

Databases: Building a database



About These Activities

Software Used

Access 2013

Windows

Files Used

Extra Resource Data2.accdb

ExtraStudents.txt

Favourites2.accdb

ResourcesTable2.xlsx

SchoolOfMotoring.accdb

Software Chooser.accde

Finding the Exercise Files

All the files for these exercises have been provided for you on a network drive. Your area of the drive is called the **Home Drive H:** .

They can also be downloaded from the ITLC Portfolio (visit <http://portfolio.it.ox.ac.uk> and search for “databases building” or similar search text to find the course pack for this course).

Trusted Locations

In the IT teaching rooms, the Home Drive has been set up as an Access Trusted Location. To find out more about Access Trusted Locations, read the article in the ITLC Portfolio (visit <http://portfolio.it.ox.ac.uk> and search for “Access trusted locations” or similar search text).

Web App or Desktop Database?

Access 2013 can also be used to create an **app database**: where users work on the data via a web browser. This would require communication using *Office 365* or *SharePoint 2013* (not currently available at Oxford University), and is not the subject of this course. We will work on a **desktop database**, which is saved locally on your computer or a network drive.






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

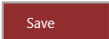


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Steps for the Learning Objectives



Learning Objective One: Create a database with 1 table	
<p>Task 1 Start <i>Access</i></p>	<p>Step 1 Start the computer if necessary</p>
	<p>Step 2 Click the Start button  on the taskbar at the bottom of the screen In the Start menu, type Access in the search box Choose <i>Access</i> </p>
	<p>Step 3 If you are prompted for any user information, just click on OK</p>
	<p>Step 4 (On your office or home computer you might otherwise start the program using an <i>Access</i> icon or tile on the Desktop)</p>
<p>Task 2 Create a new blank desktop database, named My Music Collection.accdb Make sure you save it in the Home Drive H: (or in another place as directed by your teacher)</p>	<p>Step 1 Click on  to create a new desktop database</p>
	<p>Step 2 Enter a new filename My Music Collection</p>
	<p>Step 3 Beside the filename, click  and navigate to the Home Drive H: (or another place as directed by your teacher)</p>
	<p>Step 4 Use  to create the database file</p>
<p>Task 3 Leave the file open</p>	<p>Step 1 The new file opens, showing an empty table and the Navigation Pane (but no other saved objects yet)</p>
	<p>Step 2 Maximise the window, if necessary</p>
<p>Task 4 Use the blank new table provided</p>	<p>Step 1 A new blank table is waiting for your data Initially, the table is shown in Datasheet View</p>
	<p>Step 2 Some nameless fields are provided – do not be tempted to add any data at this stage</p>

<p>Task 5</p> <p>If, later, you need to create further new tables, use  on the Create tab</p>	
<p>Task 6</p> <p>Save the new table as tblRecordings</p>	<p>Step 1</p> <p>It is good practice to save the table with a conventionally-chosen name, before adding much information</p>
	<p>Step 2</p> <p>Choose File Save</p> <p>Give the table name tblRecordings</p>
<p>Task 7</p> <p>Click the View button  on the Home tab, to switch to Design View</p>	
<p>Task 8</p> <p>In Design View, set up fields for RecordingID, Title and Condition</p>	<p>Step 1</p> <p>Edit the name of the first field to be: RecordingID</p>
	<p>Step 2</p> <p>Type the name of the next field: Title</p>
	<p>Step 3</p> <p>Type the name of the next field: Condition</p>
<p>Task 9</p> <p>Complete the data types and descriptions for the fields</p>	<p>Step 1</p> <p>Confirm that the Title and Condition fields have the Short Text data type</p>
	<p>Step 2</p> <p>Type a few words as a Description for each field</p>
<p>Task 10</p> <p>Add another field for the date that you first heard this music</p>	<p>Step 1</p> <p>Click on another empty field row</p> <p>In the Field Name column, type DateHeard</p>
	<p>Step 2</p> <p>In the Data Type column, click the drop-down menu and choose Date/Time</p>
	<p>Step 3</p> <p>In the Description column, type Date you first heard this music</p>
<p>Task 11</p> <p>Save the table design</p>	<p>Step 1</p> <p>Click  on the File tab, to save the table design</p>
	<p>Step 2</p> <p>Look for the new table name, tblRecordings, in the Navigation Pane</p>
	<p>Step 3</p> <p>Do not close the table yet</p>



Learning Objective Two: Set up field properties	
<p>Task 1 Open Favourites2.accdb and look at the tables listed This file will be in the Home Drive H: (or in another place as directed by your teacher)</p>	<p>Step 1 Choose File Open If necessary, navigate to the Home Drive H: (or another place as directed by your teacher)</p>
	<p>Step 2 Open Favourites2.accdb This database contains some of Tom’s favourite pieces of work</p>
	<p>Step 3 Notice the Navigation Pane: a list of tables that have already been created in this database, such as tbIFavouriteBooks and tbIFavouriteFilms</p>
<p>Task 2 Open tbIFavouriteMusicTracks</p>	<p>Step 1 Identify tbIFavouriteMusicTracks in the Navigation Pane Right-click the table name and choose to open it in Design View</p>
<p>Task 3 Change some data formats: Title can have maximum 100 characters DatePurchased has the format Medium Date Price has the Currency data type</p>	<p>Step 1 Click in the Title field row In the Field Properties, click in the Field Size row and enter 100</p>
	<p>Step 2 Click in the DatePurchased field row In the Data Type column, choose Date/Time</p>
	<p>Step 3 In the Field Properties, click in the Format row and use the drop-down menu to choose Medium Date</p>
	<p>Step 4 Click in the Price field row Select the Currency data type</p>
<p>Task 4 At some point, <i>Access</i> offers to check that the data in the table still conforms to the new settings you have made Agree to this when asked</p>	
<p>Task 5 Title needs to be a mandatory field</p>	<p>Step 1 In Design View, identify the Title field</p>
	<p>Step 2 With the cursor in the Title field, find the Required property in the Field Properties (at the bottom of the window)</p>

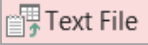



	<p>Step 3 Set Required to yes</p>
<p>Task 6 Set up a lookup control to help users choose a person for WhoseFavourite (Do not limit users to the names offered in the list)</p>	<p>Step 1 Select the WhoseFavourite field The command to start the Lookup Wizard is found lurking at the bottom of the Data Type drop-down Start the Lookup Wizard</p> <hr/> <p>Step 2 You will type in the values (one in each row, in one column) Give some plausible names, such as Edward, William, Clarrie, Emma, Nic, Joe</p> <hr/> <p>Step 3 Accept the suggested name for the lookup control</p> <hr/> <p>Step 4 Leave the Limit to List checkbox clear, so that users can type another name if none of the suggested names is suitable Do not be tempted by the multi-value setting</p> <hr/> <p>Step 5 Finish the wizard</p>
<p>Task 7 The Rank is going to be a number from 1 to 10, so set up a Validation rule and Validation text</p>	<p>Step 1 Select the Rank field</p> <hr/> <p>Step 2 In the Validation Rule property, type between 1 and 10</p> <hr/> <p>Step 3 In the Validation Text, type Please rank this item from 1 (best) to 10 (worst)</p>
<p>Task 8 Save the design, then try out the changes in Datasheet View</p>	<p>Step 1 Click  to save the table design changes</p> <p>Use the View button  on the Home tab, to switch to Datasheet View</p> <hr/> <p>Step 2 Start to add one more track, such as Clarrie's 3rd favourite, by Art Garfunkel (she bought it on 6th August 1979 and paid £1.99) Notice the effect of the date picker and the lookup list control</p> <hr/> <p>Step 3 Try to leave this record without entering a Title What happens? Why? Now give a title such as Bright Eyes</p>

	<p>Step 4 Try entering a Rank of 18, and test the effect of the Validation Rule</p>
<p>Task 9 Close the table Open tbIDJ_Tracks Examine the fields that are already in place</p>	
<p>Task 10 Assign an index to the RunningOrder field (do not allow duplicate values)</p>	<p>Step 1 Select the RunningOrder field</p>
	<p>Step 2 In the Field Properties, click the drop-down menu for Indexed and choose Yes, No Duplicates</p>
	<p>Step 3 With this No Duplicates property, it will not be possible for two records to have the same value: so 2 songs cannot have the same place in the running order Test this, to see what happens, in Datasheet View</p>
<p>Task 11 Set the SongID field to be the primary key – this will be important for later activities</p>	<p>Step 1 Select the SongID field</p> <p>Click  to make this field the Primary key</p>
	<p>Step 2 Notice the yellow key symbol in the first column, next to this field</p>
<p>Task 12 Close the table, saving the design Close Favourites2.accdb, leaving <i>Access</i> open</p>	

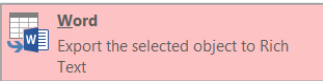
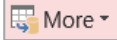
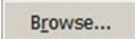
Learning Objective Three: Establish relationships between tables	
<p>Task 1 Open SchoolOfMotoring.accdb</p>	<p>Step 1 Find SchoolOfMotoring.accdb and open it</p>
	<p>Step 2 In the list of tables in the Navigation Pane, examine the names of the tables included</p>
	<p>Step 3 tblStudents lists the students with their contact information and brief notes on their progress through stages of learning to drive tblInstructors lists the instructors with a driving school, with their contact information tblLesson lists the driving lessons which take place, specifying which instructor and which student were present at each lesson tblLessonType is a short list of the types of lesson offered, with the cost of each</p>
<p>Task 2 In the Relationships diagram, add all the tables and arrange them</p>	<p>Step 1 On the Database Tools tab, click on  to display the Relationships diagram</p>
	<p>Step 2 If the Show Table dialog does not appear, click </p>
	<p>Step 3 Add all the four tables (If a table gets added twice, then after closing the Show Table dialog you will be able to select a table field list and press DELETE to remove the duplicate)</p>
	<p>Step 4 Notice the fields that are included in each table Drag the field lists to convenient positions on the diagram</p>
	<p>Step 5 Drag the borders of field lists to stretch or shrink them until all the field names are visible in each Examine the fields included in each table</p>
<p>Task 3 Join the StudentID fields in the lessons table and the students table</p>	<p>Step 1 Point to StudentID in tblLesson</p>
	<p>Step 2 Drag to StudentID in tblStudent, and drop</p>

	<p>Step 3 The direction of dragging does not matter, but it is important that you point accurately to the correct field name</p>
<p>Task 4 In the dialog that appears: Confirm the table names and field names Confirm that this is a One-to-Many relationship Choose to Enforce Referential Integrity Do not choose to Cascade Delete or Cascade Update</p>	
<p>Task 5 Finish the wizard and save the diagram design so far</p>	
<p>Task 6 Build joins between the tables and complete the diagram</p>	<p>Step 1 Build a join between the table of instructors and the table of lessons, using the InstructorID field</p> <p>Step 2 Build a join between the table of lesson types and the table of lessons, using the LessonTypeID field</p> <p>Step 3 Review the Relationships diagram, and confirm that suitable joins have appeared between the tables</p> <p>Step 4 Look carefully at the 1 and ∞ symbols that have appeared around the tables: are they sensible?</p>
<p>Task 7 Close the Relationships diagram, saving any changes</p>	

Learning Objective Four: Importing table data	
<p>Task 1 Import the table of teaching resources that has been set up in the <i>Excel</i> file ResourcesTable2.xlsx Use this data to create a new <i>Access</i> table called tblResources</p>	<p>Step 1 Continue work in the database file SchoolOfMotoring.accdb</p>
	<p>Step 2 In the External Data tab of the ribbon, click  in the Import group, to start the Import Data Wizard</p>
	<p>Step 3 Click  In the File Open dialog, ensure that Files of Type is set to Microsoft Excel Locate the <i>Excel</i> file ResourcesTable2.xlsx</p>
	<p>Step 4 Choose to Import the source data into a new table</p>
	<p>Step 5 In the wizard, make these choices: choose the worksheet called tblResources confirm that the first row contains column headings look briefly at the columns of data (no changes here) let <i>Access</i> add a primary key field name the new table tblResources</p>
	<p>Step 6 When the wizard closes, the new table now appears in the Navigation Pane</p>
<p>Task 2 Inspect the table and some data Close the table</p>	
<p>Task 3 At this point, you would normally spend some time creating relationships between the new table and the existing tables We will skip this step for now, unless you want some practice.</p>	
<p>Task 4 Notice some of the other file types available in the Import group of the ribbon, for importing data into <i>Access</i></p>	

<p>Task 5</p> <p>Collect some more students from the file ExtraStudents.txt and append them as extra records in tblStudent</p> <p>Hint: make sure you confirm that the first row of the data contains Field Names</p>	<p>Step 1</p> <p>In the External Data tab of the ribbon, click  Text File in the Import group</p>
	<p>Step 2</p> <p>Click </p> <p>In the File Open dialog, set Choose Files of Type to be Text Files</p>
	<p>Step 3</p> <p>Select ExtraStudents.txt and click </p>
	<p>Step 4</p> <p>Choose to Append a copy of the records and select tblStudent</p>
	<p>Step 5</p> <p>In the wizard, confirm that the data is delimited (separated) by commas</p> <p>Confirm that the First row contains Field Names (** be sure to check this checkbox **)</p>
<p>Task 6</p> <p>Inspect the table tblStudent and notice that 4 records have been appended</p>	
<p>Task 7</p> <p>Set up a link to another <i>Access</i> database file called Extra Resource Data2.accdb</p> <p>Link to the table tblType</p>	<p>Step 1</p> <p>Continue work in the database file SchoolOfMotoring.accdb</p>
	<p>Step 2</p> <p>Click  in the Import group of the External Data tab</p>
	<p>Step 3</p> <p>Find and select Extra Resource Data2.accdb</p> <p>Choose to Link to the data source</p>
	<p>Step 4</p> <p>The Link Tables dialog shows the tables available in this database file</p> <p>Choose tblType and link to it</p>
	<p>Step 5</p> <p>The linked table tblType appears in the Navigation Pane, with a special arrow icon</p>

<p>Task 8 Open the linked table tblType and add another record for booklet</p>	<p>Step 1 Select tblType in the Navigation Pane and open the table</p> <p>Step 2 Add another record to the table, with the single field entry booklet</p> <p>Step 3 Close the table and close the <i>Access</i> file</p>
<p>Task 9 Close this file and open Extra Resource Data2.accdb Confirm that the data in the external file has been changed</p>	<p>Step 1 Open the <i>Access</i> file Extra Resource Data2.accdb (use the File menu)</p> <p>Step 2 Open the source copy of tblType Notice that the extra record has been added (this list is sorted alphabetically, so look carefully for the additional record)</p>
<p>Task 10 In SchoolOfMotoring.accdb , export the table tblStudent to create a new <i>Excel</i> workbook</p>	<p>Step 1 In SchoolOfMotoring.accdb , select tblStudent in the Navigation Pane</p> <p>Step 2  Click Excel in the Export group of the External Data tab</p> <p>Step 3 Click Browse In the File Save dialog, ensure that the file will be sent to your network drive H:\</p> <p>Step 4 Give the filename Students Set the file format to Excel (*.xlsx) Click Save</p> <p>Step 5 Leave the Export data with formatting checkbox clear Complete the wizard</p>
<p>Task 11</p> <p>Start <i>Excel</i> from the Start menu  and open the new workbook file Students.xlsx - confirm that it now contains the same data as in the <i>Access</i> table</p>	

<p>Task 12 Export the table tblInstructor to create a new <i>Word</i> (.rtf) file</p>	<p>Step 1 Select tblInstructor and click</p>  <p>(you may need to look for this in the  menu)</p> <p>Step 2 In specifying the destination, use  to show the File Save dialog</p> <p>Step 3 Give the filename Exporting Instructors.rtf Set Save as type to Rich Text Format (*.rtf) Choose the Home Drive H:\ Click Save</p> <p>Step 4 Complete the wizard</p>
<p>Task 13 Start <i>Word</i> and open the new txt file, to inspect the data</p>	<p>Step 1 Start <i>Word</i> using the Start menu</p> <p>Step 2 Open the new file Exporting Authors.rtf (in the Open dialog, set Files of Type to All Files)</p> <p>Step 3 Look at the data that has been exported</p>
<p>Task 14 Close <i>Excel</i> and <i>Word</i> Close SchoolOfMotoring.accdb</p>	

Learning Objective Five: Your own project
<p>Task 1 Open Software Chooser.accde This file is itself an <i>Access</i> database</p>
<p>Task 2 At the Welcome page, click the button provided to Use the Chooser</p>
<p>Task 3 On the Software Chooser page, in the blue box, answer all the questions about your project</p>
<p>Task 4 In the green boxes, use any of the checkboxes that apply to your project Note that a checkbox can be in 3 states: ticked (meaning yes), clear white (meaning no) or shaded grey (meaning it doesn't matter one way or the other)</p>
<p>Task 5 When ready, click the Show Matching button A list is shown, suggesting some database software options that match your requirements, along with further details for each</p>
<p>Task 6 When ready, use the buttons to navigate the forms, either to use the Chooser further or to finish</p>
<p>Task 7 Close Software Chooser.accdb</p>
<p>Task 8 The IT Teachers in the IT Learning Centre would be happy to discuss with you your own database project</p>
<p>Task 9 If you would like a short one-to-one conversation with one of the IT Teachers, add your name to the sign-up sheet on the clipboard provided in the classroom This is an opportunity to talk through your own project, your thoughts so far and your plans for continuing We will aim to give you some pointers for next steps, in terms of taught courses, further study resources or areas of work to focus on</p>