

SynApp2.org

SynApp2 Walk through No. 1

Generating and using a web application

SynApp2 Walk through No. 1 – Generating and using a web application

The walk through is divided into two parts. Part A is intended for would-be developers of SynApp2 generated web applications. Part B is for both the developers and users of generated applications. The combination of both parts provides a front to back, step-by-step example of how to apply the web application generator and then work with the completed application.

In order to work along with the example, SynApp2 must be installed on an accessible web server. There is nothing to install on your workstation. You will need a username and password to login to SynApp2 and the finished application. That information should be known or provided to you.

Once you complete Part A, you will know the basics of how SynApp2 operates on a simple, yet practical, database design. When you complete Part B, you will know the fundamentals of how SynApp2 generated applications look and feel.

Developers will hopefully recognize the economy of effort required to produce very complete and usable data management and reporting programs that have high potential to provide and expand value.

Users will be able to easily extrapolate what they learn to other SynApp2 generated applications.

Begin the walk through.

- Developers – proceed with [Part A](#) – Generating a web application with SynApp2
- Users – advance to [Part B](#) – Working with a SynApp2 generated application

Part A – Generating a web application with SynApp2

Use PageGen to visualize and define how the pages of your web application will navigate database tables and records. SynApp2 will then take that information and use it to generate the elements of your application.

In the simplest case, a SynApp2 generated application manages the records in a single table of a database. Based on the fields of the table definition, corresponding forms are produced, allowing you to create, read, update and delete records. This fundamental functionality is summarily referred to, in some circles, as CRUD. Records searching and tabular reporting, in Adobe® PDF format and integrated with Adobe Reader®, are also produced.

An application page generated by SynApp2 has, as its focus, one specific table. But, depending on the table relationships, or schema, particular to your database, it may be necessary to include forms to manipulate one or more additional tables.

A very common situation, that SynApp2 applications easily manage, is a *one-to-many* relationship that must be maintained between the records in two tables. Any manipulation of the records in either table occurs with respect to that relationship. *Many-to-many* relationships are also managed with ease, but not addressed by this walk through.

Consider a database that has two tables - *country* and *city* - and that a one-to-many relationship exists between the records in those tables. A country may have many cities, but a city may have only one country. Every *city* record depends on exactly one *country* record. This means, that in order to insert a new record into the *city* table, you'll need a way to choose a specific record in the *country* table, with which the new *city* record will be associated.

When, according to your database definition, SynApp2 detects the need for additional application elements, beyond those of the page focus table, or *basis table*, you will be able exercise some control over how those elements are integrated into the flow of user interaction.

A database design is the starting point of any SynApp2 web application development project.

Let's take a look at a simple example.

We're going to work with a database named *census*. The *census* database begins life with the structure definitions of two tables named - yes, you guessed them - *country* and *city*.

The SQL for the database definition is:

```
-- Database: 'census'
--
-----
--
-- Table structure for table 'city'

CREATE TABLE city (
  id int(10) unsigned NOT NULL auto_increment,
  id_country int(10) unsigned NOT NULL COMMENT 'Country',
  city_name varchar(40) NOT NULL,
  population int(10) unsigned NOT NULL COMMENT ',min=100000',
  PRIMARY KEY (id)
) ENGINE=MyISAM DEFAULT CHARSET=utf8;

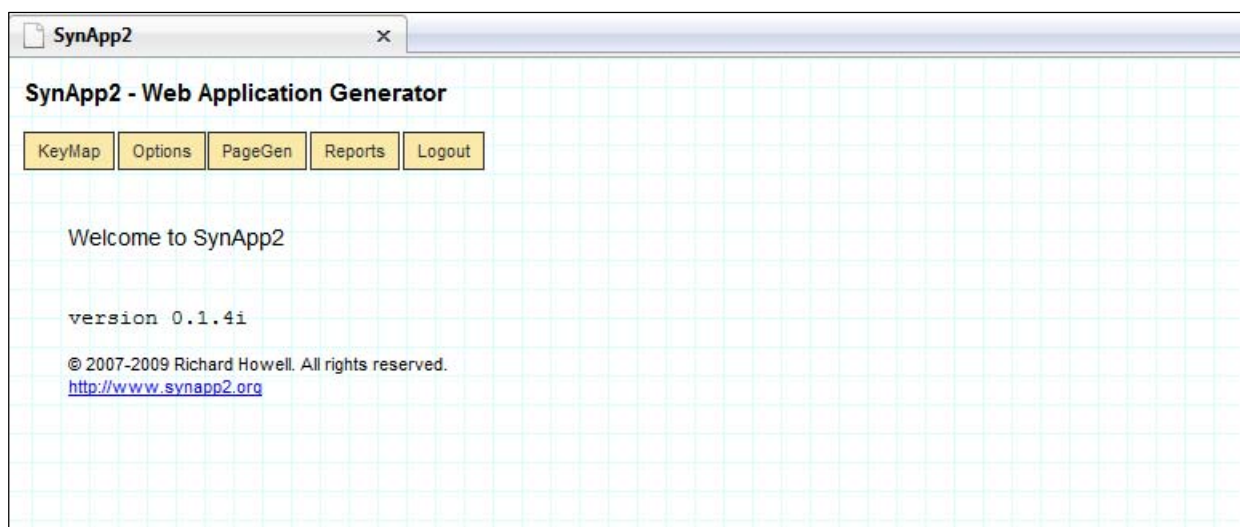
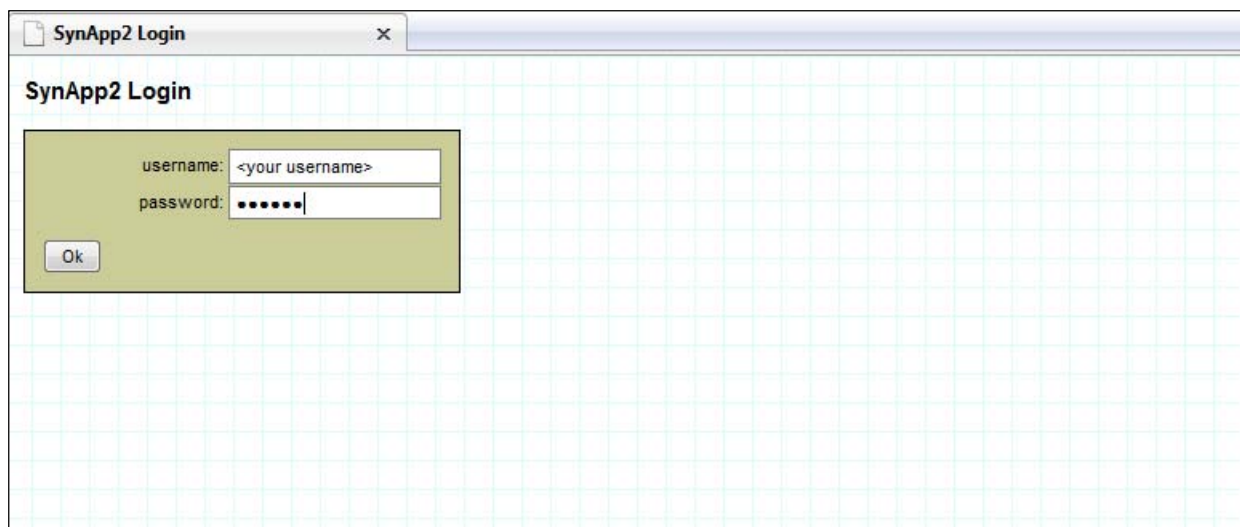
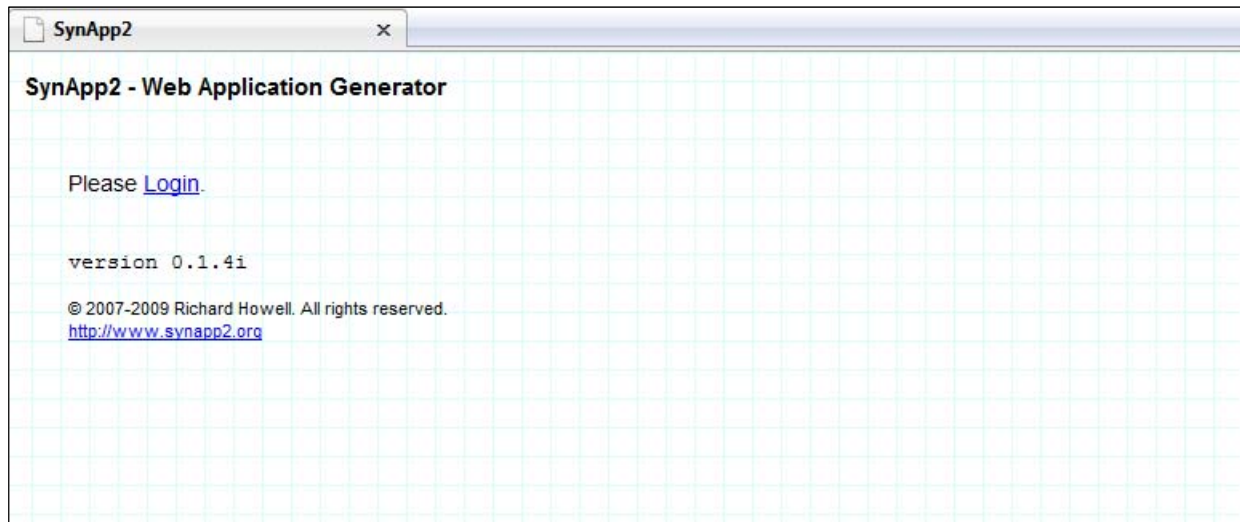
-----
-- Table structure for table 'country'

CREATE TABLE country (
  id int(10) unsigned NOT NULL auto_increment,
  country_name varchar(40) NOT NULL,
  country_abbreviation char(2) NOT NULL,
  PRIMARY KEY (id)
) ENGINE=MyISAM DEFAULT CHARSET=utf8;
```

This definition will work with MySQL. You may have to adjust the syntax if you're using another database engine.

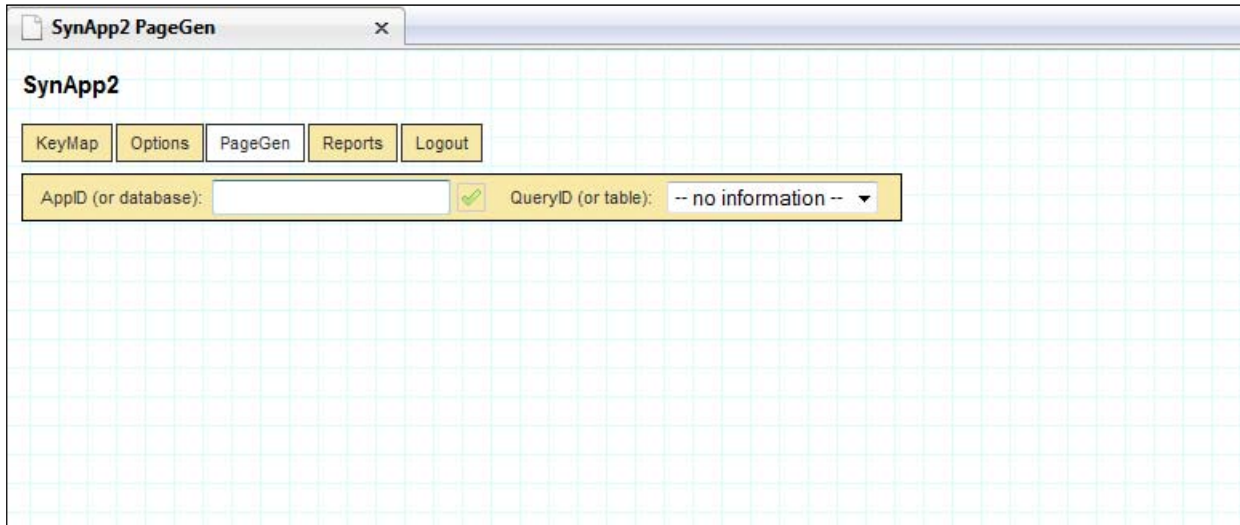
To follow along with the example, createⁱⁱ this database on your server.ⁱⁱⁱ

Part A of the walk through begins with the SynApp2 application Login and Welcome pages.



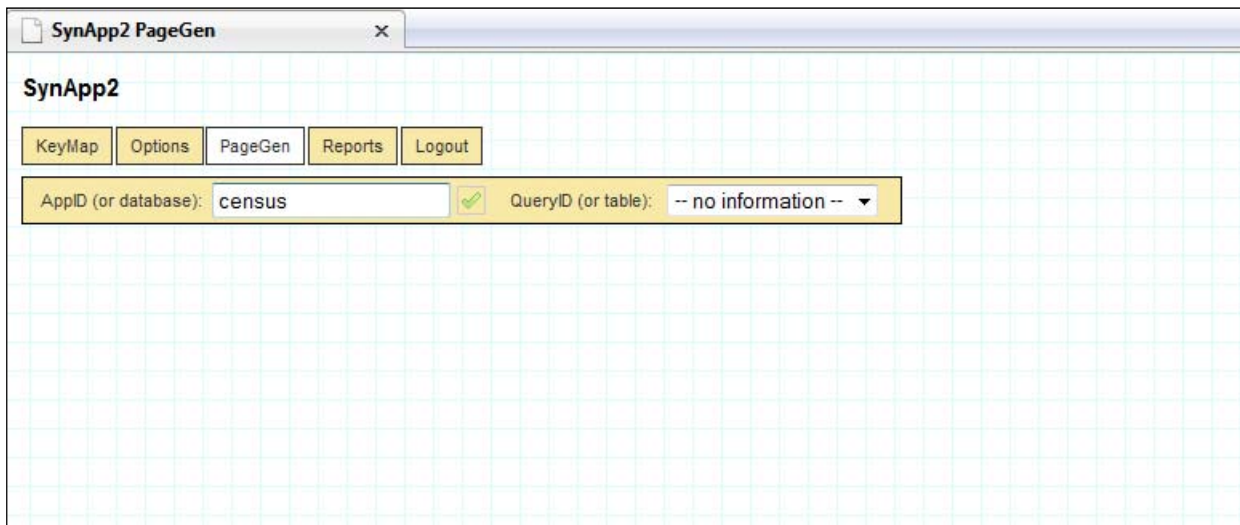
From the Welcome page, navigate to the PageGen page - click the PageGen tab, near top of the display.

The PageGen page appears.



Choose a database to work with, by specifying an application identifier - AppID.

The AppID typically implies a database of the same name. The AppID is also used for the name of the directory where your application pages and customization files are stored.



Type *census* as the value for AppID (or Database), followed by the Enter key or a click of the  (Select) icon.

Because *city* comes alphabetically before *country*, PageGen shows information about the table: *census.city*.

SynApp2

KeyMap Options PageGen Reports Logout

AppID (or database): census QueryID (or table): city

Page Settings - census.city

Basis Page: city.htm

Basis Page Template: template.htm ☒

Report Page: city.report.htm

Report Page Template: template.report.htm ☒

Run PageGen Regenerate All: ☐

Page Status

Basis Page file: city.htm - not found

Report Page file: city.report.htm - not found

Page Flow

country (id_country)

(FK1)

Clear

city (id)

The Page Settings form has initial values for Basis Page and Report Page that have been derived from QueryID (or table) and are proposed as *output* filenames^{iv} for application pages. Two values for template^v *input* filenames appear as well.

Assuming a typical installation, template files may be found in:

```
/<web_server_document_root>/synapp2/_shared_/
```

We also see that the Page Status area indicates two page files do not (yet) exist.

The Page Flow panel reflects a relationship^{vi} between the *city* and the *country* tables, while the primary focus of the Basis Page - *city.htm* - will be to manage the records of the *city* table.

The check boxes control whether or not output will be created for the basis or report pages. An application basis page does not always have to be paired with a report page, and vice versa. For our example, we want both.

Because of the one-to-many relationship the database design imposes between *country* and *city* records, the *city.htm* page must allow interaction with the records of the *country* table -- at least enough to select a *country* to which the *city* belongs. This requirement applies whenever we create (add) a new record in the *city* table.

The term *QueryID* is peculiar to SynApp2. A query id value, *qid* for short, is a name for a set of exchanges and operations that typically affect or depend upon the records of a database table with same name. There is a slight correlation to the concept of a named *VIEW*. When situations arise that require more than one set of exchanges and operations for a particular table, an alternate *qid* may be mapped into an application. In such cases, a *qid* value will differ from the table name with which it is most closely tied.

A similar situation is true for the term *AppID*. An application id, *appid* for short, is a name for a set of pages and files that are used to interact with a database having the same name. Because it is possible to create more than one SynApp2 application for any given database, an alternate *appid* can be mapped to a database name.

On the Page Flow panel, click the radio button in the box labeled: *country (id_country)*.

The screenshot shows the SynApp2 PageGen application window. At the top, there are tabs for KeyMap, Options, PageGen (selected), Reports, and Logout. Below the tabs, there are two input fields: 'AppID (or database): census' and 'QueryID (or table): city'. The main area is divided into two panels. The left panel, titled 'Page Settings - census.city', contains fields for 'Basis Page: city.htm', 'Basis Page Template: template.htm' (with a checkmark), 'Report Page: city.report.htm', and 'Report Page Template: template.report.htm' (with a checkmark). Below these are buttons for 'Run PageGen' and 'Regenerate All:'. The right panel, titled 'Page Flow', shows a diagram with two boxes: 'country (id_country)' and 'city (id)'. The 'country (id_country)' box has a radio button selected next to it, and a '(FK1)' label is above the 'city (id)' box. A 'Clear' button is located between the two boxes. At the bottom of the left panel, a 'Page Status' box indicates that the 'Basis Page file: city.htm - not found' and 'Report Page file: city.report.htm - not found'.

The Page Flow setting will cause PageGen to produce form elements on the *city.htm* page to support search and selection of records in the *country* table and will provide an improvement over what would otherwise be accomplished by a list box. This is especially important for tables with large numbers of records. Facilities to create and update *country* records, from the *city.htm* page, will also be generated.

An underlying authorization sub-system provides control over which viewing and editing features are available, based on the login username. See: [SynApp2 Customization](#).

Generate your *census* web application by clicking the **Run PageGen** button.

The Page Status area shows that several application files were created.

The screenshot shows the SynApp2 PageGen application window. At the top, there's a title bar 'SynApp2 PageGen' and a menu bar with 'KeyMap', 'Options', 'PageGen', 'Reports', and 'Logout'. Below the menu bar, there's a form with 'AppID (or database): census' and 'QueryID (or table): city'. The main area is divided into two panels. The left panel, titled 'Page Settings - census.city', contains fields for 'Basis Page: city.htm', 'Basis Page Template: template.htm', 'Report Page: city.report.htm', and 'Report Page Template: template.report.htm'. It also has a 'Run PageGen' button and a 'Regenerate All' checkbox. The right panel, titled 'Page Flow', shows a flow diagram with 'country (id_country)' and 'city (id)' connected by a line labeled '(FK1)'. There is a 'Clear' button in this panel. At the bottom left, the 'Page Status' area displays a log of actions: 'PageGen started...', 'generated: city.htm (2009-08-24 10:44:08)', 'generated: city.report.htm (2009-08-24 10:44:08)', 'created index.html', 'created welcome.htm', 'PageGen done.', 'Basis Page file: city.htm (2009-08-24 10:44:08)', and 'Report Page file: city.report.htm (2009-08-24 10:44:08)'.

There you have it – a complete web application. Everything that is needed to work with the *census* database has been created, including a tidy PDF report that you'll see at the end of Part B of the walkthrough.

A new application directory was automatically created to store the new files. In addition to index and welcome pages, a file named `custom.inc.php` (not shown) was created and is a key place where you can introduce application specific customization. See: [SynApp2 Customization](#).

Assuming a typical installation, all of the application files may be found in:

```
/<web_server_document_root>/synapp2/census/
```

You can immediately begin working with your application. Because you are already logged into SynApp2, and you are the creator of the application, you can jump directly to it – bypassing the application login screen.

Click the on either of the links to the [city.htm](#) page.

Part B – Working with a SynApp2 generated application

An application to work with *census* data has been created – synthesized, if you will – using SynApp2.

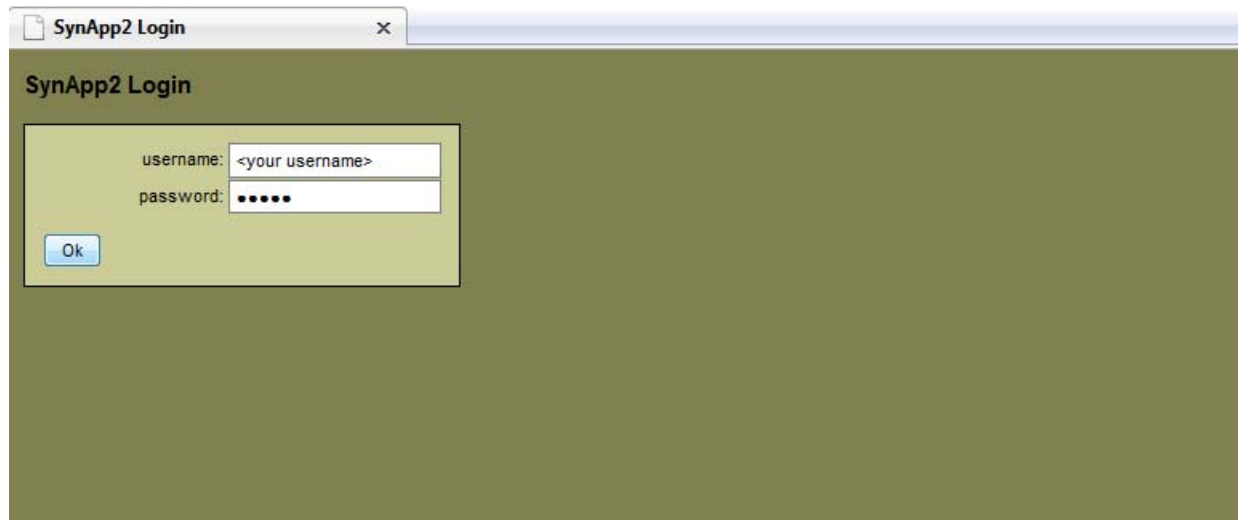
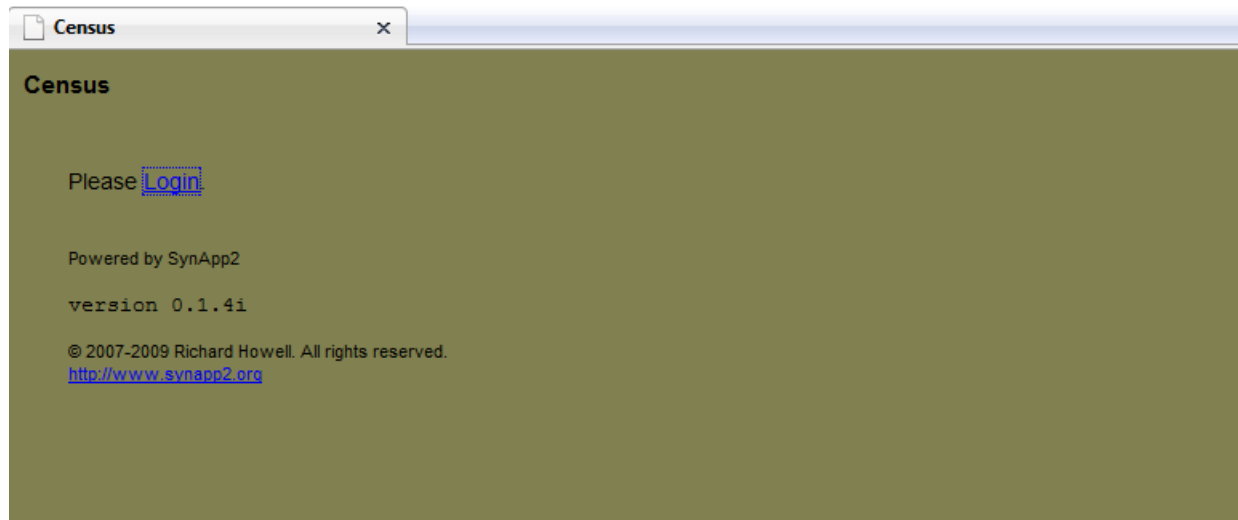
The application data is stored in two related tables, one for countries and one for cities. The *country* table has columns (i.e. fields) for Country Name and Country Abbreviation. The *city* table has columns for City Name and Population. The purpose, or meaning, of all of the table columns is expected to be (or soon become) readily apparent.

There are a few business rules about the data that will be enforced by the application, as you use it.

1. A country must be selected before you can add a new city^{vii}
2. All Input Form fields must have a value^{viii}
3. A city population must be at least 100000^{ix}

Rule number 1 is the central influence over the sequence of steps you'll carry out as you work. You really don't need to be particularly concerned about the business rules. They're only mentioned to help you notice the structure and guidance provided by the application.

Part B of the walk through begins with the Census application Login and Welcome pages.



From the Welcome page, navigate to the City page - click the City tab, near top of the display.

The City page appears.^x



City

City Reports Logout

Search Form - Country

Country Name:

Country Abbreviation:




Country  

Fill in values and then click Search

Select Form - City

City Name	Population

Rows:

City          

Navigate records, select a record and then click Edit (or click Add to create a new record)

[Jump to: SynApp2_page PageGen](#)

There aren't any records in any of the database tables yet. But, let's see what happens if we try to search for and select a country, as we'll need to do before we can add a new city.


City

City Reports Logout

Search Form - Country

Country Name:

Country Abbreviation:

Country  









Fill in values and then click Search

Search

Select Form - City


City Name	Population

Rows:

City          



Navigate records, select a record and then click Edit (or click Add to create a new record)

[Jump to: SynApp2_page PageGen](#)

Leave all of the fields of Search Form – Country blank and click  (Search).

An empty Select Form confirms that the *country* table has 0 rows. Before you can do anything with cities you have to have some countries to associate them with. Therefore, the first thing you'll need to do is add a *country*.

The screenshot shows a web application window titled "City". At the top, there are three tabs: "City", "Reports", and "Logout". Below the tabs, there are two main sections. The first section is titled "Search Form - Country" and contains two input fields: "Country Name:" and "Country Abbreviation:". Below these fields is a "Country" label with a magnifying glass icon and a green plus icon. Below the plus icon is the text "Fill in values and then click Search". Below the search section is a "Select Form - Country" section. It contains a table with two columns: "Country Name" and "Country Abbreviation". The table is empty. Below the table is a "Rows:" label with the value "0". Below the table and rows section is a "Country" label with a magnifying glass icon and a green plus icon. Below the plus icon is the text "Navigate records, select a record and then click Edit (or click Add to create a new record)". At the bottom of the window, there is a link: "Jump to SynApp2 page PageGen".

Begin the process of creating a new *country* record. Click  (Add) on either control bar. As both control bars associated with Country, both  (Add) controls initiate the same behavior.

The screenshot shows the same web application window as before, but with a modal dialog box titled "Input Form - Country" open. The dialog box contains two input fields: "Country Name:" and "Country Abbreviation:". Below these fields are "Ok" and "Cancel" buttons. The background of the application is dimmed.

The Input Form is where you enter values for each field (or column).

Fill in a value for Country Name.

The screenshot shows a web application window titled 'City'. It has a navigation bar with 'City', 'Reports', and 'Logout' buttons. The main content area is divided into two sections. The top section is titled 'Search Form - Country' and contains a 'Country Name' input field. The bottom section is titled 'Select' and contains a table with columns 'City Name' and 'Population'. A dialog box titled 'Input Form - Country' is overlaid on the search form. It has two input fields: 'Country Name' (filled with 'New Zealand') and 'Country Abbreviation' (empty). There are 'Ok' and 'Cancel' buttons at the bottom of the dialog box. The background also shows a 'Rows:' label and a 'City' label with a list of cities and their populations.

Fill in a value for Country Abbreviation.

(Our example uses ISO 3166-1 alpha-2 codes.)

This screenshot is identical to the previous one, but the 'Country Abbreviation' field in the 'Input Form - Country' dialog box is now filled with 'NZ'. The 'Ok' button is highlighted in blue, indicating it is the default action.

Complete the input operation by hitting the Enter key, or click Ok.

The new record is stored to the database, *on the web server*, and appears in the Select Form.^{xi}

The screenshot shows a web application window titled "City". At the top, there are three tabs: "City", "Reports", and "Logout". Below the tabs, there are two main sections. The first section is titled "Search Form - Country" and contains two input fields: "Country Name:" and "Country Abbreviation:". Below these fields is a search bar with a magnifying glass icon and a plus icon. The second section is titled "Select Form - Country" and contains a table with two columns: "Country Name" and "Country Abbreviation". The table has one row with the values "New Zealand" and "NZ". Below the table is a "Rows:" label with a value of "1". At the bottom of the Select Form section is a control bar with a "Country" label and several icons: a magnifying glass, a left arrow, a right arrow, a delete icon (X), an add icon (+), an edit icon (pencil), and a checkmark icon. Below the control bar is a text label: "Navigate records, select a record and then click Edit (or click Add to create a new record)". At the very bottom of the window is a link: "Jump to SynApp2 page PageGen".

Repeat the process of creating a new *country* record.

This screenshot is identical to the previous one, but with an additional "Add" button highlighted below the control bar in the "Select Form - Country" section. The "Add" button is a small rectangular button with the text "Add" in it.

Again, you may click + (Add) on either control bar because they both affect Country exactly the same way.

Fill in the column values.

The screenshot shows the 'City' application window. At the top, there are tabs for 'City', 'Reports', and 'Logout'. Below the tabs, there is a 'Search Form - Country' section with a 'Country Name' input field. Overlaid on this is an 'Input Form - Country' dialog box. This dialog box has two input fields: 'Country Name' with the text 'Czech Republic' and 'Country Abbreviation' with the text 'CZ'. At the bottom of the dialog box are 'Ok' and 'Cancel' buttons. In the background, a 'Select Form - Country' section is visible, featuring a table with columns 'City Name' and 'Population'. Below the table is a 'Rows' input field. At the bottom of the application window, there is a navigation bar with a 'City' label, several navigation icons, and a text instruction: 'Navigate records, select a record and then click Edit (or click Add to create a new record)'. A link 'Jump to: SynApp2_page PageGen' is also present.



Complete the input operation by hitting the Enter key, or click Ok.

This screenshot shows the 'City' application window after the input operation. The 'Input Form - Country' dialog box is no longer present. The 'Search Form - Country' section now has empty input fields for 'Country Name' and 'Country Abbreviation', and a 'Country' dropdown menu. Below it is a 'Select Form - Country' section. This section contains a table with two columns: 'Country Name' and 'Country Abbreviation'. The table has two rows: the first row contains '2', 'Czech Republic', and 'CZ'; the second row is empty. Below the table is a 'Rows' input field with the value '2'. At the bottom of the application window, the navigation bar now includes an 'Add' button. The text instruction and the 'Jump to: SynApp2_page PageGen' link remain the same.


The second new record is stored to the database and appears in the Select Form.

Repeat the Add operation for another Country and a third record is stored and appears in the Select Form.

The screenshot shows a web application window titled "City". It has three tabs: "City", "Reports", and "Logout". The "City" tab is active. Below the tabs, there are two main sections. The first section is titled "Search Form - Country" and contains two input fields: "Country Name:" and "Country Abbreviation:". Below these fields is a search button labeled "Country" with a magnifying glass icon. Below the search button is a text box with the instruction "Fill in values and then click Search". The second section is titled "Select Form - Country" and contains a table with two columns: "Country Name" and "Country Abbreviation". The table has one row with the values "3" and "United States of America" in the first column, and "US" in the second column. Below the table is a "Rows:" label followed by a text box containing the number "3". Below the table and rows label is a toolbar with several icons: a blue arrow pointing right, a blue arrow pointing left, a blue arrow pointing up, a blue arrow pointing down, a red X, a green plus, a pencil, a minus, and a checkmark. Below the toolbar is a text box with the instruction "Navigate records, select a record and then click Edit (or click Add to create a new record)". At the bottom of the page is a link that says "Jump to SynApp2 page PageGen".

Notice now, that  (First) and  (PgUp) icons^{xiii} of Select Form – Country are enabled, having changed from gray to blue. This means that you can use these controls to navigate records in the *country* table. The ability to navigate will become increasingly important as more records are added.

This screenshot is similar to the previous one, but the "First" button (blue arrow pointing right) in the toolbar of the "Select Form - Country" section is now highlighted with a mouse cursor. The rest of the interface remains the same.

Navigate to the first row of the *country* table - click  (First).

The rows are retrieved from the database and displayed.^{xiii}

The screenshot shows a web application window titled "City". At the top, there are three tabs: "City", "Reports", and "Logout". Below the tabs, there are two main sections. The first section is titled "Search Form - Country" and contains two input fields: "Country Name:" and "Country Abbreviation:". Below these fields is a search bar with the text "Country" and a search icon. Below the search bar is a button labeled "Search". The second section is titled "Select Form - Country" and contains a table with three rows of data. The table has two columns: "Country Name" and "Country Abbreviation". The rows are: 1. New Zealand, NZ; 2. Czech Republic, CZ; 3. United States of America, US. Below the table is a "Rows:" label with a value of 3. At the bottom of the section is a navigation bar with icons for adding, deleting, and editing records, and a text label: "Navigate records, select a record and then click Edit (or click Add to create a new record)".

City

City Reports Logout

Search Form - Country

Country Name:

Country Abbreviation:

Country

Fill in values and then click Search

Select Form - Country

	Country Name	Country Abbreviation
1	New Zealand	NZ
2	Czech Republic	CZ
3	United States of America	US

Rows: 3

Country

Navigate records, select a record and then click Edit (or click Add to create a new record)

Now that the *country* table has a few rows of data, we can select a *country* and then add a *city*.

This screenshot is identical to the previous one, but the first row of the "Select Form - Country" table is highlighted in black. The row contains the data: 1, New Zealand, NZ.

City

City Reports Logout

Search Form - Country

Country Name:

Country Abbreviation:

Country

Fill in values and then click Search

Select Form - Country


	Country Name	Country Abbreviation
1	New Zealand	NZ
2	Czech Republic	CZ
3	United States of America	US



Rows: 3

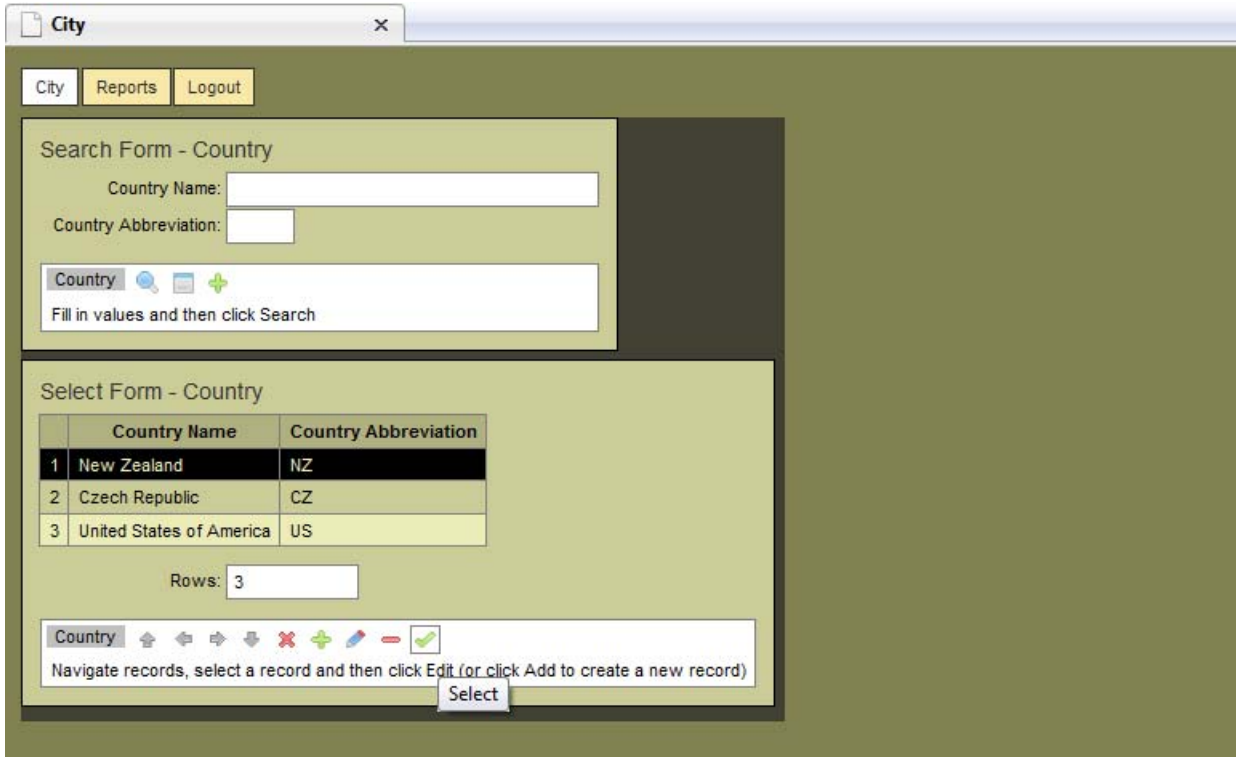
Country

Navigate records, select a record and then click Edit (or click Add to create a new record)

Highlight a country by clicking within a cell of Select Form – Country, on the row you want to select.


The highlighted row can now be selected with  (Select).

Note too, that  (Edit) and  (Delete) are available.



The screenshot shows a web application window titled 'City'. It has a navigation bar with 'City', 'Reports', and 'Logout' buttons. The main content area is divided into two sections. The top section, 'Search Form - Country', contains input fields for 'Country Name' and 'Country Abbreviation', a search button with a magnifying glass icon, and a text prompt 'Fill in values and then click Search'. The bottom section, 'Select Form - Country', contains a table with three rows of country data. The first row, 'New Zealand' with abbreviation 'NZ', is highlighted. Below the table is a 'Rows: 3' indicator. At the bottom of this section is a toolbar with icons for navigating records and a green checkmark icon for selecting a record. A tooltip labeled 'Select' is visible over the checkmark icon.

	Country Name	Country Abbreviation
1	New Zealand	NZ
2	Czech Republic	CZ
3	United States of America	US

Select the highlighted row – click  (Select).



The screenshot shows the same 'City' application window. The 'Search Form - Country' section is now replaced by the 'Display Form - Country' section, which shows the selected country's details: 'Country Name: New Zealand' and 'Country Abbreviation: NZ'. The bottom section, 'Select Form - City', contains an empty table with columns 'City Name' and 'Population'. Below the table is a 'Rows: 0' indicator. The toolbar at the bottom remains the same, with the green checkmark icon still visible.


City Name	Population
-----------	------------

The selected *country* is now visible in the Display Form.

From this point, any number of *city* records can be added for the selected *country*.

Begin the process of creating a new *city* record for the selected *country* record.

The screenshot shows a web application window titled 'City'. At the top, there are three tabs: 'City', 'Reports', and 'Logout'. Below the tabs, there are two main sections. The first section, 'Display Form - Country', contains two input fields: 'Country Name' with the value 'New Zealand' and 'Country Abbreviation' with the value 'NZ'. The second section, 'Select Form - City', contains a table with two columns: 'City Name' and 'Population'. Below the table, there is a 'Rows' field with the value '0'. At the bottom of the 'Select Form - City' section, there is a control bar with several icons: a left arrow, a right arrow, a double left arrow, a double right arrow, a red X, a green plus, a pencil, and a minus. Below the control bar, there is a text box with the text 'Navigate records, select a record and then click Edit (or click Add to create a new record)'. Below the text box, there is an 'Add' button. At the bottom of the page, there is a link that says 'Jump to: SynApp2_page PageGen'.

Click  (Add) on the control bar.

The screenshot shows the same web application window as before, but with a dialog box titled 'Input Form - City' open. The dialog box contains two input fields: 'City Name' and 'Population'. At the bottom of the dialog box, there are two buttons: 'Ok' and 'Cancel'. The background of the application is dimmed.

Just as with *country*, we have an Input Form to enter column values for a *city* record.

Fill in the column values.

The screenshot shows a web application window titled 'City'. At the top, there are three tabs: 'City' (selected), 'Reports', and 'Logout'. Below the tabs, there are two main sections. The top section is titled 'Display Form - Country' and contains a text input field for 'Country Name' with the value 'New Zealand'. The bottom section is titled 'Select Form - City' and contains a table with the following data:

	City Name	Population
1	Wellington	385600


Below the table, there is a 'Rows: 0' label. At the bottom of the window, there is a control bar with several icons: a left arrow, a right arrow, a double left arrow, a double right arrow, a red X, a green plus, a pencil, and a minus. Below the icons, there is a text label: 'Navigate records, select a record and then click Edit (or click Add to create a new record)'. At the bottom of the window, there is a link: 'Jump to: SynApp2_page PageGen'.

Complete the Add operation with the Enter key or click Ok. The new *city* record is stored to the database and appears in the Select Form. **You can easily repeat the process for another *city* in the same *country*.**

The screenshot shows the same web application window as before, but now the 'Input Form - City' dialog box is closed. The 'Display Form - Country' section now includes a 'Country Abbreviation' field with the value 'NZ'. The 'Select Form - City' section now shows the table with one record:

	City Name	Population
1	Wellington	385600

Below the table, there is a 'Rows: 1' label. The control bar at the bottom now has a green plus icon highlighted with a mouse cursor. The text label below the icons now reads: 'Navigate records, select a record and then click Edit (or click Add to create a new record)'. The link at the bottom remains 'Jump to: SynApp2_page PageGen'.

Click  (Add), on the control bar.

Again, we have an Input Form to enter column values for a *city* record.

The screenshot shows a web application window titled 'City'. It has a navigation bar with 'City', 'Reports', and 'Logout' buttons. The main content area is divided into two sections. The top section, 'Display Form - Country', shows 'Country Name: New Zealand'. The bottom section, 'Select', contains a table with one row: '1' in the first column and 'Wellington' in the second column. Below the table is a 'Rows: 1' indicator. A modal window titled 'Input Form - City' is open in the center. It contains two input fields: 'City Name' with the value 'Auckland' and 'Population' which is empty. At the bottom of the modal are 'Ok' and 'Cancel' buttons. Below the modal, there is a toolbar with icons for navigating records and a text box that says 'Navigate records, select a record and then click Edit (or click Add to create a new record)'. At the bottom of the page is a link: 'Jump to SynApp2 page PageGen'.

See what happens if you fill a value for **only** City Name and then hit the Enter key, or click Ok – leaving the Population field empty.

This screenshot shows the same 'City' input form as the previous one, but with a validation error. The modal window 'Input Form - City' is still open, with 'City Name' set to 'Auckland' and 'Population' empty. A red error message, 'Population is required, please enter a value', is displayed above the 'Population' input field. The 'Ok' button is now disabled, indicated by a greyed-out appearance. The rest of the interface, including the 'Display Form - Country' section, the 'Select' table, and the navigation bar, remains the same as in the previous screenshot.

An informative message appears with detail about a problem and a corrective action.

A click on the message will shift the input focus to the corresponding input control.

City

City Reports Logout

Display Form - Country

Country Name: New Zealand

Country:

Select Form - City

City Name: Auckland

Population: 1313200

Population is required, please enter a value

Ok Cancel

City

Navigate records, select a record and then click Edit (or click Add to create a new record)

[Jump to SynApp2 page PageGen](#)

Fill in the Population field and hit the Enter key, or click Ok.

City

City Reports Logout

Display Form - Country

Country Name: New Zealand

Country Abbreviation: NZ

Select Form - City

	City Name	Population
2	Auckland	1313200


Rows: 2

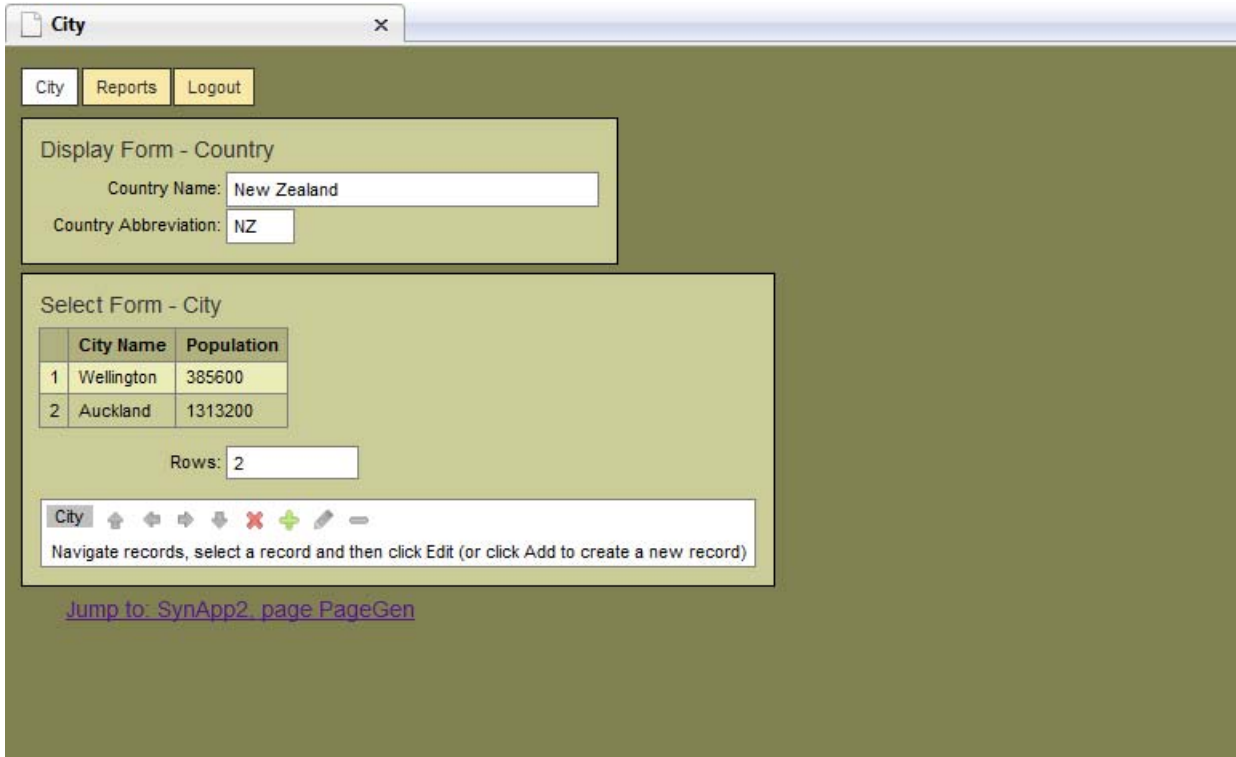
City

Navigate records, select a record and then click Edit (or click Add to create a new record)

[Jump to SynApp2 page PageGen](#)

Once again, the new *city* record is stored to the database and appears in the Select Form^{xiv}.









Navigate to the first row of the *city* table – click  (First).



The screenshot shows a web application window titled 'City'. It has a navigation bar with 'City', 'Reports', and 'Logout' buttons. Below the navigation bar, there are two main sections. The first section, 'Display Form - Country', contains two input fields: 'Country Name' with the value 'New Zealand' and 'Country Abbreviation' with the value 'NZ'. The second section, 'Select Form - City', contains a table with two columns: 'City Name' and 'Population'. The table has two rows: '1 Wellington 385600' and '2 Auckland 1313200'. Below the table, there is a 'Rows: 2' label. At the bottom of the 'Select Form - City' section, there is a toolbar with a 'City' label, a first button (up arrow), a previous button (left arrow), a next button (right arrow), a last button (down arrow), a delete button (red X), an add button (green plus), an edit button (pencil), and a close button (minus). Below the toolbar, there is a text box that says 'Navigate records, select a record and then click Edit (or click Add to create a new record)'. At the bottom of the window, there is a link that says 'Jump to: SynApp2. page PageGen'.

	City Name	Population
1	Wellington	385600
2	Auckland	1313200

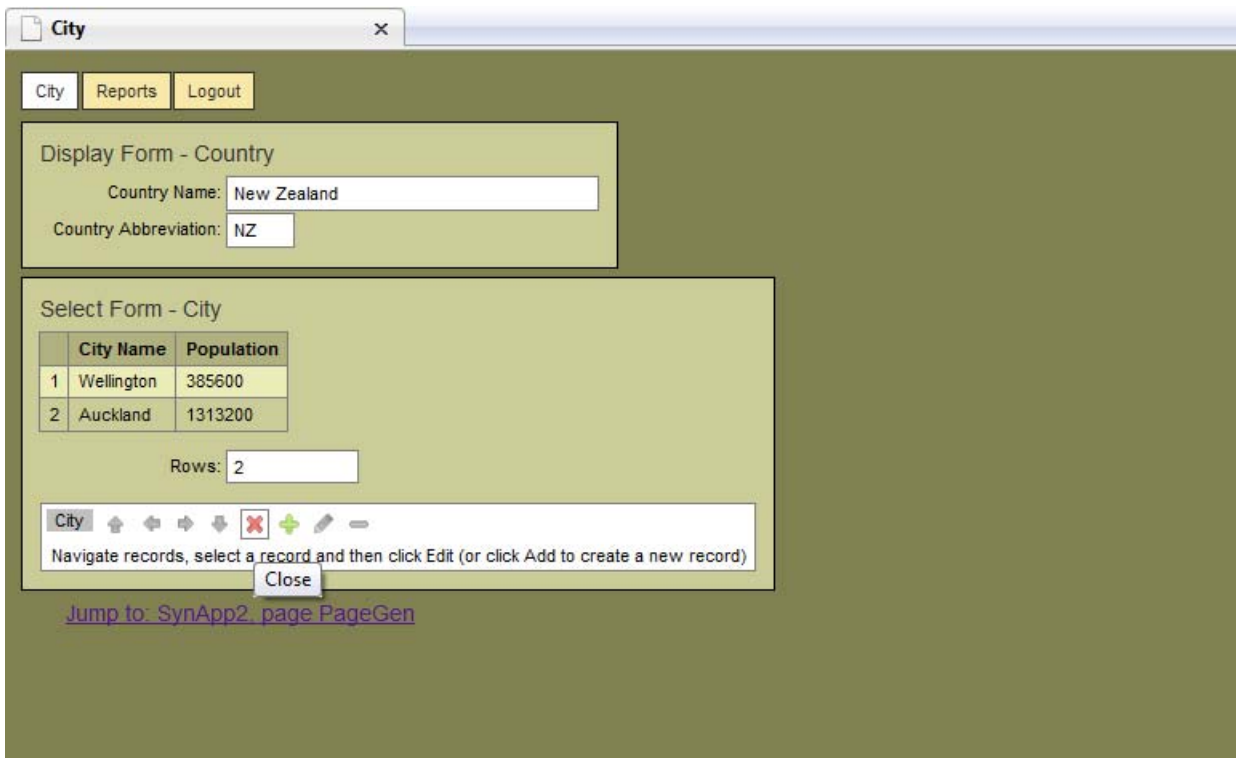
Rows: 2

City        

Navigate records, select a record and then click Edit (or click Add to create a new record)

[Jump to: SynApp2. page PageGen](#)









Only *city* records for the selected *country* are presented.



This screenshot is identical to the previous one, but with a 'Close' button highlighted over the red X delete button in the toolbar of the 'Select Form - City' section.

	City Name	Population
1	Wellington	385600
2	Auckland	1313200

Rows: 2

City        

Navigate records, select a record and then click Edit (or click Add to create a new record)

[Jump to: SynApp2. page PageGen](#)

Dismiss the Select Form – click  (Close).

Now you're free to select another *country* and then add *city* records.

The screenshot shows the 'City' application window. At the top, there are tabs for 'City', 'Reports', and 'Logout'. Below the tabs, there are two main sections. The first section is titled 'Search Form - Country' and contains two input fields: 'Country Name:' and 'Country Abbreviation:'. Below these fields is a search bar with a magnifying glass icon and a plus sign. The second section is titled 'Select Form - Country' and contains a table with three rows of country data. Below the table is a 'Rows:' field with the value '3'. At the bottom of the 'Select Form' section is a toolbar with various icons for navigating and editing records.

	Country Name	Country Abbreviation
1	New Zealand	NZ
2	Czech Republic	CZ
3	United States of America	US

To demonstrate the Search Form, narrow the set of records to choose from.


This screenshot shows the same 'City' application window, but the 'Country Name' field in the 'Search Form - Country' section now contains the text 'republic'. The 'Country Abbreviation' field is still empty. The 'Select Form - Country' section remains unchanged, showing the same table of country data and the 'Rows: 3' field.

	Country Name	Country Abbreviation
1	New Zealand	NZ
2	Czech Republic	CZ
3	United States of America	US


Type a **portion** of a Country Name into the Search Form, followed by the Enter key, or click  (Search).

Now, only matching records are displayed. In this case it's only one.

The screenshot shows a web application window titled 'City'. At the top, there are three tabs: 'City', 'Reports', and 'Logout'. Below the tabs, there are two main sections. The first section is 'Search Form - Country', which contains two input fields: 'Country Name' with the value 'republic' and 'Country Abbreviation' which is empty. Below these fields is a 'Country' dropdown menu and a green plus icon. A text label below the dropdown says 'Fill in values and then click Search'. The second section is 'Select Form - Country', which contains a table with two columns: 'Country Name' and 'Country Abbreviation'. The table has one row with the values 'Czech Republic' and 'CZ'. Below the table is a 'Rows' input field with the value '1'. At the bottom of the 'Select Form' section is a 'Country' dropdown menu and a set of navigation icons (up, down, left, right, search, add, edit, delete, confirm). A text label below the icons says 'Navigate records, select a record and then click Edit (or click Add to create a new record)'. At the very bottom of the window is a link that says 'Jump to SynApp2 page PageGen'.


The SQL LIKE operator is applied to each Search Form field with wild card characters on both ends of the term i.e. %<term>%. The search pattern terms are then combined with AND^{xv}. **Don't supply excess detail.** If you over do it, you'll get zero rows. If you get way too many rows, add a little more detail, and click  (Search) again.

This screenshot is identical to the previous one, but with a 'Select' tooltip appearing over the green checkmark icon in the navigation bar of the 'Select Form - Country' section. The tooltip contains the word 'Select'.

Highlight a record by clicking in a cell on the Select Form row – then click  (Select).

The record you highlighted and selected appears in the Display Form.

The screenshot shows a web application window titled "City". At the top, there are three tabs: "City", "Reports", and "Logout". Below the tabs, there are two main sections. The first section, "Display Form - Country", contains two text input fields: "Country Name:" with the value "Czech Republic" and "Country Abbreviation:" with the value "CZ". The second section, "Select Form - City", contains a table with two columns: "City Name" and "Population". The table is currently empty. Below the table, there is a "Rows:" label followed by a text input field containing the value "0". At the bottom of the "Select Form - City" section, there is a toolbar with several icons: a left arrow, a right arrow, a double left arrow, a double right arrow, a red X, a green plus, a pencil, and a minus. Below the toolbar, there is a text label: "Navigate records, select a record and then click Edit (or click Add to create a new record)". Below this label, there is a button labeled "Add". At the very bottom of the window, there is a link: "Jump to: SynApp2_page PageGen".

Now you're ready to add a new *city* for the selected *country* – click  (Add).

The screenshot shows the same web application window as before, but with a dialog box titled "Input Form - City" open in the foreground. The dialog box contains two text input fields: "City Name:" with the value "Praha (Prague)" and "Population:" with the value "104675542". Below the input fields, there are two buttons: "Ok" and "Cancel". The background of the application window is dimmed, but the "Display Form - Country" and "Select Form - City" sections are still visible. The "City" tab is still selected at the top.

Enter the column values and click Ok.

The new *city* record is stored to the database and appears in the Select Form.


The screenshot shows a web application window titled "City". At the top, there are three tabs: "City", "Reports", and "Logout". Below the tabs, there are two main sections. The first section, "Display Form - Country", contains two text input fields: "Country Name:" with the value "Czech Republic" and "Country Abbreviation:" with the value "CZ". The second section, "Select Form - City", contains a table with the following data:

	City Name	Population
1	Praha (Prague)	104675542

Below the table, there is a "Rows:" label followed by a text input field containing the value "1". At the bottom of the "Select Form - City" section, there is a toolbar with icons for navigating records (up, down, left, right, first, last, search, and a red 'X' icon). Below the toolbar, there is a text label: "Navigate records, select a record and then click Edit (or click Add to create a new record)". At the very bottom of the window, there is a link: [Jump to: SynApp2_page PageGen](#).

You're done entering cities for this *country*.

This screenshot is identical to the previous one, showing the "City" application window with the "Select Form - City" section. The table contains one record for "Praha (Prague)". The "Rows:" field is set to "1". The toolbar at the bottom of the "Select Form - City" section now has a red 'X' icon highlighted, and a tooltip labeled "Close" is visible over it. The text label below the toolbar remains: "Navigate records, select a record and then click Edit (or click Add to create a new record)". The link at the bottom is still [Jump to: SynApp2_page PageGen](#).

Dismiss the Select Form – click  (Close).

Search filtering is still active.

The screenshot shows the 'City' application window. At the top, there are tabs for 'City', 'Reports', and 'Logout'. Below the tabs, there are two main sections. The first section is 'Search Form - Country', which contains two input fields: 'Country Name' with the value 'republic' and 'Country Abbreviation' which is empty. Below these fields is a 'Country' dropdown menu with a search icon and a plus sign. Below the dropdown is a text box with the instruction 'Fill in values and then click Search'. Below the text box is a 'Reset' button. The second section is 'Select Form - Country', which contains a table with two columns: 'Country Name' and 'Country Abbreviation'. The table has one row with the values 'Czech Republic' and 'CZ'. Below the table is a 'Rows' input field with the value '1'. Below the 'Rows' field is a 'Country' dropdown menu with a search icon and a plus sign. Below the dropdown is a text box with the instruction 'Fill in values and then click Search'. Below the text box is a 'Reset' button. At the bottom of the window, there is a link that says 'Jump to: SynApp2_page PageGen'.

City

City Reports Logout

Search Form - Country

Country Name: republic

Country Abbreviation:

Country

Fill in values and then click Search

Reset

Select Form - Country

	Country Name	Country Abbreviation
1	Czech Republic	CZ

Rows: 1

Country

Navigate records, select a record and then click Edit (or click Add to create a new record)

[Jump to: SynApp2_page PageGen](#)

Clear the Search Form – click Reset (Reset).

The screenshot shows the 'City' application window. At the top, there are tabs for 'City', 'Reports', and 'Logout'. Below the tabs, there are two main sections. The first section is 'Search Form - Country', which contains two input fields: 'Country Name' and 'Country Abbreviation', both of which are empty. Below these fields is a 'Country' dropdown menu with a search icon and a plus sign. Below the dropdown is a text box with the instruction 'Fill in values and then click Search'. Below the text box is a 'Reset' button. The second section is 'Select Form - Country', which contains a table with two columns: 'Country Name' and 'Country Abbreviation'. The table has three rows with the values 'New Zealand', 'Czech Republic', and 'United States of America'. Below the table is a 'Rows' input field with the value '3'. Below the 'Rows' field is a 'Country' dropdown menu with a search icon and a plus sign. Below the dropdown is a text box with the instruction 'Fill in values and then click Search'. Below the text box is a 'Reset' button. At the bottom of the window, there is a link that says 'Jump to: SynApp2_page PageGen'.

City

City Reports Logout

Search Form - Country

Country Name:

Country Abbreviation:

Country

Fill in values and then click Search

Select Form - Country

	Country Name	Country Abbreviation
1	New Zealand	NZ
2	Czech Republic	CZ
3	United States of America	US

Rows: 3

Country

Navigate records, select a record and then click Edit (or click Add to create a new record)

[Jump to: SynApp2_page PageGen](#)

The full set of *country* records is visible.

Check what you've learned. Do whatever steps it takes to add two more *city* records, as shown below.


The screenshot shows a web application window titled 'City'. It has three tabs: 'City', 'Reports', and 'Logout'. The 'City' tab is active. The interface is divided into two main sections. The top section, 'Display Form - Country', contains two input fields: 'Country Name' with the value 'United States of America' and 'Country Abbreviation' with the value 'US'. The bottom section, 'Select Form - City', contains a table with two columns: 'City Name' and 'Population'. The table has two rows: '1 New York 8310212' and '2 Los Angeles 3849378'. Below the table is a 'Rows: 2' label. At the bottom of the 'Select Form - City' section is a navigation bar with a 'City' label, a set of navigation icons (up, down, left, right, delete, add, edit, cancel), and a 'Close' button. Below the navigation bar is a text box with the instruction 'Navigate records, select a record and then click Edit (or click Add to create a new record)'. At the bottom of the window is a link: 'Jump to: SynApp2, page PageGen'.

City Name	Population
1 New York	8310212
2 Los Angeles	3849378

Once you've added the new records, dismiss the Select Form for *city* – click  (Close).

The screenshot shows the same web application window. The 'City' tab is still active. The 'Display Form - Country' section is now a 'Search Form - Country' with two input fields: 'Country Name' and 'Country Abbreviation'. Below these fields is a 'Country' label, a set of navigation icons, and a text box with the instruction 'Fill in values and then click Search'. The bottom section, 'Select Form - Country', contains a table with two columns: 'Country Name' and 'Country Abbreviation'. The table has three rows: '1 New Zealand NZ', '2 Czech Republic CZ', and '3 United States of America US'. Below the table is a 'Rows: 3' label. At the bottom of the 'Select Form - Country' section is a navigation bar with a 'Country' label, a set of navigation icons (up, down, left, right, delete, add, edit, cancel), and a 'Close' button. Below the navigation bar is a text box with the instruction 'Navigate records, select a record and then click Edit (or click Add to create a new record)'.

Country Name	Country Abbreviation
1 New Zealand	NZ
2 Czech Republic	CZ
3 United States of America	US

Dismiss the Select Form for *country* – click  (Close).

Now you're back to the beginning and ready to explore reports.

The screenshot shows a web application window titled "City". At the top, there are three tabs: "City", "Reports", and "Logout". The "City" tab is active. Below the tabs, there are two main sections. The first section is titled "Search Form - Country" and contains two input fields: "Country Name:" and "Country Abbreviation:". Below these fields is a search button labeled "Country" with a magnifying glass icon. Below the search button is a text input field with the placeholder text "Fill in values and then click Search". The second section is titled "Select Form - City" and contains a table with two columns: "City Name" and "Population". Below the table is a "Rows:" label and an input field. Below the input field is a toolbar with icons for navigating records (up, down, left, right, first, last, search, add, delete, edit). Below the toolbar is a text input field with the placeholder text "Navigate records, select a record and then click Edit (or click Add to create a new record)". At the bottom of the window, there is a link: [Jump to: SynApp2_page PageGen](#).

Click the Reports tab.

The screenshot shows the same web application window, but now the "Reports" tab is active. The "City" tab is still visible but inactive. Below the tabs, there is a single tab labeled "City". Below the "City" tab is a link: [Jump to: SynApp2_page PageGen](#).

Invoke the City report – click the City report tab on the **lower** tier.

The Report Form works just like the Search Form, described earlier.

Reports

City Reports Logout

City

Report Form - City

Country:

City Name:

Population:

City

Fill in values and then click Report

Report

Run the City report – click the Report (Report) icon.

Reports

City Reports Logout

City

1 / 1

54.6%

Sign

Find

City

Country	City Name	Population
New Zealand	Wellington	386200
New Zealand	Auckland	1313200
Czech Republic	Prague (Prague)	1045755
United States of America	New York	2310212
United States of America	Los Angeles	3840378

Done

A neatly formatted report appears. You can view, print, save, and even email it with another click or two.

Here's a slightly closer view of a portion of the City report.

City	
Country	
New Zealand	Wellington
New Zealand	Auckland
Czech Republic	Praha (Prague)
United States of America	New York
United States of America	Los Angeles

That completes the example and Part B of the walk through.

Click Logout.

In the future, you should be able to adapt the interaction sequences, you've learned for the Census application, to other SynApp2 powered web applications.

Endnotes

ⁱ Developers – Even though several tables may be manipulated on a single application page, such functionality is provided in the context of managing the table of primary focus - the *basis_table*. The term *basis_table* appears in other SynApp2 documentation and the SynApp2 program source code.

ⁱⁱ Developers – A very popular, free software tool – **phpMyAdmin** – is available for managing MySQL databases. If you don't have it – get it. See: <http://www.phpmyadmin.net>

ⁱⁱⁱ Developers – If you are using or adapting this walk through as a training exercise for multiple users, you will need to coordinate access to a shared database named *census*. The tables will need to be emptied before/between sessions. You could create separate databases, each with a unique name, having the same tables and structure as the original. Concurrent access to a shared database is not an issue for live data, but because the walk through depends on state of the data tables, someone or something must manage the environment.

^{iv} Developers – You can change an output filename if you need to. Just know that if you strategically name your tables from the outset, you'll be able to move along without having to override names later on. Also, if you do change an output filename, from the default value, the resulting page will *not* be automatically linked to by a tab on the page navigation or report selection area. You'll have to make a customization. See: [SynApp2 Customization](#)

^v Developers – The default template file, `template.htm`, resides in the `synapp2` application directory. You can derive new template files and use them as needed. Simply specify the appropriate name in the Template field before you generate the page. It is even possible to use an existing page as its own template. In other words the input file is the same as the output file. This will preserve your code, for page specific customization, that has been placed outside special section marker tokens, between which SynApp2 inserts generated code.

^{vi} Developers – On the Page Flow panel, related tables are aligned in a column called a *path*. A path is a SynApp2 term that is intended to mean all of the table relationships, represented by a chain of foreign keys, beginning at the basis table and continuing up through successive tables according to the database schema as represented in the SynApp2 *keymap*. Check the radio button to designate a *tier table*. The terminology is admittedly obscure, at this point, but these terms shows up in other documentation and the SynApp2 program source code. The important thing is that, for this example, SynApp2 will generate forms that allow you to search, create, read, update, and even delete parent table records, in the course of managing child table records.

^{vii} Developers – For the Census application, it is also necessary to select a *country* before you may select a *city* to edit/update or delete. The example was created, in Part A of the walk through, with an absolute minimum of interaction. An additional page could be generated that allows independent selection of *city* records, and yet still enforces the relationship with *country* by means of a list box control. The pages can co-exist.



^{viii} Developers – database table column definitions that are designated as NOT NULL, drive SynApp2 to require a value on any Input Form where the field is exposed for editing.

^{ix} Developers – if you look at the database table definition for *city*, you can see where the rule for Population, `min=100000` gets introduced.

^x **Users** – You won't normally see [Jump to: SynApp2, page PageGen](#) at the bottom of the Census application pages.

Developers – You will see the link to SynApp2 at the bottom of the Census application pages only when you enter a SynApp2 generated application from SynApp2. This link, and a reciprocal, is made available to allow instant back-and-forth transition between the SynApp2 development environment and the application you're working on.

^{xi} **Users** – Once you submit an Input Form and the new or updated row appears in the Select Form – **the data is saved**. Nothing further is required.

^{xii} **Users** – The  (Last) and  (PgDn) controls behave like their counterparts. They are used to scroll through records, one page at a time, or jump directly to the last row of available data.

^{xiii} **Users** – You can click on any column heading to change the sort order of the rows in the Select Form. As you click on a column heading in a Select Form, the sort order of the rows will toggle between ascending and descending order according to the values in that column. A click in the leftmost cell of the heading row will restore the default sort order.

Developers – Records are always maintained in a sorted order. By default, the order is according to the record's primary key value. This can be easily customized. As the primary key is always an automatically assigned numeric value, the default table order ends up being the chronological order in which the records were inserted.

^{xiv} **Users** – Anytime you add or edit a record, you'll see the result at the top row of the paginated tabular display.

Developers – This is one example of what SynApp2 considers to be a *follow-up* display. See [SynApp2 Concepts](#). When records are ordered by the primary key values, the follow-up display always shows the new (or updated) record, by itself, on the last page of the paginated tabular display. When records are sorted by something other than their primary key, they won't always appear on the last row of the last page of the Select Form. Because new records will typically fall into sorted order between other records, the follow-up Select Form display will show records that come logically *after* the one just inserted or updated. As more records are inserted, the select form will fill to its maximum capacity, which by default is 5 records, and is something you can customize.

^{xv} **Users** – don't worry too much about the explanation of what the `LIKE` operator is or does.

Developers – Case sensitivity of the Search Form and Report Form patterns varies depending on the database engine.

See: http://dev.mysql.com/doc/refman/5.0/en/string-comparison-functions.html#operator_like.

There is similar information about the `LIKE` operator for other database engines.