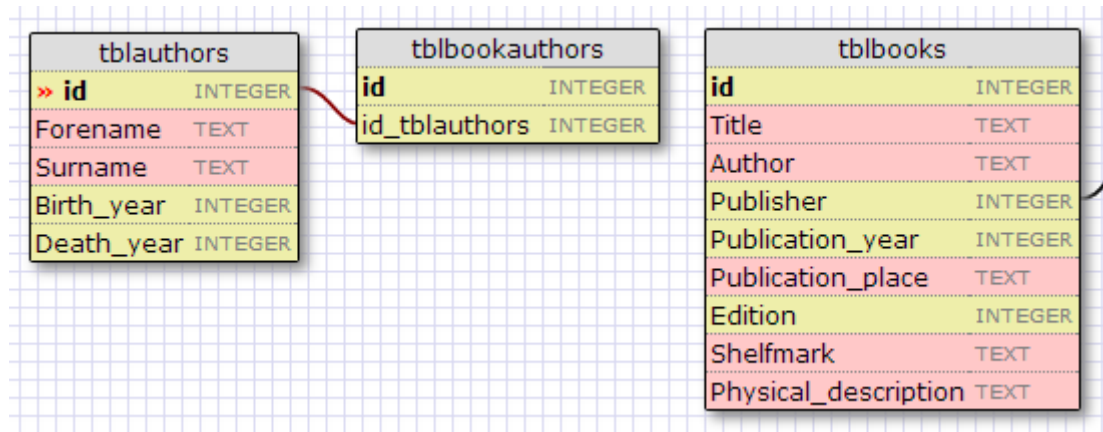
It will be easiest to add the necessary relationships if the new table is positioned between **tblauthors** and **tblbooks**.



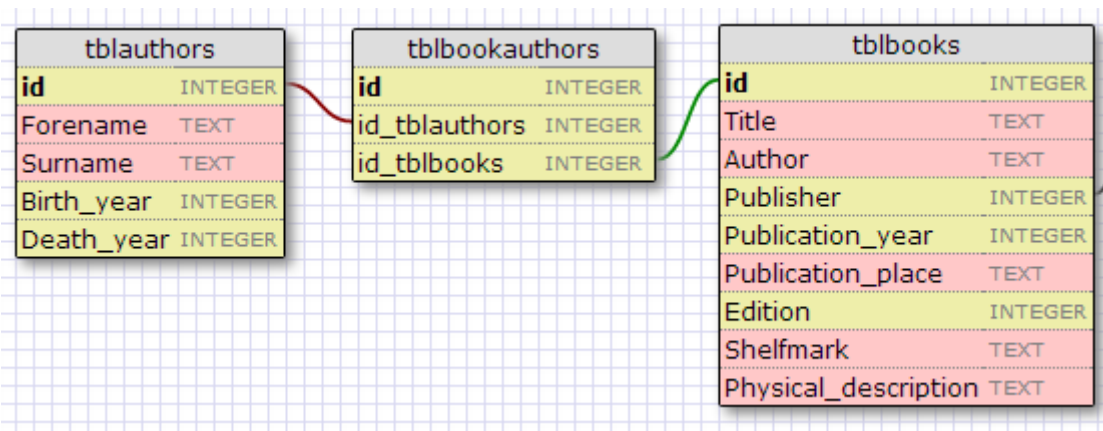
We now need to add two further fields to the new table: one which will be joined to the **id** field of **tblauthors**, and one which will be joined to the **id** field of **tblbooks**.

The quickest way to do this is to create new foreign keys in **tblbookauthors**.

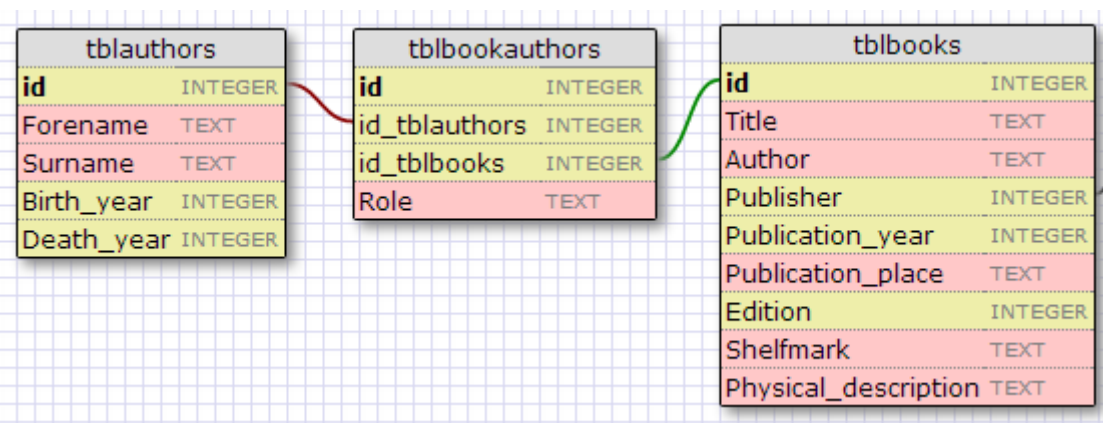
To create a foreign key for the **tblauthors id** field, click **tblauthors id**, then **Create foreign key**, then the header of **tblbookauthors**. The foreign key field will appear in **tblbookauthors**, with a link to the **tblauthors id** field.



Repeat this process for the **tblbooks** id field.



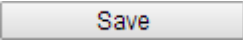
Link tables will often consist only of their own primary key field, plus two foreign key fields. However, it can sometimes be useful to add additional fields. For example, we might add a **Role** field to **tblbookauthors**, which could be used to indicate the part someone had played in the writing of a book (main author, co-author, editor, translator, etc.).



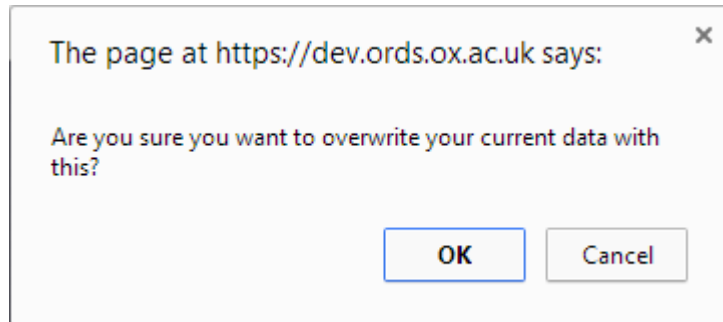
The **tblbookauthors** table would be the most appropriate place for this field, as being (for example) the main author is a property of a particular act of authoring, rather than of an author – because an author might be the main author of one book, and the co-author of another.

3.3.6. Saving changes to a database structure

The schema designer does not automatically save changes. It is therefore important to ensure you save the schema before leaving the page, or any edits you have made will be lost.

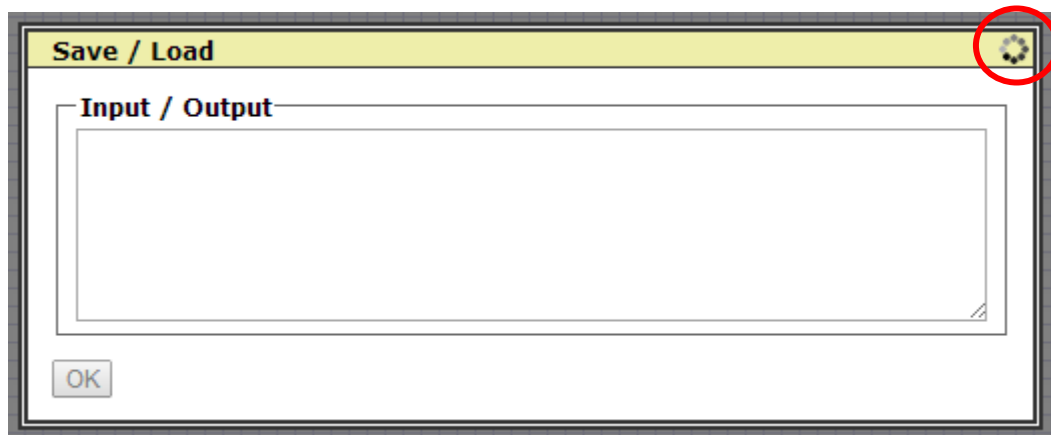
To save your schema, click the  button on the toolbar. You will see two dialogue boxes.


The first will ask you to confirm that you wish to overwrite any existing data (you will see this message even if this is a brand new database and there is no current data).



Click .

This will activate the second dialogue box. You will see a small whirling symbol in the top right-hand corner as *ORDS* attempts to save the database.



If the save operation is successful, you will see a message saying **Database saved**. Click  to close the dialogue box.

If there is a problem with the database structure, the save operation will fail, and you will see an error message. You will need to find and fix any problems before you can save the schema.

It is a good idea to get into the habit of saving the schema regularly as you design your database. This reduces the risk of losing work in the event of a problem with the database structure or a system error.

If you cannot resolve the problems with your database structure, or think you have encountered an error which is preventing you from saving changes, please contact the *ORDS* help desk by emailing ords@it.ox.ac.uk.

If you leave the schema designer open for an extended period without working on it, there is a risk that the system will time out, and you will find you are unable to save any changes previously made. It is therefore sensible to save changes whenever you step away from your computer, or if you change windows to work on another task.

3.3.7. Common problems when changing database structures

If you find that the system will not save your database structure it is likely to be because:

- You have tried to change a variable type but there is already data in that field which is incompatible with the new data type.
- You have two tables with the same name, or two fields with the same name within one table.
- You are trying to create a relationship between two fields that are not of the same variable type.
- Your browser session has timed out – this may happen if you’ve been working on the structure for a long period without saving changes. Do remember to save changes frequently – this also makes it easier to see what might be going wrong if a problem does occur.
- You have more data in a particular table than the *ORDS* can hold in memory (usually around 500,000 records).

If after checking your structure none of these problems are evident, write to ords@it.ox.ac.uk explaining the problem. Including a screenshot of your structure might help the *ORDS* team diagnose the problem. On most computers you can take a screenshot by pressing the PRNTSCRN function key and then pasting the image into a word processor file using **CTRL+v**.

3.4. Milestone and test versions of databases

If you are a project owner or administrator, you can create and delete database versions, and set a test database version to be the main database version.

The *ORDS* system allows you to have up to three versions of each database. When you upload a database or create one using the schema designer, this automatically becomes the main database version. You then also have the option of creating a milestone version, and/or a test version.

At the point when a milestone or test version is created, it will be an exact copy of the main database version at that time. However, after that point, the versions then operate independently: any changes made to the contents or structure of the main version will not affect test or milestone versions, and vice versa.

Main database version

As the name suggests, this is the primary copy of the database. Generally, most of the work (adding or editing records, querying, creating datasets, etc.) will be done with this version.

Milestone database version

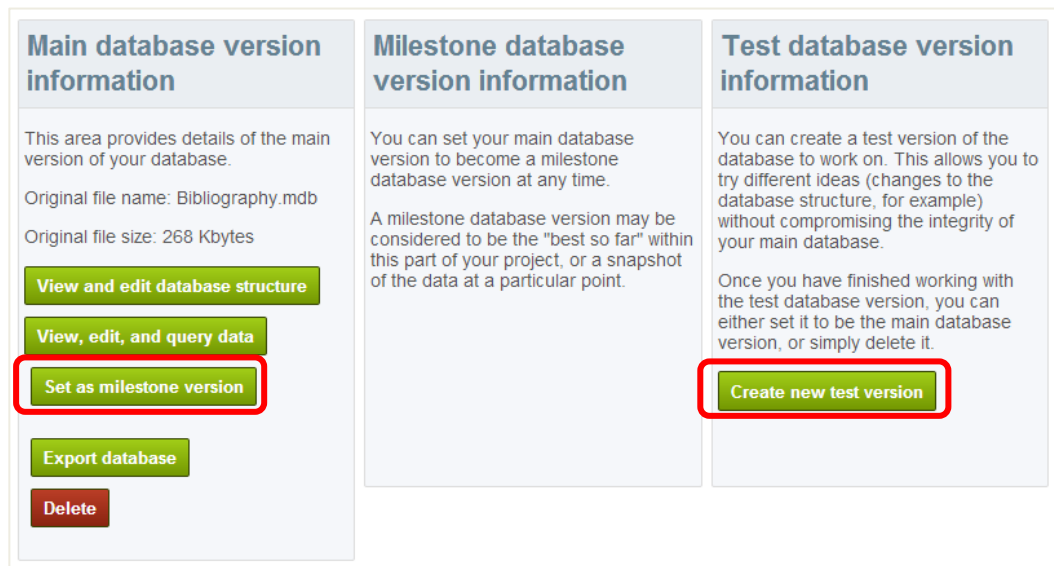
A milestone database version is intended to provide a snapshot of the database as it was at a particular point. This can be used to enable comparison of past and present versions of the data.

Test database version

A test database version is intended to provide a safe environment to experiment with changes before implementing these in the main version. For example, if a major change to the structure of the database is planned, it is best to create a test version and to try the changes here first. If the changes are successful, the test version can be set to be the main database version. Alternatively, the test version can simply be deleted, leaving the main version intact and unchanged.

3.4.1. Creating and deleting a milestone or test version of a database

To create a milestone version or test version of a main database version, simply **click** on the relevant button in the database page:



Clicking on either button should result in a 'success' message, and you will see additional buttons appear in the **Milestone** or **Test** panes. These work in the same way as the corresponding buttons in the **Main database** pane, but will only apply to the database version under which they are listed.

If you create a test version of your database you will see one additional button:

Make this the main database

. Clicking on this button will make the current test version of the database into the new main version, overwriting the design and all of the data currently in the main version. You will be asked to confirm that this is really what you want to do.

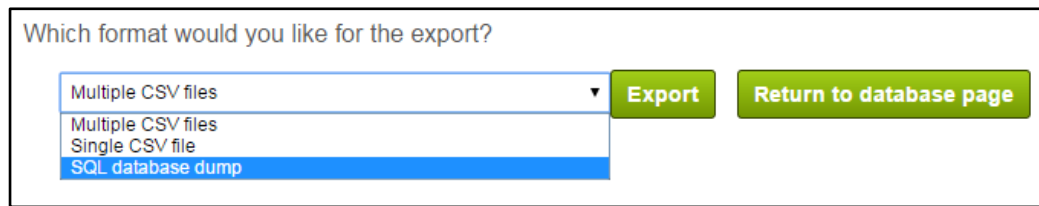
Clicking the **Delete** button under the Milestone or Test versions of a database will delete that version and all of the data therein. Clicking the **Delete** button under the main database version will delete **ALL** versions of the database and all of the data. Only do this if you are sure that you want to start this database again from scratch.

3.5. Exporting databases

If you wish to load your database into another database management system or simply keep a local copy on your own machine, you can export it in its entirety.

You can only export the main version of a database, not the milestone or test versions.

Simply **click** the **Export database** button under the **Main database** pane and select the file format you would like to use for your export.



The screenshot shows a web interface for selecting an export format. At the top, it asks "Which format would you like for the export?". Below this is a dropdown menu with three options: "Multiple CSV files", "Single CSV file", and "SQL database dump". The "SQL database dump" option is currently selected and highlighted in blue. To the right of the dropdown are two green buttons: "Export" and "Return to database page".

There are three different database export formats:

- A PostgreSQL dump
- A single .csv file
- Multiple .csv files

A PostgreSQL dump exports all of your data along with information about the structure of your data, including the relationships between tables. This is the ideal choice if you want to retain all information about your database. The file will be saved with the extension .sql. Because PostgreSQL is an open standard, you should find that there is a wide range of software available into which you can upload your database file.

.csv files are simple comma-separated value files. There is a huge variety of software that will allow a .csv upload, including database software, spreadsheet software, data analysis software, and so forth. The only problem with .csv files is that they will not retain information about the structure of your database, only the table names, field names, and the data itself. Any relationships you have established between tables will be lost.

Downloading your database as a single .csv file will combined all tables in your database into a single file. Downloading multiple .csv files will create a zipped download containing a separate file for each table.

Click  to save your database to your computer.

On a *Windows* machine, the file will be downloaded to your **Downloads** folder by default.

Exercise 2: Creating a new project and importing a database file

Now look at this exercise (page 54).

Exercise 3: Viewing and editing the database structure

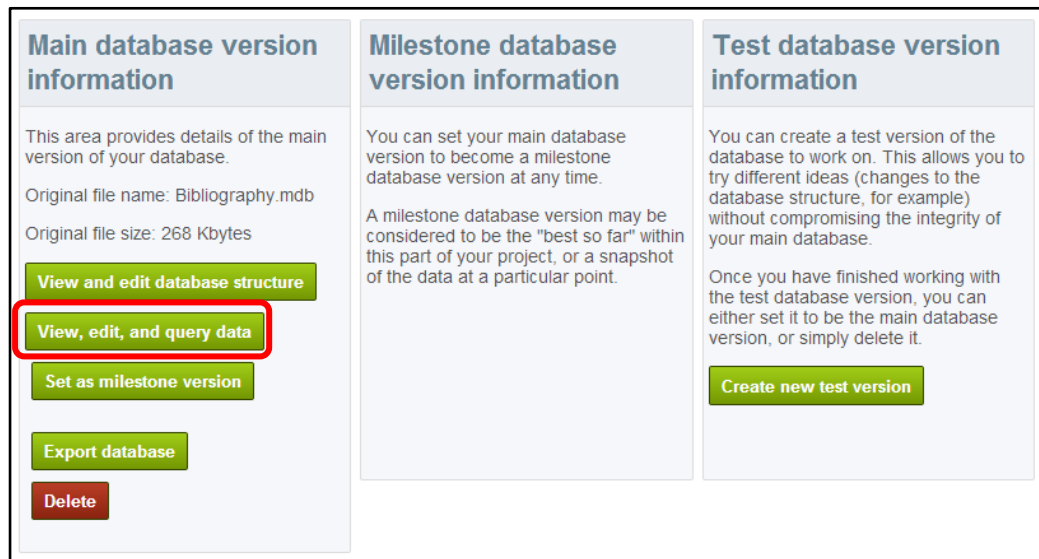
Now look at this exercise (page 57).

4 Editing data

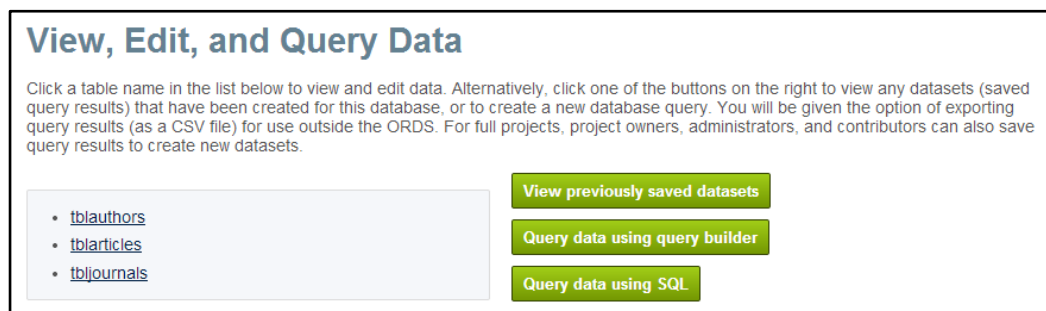
Once you are happy with your database structure, you probably won't go back to use the schema designer very frequently. Most of your work will be done using the data editing interface.

4.1. The ORDS editing screen

To view and edit data in the main database version, click the **View, edit, and query data** button in the main database panel on the database page.



You will be taken to the database functions page, where you will see a list of the tables in the database.



To view the contents of a table, click the table name. The data contained in the table will be displayed.

Table data for tblauthors. This is the main database version.

records #: 1 to 9 of 9 Page: 1 of 1 Go To Row: Records per page: 100 ▼

id [auto increment]	author_name	date_of_birth	date_of_death	Delete
2	Smith, Alice	1894	1986	Delete
3	Jones, Gerard	1968	-	Delete
4	Hills, Paul	Unknown	-	Delete
5	Painter, Mary	1969	-	Delete
6	Michaels, Sarah	Unknown	-	Delete
7	Market, Bob	1945	-	Delete
8	French, George	1952	-	Delete
9	Stacey, P. G.	1955	-	Delete
10	Appleton, Lucy	1936	-	Delete

Save changes

Add new record

If the database table currently contains no records, you will see just the table description and the **Add new record** button.

If, on the other hand, the table contains more than a hundred records, these will be divided into pages. At the top of the data table display window, you will see a summary of which records you are currently viewing, the total number of records in the data table.

Table data for city. This is the main database version.

records #: 1 to 100 of 3113 **Next >>** Page: 1 of 32 Go To Record:

You can move between pages using the **<< Previous** and **Next >>** buttons. You can also skip to a specific record by typing the record number into the **Go to Record:** box and then pressing ENTER.

Beneath the pagination bar, you will be able to see the actual data records in the selected table. To edit the records on-screen, simply click in the cell you wish to edit and then change the data to the desired value. The cell will turn blue to indicate that the data has been altered. You can edit more than one cell at a time before saving your changes.

To save your edits, simply **press** ENTER, or **click** on the **Save changes** button.

The table will re-load and you should see your changes in the display.

Note that if you try to enter data in a cell that is not compatible with the data type for that field, the *ORDS* will give you an error message and your edits will not be saved.

4.2. Editing data in linked tables

If you are editing data in a table that has relationships with other tables in your database, you will notice that the linked fields work slightly differently from unlinked fields.

The database table shown below is a list of articles from a bibliographic database. Each record includes information about the article's author, and the journal in which the article was published. This information takes the form of a link to another table in the database – **tblauthors** for the author information, and **tbljournals** for the journal information.

Table data for tblarticles. This is the main database version.

records #: 1 to 15 of 15 Page: 1 of 1 Go to: Records per page: 100

	author (links to table: tblauthors) Viewed column: id	title	journal (links to table: tbljournals) Viewed column: id	year	volume
1	10	Medieval Saints	5	1986	25
2	4	Fuedal Lords and Ladies	2	1998	95
3	2	Art and Architecture in 17	4	1972	45
4	3	Politics of Identity in the E	5	1992	31
5	2	Ecclesiastical Courts and	5	1993	32

By default, the author and journal fields for each record in the **tblarticles** table display the ID numbers of the **tblauthor** and **tbljournal** records. This is not very informative if you are trying to edit the records.

To change this, you can **click** the drop-down list at the top of the column, and select the field from the linked table that you would like to view.

Table data for tblarticles. This is the main database version.

records #: 1 to 15 of 15 Page: 1 of 1 Go to: Records per page: 100

	author (links to table: tblauthors) Viewed column: id	title	journal (links to table: tbljournals) Viewed column: id	year	volume
1	id	Medieval Saints	5	1986	25
2	4	Fuedal Lords and Ladies	2	1998	95
3	2	Art and Architecture in 17	4	1972	45
4	3	Politics of Identity in the E	5	1992	31
5	2	Ecclesiastical Courts and	5	1993	32

The table should now update to display the data from the selected field.

Table data for tblarticles. This is the main database version.

records # 1 to 15 of 15 Page: 1 of 1 Go to: Records per page: 100 ▼

id	author (links to table: tblauthors) Viewed column: author_name ▼	title	journal (links to table: tbljournals) Viewed column: id ▼	year	volume
1	Appleton, Lucy ▼	Medieval Saints	5 ▼	1986	25
2	Hills, Paul ▼	Fuedal Lords and Ladies	2 ▼	1998	95
3	Smith, Alice ▼	Art and Architecture in 17	4 ▼	1972	45
4	Jones, Gerard ▼	Politics of Identity in the E	5 ▼	1992	31
5	Smith, Alice ▼	Ecclesiastical Courts and	5 ▼	1993	32

Where a field is linked to another table, you cannot simply write into that field the value you would like, you must select it from the records in the linked field. This ensures the integrity of the database, and it is also a useful way to ensure that data editors are consistent – there is no opportunity for typos or alternative forms of words or names.

If you have a lot of records to select from in the linked table, you can start writing the name of the record you are looking for into the search box in the drop-down list. This will narrow down the available options.

If you wish to add a new option to select, you will need to add that record in the source table.

4.3. Adding and deleting records

If you are the project owner, a project administrator, or a contributor, you can add new records to database tables.

Open the table to which you wish to add a new record. Click the **Add new record** button, which is located towards the bottom of the window.

This will take you to the **Add New Record** form.

Add New Record

To add a new record to the table, complete the fields below. Fields marked '[auto increment]' will be completed automatically by the ORDS system.

The capitalized label beneath the field name indicates the field's data type. This may restrict what can be entered in the field. If you need to change a field's data type, you can do this via the schema design page.

	year	<input type="text"/>
	VARCHAR	
	volume	<input type="text"/>
	VARCHAR	
	author	<input type="text" value="[null value]"/>
	(links to table: tblauthors) Viewed column:	
<input type="text" value="author_name"/>		
	pages	<input type="text"/>
	VARCHAR	
	id	<input type="text" value="[auto increment]"/>
	INTEGER	
	title	<input type="text"/>
	VARCHAR	
	journal	<input type="text" value="[null value]"/>
	(links to table: tbljournals) Viewed column:	
<input type="text" value="journal_name"/>		

This form is generated automatically according to the types of field in the table. For each field you will see the field name with the type of data it takes indicated below.

Fields that are linked to other tables include a drop-down list of the records you can select from, with another drop-down list below and to the left of the field from which you can select the column from the linked that you wish to select from.

Fields with certain special data types, such as **Date**, **Time**, or **Timestamp**, indicate the format in which you should enter the data in light grey text (e.g. **hh:mm:ss** for **Time**), along with a date-picker (or equivalent tool) to the right.

Auto-increment fields are greyed-out: the *ORDS* will automatically assign a unique number to such fields when you add the record. This prevents two records being created with the same number when you have multiple project members adding data at the same time. If you wish to be able to input a number of your own choosing in such fields, you will need to go to the schema designer and de-select the auto-increment box.

Boolean data fields only accept **true** or **false** values. A tick box is provided.

Once you are happy with the contents of the form, save the new record by clicking either or , as desired.

To delete a record, go back to the data editing interface simply **click the** button by the right-hand side of the record you wish to delete. You will be asked to confirm the deletion before proceeding.

If a record is linked to by records in other tables, *ORDS* will not let you delete it: after clicking you will instead see an error message. To be able to delete the record, you will first need to delete or edit all the other records that link to it.

4.4. Adding new records in bulk

At present, each new record you add to a table needs to be added by hand. If you wish to add or upload records in bulk, contact the *ORDS* team at ords@it.ox.ac.uk for support. They may be able to write a script that will add a large number of new records to an existing table.

Exercise 4: Viewing and editing data

Now look at this exercise (page 60).

5 Querying a database

All *ORDS* project members are permitted to query databases within the project, even viewers.

From the database page, click the **View, edit, and query data** button under the database version you wish to query.

You will be taken to the **View, Edit, and Query Data** page, where you will see a list of the tables in the database, plus a number of buttons. Two of these buttons – **Query data using query builder** and **Query data using SQL** – will take you to *ORDS* query tools.

View, Edit, and Query Data

Click a table name in the list below to view and edit data. Alternatively, click one of the buttons on the right to view any datasets (saved query results) that have been created for this database, or to create a new database query. You will be given the option of exporting query results (as a CSV file) for use outside the ORDS. For full projects, project owners, administrators, and contributors can also save query results to create new datasets.

- [tblauthors](#)
- [tblarticles](#)
- [tbljournals](#)

View previously saved datasets

Query data using query builder

Query data using SQL

The **Query Builder** allows you to construct simple queries using drop-down lists. It is straightforward to use, but its scope is quite limited. The **SQL Query Box** is much more powerful, but requires knowledge of SQL (Structured Query Language). The **Query Builder** will be further developed during 2015 to enable the construction of a wider range of query types.

5.1. The Query Builder

The **Query Builder** tool enables the construction of SQL queries without the need to learn SQL. It allows you to select a table from your database, and display the contents of some or all of the fields in that table.

[My Projects](#) [Sample project](#) > [Database Details](#) > [View, Edit, and Query Data](#) > [Datasets](#) >

Build a query for main version of Bibliography database.

This screen will allow you to construct simple database queries. Please note that this tool is a work in progress.

When you select a table from the drop-down list below, a list of the columns within that table will appear. Select the columns whose contents you'd like to see displayed (you can select multiple columns by holding down Ctrl as you click), then click the 'Build query' button. Finally, click 'Run query' to see the results.

Query Builder

Table	Columns to show
Select table ...	

Build query

SQL Query

Clear query Run query

Save query results as dataset

Export query results as CSV

Start by selecting a table, using the **Table** drop-down list.

Query Builder

Table	Columns to show	
Select table ... Select table ... tblauthors tblarticles tbljournals		Build query
<div>Clear query Run query</div>		

A second list will appear under **Columns to show**, listing the fields from the selected table.

Query Builder

Table	Columns to show	
tblarticles	All_Data id author pages year volume	Build query

You can either select **All_Data** (which selects all fields in the table), or a subset of the fields by clicking the appropriate items in the list. To select multiple items, hold down CTRL as you click.

Query Builder

Table	Columns to show	
tblarticles ▼	author pages year volume journal title	Build query

Now click **Build query**.

The query builder will generate an SQL statement, which will appear in the **SQL Query** box.

Query Builder

Table	Columns to show	
tblarticles ▼	author pages year volume journal title	Build query

SQL Query

```
select "author","journal","title" from
"tblarticles"
```

Clear query Run query

Finally, click **Run query**. Your query results will be displayed at the bottom of the screen.

Query data for 'select "author","journal","title" from "tblarticles"'. This is the main database version.

records #: 1 to 15 of 15 Page: 1 of 1 Go To Row:

author	journal	title
9	5	Medieval Saints
4	2	Feudal Lords and Ladies
2	4	Art and Architecture in 17th Century Parish Churches
3	5	Politics of Identity in the Early Church
2	5	Ecclesiastical Courts and Changing Ideas of Justice
7	2	England, our England
3	3	Colonial Conceptions of Identity
8	3	Symbolism in West African Traditional Art
8	5	The Spirituality of Slavery
6	4	Doctors of the Church: Religion and Health in Medieval Europe
9	2	The War of the Roses and Female Emancipation
7	3	Early Modern Perceptions of Englishness

Query results can be sorted alphabetically and numerically by clicking the column headers. Clicking a column heading once will sort the results 1-n or a-z (depending on the type of data in that field). Clicking it again will reverse the order.

Note that in the example above the **author** and **journal** fields display only numbers. This is because both those fields link to other tables in the database – what is being displayed here are the primary keys of the records linked to. In order to display the author or journal name, you will need to use an SQL statement.

5.2. SQL queries

The **SQL Query Box** is a flexible tool, which allows more complex queries to be constructed. These include queries which draw data from multiple tables, or which include conditional statements.

Although SQL may initially look slightly cryptic, it is possible to gain a reasonable grasp of the main principles relatively quickly. Plenty of books and online guides to the language are available. In particular, W3schools.com offers a helpful tutorial at <http://www.w3schools.com/sql/>.

If you need assistance with querying your database, the *ORDS* team may be able to help: please contact the help desk by emailing ords@it.ox.ac.uk.

To open the **SQL Query Box**, click **Query data using SQL** from the table list page. (Alternatively, you can start by using the **Query Builder** to design a query, and then add to that by typing into the query box on that page.)

My Projects Sample project > Database Details > View, Edit, and Query Data > Datasets >

Build a query for main version of Bibliography database.

This screen will allow you to construct database queries using SQL.

Please be aware that SQL is a powerful query language - as well as allowing you to view and analyse the contents of your database, it can also be used to edit or delete data and database tables. If this occurs, it may be difficult (in some cases impossible) to retrieve the original data. If you would like to learn how to construct SQL queries, there are plenty of books and online guides available. W3schools.com offers a helpful [SQL tutorial](#).

If you would like to save a copy of the results of your query, you can export the results as a CSV file. For full projects, project owners, administrators, and contributors can also save the results as an ORDS dataset.

SQL Query

Clear query

Run query

Save query results as dataset

Export query results as CSV

Type your SQL query into the **SQL Query** box, and **click** **Run query**. Your query results will be displayed at the bottom of the screen. As before, your results can be sorted by clicking on the column headings.

5.2.1. SQL basics

Whilst this course book is not the place to give a full description of SQL (Structured Query Language), the basic commands that you might wish to use in *ORDS* are fairly straightforward.

- **SELECT** statements indicate from which field(s) data should be returned
- **FROM** statements indicate the table(s) in which those fields are to be found
- **JOIN / ON** statements are used when you wish to query multiple tables
- **WHERE** statement provide the conditions that a record must meet in order to be listed in results; **AND** and **OR** can be used for advanced queries
- **ORDER BY** statements control the order in which results are returned

In order to return particular columns from a given table, you would write a query such as:

```
SELECT field1, field3, field4 FROM table1
```

If you only wanted to return records which met a particular criteria (such as the data in one field being greater than 100), then your query would look something like this:

```
SELECT field1, field3, field4 FROM table1 WHERE field4>100
```

If you wish to combine results from multiple tables, you need to indicate which tables you are drawing information from and how the tables are related. It's common practice to use a form of shorthand to indicate which table each field belongs to, for instance:

```
SELECT a.field1, a.field3, a.field4, b.field1 FROM table1 a JOIN table2 b ON a.field2 = b.field2 WHERE a.field4>100
```

The letters indicated after the table names in the FROM/JOIN part of the query are placed before the field names (followed by a full stop) to define exactly which table the fields belong to.

If any of your table names or field names include spaces, you will need to enclose these in double quotation marks, so that *ORDS* recognizes the name as a single entity. For instance:

```
SELECT "field one", "field two" FROM "my table"
```

If your SQL query is not properly formed, you'll just get an error message. You can't delete data from the *ORDS* by simply entering a 'wrong' query.

5.3. Exporting query results

Whichever query tool you use, you have the option of exporting the results of your query as a CSV file. This allows them to be viewed outside the *ORDS*, or to be imported into other software for analysis.

To export the results of your query, **click** [Export query results as CSV](#).

You can save the results, or, depending on the default settings of your computer, they may be opened automatically in a spreadsheet.

5.4. Saving query results as datasets

Project owners, project administrators, and contributors can also save their query results within the *ORDS*, as a 'dataset'.

You cannot save queries in a trial databases – you will need to apply for a full project first.

In order to create a saved query, **click** on [Save query results as dataset](#) after running a query. This will open the **Save Query** dialogue:

The screenshot shows the 'Save query results as dataset' form in the ORDS interface. The header bar includes the ORDS logo, a search bar, and user information for James A J Wilson. The form itself has a title 'Save query results as dataset' and several input fields: 'Dataset name' (with a subtext 'The name of this dataset'), 'Description' (with a subtext 'Please give a description of this dataset'), 'Query' (with a subtext 'The query used to create this dataset' and containing the text 'select "cityname","id" from "city"'), and 'Authorization' (a dropdown menu currently set to 'public'). There is also a checkbox for 'Create as static dataset' with a subtext explaining that it creates a snapshot of the data. At the bottom are 'Cancel' and 'Save' buttons.

Similar to the **Create Project** and **Create Database** forms, this form allows you to give your new dataset a title and description, as well as defining who can access it and whether it is 'static' or 'dynamic'.

One of the features of the *ORDS* is that you can share or publish datasets even whilst keeping your underlying database private. If you **Save** your dataset with the **Authorization** set to **public** then people will be able to search for it and view it without needing to be logged in to the *ORDS*. Each public dataset is given its own unique URL so that it can be cited online or in publications.

Ticking the **Create as static dataset** box will result in your dataset being saved as a 'static' dataset, meaning that the dataset will be permanently fixed in the form it was when it was saved. If the underlying data later changes, these changes will not be reflected in the dataset. If the box is unchecked then the dataset will be saved as 'dynamic'. If the data in the underlying database is later changed, these changes will also appear in the saved dataset.

If you are planning on publishing the dataset, it is generally wise to save it as static. If you are saving it in order for other project members to refer to it in future, then a dynamic dataset may be preferable.

Once you have created and saved your dataset, it will be added to the list of datasets belonging to your database. To access this list, click the

View previously saved datasets button on the **View, Edit, and Query Data** page.

The screenshot displays the ORDS web interface. At the top, there's a dark blue header with the 'ORDS' logo on the left, a search bar in the center, and user details 'James A. J. Wilson' with a 'Log out' link on the right. Below the header, a breadcrumb trail shows 'My Projects > My First Project > Database Details > Database Functions'. The main section is titled 'View, Edit, and Query Data'. It contains a paragraph explaining how to view and edit data, and how to create new datasets. On the left, there's a list of tables: 'country', 'city', and 'province'. On the right, there are three buttons: 'View previously saved datasets' (which is highlighted with a red rectangular box), 'Query data using query builder', and 'Query data using SQL'. At the bottom, there's a footer with links for 'Privacy', 'Help', 'About us', and 'Contact us', the 'University of Oxford' logo, and the text 'Current Version: 1.0.5 - 3698'.

This will take you to the **Dataset List** for the current database:

My Projects > My First Project > Mondial > Table List for Mondial > Datasets

Dataset List for Mondial

Your dataset has been saved.

Dataset Name	Dataset Description	Query	Visibility	Static			
Big cities	Cities with over a million inhabitants	select "cityname","id","population" from "city" WHERE population>1000000 order by "population" desc	public	true	View query data	Edit	Delete dataset
Cities in Australia	A list of the cities in Australia, with populations	SELECT cy.id, cy.cityname, cy.population, co.countryname FROM city cy JOIN country co ON cy.country=co.code WHERE co.countryname='Australia' order by "population" desc	public	true	View query data	Edit	Delete dataset
All cities	All information	select * from "city"	public	false	Run query	Edit	Delete dataset

[Query data using query builder](#) [Query data using SQL](#)

The **Dataset List** shows all saved datasets in the current database and enables project members to re-run them, and, if they have the appropriate permissions, edit or delete them. The list also shows at a glance whether the dataset is viewable by the public, and whether it is static or dynamic.

Exercise 5: Querying a database

Now look at this exercise (page 63).

Exercise 6: Creating a new database from scratch

A final exercise drawing together a number of processes covered in this course book (page 66).

6 Connecting to the ORDS from third-party software and websites

The *ORDS* is a service that both hosts databases and provides online tools for viewing, editing, and querying the data it hosts. You may, however, wish to use the *ORDS* as a secure database hosting platform without using the online tools. You may, for instance, wish to edit your database using customized data entry forms that you have designed in *Microsoft Access* or other desktop software, or perhaps you have a project website and would like people to be able to access the information hosted by the *ORDS* to be searchable via that website.

This is possible in the *ORDS* via the use of an ODBC (Open DataBase Connectivity) connection.

In order to establish an ODBC connection with the *ORDS*, whether from desktop software or a website, you need to know the following information:

- The URL where your database is being hosted
- The IP (Internet Protocol) address from which your computer is making the connection
- The port number via which communications are being received
- Your ODBC password

As of the 21st November 2014, you will need to email the *ORDS* team (ords@it.ox.ac.uk) your current IP address in order for the team to supply you with the rest of the information you need to connect. You can find your current IP address by directing your browser to <http://www.whatismyip.com/>, or similar Internet sites.

By 2015, the process of setting up an ODBC connection will be more automated.

When you navigate to your account screen (by clicking on your account name in the *ORDS* title bar), you will be able to submit your IP address directly via the *ORDS* and set the password you will need to use to make the connection. The *ORDS* will list the projects in which you are involved and the URL that you need to use to make the connection.

You will still need to enter this information into the editing software you wish to use to access the *ORDS* database (or your website code), as this is where the connection needs to be established. Additional documentation will be provided describing how to do this from the *ORDS* website (<http://ords.ox.ac.uk/>) once the ODBC service is launched.

7 What next?

Courses offering training in database management software, database design and related topics are described below. In all cases, please refer to the IT Learning Programme web page (via www.it.ox.ac.uk/courses/) for further details.

7.1. Database design courses

Databases: Concepts of database design

Historical Research: Databases for research in History and Archaeology

7.2. Relational database management systems courses

Databases: Building a database using Access

Databases: Creating a user interface using Access

Databases: MySQL introduction

Databases: MySQL further techniques

Databases: Querying and analysing data using Access

Databases: Reporting data using Access

7.3. Computer8

We encourage everyone to work at their own pace. This may mean that you don't manage to finish all of the exercises for this session. If this is the case, and you would like to complete the exercises while someone is on hand to help you, come along to one of the Computer8 sessions that run during term time. More details are available from www.it.ox.ac.uk/courses/

7.4. Further help

It may be possible for you to use ITLP facilities in IT Services, Banbury Road to work through the exercises in this booklet after the course, or when you don't have access to the applications on your own computer. Contact us on courses@it.ox.ac.uk for details.

The IT Services Help Centre is a good place to get advice about any aspect of using computer software or hardware. For Help Centre opening times, visit www.it.ox.ac.uk/help/gettinghelp/ and follow links to the General Helpdesk, or contact them by email on help@it.ox.ac.uk.

7.5. Downloadable course materials and more – the ITLP Portfolio

These course materials are available through the ITLP Portfolio, at <http://portfolio.it.ox.ac.uk>.

Each course pack includes the course handbook in pdf form and a zip folder of the exercise files that you need to complete the exercises. Archive versions of the course book may also be useful if you use an earlier version of the software.

The ITLP Portfolio helps you find articles, videos, resources and weblinks for further IT study. For some resources, you will be asked for your Oxford (SSO) username and password.

It may be possible for you to use the facilities at IT Services to work through the exercises in this booklet, or use any of the applications that are available. Contact us on courses@it.ox.ac.uk for details.

7.6. Useful websites

The main *ORDS* website is at <http://ords.ox.ac.uk/>.

The *ORDS* application is at <https://app.ords.ox.ac.uk/>.

Appendix: Student Exercises

Exercise 1 Registering to use the ORDS

- Open a browser and navigate to the ORDS website
- Log in to the ORDS
- Register with the ORDS system, and verify your account

Task 1 Open the ORDS website

Step 1
Start the computer if necessary.

Step 2
Click the **Start** button on the **Task Bar** at the bottom of the screen.

Step 3
If *Mozilla Firefox* appears on the **Start** menu, double-click on it.

Otherwise, start to type **Firefox** in the **Search programs and files** box, and double-click the entry when it appears.

(You can use a different browser if you prefer.)

Step 4
Type **http://app.ords.ox.ac.uk** in the address bar, then press ENTER.

Task 2 Log in to the ORDS

Step 1
When the ORDS home page appears, click the **Log in using SSO** button.

Step 2
When the SSO log in screen appears, enter your username and password.

Click the **Login** button, then click the **✓ Continue** button on the confirmation page that follows.

(Your SSO username and password are those that you will use to access many University services, such as email, library resources, and WebLearn. Your SSO username will usually have the form **abcd1234**.

If you do not have an SSO username and password, please speak to the course instructor.)

Task 3

Register with the *ORDS* system, and verify your account

Step 1

If this is the first time you have used the *ORDS*, you will now be prompted to register. (If you have already registered, you will be taken straight to the *ORDS* welcome page.)

When the registration form appears, you will probably find that your details have been completed automatically. Check that your name and email address are appearing correctly, and edit them if necessary.

If the form has not been completed automatically, enter your name and your University email address.

When you are happy that your name and email address are correct, click the  button.

Step 2

Clicking  will trigger a confirmation email.

Open another browser tab, go to

<http://nexus.ox.ac.uk/>, and log in to your email account.

Find the *ORDS* confirmation email (this will have the subject line **Message from ORDS**) and open it. The email will contain a link; click on this to verify your *ORDS* account.

(If you do not see the confirmation email in your inbox, please check your junk email folder. If the message has not arrived within a few minutes of registering, please inform the course instructor.)

After clicking the link, you will be taken back to the *ORDS* welcome page, and should see a message confirming that your account has been verified.

Step 3

You will now have two tabs open showing the *ORDS* welcome page. Close one of these, but leave the other open for the next exercise.

Exercise 2 Creating a new project and importing a database file

- *Create a new ORDS project*
- *Request full project status*
- *Create an empty ORDS database*
- *Import an existing database file*

Task 1

Create a project

Step 1Go to the *ORDS* welcome page.

(You should already have this on the screen from the previous exercise; if not, go to <http://app.ords.ox.ac.uk> and log in again.)

Step 2Click the  button.**Step 3**

When the **Create a New Project** form appears, complete the **Name** and **Description** fields.

Type **My First ORDS Project** (or another name of your choice) in the **Name** field.

The **Description** field is intended to provide a summary of key information about the project. For now, type **A project created during an ORDS training session** in this field – you can return and edit this later if you choose.

You can also complete the **Start date** and **End date** fields if you wish, but this is optional.

Leave the **Hide project metadata?** and **ODBC access for project** check boxes unticked.

Step 4

When you have completed the form, click .

You will be returned to the *ORDS* welcome page, where you should see a message saying **Project created successfully**.

Underneath this will be a list of the *ORDS* projects you are currently involved in, including the project you have just created.


Task 2




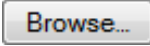

Request full project status

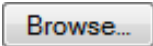

Step 1

The project you have just created will be a trial project. However, some of the later exercises require you to have a full project.

On the *ORDS* welcome page, click on the name of the project you have just created.

When the project page appears, scroll to the bottom of the page and click . This will trigger a full project request. You will be notified by email when the project has been upgraded.

<p>Task 3</p> <p>Create an empty database</p>	<p>Step 1</p> <p>The project page for the project you created in Task 1 should still be on the screen. If not, go to the <i>ORDS</i> welcome page and click the project name.</p> <p>Click .</p> <p>Step 2</p> <p>When the Add Database to Project form appears, complete the Name and Description fields.</p> <p>In the Name field, type Victorian Gentlemen's Clubs.</p> <p>In the Description field, type A database of members of London gentlemen's clubs in the Victorian era.</p> <p>Step 3</p> <p>Click the small calendar icon at the right-hand end of the Created on field. A calendar will appear with today's date highlighted in pink.</p> <p>Click the highlighted date to add the date to the field.</p> <p>Leave the other fields blank for the moment.</p> <p>Step 4</p> <p>When you are happy with the contents of the form, click  to create the database.</p> <p>You will be taken back to the project page, and should see a message confirming that the database has successfully been created.</p> <p>The name of the new database will now appear in the list of <i>ORDS</i> databases for the project.</p>
<p>Task 4</p> <p>Import an existing database file</p>	<p>Step 1</p> <p>On the project page, click the name of the database you have just created.</p> <p>Step 2</p> <p>When the database page opens, click .</p> <p>Step 3</p> <p>When the Upload a database to ORDS page opens, click . (Note: if you are using a browser other than <i>Firefox</i>, the labelling of this button may vary.)</p> <p>Step 4</p> <p>When the File Upload dialogue opens, navigate to Drive H:</p> <p>Click the file called Clubs_database to select it, then click .</p>

	<p>Step 5</p> <p>You will be returned to the Upload a database to ORDS page. You should now see the name of the file just selected alongside the  button.</p> <p>Click .</p> <p>Step 6</p> <p>You will be returned to the project page, and should see two messages: one confirming that your database will be uploaded, and the other saying you will be notified by email when the process is complete.</p> <p>Leave the project page on the screen for the next exercise.</p> <p>If you log in to your email account, you should also see two messages from <i>ORDS</i>: one saying that the database has been sent to the servers for processing, and one confirming that the upload was successful.</p> <p>(With large files, it may take some time for the second email to arrive. However, this database file is quite small, so should be processed quickly. If you have not received the second message after a few minutes, or if you receive a message saying there was a problem with the upload, please inform the course instructor.)</p>
--	--

Exercise 3 Viewing and editing the database structure

- *View the database structure*
- *Add comments to database tables and fields*
- *Rename a field*
- *Add a new field to a table*
- *Save your changes and exit*

Task 1

View the database structure

Step 1

The project page for the project created in **Exercise 2** should still be on the screen. If not, you can reach this from the *ORDS* welcome page by clicking the name of the project.

Click the name of the database created in **Exercise 2**.

Step 2

When the database page appears, find the **Main database version information** pane (you may need to scroll down a little), and click

View and edit database structure.

Step 3

When the schema design page appears, you will see the database tables (each of which contains several fields), joined by curved lines which represent the relationships between them.

You can move tables around on the page by clicking a table's grey header bar and dragging it.

Arrange the tables on the screen so you can see all of them clearly, without the relationship lines crossing each other. (This is easiest if the **club_memberships** table is in the middle, with the others around it.)

Task 2

Add comments to database tables and fields

Step 1

Tables and fields in *ORDS* databases may have comments added to them, which can be used to record additional information.

Let's add a comment to the **evidence** table.

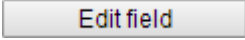



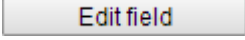

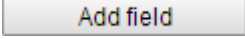
Click the header of the **evidence** table to select it (the table border will change colour). Then click the


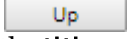
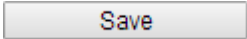
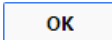

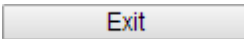
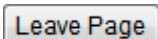
Edit table button in the toolbar on the right-hand side of the screen.

When the **Edit table** dialogue box appears, type **Details of the work in which evidence of club membership is found**, then click **OK**.

Step 2

View the comment by hovering the mouse pointer over the table header.

	<p>Step 3 Now let's add a comment to the end_date field in the addresses table. Click the field to select it (two small red arrows will appear next to the field name).</p> <p>Click the  button in the toolbar on the right-hand side of the screen.</p> <p>The addresses table will expand to show various additional options. Click .</p> <p>In the dialogue box which appears, type If club still at address, enter 2014. Then click . The comment will appear at the bottom of the table.</p> <p>Finally, click  to shrink the addresses table back to its normal size.</p> <p>Step 4 View the comment by hovering the mouse pointer over the field.</p>
<p>Task 3 Rename a field</p>	<p>Step 1 Click the first_name field in the people table to select it (two small red arrows will appear next to the field name).</p> <p>Step 2 Click the  button in the toolbar on the right-hand side of the screen.</p> <p>Step 3 The people table will expand to show various additional options. The field name will be highlighted.</p> <p>Replace first_name with forename.</p> <p>Step 4 Finally, click  to shrink the people table back to its normal size.</p>
<p>Task 4 Add a new field to a table</p>	<p>Step 1 Click the header of the evidence table to select it (the table border will change colour).</p> <p>Step 2 Click the  button in the toolbar on the right-hand side of the screen.</p> <p>Step 3 The evidence table will expand to show various additional options. A new field will have been added, with the placeholder name new_field. Replace the placeholder name with publisher.</p> <p>Step 4 Use the Type drop-down list to select the data type Text.</p>

	<p>Step 5</p> <p>Click  to shrink the evidence table back to its normal size. The new publisher field will turn pink, to indicate that it is a text field.</p> <p>Step 6</p> <p>By default, new fields are added at the bottom of a table. However, fields can be reordered if desired.</p> <p>The new publisher field should still be selected – if not, click it to select it again. Use the  button on the toolbar to move it to between the title and date fields.</p>
<p>Task 5</p> <p>Save your changes and exit</p>	<p>Step 1</p> <p><i>ORDS</i> does not have an autosave function, so it is important to save your changes before leaving the schema design page.</p> <p>Click the  button in the toolbar on the right-hand side of the screen. When the confirmation dialogue box appears, click .</p> <p>Step 2</p> <p>This will activate a second dialogue box. You will see a small whirling symbol in the top right-hand corner of this box as <i>ORDS</i> saves the database.</p> <p>When the Database saved message appears, click  to close the dialogue box.</p> <p>(If you experience any problems saving your database changes, please speak to the course instructor.)</p> <p>Step 3</p> <p>To exit the schema design page, click the  button in the toolbar on the right-hand side of the screen.</p> <p>When the confirmation dialogue box appears, click  to return to the database page.</p>

Exercise 4 Viewing and editing data

- *View a table in an ORDS database*
- *Change the content displayed in a linked field*
- *Edit an existing record*
- *Add a new record*
- *Delete a record*
- *Export a copy of the database*

Task 1

View a table

Step 1

The database page for the database imported in **Exercise 2** should still be on the screen. If not, you can reach the database page from the *ORDS* welcome page by clicking the name of the project, and then the name of the database.

Find the **Main database version information** pane (you may need to scroll down a little), and click

View, edit, and query data

Step 2

When the **View, Edit, and Query Data** page appears, you will see a list of the database tables in a grey pane on the left-hand side of the screen.

Click **addresses** to view the contents of this table.

Step 3

The **addresses** table will appear. Use the scroll bars at the right-hand side and bottom of the viewing pane to see more of the contents.

Task 2

Change the content displayed in a linked field

Step 1

This table gives the addresses of the clubs listed in the database. It contains a field called **club_id**, which links to the **clubs** table.

By default, this will show the content of the primary key field of the **clubs** table, which is called **id**. As this field simply contains a number, this isn't very informative. However, we can change the field from the **clubs** table that is displayed.

Underneath the field name is the **Viewed field** drop-down list. Click the small arrow at the right-hand end of this field to see the list of available fields. Click **club_name** to select it.





The **club_id** field will now display the names of the clubs that had their premises at each address.

Step 2

Return to the list of tables by clicking **View, Edit, and Query Data** in the breadcrumb trail towards the top of the screen.

Task 3**Step 1**

In the list of tables, click **people** to open that table.

Edit an existing record	<p>Step 2</p> <p>Record number 5 of the people table contains two mistakes, and the date of death is also missing. Let's correct this.</p> <p>Click the title field for record number 5, and replace Mt with Mr.</p> <p>Click the first_name field, and replace Richrad with Richard.</p> <p>Click the death_year field (you may need to scroll across to see this), and replace [null value] with 1906.</p> <p>Step 3</p> <p>Note that the background of the fields which have been edited is blue, indicating unsaved changes.</p> <p>Click . The cell backgrounds will revert to white.</p>
<p>Task 4</p> <p>Add a new record</p>	<p>Step 1</p> <p>With the people table still on the screen, click . (You may need to scroll down to see the button.)</p> <p>Step 2</p> <p>When the Add New Record form appears, complete the fields as follows:</p> <ul style="list-style-type: none"> • title: Sir • first_name: Algernon • surname: Ponsonby • occupation: Gentleman • birth_year: 1820 • death_year: 1889 • notes: Younger brother of Julian Ponsonby <p>The id field will be completed automatically with the next available number.</p> <p>Step 3</p> <p>Click .</p> <p>You will be returned to the table view, and should see the record you have just added at the bottom of the table.</p>
<p>Task 5</p> <p>Delete a record</p>	<p>Step 1</p> <p>Record number 7 is a duplicate of record number 6. Let's tidy up the table by deleting it.</p> <p>Locate the record, and scroll to the right-hand end of the table. Click the  button at the end of record 7.</p>

	<p>Step 2</p> <p>When the confirmation screen appears, click .</p>
	<p>Step 3</p> <p>You will be returned to the table, and should see a message confirming that the record has been deleted successfully.</p> <p>(Note: This record is not linked to by any other records in other database tables, so can be deleted straightforwardly. If there were any such links, these would need to be removed before the record could be deleted.)</p>
<p>Task 6</p> <p>Export a copy of the database</p>	<p>Step 1</p> <p>Return to the database page by clicking Database Details in the breadcrumb trail towards the top of the screen.</p>
	<p>Step 2</p> <p>Find the Main database version information pane (you may need to scroll down a little), and click .</p>
	<p>Step 3</p> <p>When the export options page appears, use the drop-down list to select Single CSV file.</p>
	<p>Step 4</p> <p>Click . When the file opening dialogue box appears, check that <i>Microsoft Excel</i> is selected as the program that will open the file (if not, use the drop-down list to select it), then click .</p>
	<p>Step 5</p> <p>The file will open in <i>Excel</i>. Scroll down to see the contents of the various tables.</p> <p>To save a copy, click File and then Save As. When the Save As dialogue opens, navigate to Drive H:, then click . (You can now close this file if you wish.)</p>
	<p>Step 6</p> <p>Return to the browser tab displaying <i>ORDS</i>. Click .</p>

Exercise 5 Querying a database

- Build a simple query using the query builder
- Write a more complex query using the SQL query box
- Save the query results as a dataset

Task 1

Build a simple query using the query builder

Step 1

The database page for the database imported in **Exercise 2** should still be on the screen. If not, you can reach the database page from the *ORDS* welcome page by clicking the name of the project, and then the name of the database.

Find the **Main database version information** pane (you may need to scroll down a little), and click

View, edit, and query data.

Step 2

When the **View, Edit and Query Data** page appears, click **Query data using query builder**.

Step 3

The query builder allows you to select a single *ORDS* table and see a list of the contents of any or all of its fields. Let's create a query for the **addresses** table.

Use the **Table** drop-down list to select the **addresses** table.

Step 4

A list of fields will appear in the **Columns to show** column. Click **All_Data** to select it.

(You can also select a subset of the fields by holding down CTRL and clicking each of the fields you wish to include.)

Step 5

Click **Build query**. The query will appear in the **SQL Query** box.

Step 6



Click **Run query**. Your query results will be displayed at the bottom of the screen.

Step 7

Notice that the **club_id** field in the query results only contains a number – the **id** number of the club record that each address is linked to.

To find out which club this referred to, you'd need to go and look at the **clubs** table, which would be time consuming. However, it is possible to write a more complex SQL query which pulls in the name of the club from that table – we'll do that in the next task.

	<p>Step 8</p> <p>Return to the View, Edit, and Query Data page by clicking View, Edit, and Query Data in the breadcrumb trail towards the top of the screen.</p>
<p>Task 2</p> <p>Write a more complex query using the SQL query box</p>	<p>Step 1</p> <p>Click Query data using SQL.</p> <p>Step 2</p> <p>When the SQL query box appears, type the following in the box:</p> <pre>SELECT a.* , c.club_name FROM addresses a JOIN clubs c ON a.club_id = c.id</pre> <p>This will give the contents of the addresses table, but with the name of the clubs rather than just an id number.</p> <p>Step 3</p> <p>Click Run query. Your query results will be displayed at the bottom of the screen.</p> <p>Step 4</p> <p>Let's make the query into a conditional query. If we only want to see contemporary club addresses, we can add a WHERE statement to the above query so that it only returns results where the end date is later than 2010:</p> <pre>SELECT a.* , c.club_name FROM addresses a JOIN clubs c ON a.club_id = c.id WHERE a.end_date > 2010</pre> <p>Step 5</p> <p>Click Run query again. Your updated query results will be displayed at the bottom of the screen.</p>
<p>Task 3</p> <p>Save the query results as a dataset</p>	<p>Step 1</p> <p>We can now save the results of the query for future reference. In <i>ORDS</i> terminology, this is called creating a dataset.</p> <p>Click Save query results as dataset.</p>

	<p>Step 2</p> <p>When the Save query form appears, complete it as follows:</p> <ul style="list-style-type: none"> • Dataset name: <code>Club addresses</code> • Description: <code>List of addresses with associated club names, created on [today's date].</code> <p>(Replace <code>[today's date]</code> in the above with the date on which you create the dataset.)</p> <p>The Query field will be completed automatically.</p> <p>Tick the Create as static dataset checkbox. This means the dataset will be a snapshot of the data at the point when it is saved – the contents will not be updated if the addresses or clubs tables are later edited.</p> <p>From the Authorization drop-down list, select Project members. This means the dataset will only be visible to members of this <i>ORDS</i> project.</p> <p>Step 3</p> <p>Click .</p> <p>You will be taken to the dataset list, and should see a message confirming that the dataset has been saved.</p> <p>Step 4</p> <p>To view the dataset, click .</p>
	<p>Task 4</p> <p>If you have time, you may like to return to the SQL query box and experiment with constructing some other queries.</p> <p>A brief guide to SQL statements is included in section 5.2.1 above (see page 45). For a more detailed guide, a useful SQL tutorial is available from W3Schools: http://www.w3schools.com/sql/</p>

Exercise 6 Creating a new database from scratch

- *Create an empty database*
- *Add tables and fields to the new database*
- *Add a relationship between tables*
- *View the new tables and add records*

Task 1

Create an empty database

Step 1

Return to the project page by clicking the project name in the breadcrumb trail towards the top of the screen.

Step 2

Click .

Step 3

When the **Add Database to Project** form appears, complete the **Name** and **Description** fields.

In the **Name** field, type **Bibliography**.

In the **Description** field, type **Details of useful source materials**.


Step 4

Click the small calendar icon at the right-hand end of the **Created on** field. A calendar will appear with today's date highlighted in pink.

Click the highlighted date to add it to the field.

Leave the other fields blank.

Step 5

When you are happy with the contents of the form, click  to create the database.

You will be taken back to the project page, and should see a message confirming that the database has successfully been created.

The name of the new database will now appear in the list of *ORDS* databases for the project.

Task 2

Add tables and fields to the new database

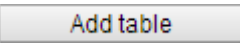
Step 1

Click the name of the database you have just created to go to the database page.


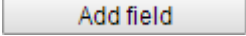

Find the **Main database version information** pane (you may need to scroll down a little), and click

.

Step 2

You will see a blank schema design page. Click the  button on the toolbar. The mouse pointer will change from an arrow to a cross.

Click the place on the working area where you would like the table to appear. (You will be able to move it later if you wish.)

	<p>Step 3</p> <p>The new table will appear, and the Edit table dialogue box will open. The table will have a placeholder name (beginning new_table) – replace this with tblWorks. (tbl is a prefix commonly used to denote tables in databases).</p> <p>Click .</p> <p>You will see that your new table has been automatically populated with a field called id. This is the primary key field – the field that provides a unique identifier for each record.</p>
	<p>Step 4</p> <p>To add another field to the new table, click the table to select it (the table border will change colour), then click .</p>
	<p>Step 5</p> <p>The table will expand to show various additional options. A new field will have been added, with the placeholder name new_field. Replace the placeholder name with title.</p>
	<p>Step 6</p> <p>Use the Type drop-down list to select the data type Text.</p>
	<p>Step 7</p> <p>Click  to shrink the tblWorks table back to its normal size. The new title field will turn pink, to indicate that it is a text field.</p>
	<p>Step 8</p> <p>Repeat steps 4 to 7 to add three more fields to the table, with these names and data types:</p> <ul style="list-style-type: none"> • author (text) • publisher (text) • date (integer)
	<p>Step 9</p> <p>Repeat steps 2 and 3 to create a second table called tblAuthors.</p>

Step 10

Repeat steps 4 to 7 to add three additional fields to the **tblAuthors** table:

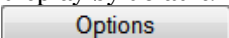

- **name** (text)
- **birth_date** (integer)
- **death_date** (integer)

The completed tables should look like this:

tblWorks	
id	INTEGER
title	TEXT
author	TEXT
publisher	TEXT
date	INTEGER

tblAuthors	
id	INTEGER
name	TEXT
birth_date	INTEGER
death_date	INTEGER

(The data type labels next to each field name may not display by default. To see these, click

, tick the **Show field data type in table design?** checkbox, then click .)

Task 3

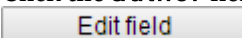
Add a relationship between tables

Step 1


We now need to join the two tables together, so that information from **tblAuthors** can be used to populate the **author** field in **tblWorks**.

We will do this by creating a relationship between the **author** field and the **id** field in **tblAuthors**. Fields that are linked in this way must have the same data type: this means that (perhaps counterintuitively), the **author** field needs to have the data type **Integer**.

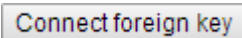
Click the **author** field to select it, then click

.

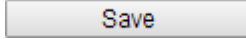
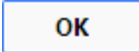

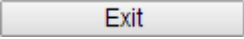
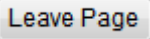




Use the **Type** drop-down list to select the data type **Integer**.


Click . The author field will now be yellow, indicating that it has a numeric data type.

Step 2

To create the relationship, click the **id** field of **tblAuthors** to select it. This will activate the  button on the toolbar; click this button. Now click the **author** field in **tblWorks**.

A curved line should appear between the two fields, indicating that the relationship has been created.

	<p>Step 3</p> <p>Click the  button in the toolbar on the right-hand side of the screen. When the confirmation dialogue box appears, click .</p> <p>Wait for the save operation to complete, then click .</p> <p>(If you experience any problems saving your database, please speak to the course instructor.)</p> <p>To exit the schema design page, click the  button. When the confirmation dialogue box appears, click  to return to the database page.</p>
<p>Task 4</p> <p>View the new tables and add records</p>	<p>Step 1</p> <p>From the database page, click .</p> <p>Step 2</p> <p>When the View, edit, and query data page appears, you will see the names of the two tables you have just created listed in a grey pane on the left-hand side of the screen.</p> <p>Click tblAuthors to view this table.</p> <p>Step 3</p> <p>The table is currently empty, so no records will be displayed. Click .</p> <p>Step 4</p> <p>When the Add New Record form appears, complete the fields as follows:</p> <ul style="list-style-type: none"> • name: Anthony Fallon • birth_date: 1923 • death_date: 2004 <p>The id field will be completed automatically.</p> <p>Step 5</p> <p>Click .</p> <p>You will be returned to the table view, and should see the record you have just added.</p> <p>Step 6</p> <p>Return to the list of tables by clicking View, Edit, and Query Data in the breadcrumb trail towards the top of the screen.</p> <p>Step 7</p> <p>Click tblWorks to view this table.</p> <p>Once again, the table will be empty. Click .</p>

	<p>Step 8</p> <p>When the Add New Record form appears, complete the fields as follows:</p> <ul style="list-style-type: none"> • title: <code>The World of the London Club</code> • publisher: <code>Carter and Sons</code> • date: <code>1967</code> <p>Step 9</p> <p>Because the author field is linked to the tblAuthors table, this requires a slightly different treatment. You will see two drop-down lists by this field, one on the left and one on the right.</p> <p>Use the left-hand drop-down list to change the viewed field to name. This means that the right-hand drop-down list will display the contents of the name field, rather than record id numbers.</p> <p>Now use the right-hand drop-down list to select Anthony Fallon. (The tblAuthors table currently only contains one record, so the list only has one name in it. If more records were added to tblAuthors, these would also appear in the drop-down list.)</p> <p>Step 10</p> <p>Click .</p> <p>You will be returned to the table view, and should see the record you have just added.</p>
<p>Task 5</p> <p>If you have time, add some further records to the tables you've created.</p>	

