

FrontBase®

A WebObjects®

Application



Because of last-minute changes to FrontBase, some of the information in this manual may be inaccurate. Please read the Release Notes on the FrontBase distribution for the latest up-to-date information.

Revised: 02/17/05 gab

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A

A WebObjects Application

Welcome to the Fun part ! This chapter will guide you through a complete process from where to get FrontBase for FREE, through the database model and table definition/creation, and web application development.

This chapter will guide you through the following:

- [“Overview” on page 5.](#)
- [“Package Installation” on page 5.](#)
- [“Creation of the Contacts Database” on page 12.](#)
- [“Enterprise Object Model Creation” on page 26.](#)
- [“Table Creation” on page 14.](#)
- [“WebObjects Application Creation” on page 44.](#)
- [“Running the WOContacts Application” on page 130.](#)

Overview

FrontBase is available for FREE download at www.frontbase.com.

Package Installation

1. After decompressing the downloaded package, you will have a file FrontBase-MacOSX-<version>.mpkg as seen in [Figure A.1](#)

A WebObjects Application Package Installation

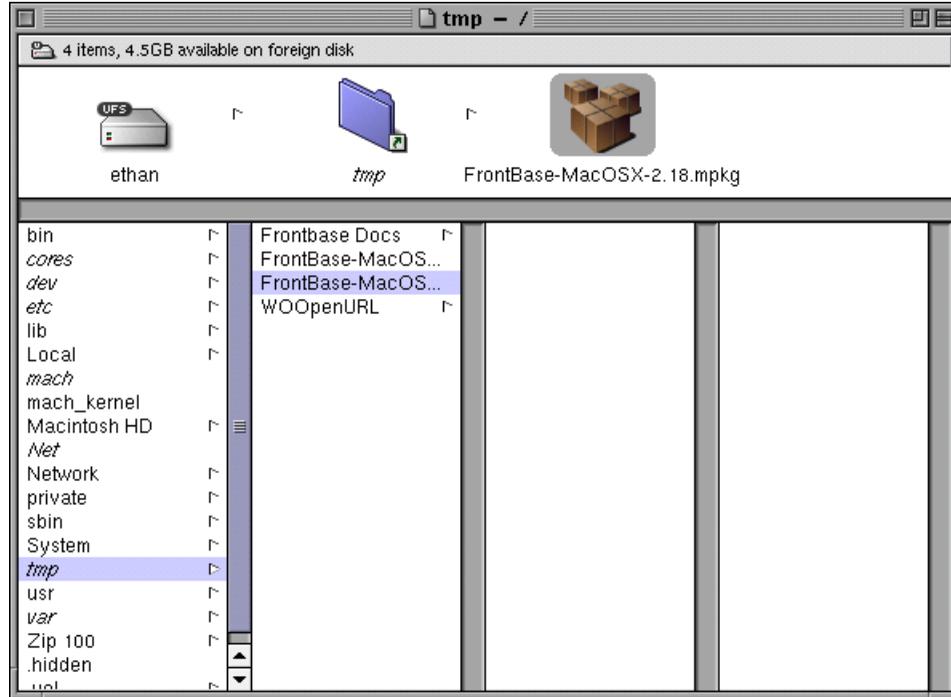


Figure A.1 FrontBase-MacOSX-<version>.mpkg

2. You are now presented with a window as seen in [Figure A.2](#), showing you the components that will be installed. Notice the checkboxes are all checked. Since this is our first install, we leave them all checked.

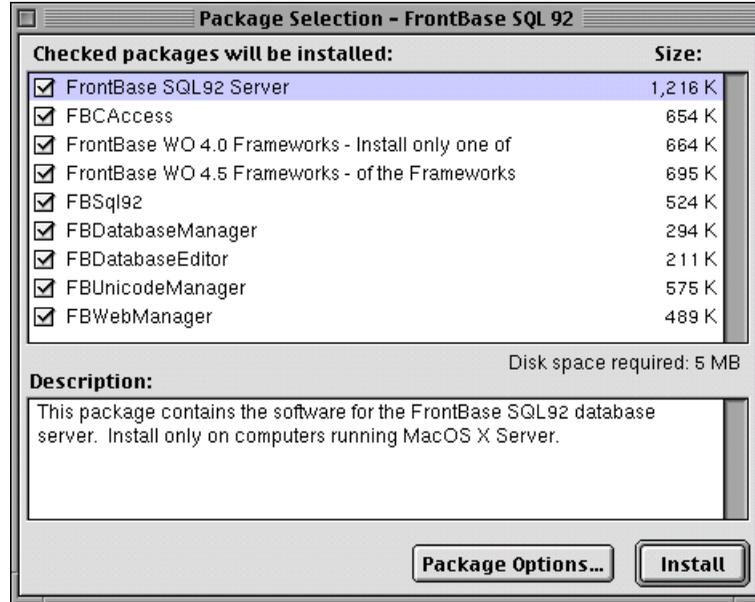


Figure A.2 Components to be Installed

3. Click the Install button and you will be prompted to confirm the installation. To confirm the installation click the "Continue" button as seen in [Figure A.3](#).

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Package Installation

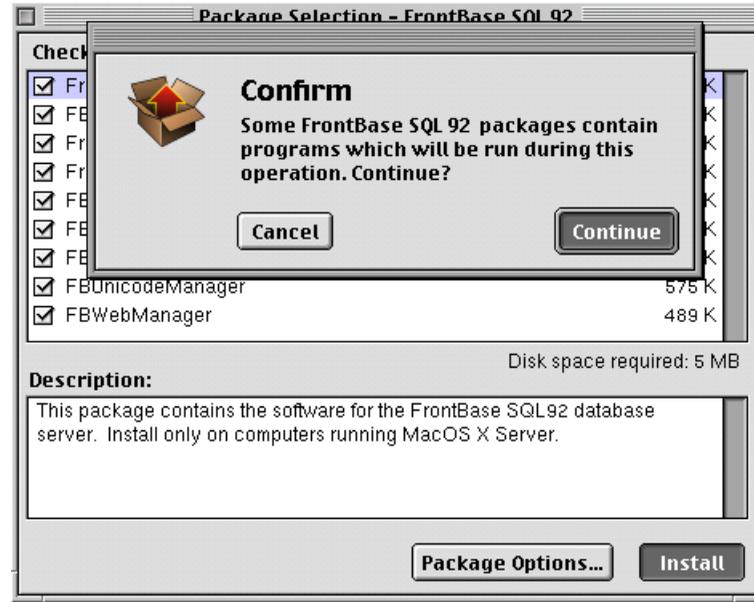


Figure A.3 Confirm Installation

4. If you already have a version of FrontBase installed, you will be informed that some of the files are already installed as seen in [Figure A.4](#). That is ok, click on the "Continue" button.



Figure A.4 Files Have Been Found

5. The installer will now proceed to install FrontBase on your computer. When installation is complete you will see the panel as shown in [Figure A.5](#).

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Package Installation

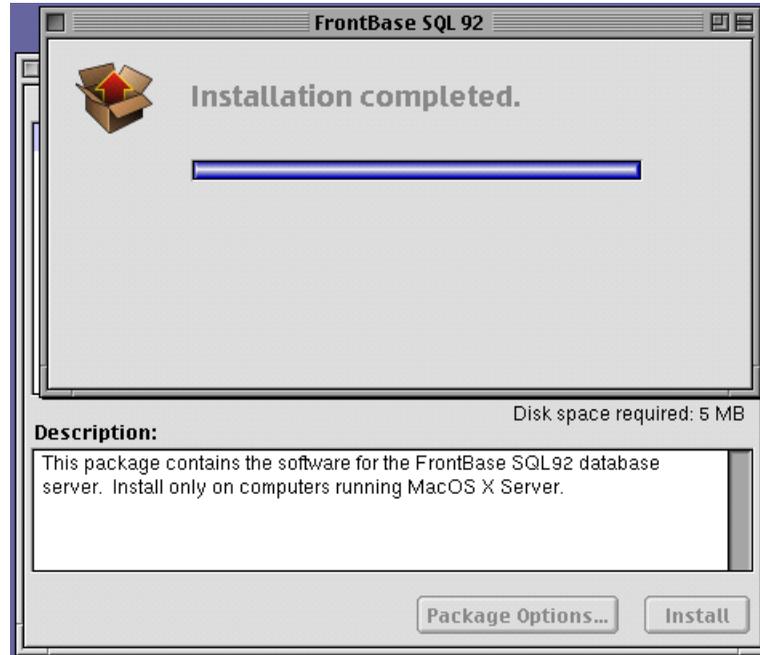


Figure A.5 Installation Complete

6. The frontBase engine, FBExec is started automatically as part of the installation process. To verify that it is open a terminal window and execute the following command, as seen in [Figure A.6](#).

```
ps axc | grep FBExec
```

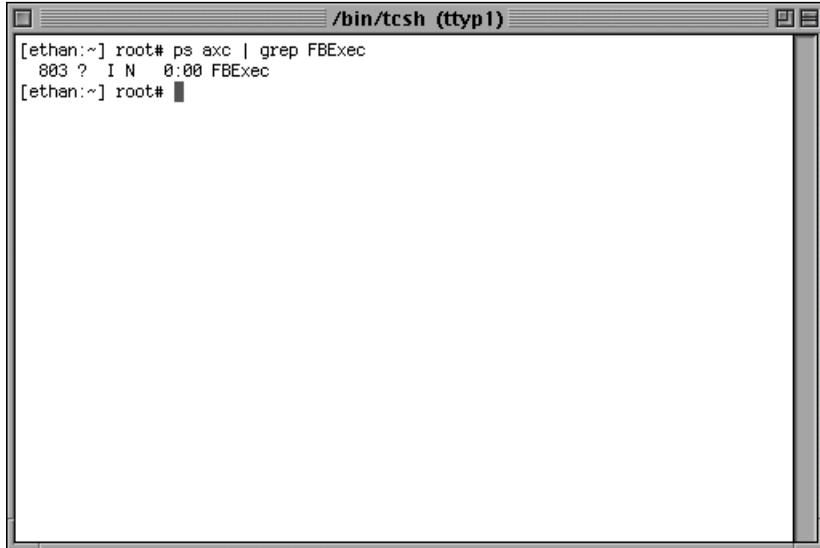


Figure A.6 FBExec Verification

NOTE: To open a terminal window, from the Workspace Manager navigate and double click /System/Administration/Terminal.app.

If for some reason for some reason the FBExec is not running, try to launch it from the same Terminal window by using the following command:

```
/Local/Library/FrontBase/bin/FBExec &
```

If it still does not start, please e-mail all the messages to:
support@FrontBase.com.

NOTE: It is normal to see a single start-up message upon manual start-up.

Creation of the Contacts Database

FBDatabaseManager

1. Create a FBDatabaseManager shortcut. From the Workspace Manager navigate to /Local/Applications/FBDatabaseManager.app as seen in [Figure A.7](#)

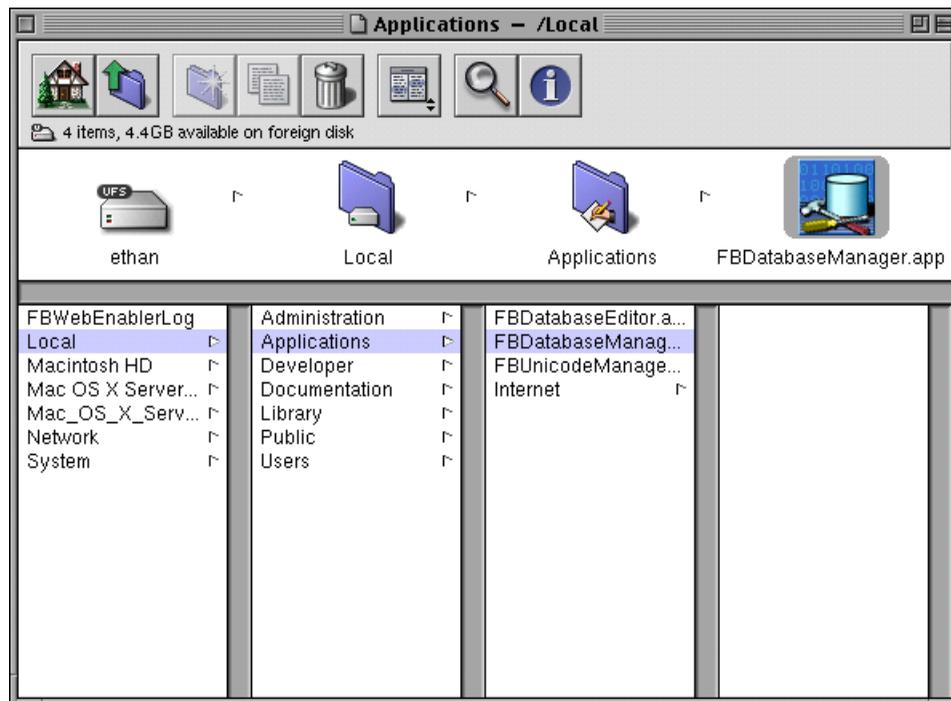


Figure A.7 Create a FBDatabaseManager shortcut

2. Click and drag the FBDatabaseManager.app to your Desktop. Now start-up FBDatabaseManager by double clicking on this icon as seen in [Figure A.8](#).

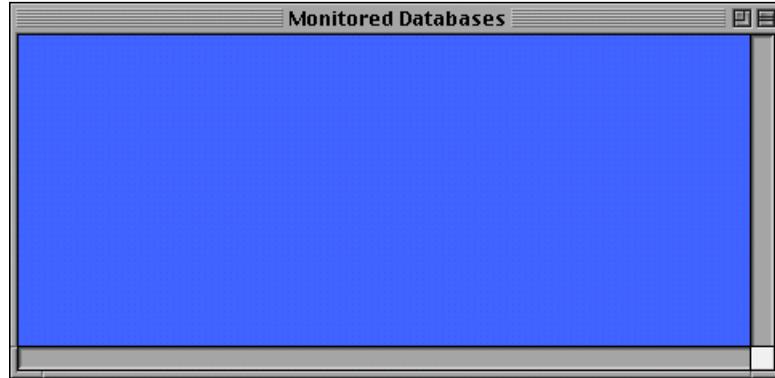


Figure A.8 Starting FBDatabaseManager

3. From the Menu choose Database->Create and you will be prompted for Host name and Database name. Enter your host, click "Add" and enter Contacts for the Database name, click "Select" as seen in [Figure A.9](#).

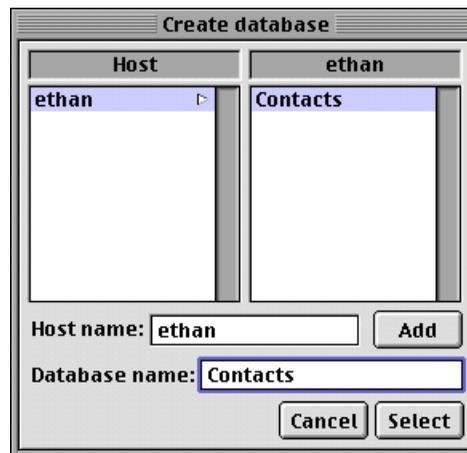


Figure A.9 Create Contacts

4. Your database has been created and it will now be started and displayed in the Monitor as seen in [Figure A.10](#).

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Table Creation

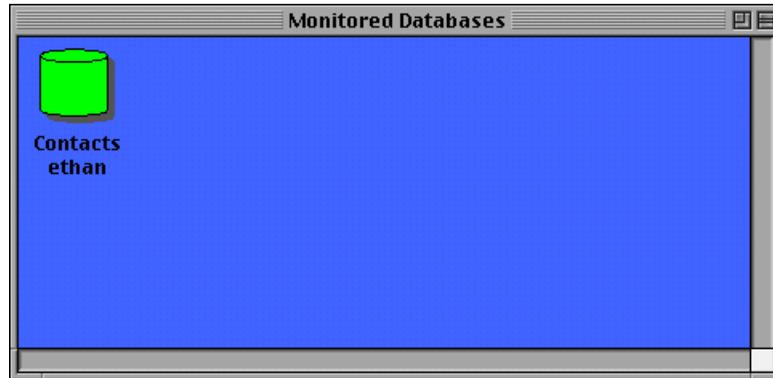


Figure A.10 Verification in Monitor

Table Creation

EOModeler

1. Create an EOModeler shortcut. From the Workspace Manager navigate to /System/Developer/Applications/EO-Modeler.app as seen in [Figure A.11](#).

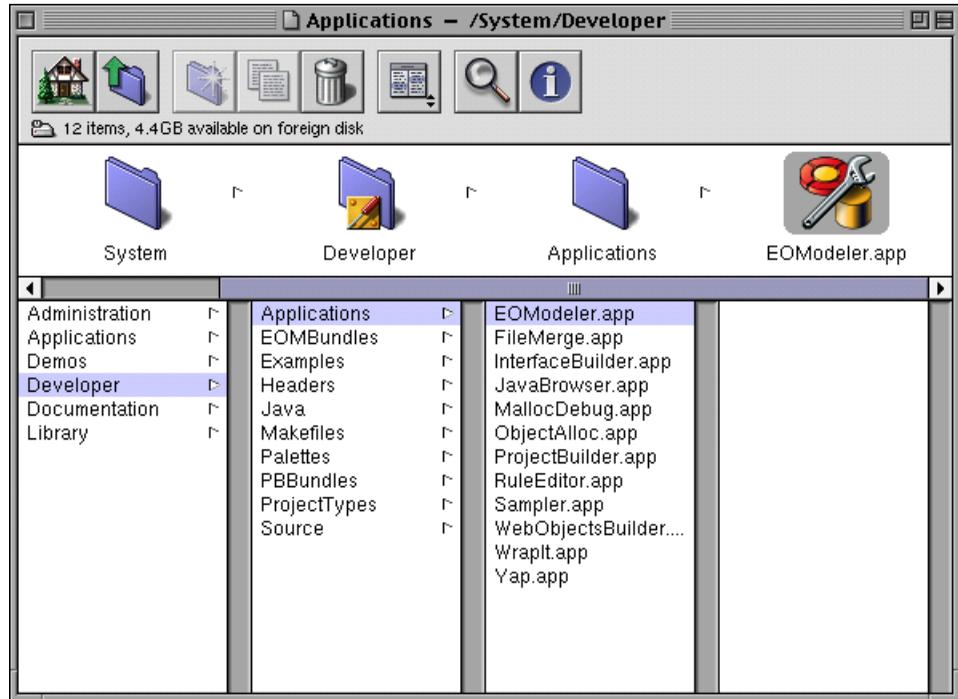


Figure A.11 Create an EOModeler Shortcut

2. Click and drag the EOModeler.app to your Desktop. Now start-up EOModeler by double clicking on this icon. Choose Model->New from the menu and choose FrontBase for the adaptor to be used for your application, as seen in [Figure A.12](#).

A WebObjects Application

Table Creation

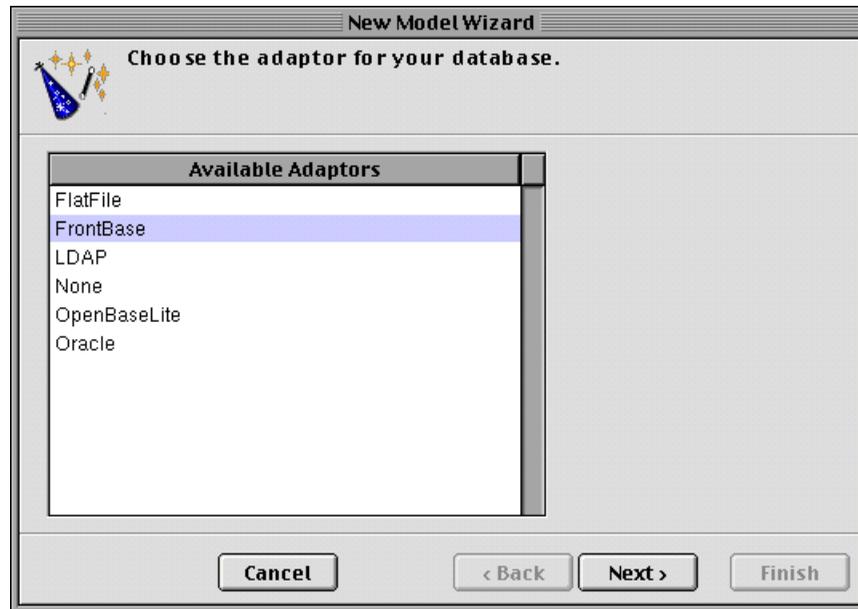


Figure A.12 Starting EOModeler

3. Click the "Next" button and enter Contacts for the Database name, your hostname for the Host name and click "Login" as seen in [Figure A.13](#).

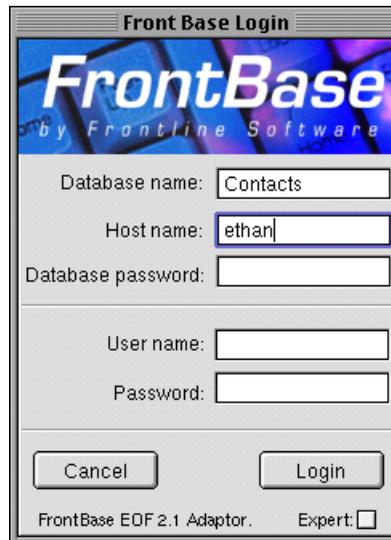


Figure A.13 Define the Database

4. You will then be prompted to what to include in you database EOModel, click "Finish" as seen in [Figure A.14](#).

A WebObjects Application

Table Creation

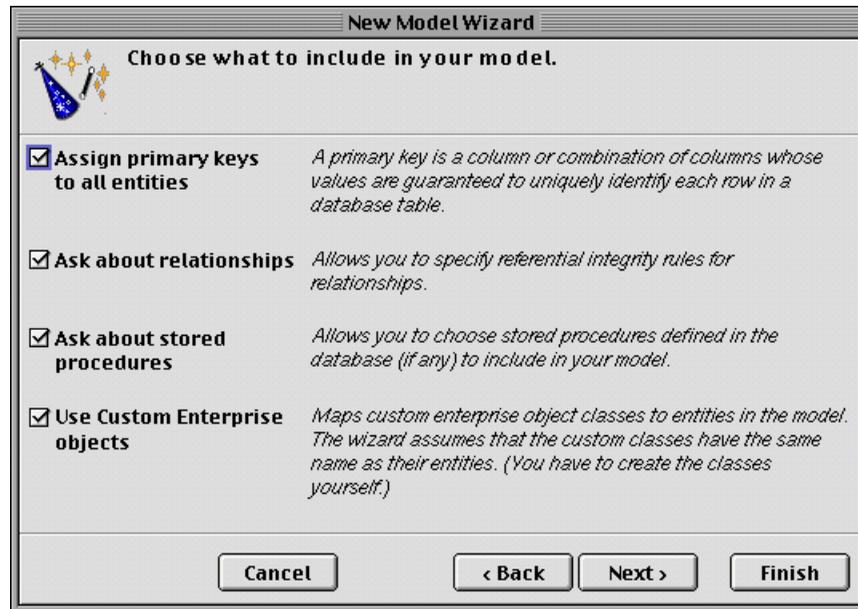


Figure A.14 Defining the Model

5. It is a good idea to save your model now.
Choose Model->Save and click on Library and enter Models/Contacts in the Name field as seen in [Figure A.15](#).



Figure A.15 Saving the Model

6. You might be prompted for a Nonexisting path if you do not have a Models Folder. Click "Create" to create the Folder and model file as seen in [Figure A.16](#).

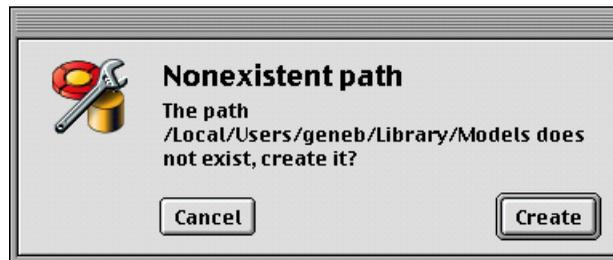


Figure A.16 Path Creation

7. Your model should now reflect the new database name "Contacts" as seen in [Figure A.17](#).

A WebObjects Application

Table Creation

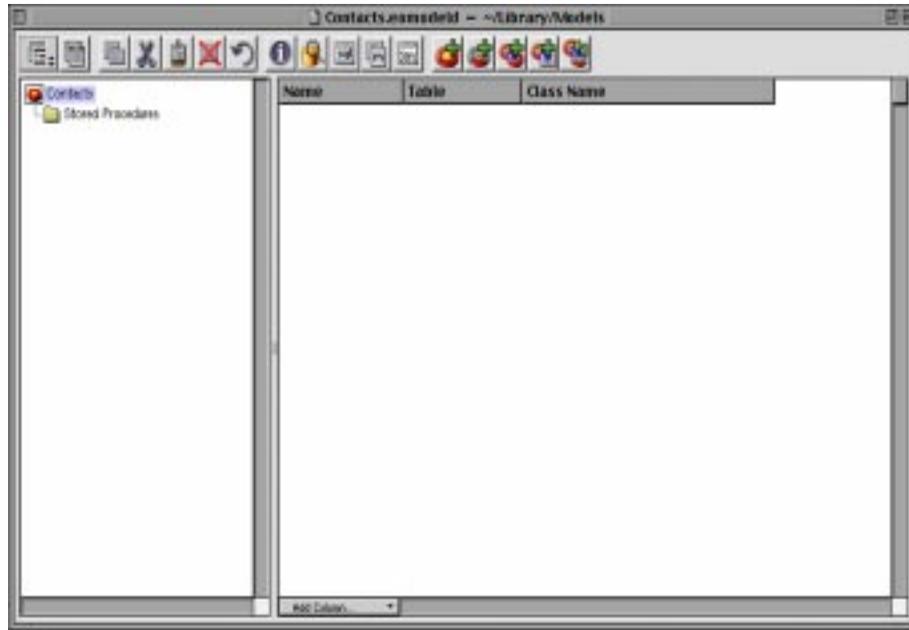


Figure A.17 The Contacts EOModel

To start creating Entities in EOModeler,

8. Choose Property->Add Entity your window should look like [Figure A.18](#).

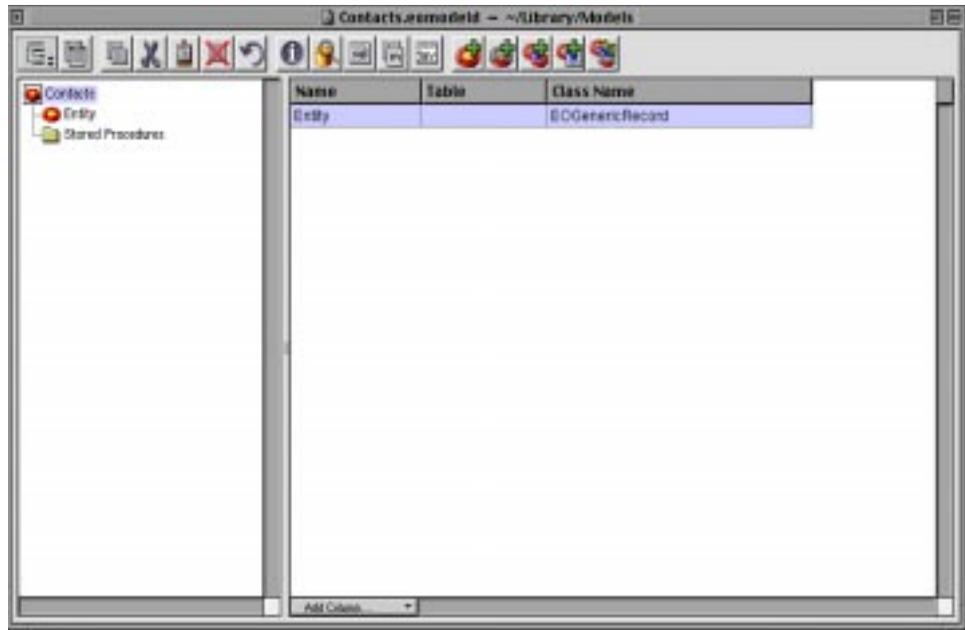


Figure A.18 Creating Table Entities

9. Under the "Name" column, double click the Entity entry and replace it with Contact, double click in the field under the "Table" column and enter CONTACT, finally double click EOGenericRecord under the "Class Name" column and enter Contact as seen in [Figure A.19](#).

A WebObjects Application

Table Creation

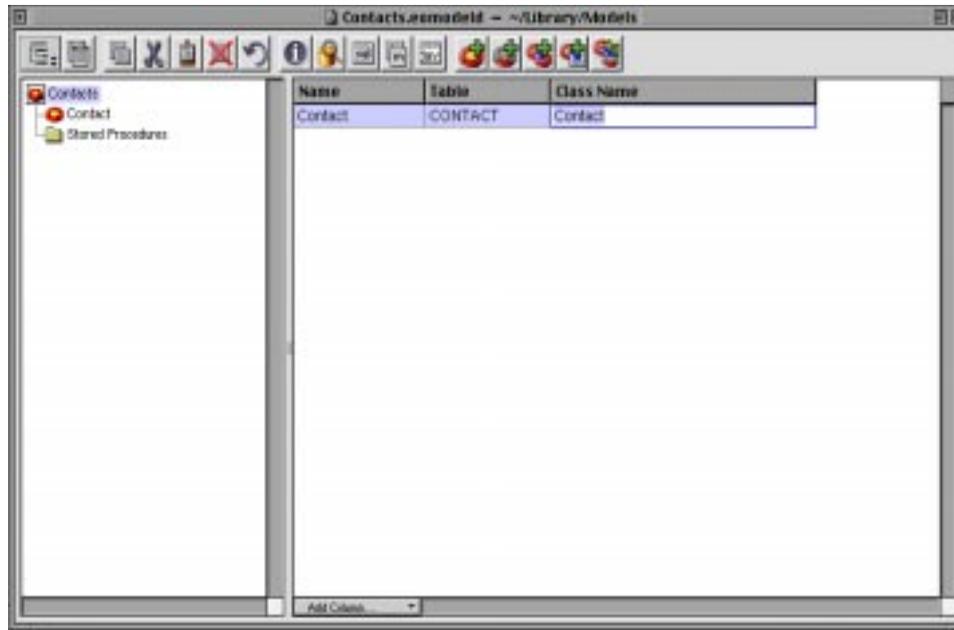


Figure A.19 Record Creation

10. Repeat the previous 2 steps for the tables Company and Product so your model looks like [Figure A.20](#).

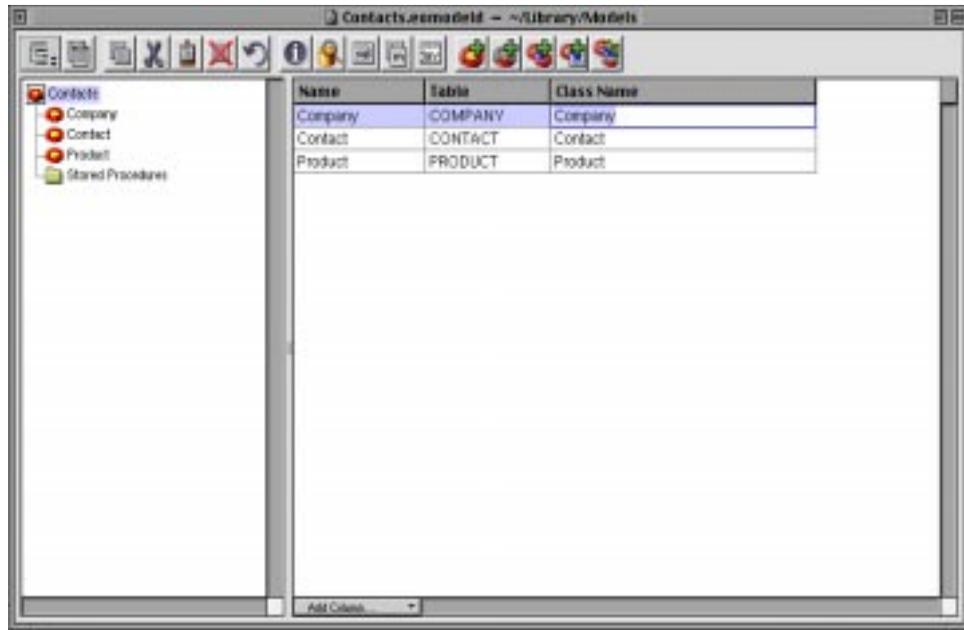


Figure A.20 The Complete Contacts EOModel

11. Click Model->Save to save your model. You will see a Consistency Check, [Figure A.21](#) stating that your tables do not have any primary keys defined. Click OK, because you are now going to define your tables in the next section.

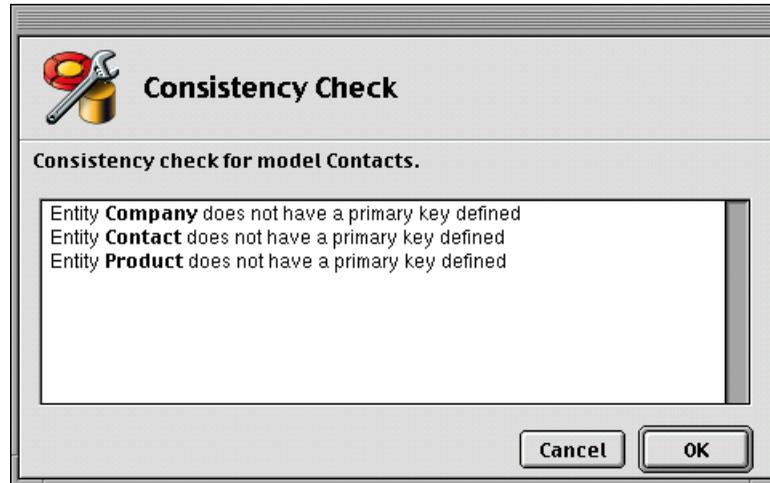


Figure A.21 Consistency Check

EOAdaptor Connection Dictionary Keys

The following keys are known to the FrontBase EOAdaptor. The keys are case sensitive and the values of the databaseName has the case sensitivity of the underlying file system.

- databaseName NSString The name of the database
- userName NSString The database name of the user, default the login name
- hostName NSString The name of the host, defaults to current host
- databasePassword NSString The digested database password, default none
- password NSString The digested password for the user, default none
- debugFile NSString A file to write debug info into, opened append write
- debug NSNumber The debug level
 - 0: off
 - 1: on

- catalogName NSString The catalog name, defaults to current database
- schemaName NSString The schema name, defaults to the default schema for the user
- isolationLevel NSNumber The isolation level, defaults to SERIALIZABLE
 - 0: ISOLATION LEVEL READ UNCOMMITTED
 - 1: ISOLATION LEVEL READ COMMITTED
 - 2: ISOLATION LEVEL REPEATABLE READ
 - 3 :ISOLATION LEVEL SERIALIZABLE
 - 2: ISOLATION LEVEL VERSIONED
- updateability NSNumber The updatability, defaults to READ WRITE
 - 0: READ WRITE
 - 1: READ ONLY
- lockingDisciplineNSNumber The locking dicipline, defaults to pessimistic
 - 0: LOCKING PESSIMISTIC
 - 1: LOCKING DEFERRED
 - 2: LOCKING OPTIMISTIC
- batchSize NSNumber The number of rows fetched in the first batch, default 200
- nextBatchSize NSNumber The number of rows fetched in subsequent batches, default 200

The passwords must be digested. This is done with the Class method of the class FBPasswordDigest something like:

```
[FBPasswordDigest digestPassword:pw user:@"_SYSTEM"];
```

NOTE: The pw is the password that the user entered, and the user is the uppercase user name. For the database password you must use `_SYSTEM` and the user.

FBPasswordDigest is defined in the FBAccess framework, in the header file FBPasswordDigest.h

Enterprise Object Model Creation

The Company Table

1. The SQL for the table will be as follows:

```
SET TRANSACTION ISOLATION LEVEL SERIALIZABLE, LOCKING
PESSIMISTIC;
DROP TABLE "Company" CASCADE;
CREATE TABLE "Company"
( "Address1"    VARCHAR(255),
  "Address2"    VARCHAR(255),
  "City"        VARCHAR(255),
  "Contact_Id"  INT,
  "Country"     VARCHAR(255),
  "Email"       VARCHAR(64),
  "Name"        VARCHAR(255),
  "Product_Id"  INT,
  "State"       VARCHAR(255),
  "Telephone"   VARCHAR(64),
  "Zip"         VARCHAR(64)
);
DELETE FROM INFORMATION_SCHEMA.EOMODELER_RELATIONS WHERE
"SCHEMA_NAME" = CURRENT_SCHEMA AND SOURCE_TABLE = 'COMPANY';

INSERT INTO INFORMATION_SCHEMA.EOMODELER_RELATIONS VALUES
(CURRENT_SCHEMA, 'toContact', 0, 0, 'COMPANY', '(CONTACT_ID)', 'CONTACT', '(CONTACT_ID)');

INSERT INTO INFORMATION_SCHEMA.EOMODELER_RELATIONS VALUES
(CURRENT_SCHEMA, 'toProduct', 0, 0, 'COMPANY', '(PRODUCT_ID)', 'PRODUCT', '(PRODUCT_ID)');
```

```
ALTER TABLE "Company" ADD PRIMARY KEY
("Contact_Id","Product_Id") NOT DEFERRABLE INITIALLY IMMEDIATE;
ALTER TABLE "Company" ADD FOREIGN KEY ("Product_Id") REFERENCES
"Product" ("Product_Id") DEFERRABLE INITIALLY DEFERRED;
ALTER TABLE "Company" ADD FOREIGN KEY ("Contact_Id") REFERENCES
"Contact" ("Contact_Id") DEFERRABLE INITIALLY DEFERRED;
COMMIT;
```

2. To create the Company Table click on the "Company" entry in the left frame of EOModeler and make sure that you see the following columns:

- Name
- Value Class
- External Type
- Width
- Column
- Value

as seen in [Figure A.22](#). If you do not have all the columns, choose the "Add Column" drop down button in the Company Attributes section to add the desired column. You may have to add the "Value" column for example.

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Enterprise Object Model Creation

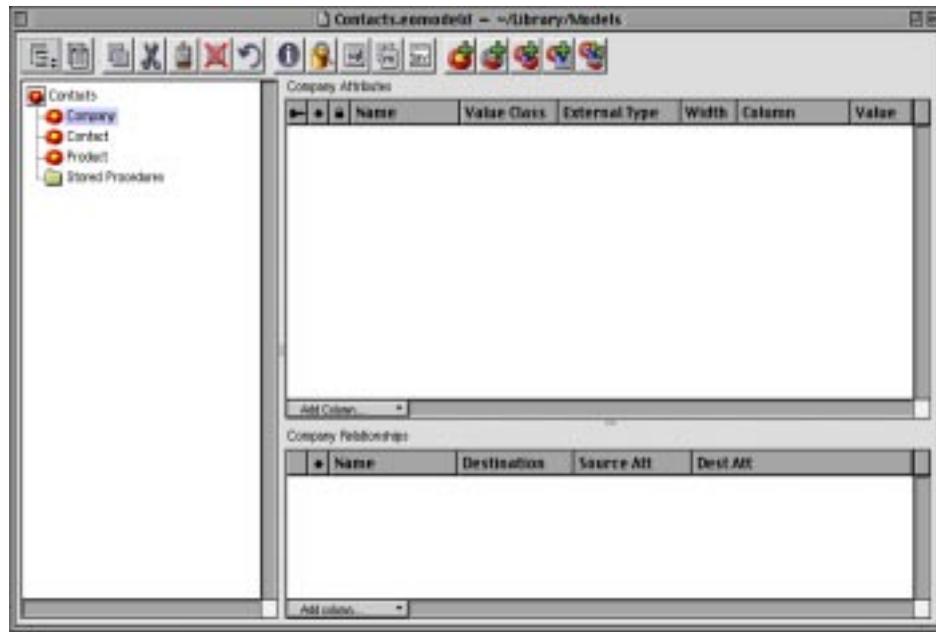


Figure A.22 Company Table Creation

Add the Table Attributes

1. To add attributes to the Company table you will choose Property->Add Attribute and your window will look like [Figure A.23](#).

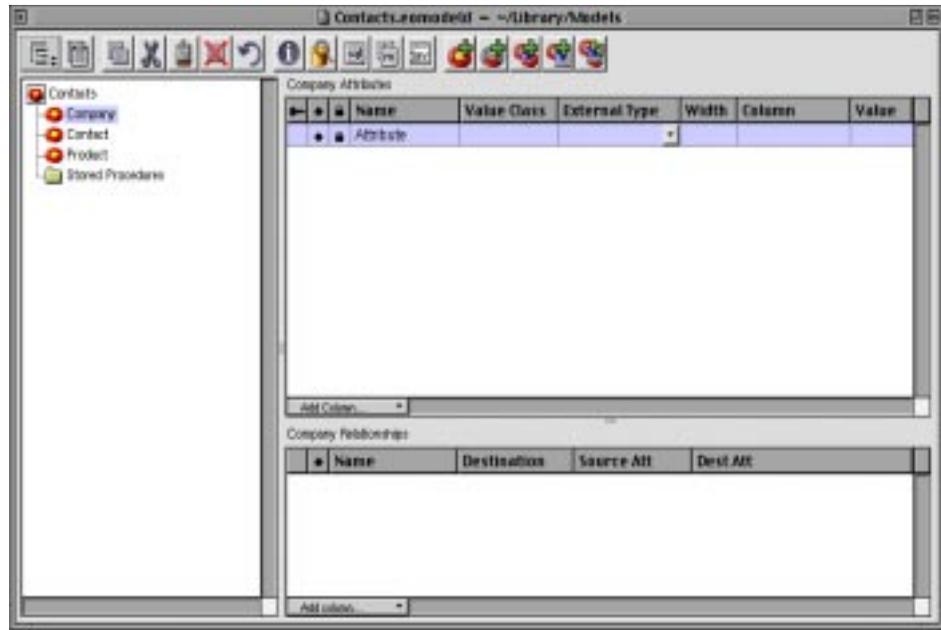


Figure A.23 Adding Company Attributes

2. The Company table will have a relationship with the Contact and Product table so you will create a key to hold the ID's of each of the table data. To create the key entry first click under the "key" icon, next click under the "diamond" icon to deselect the column, next double click the "Attribute" entry under the Name column and enter contactID, double click under the Value Class and enter NSNumber, next choose INT for the External Type column, double click under the Column column and enter CONTACT_ID, next double click and finally enter i under the Value column. Repeat this for the productID so that your Company table looks like [Figure A.24](#).

A WebObjects Application

Enterprise Object Model Creation

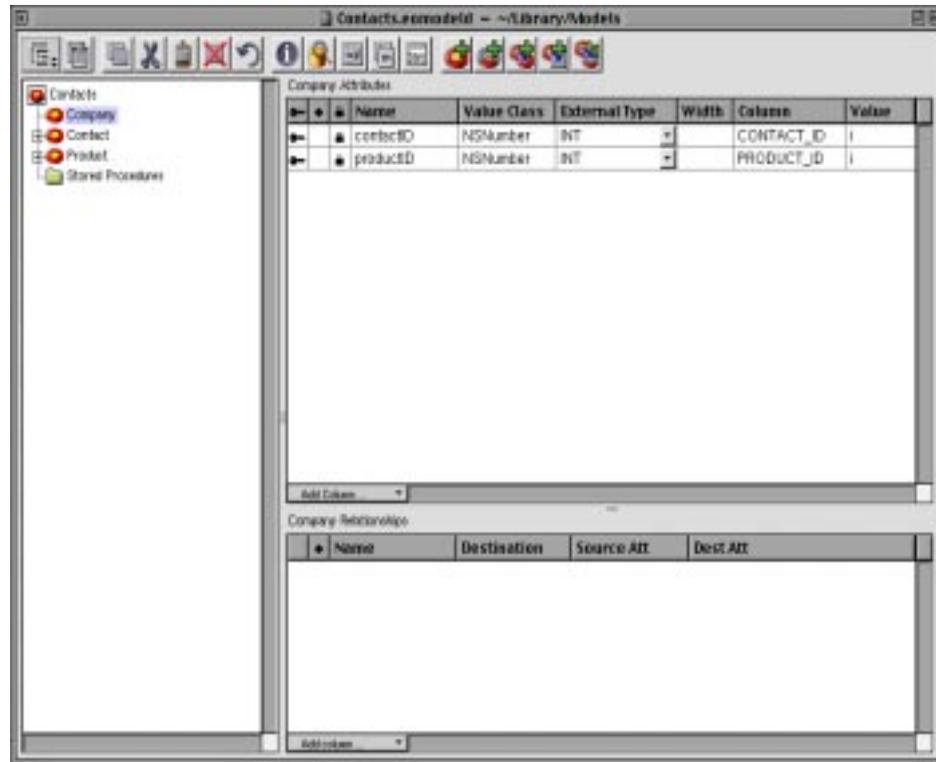


Figure A.24 Adding the ContactID Key

3. The rest of the fields will be of NSString Value Class and VARCHAR External Type. I will step you through the name and you will do the same steps for all of the fields in the Company table. Once again choose Property->Add Attribute from the menu. Double click the "Attribute" entry under the Name column and enter name, double click under the Value Class and enter NSString, next choose VARCHAR for the External Type column, double click under the Width column and enter 255, double click under the Column column and enter NAME. Repeat this for all the rest of the attributes defined above so that your Company table looks like [Figure A.25](#).

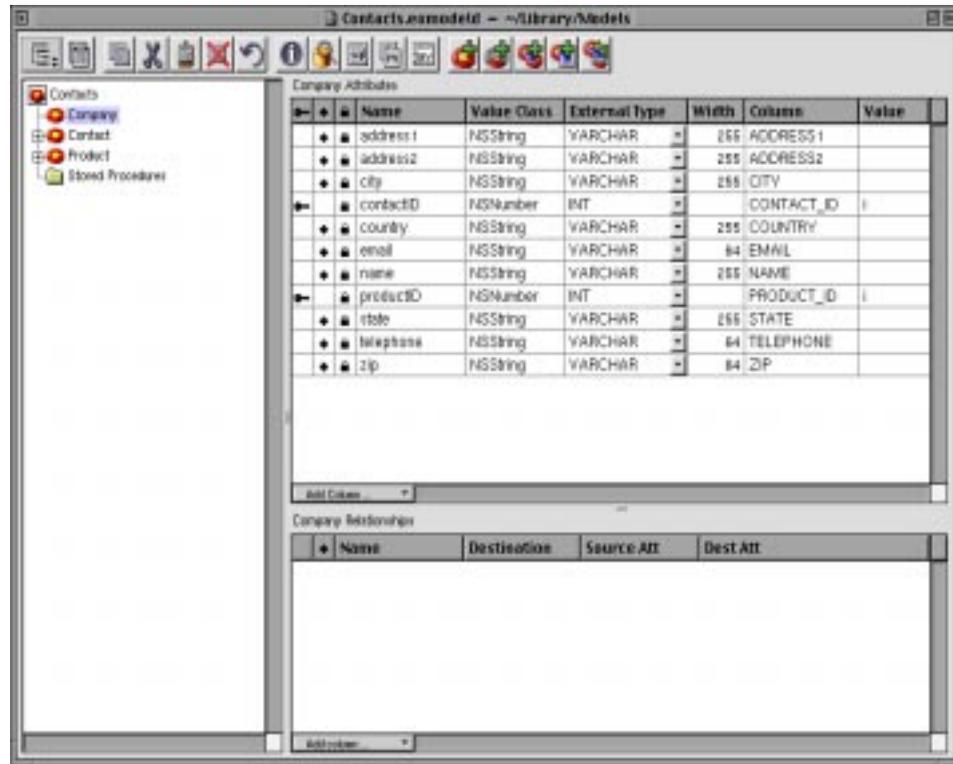


Figure A.25 Adding the Name Attribute

1. The procedure for the Contact table is the same as the Company table. The table definition for the Contact table is as follows:

```
SET TRANSACTION ISOLATION LEVEL SERIALIZABLE, LOCKING
PESSIMISTIC;
DROP TABLE "Contact" CASCADE;
CREATE TABLE "Contact"
( "Address1"    VARCHAR(255),
  "Address2"    VARCHAR(255),
  "City"        VARCHAR(255),
  "Contact_Id"  INT,
  "Country"     VARCHAR(255),
  "Email"       VARCHAR(64),
  "Name"        VARCHAR(255),
  "State"       VARCHAR(64),
```

A WebObjects Application

Enterprise Object Model Creation

```
"Telephone"  VARCHAR(64),
"Zip"        VARCHAR(64)
);
DELETE FROM INFORMATION_SCHEMA.EOMODELER_RELATIONS WHERE
"SCHEMA_NAME" = CURRENT_SCHEMA AND SOURCE_TABLE = 'CONTACT' ;

INSERT INTO INFORMATION_SCHEMA.EOMODELER_RELATIONS VALUES
(CURRENT_SCHEMA, 'toCompany', 0, 1, 'CONTACT', '(CONTACT_ID)', 'COMPAN
Y', '(CONTACT_ID)');

SET UNIQUE = 1000000 FOR "CONTACT";
ALTER TABLE "Contact" ADD PRIMARY KEY ("Contact_Id") NOT
DEFERRABLE INITIALLY IMMEDIATE;
COMMIT;
```

2. After you have followed the steps to create the Contact table you definition should look like [Figure A.26](#).

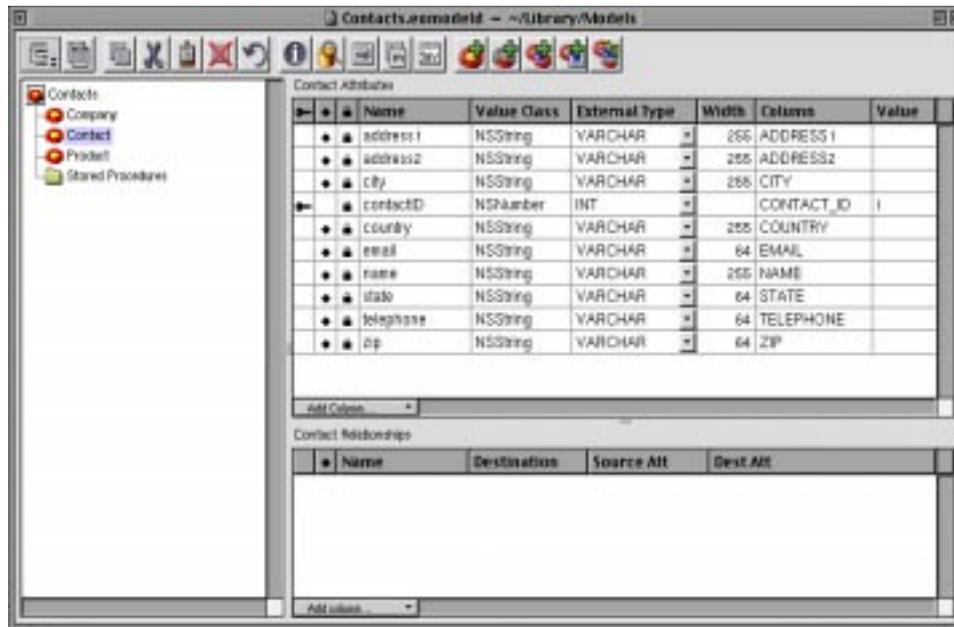


Figure A.26 Contact Table Creation

1. The procedure for the Product table is the same as the Company table. The table definition for the Product table is as follows:

```
SET TRANSACTION ISOLATION LEVEL SERIALIZABLE, LOCKING
PESSIMISTIC;
DROP TABLE "Product" CASCADE;
CREATE TABLE "Product"
( "Name"          VARCHAR(255),
  "Price"         FLOAT,
  "Product_Id"   INT
);
DELETE FROM INFORMATION_SCHEMA.EOMODELER_RELATIONS WHERE
"SCHEMA_NAME" = CURRENT_SCHEMA AND SOURCE_TABLE = 'PRODUCT';

INSERT INTO INFORMATION_SCHEMA.EOMODELER_RELATIONS VALUES
(CURRENT_SCHEMA, 'toCompany', 0, 1, 'PRODUCT', '(PRODUCT_ID)', 'COMPAN
Y', '(PRODUCT_ID)');

SET UNIQUE = 1000000 FOR "PRODUCT";
ALTER TABLE "Product" ADD PRIMARY KEY ("Product_Id") NOT
DEFERRABLE INITIALLY IMMEDIATE;
COMMIT;
```

2. After you have followed the steps to create the Product table your definition should look like [Figure A.27](#).
3. Choose Model->Save to save your model. You are now going to add Relationships to your tables in the next section.

A WebObjects Application

Enterprise Object Model Creation

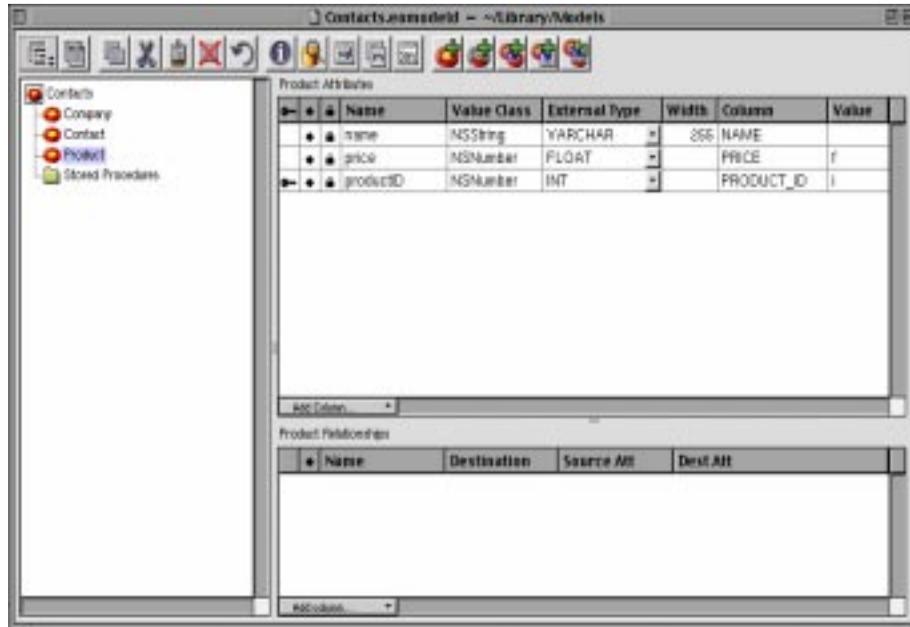


Figure A.27 Create the Product Table

Creating Relationships

1. It is now time to create the relationships that will join our tables together. First click on the Contact table entry in the left frame of EOModeler. Then you should see you table definition for the Contact table.
2. From the menu choose Property->Add Relation as seen in [Figure A.28](#).

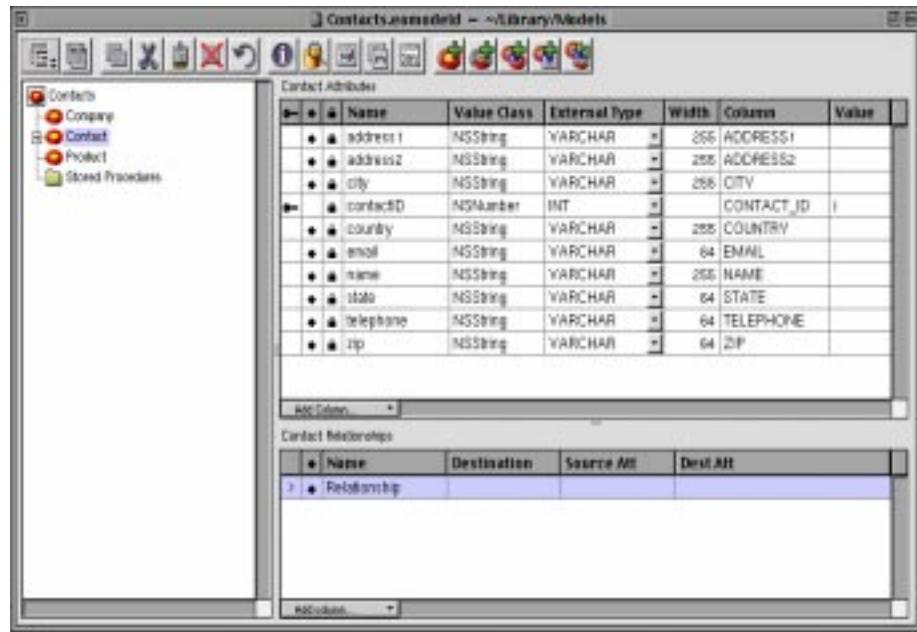


Figure A.28 Adding Contact Relationships

3. From the menu choose Tools->Inspector to bring up the Relationship inspector. You are going to add a One-To-Many relationship to the Company table. Enter toCompany in the name, next select the Company table from the Entity list, next select the "To Many" radio button, finally select contactID from the Source Attributes list and contactID from the Destination Attributes List. Click on Connect and you should see the selections have a "dimple" to show the connection has been completed. See [Figure A.29](#).

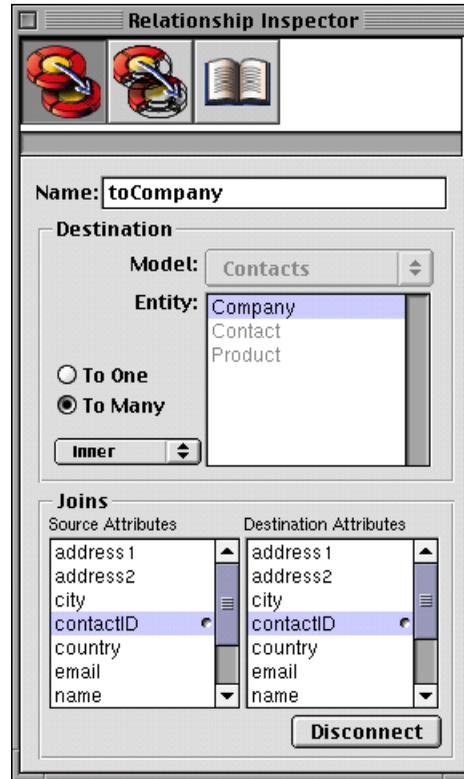


Figure A.29 Defining the Relationship

4. Your model should also show the relationship. Make sure that there is a '>>' by the relationship, if not that means that you only have a one-to-one relationship. See [Figure A.30](#).

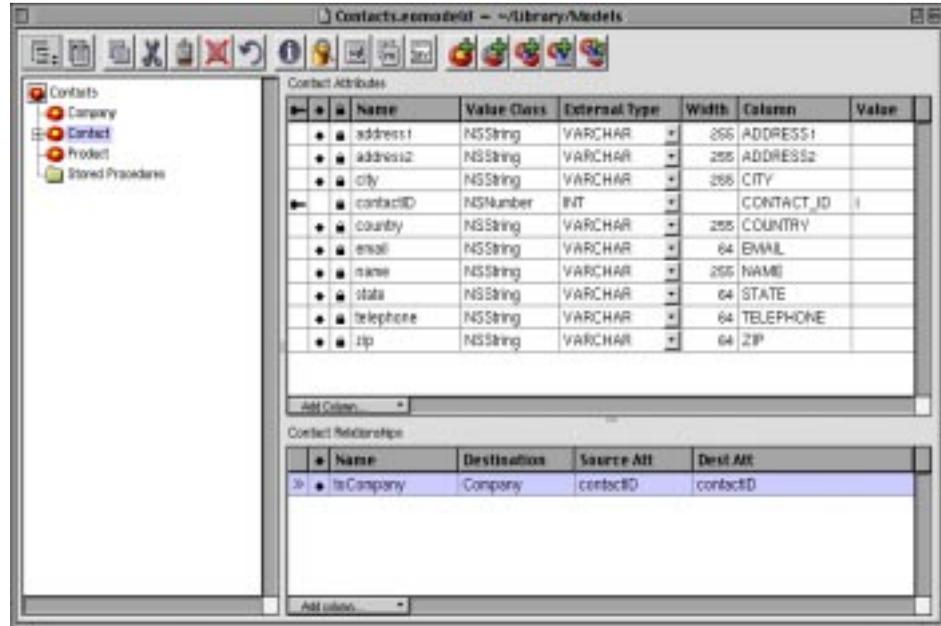


Figure A.30 One-To-Many Relationship

1. For the Company table, you will have 2 one-to-one relationships. The first to the Contact table and the second to the Product table. Follow the steps that you performed in the Contact table except DO NOT select the “To Many “radio button. These are just to be one-to-one relationships. Your relationship for the Contact table should look like [Figure A.31](#).

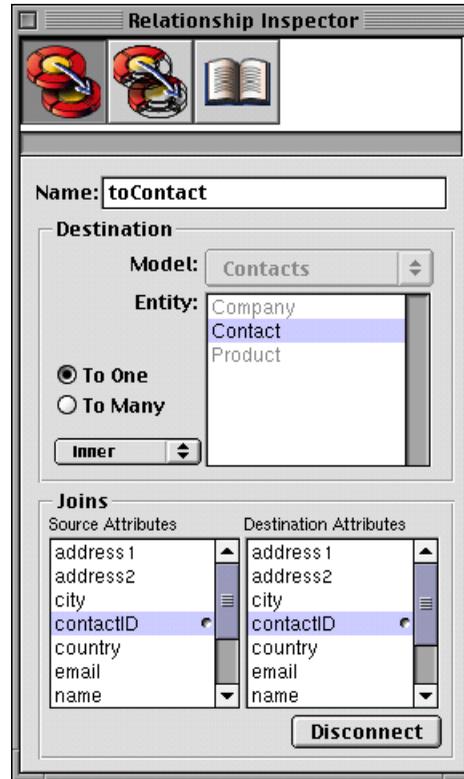


Figure A.31 Company Relationship To Contact Table

2. The second relationship is to the Product table. Your relationship for the Contact table should now look like [Figure A.32](#).

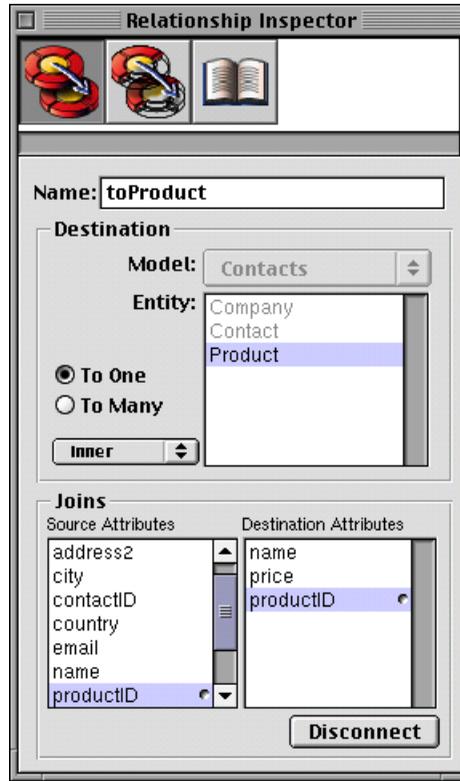


Figure A.32 Company Relationships To Product Table

1. For the Product table, you will have 1 one-to-many relationship. You are going to add a One-To-Many relationship to the Company table. Enter toCompany in the name, next select the Company table from the Entity list, next select the "To Many" radio button, finally select productID from the Source Attributes list and productD from the Destination Attributes List. Click on "Connect" and you should see the selections have a "dimple" to show the connection has been completed. See [Figure A.33](#).

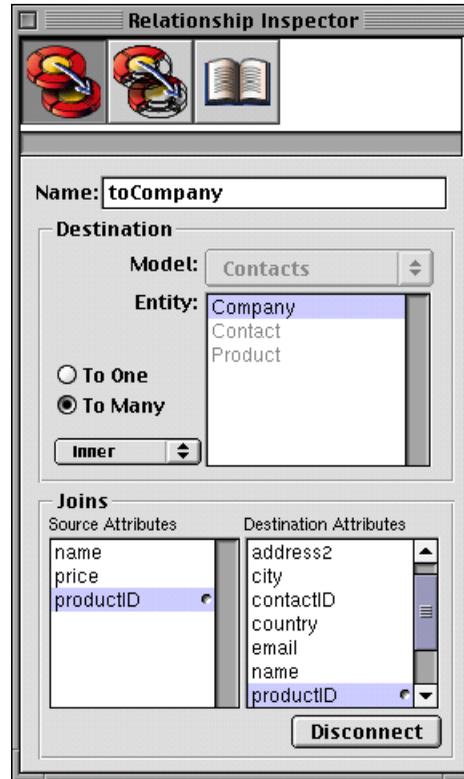


Figure A.33 Product Table Relationships

1. If you would like to see a Diagram View of what your database looks like, Choose Tools->Diagram View and your model should look like [Figure A.34](#).

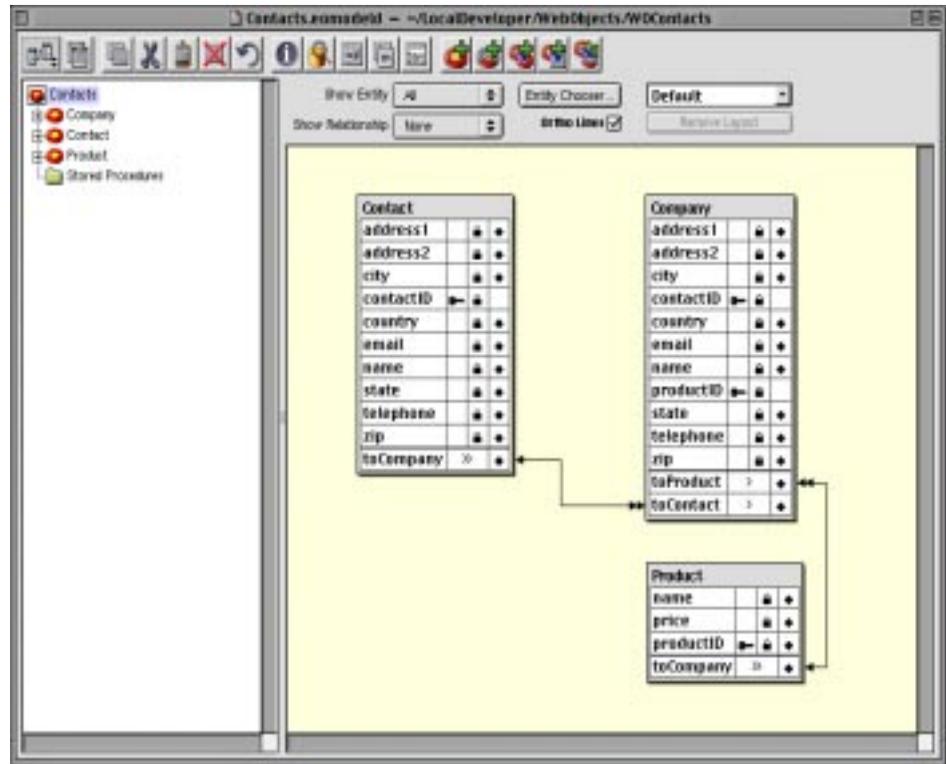


Figure A.34 The Diagram View of the Relationships

1. You have now created your model, but you still have to create the actual tables in the FrontBase Contacts database. Select the Contacts entry in the left frame of the EOModeler, from the menu choose Property->Generate SQL and you will see a window as in [Figure A.35](#).

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Enterprise Object Model Creation

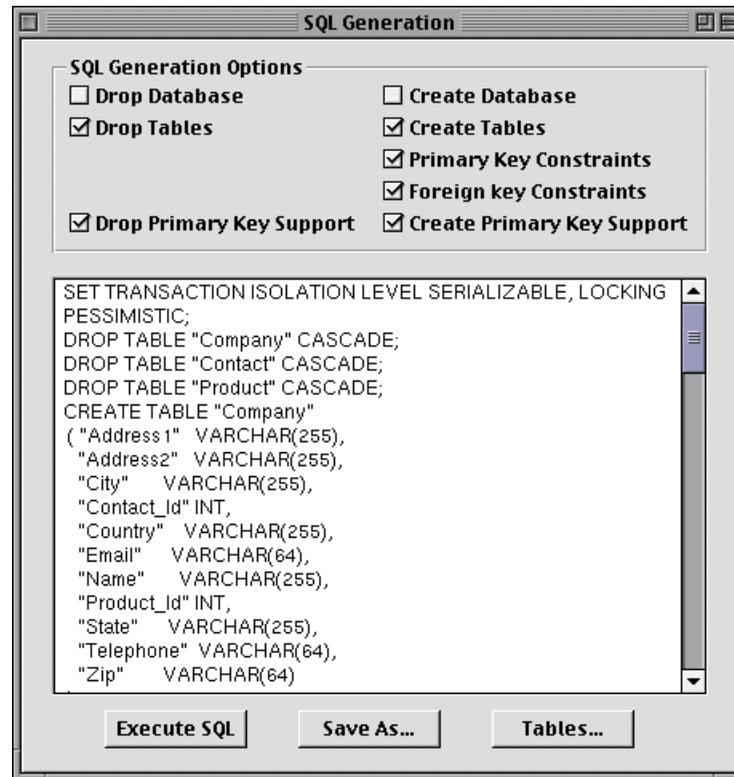


Figure A.35 Generating SQL

2. Select Execute SQL and you will see an Alert for each of the tables See [Figure A.36](#). This is ok because the SQL is trying to drop the table and create it again. Since the table does not exist yet, it cannot drop it thus you get the alert. Just click the "Continue" button for each of the tables.



Figure A.36 Creating the Physical Tables

Congratulations, you have now defined and created your Contacts database tables. You may quit EOModeler. You are ready to create your WebObjects Application in the next section.

WebObjects Application Creation

ProjectBuilder

1. Create a ProjectBuilder shortcut. From the Workspace Manager navigate to /System/Developer/Applications/ProjectBuilder.app as seen in [Figure A.37](#).

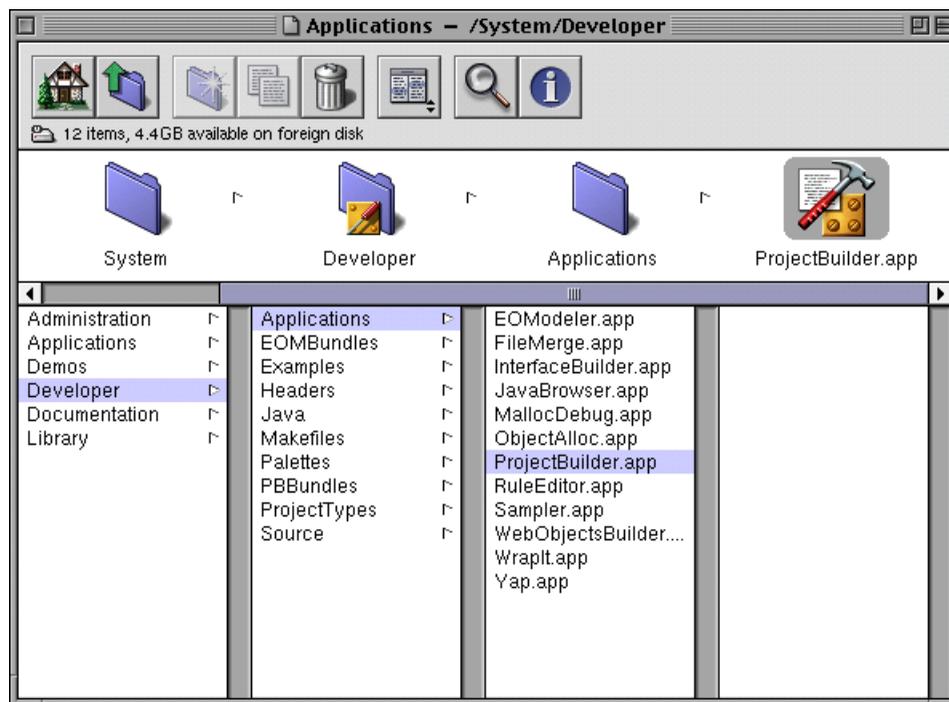


Figure A.37 Create a ProjectBuilder Shortcut

2. Click and drag the ProjectBuilder.app to your Desktop. Now start-up ProjectBuilder by double clicking on this icon. Choose Project->New from the menu and you will choose WebObjects Application from the Project Type popup button, navigate to the folder where you want the project to be placed (I chose LocalDeveloper) and then enter WOContacts in the Name field and click "OK" as seen in [Figure A.38](#).



Figure A.38 Create a New Project

Create the Contact Entry Page

1. You are going to first create the main window that will be for our Contacts using the Contact table. On the first window of the WebObjects Application Wizard, choose the "Wizard" radio button and Primary Language "Java" as seen in [Figure A.39](#), then click "Next".

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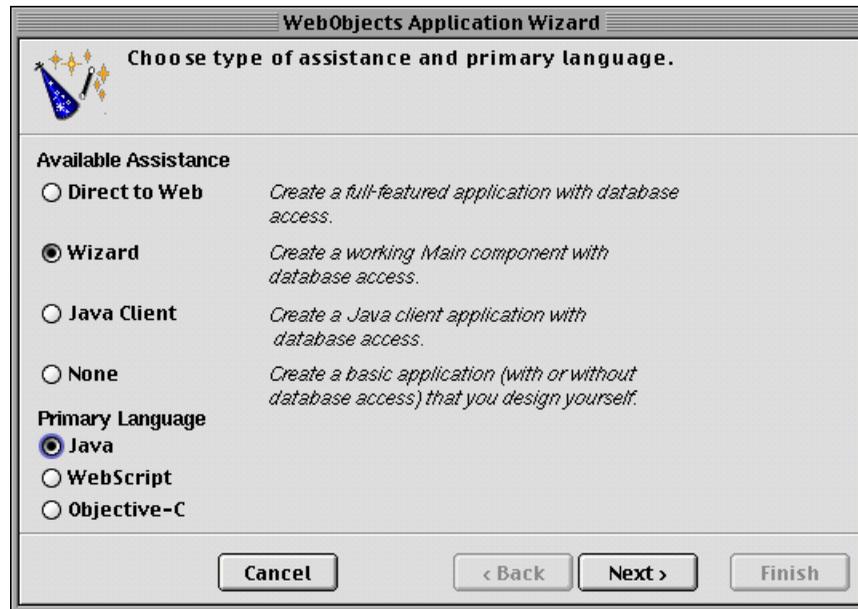


Figure A.39 Create the Main Component

2. You will now choose the database model that you just created in the last section. Choose the "Open existing model file" radio button. Then choose the "Browse" and navigate to the LocalLibrary/Models/Contacts.eomodel selection as seen in [Figure A.40](#) and click "OK".

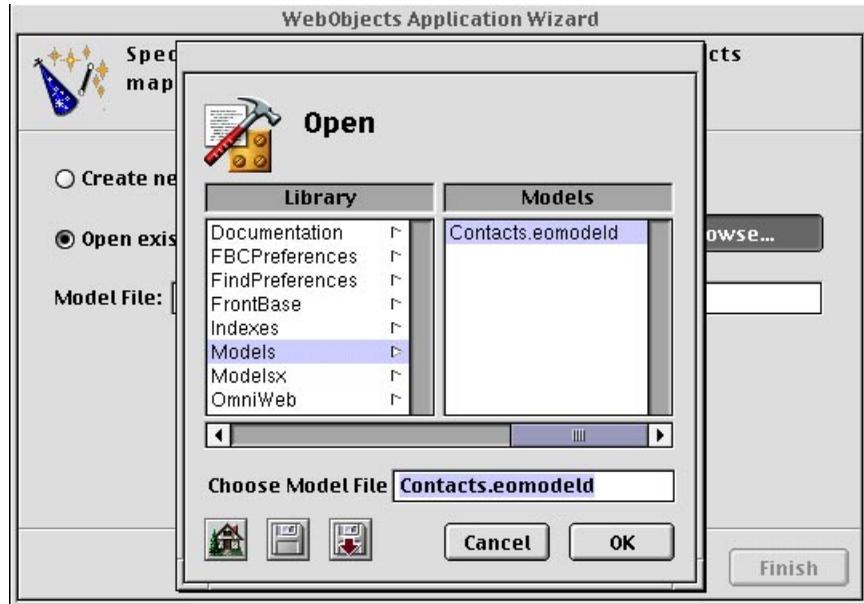


Figure A.40 Choosing the Contacts EOModel

3. Your model selection window should appear as seen in [Figure A.41](#), and click “Next”.

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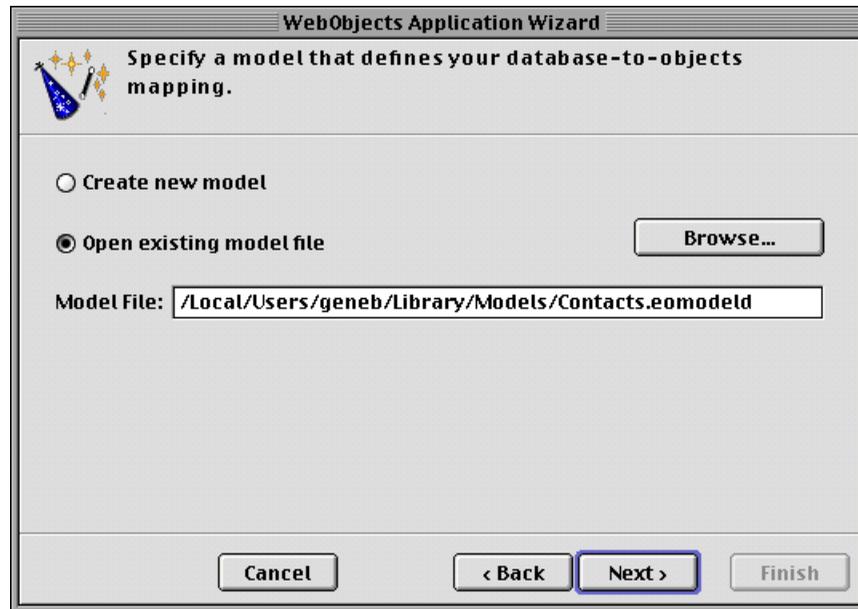


Figure A.41 Selecting the EOModel

4. Since the main page will be a search and entry for Contacts, choose the Contact table as seen in [Figure A.42](#), and click "Next".

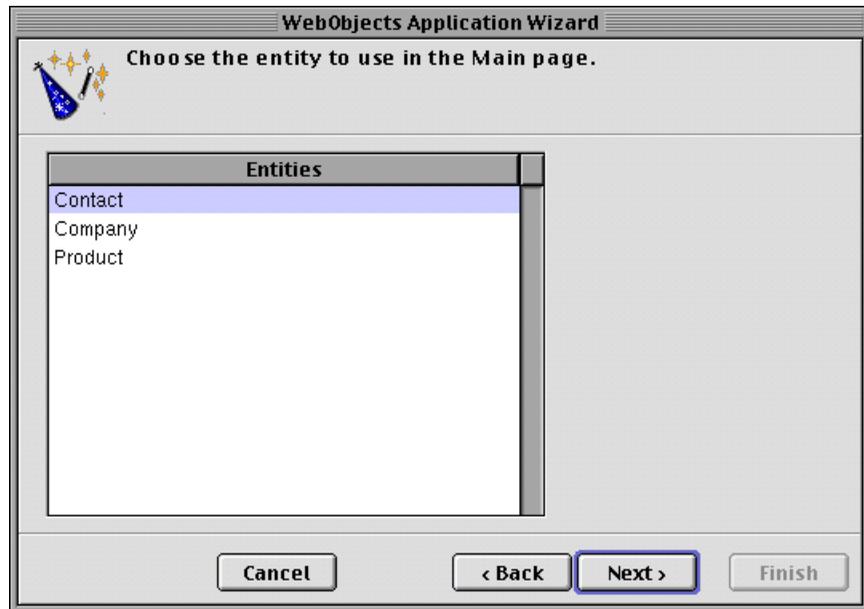


Figure A.42 Select the Contact Table

5. Select "Selected Record" and "Matching Records" as seen in [Figure A.43](#), and click "Next".

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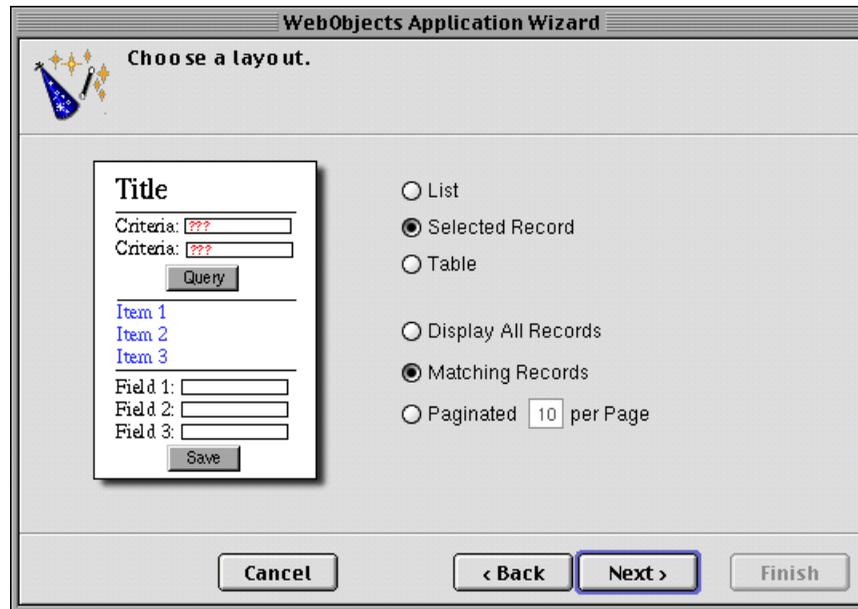


Figure A.43 Choosing a Page Layout

6. It is time to select what fields will be displayed in the window. For this application double click on all of them so your window looks like [Figure A.44](#), and click “Next”.

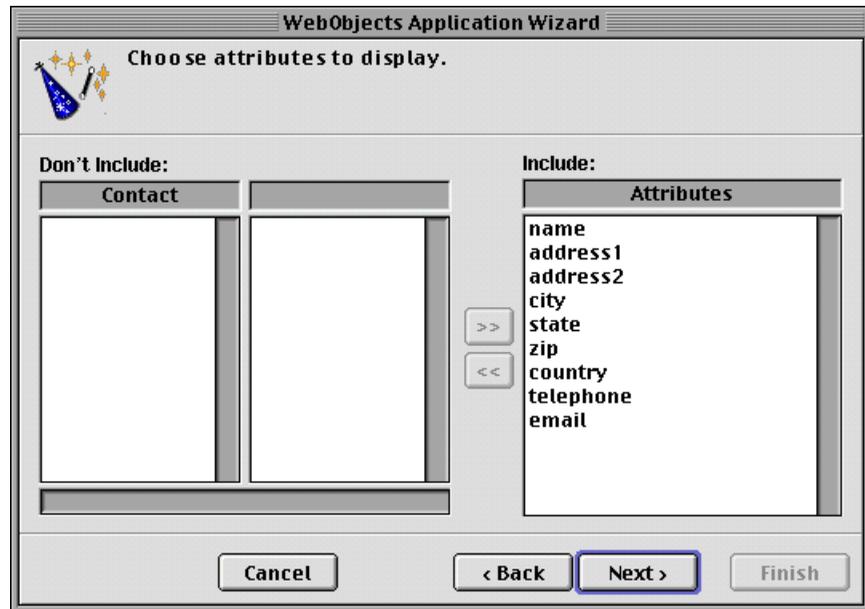


Figure A.44 Choosing the Attributes To Display

7. For this application we are going to make the telephone number the field that will be our hyperlink.
8. Double click telephone as seen in [Figure A.45](#), and click "Next".

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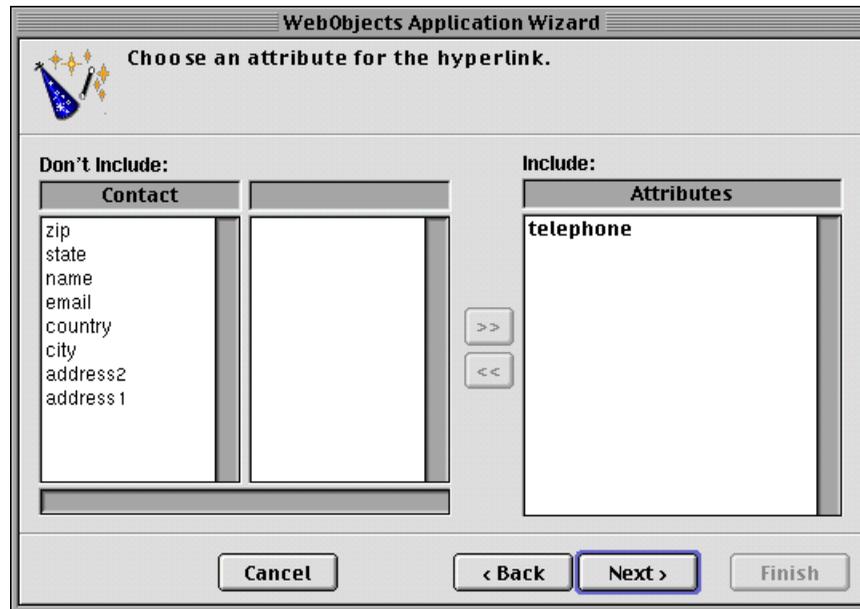


Figure A.45 Choosing an Attribute for the Hyperlink

9. To query the database for entered Contacts, we will use the name, telephone and email fields. Double click these fields respectively as seen in [Figure A.46](#), and click "Finish".

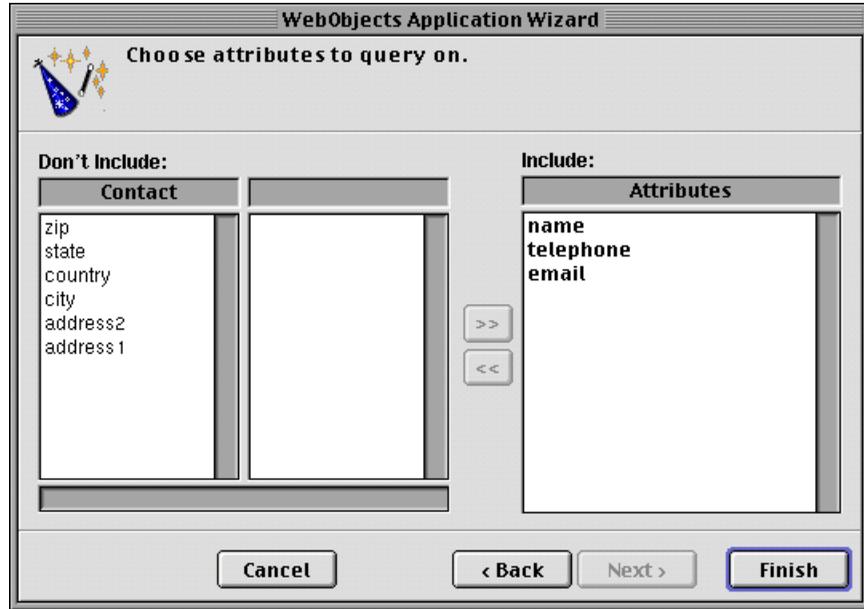


Figure A.46 Choosing the Attribute to Query On

10. You have now created the project and your Contacts entry screen. You are now in the Project Builder's Main Window as seen in [Figure A.47](#). From here you will add more windows, build and edit all of your files and run your WebObjects Contacts application.

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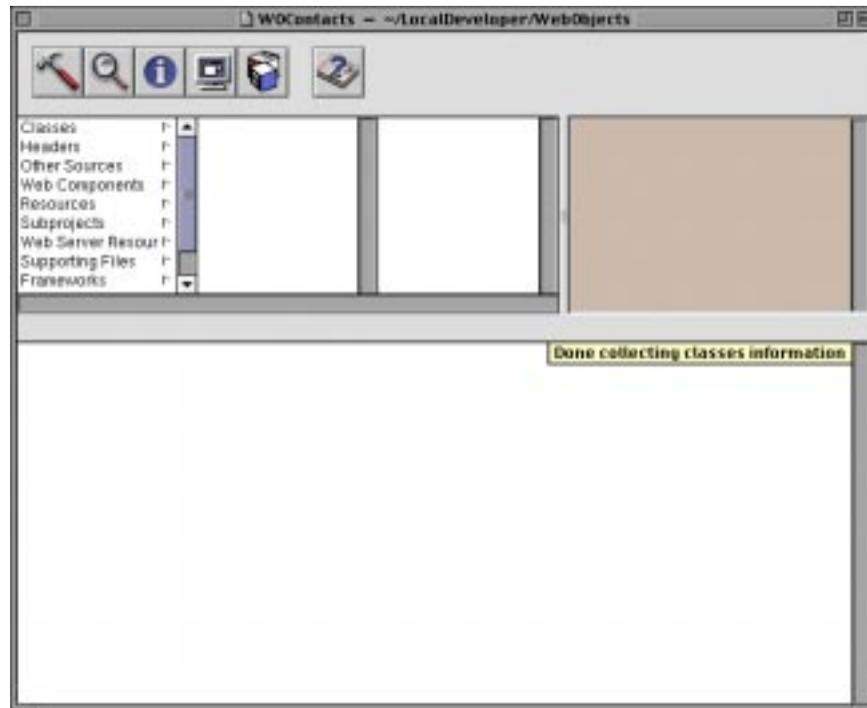


Figure A.47 ProjectBuilder's Main Window

Create the ProductEntry Page

1. Click on the "Web Components" entry in the left column and you will see "Main.wo", this is your main Web Component. You will now create a screen for the Product table by selecting File->New in Project from the Project Builder's menu. Click on the "Web Component" suitcase and enter ProductEntry in the Name field as seen in [Figure A.48](#), and click "OK".



Figure A.48 Adding the ProductEntry Component

2. Make sure the "Component Wizard" and "Java" are selected as seen in [Figure A.49](#), and click "Next".

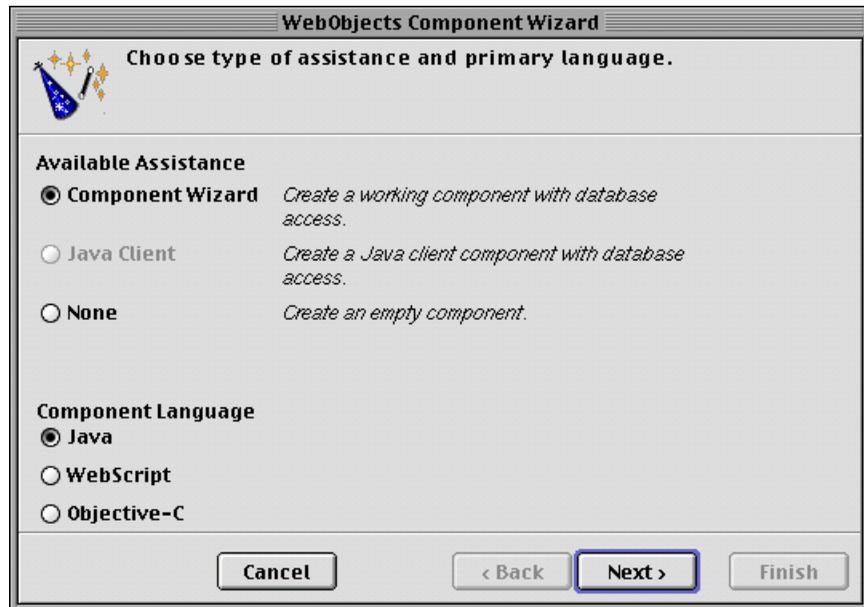


Figure A.49 Using the Component Wizard

3. Choose the Product entity from the list as seen in [Figure A.50](#), and click "Next".

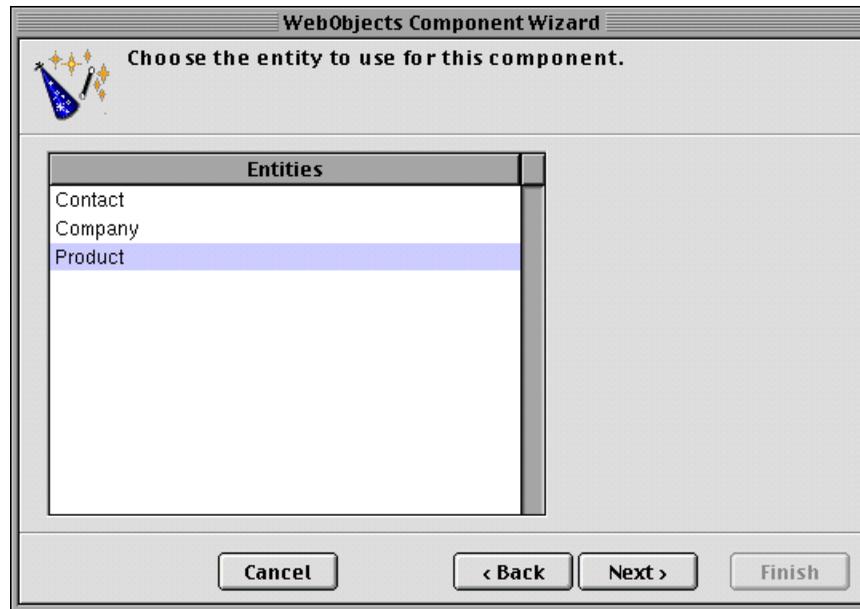


Figure A.50 Choosing the Product Table

4. Select "Selected Record" and "Matching Records" as seen in [Figure A.51](#), and click "Next".

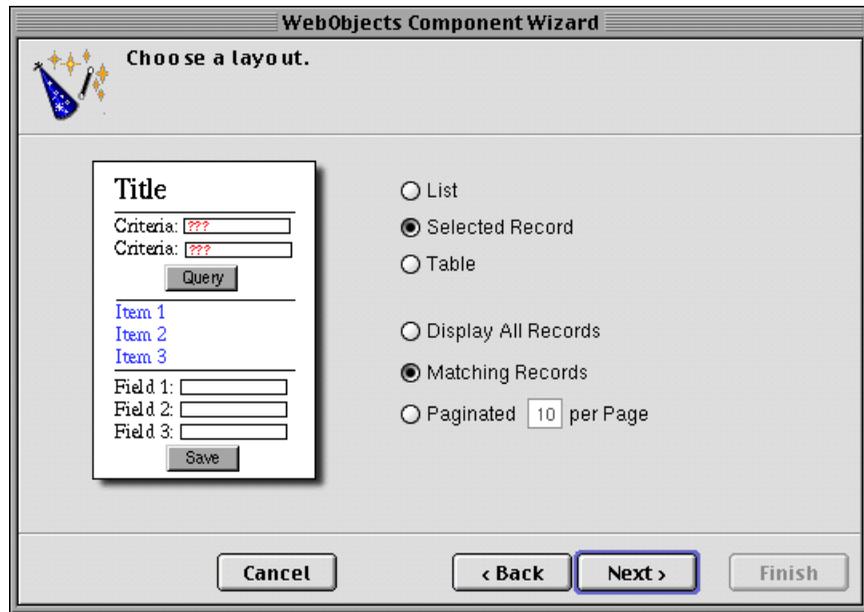


Figure A.51 Choosing the Page Layout

5. Double click on name and price as seen in [Figure A.52](#), and click "Next".

A WebObjects Application

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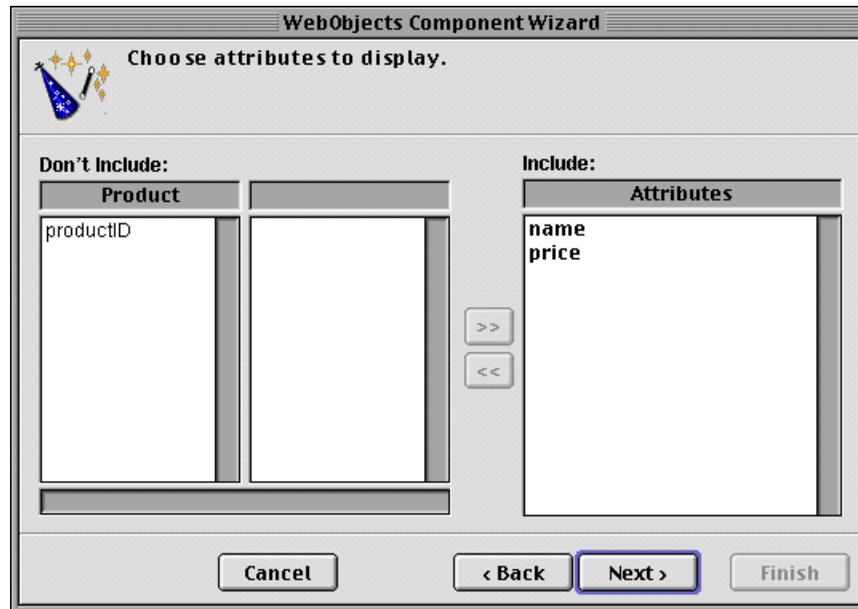


Figure A.52 Choosing the Attributes to Display

6. Double click on the name field that will be the hyperlink for the product window, as seen in [Figure A.53](#), and click "Next".

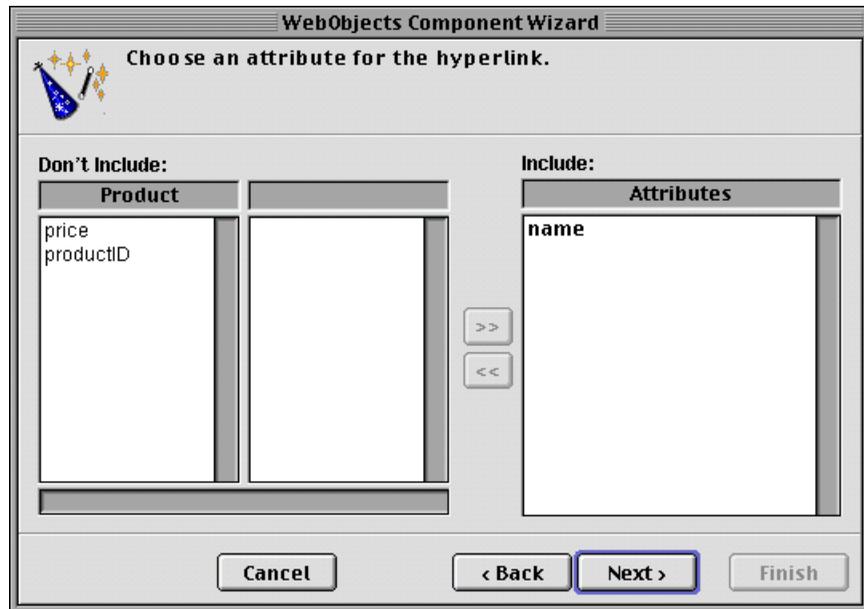


Figure A.53 Choosing the Attribute for the Hyperlink

7. Double click on the name field that will be the search field for the product, as seen in [Figure A.54](#), and click "Finish".

A WebObjects Application

WebObjects Application Creation

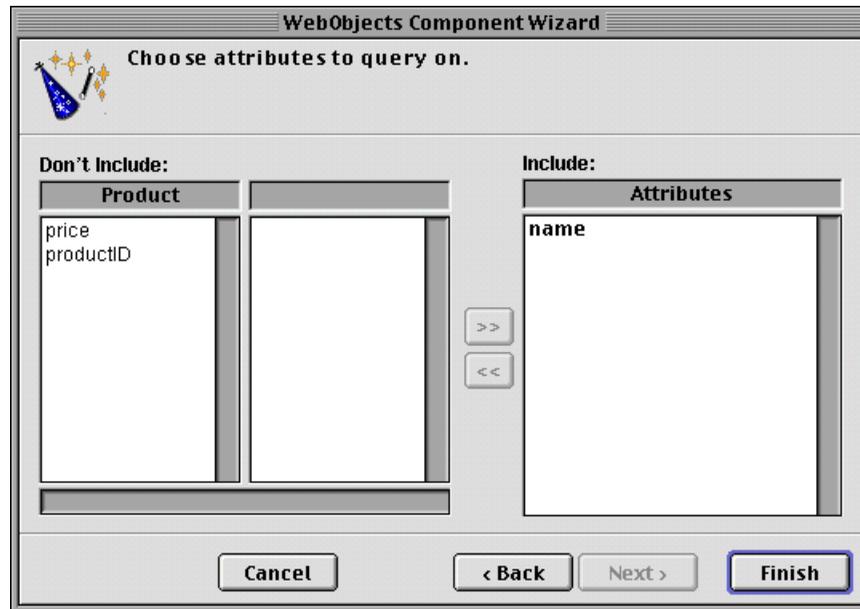


Figure A.54 Choosing the Attributes to Query On

8. Notice that now in ProjectBuilder you will see ProductEntry.wo under the Main.wo entry as seen in [Figure A.55](#).

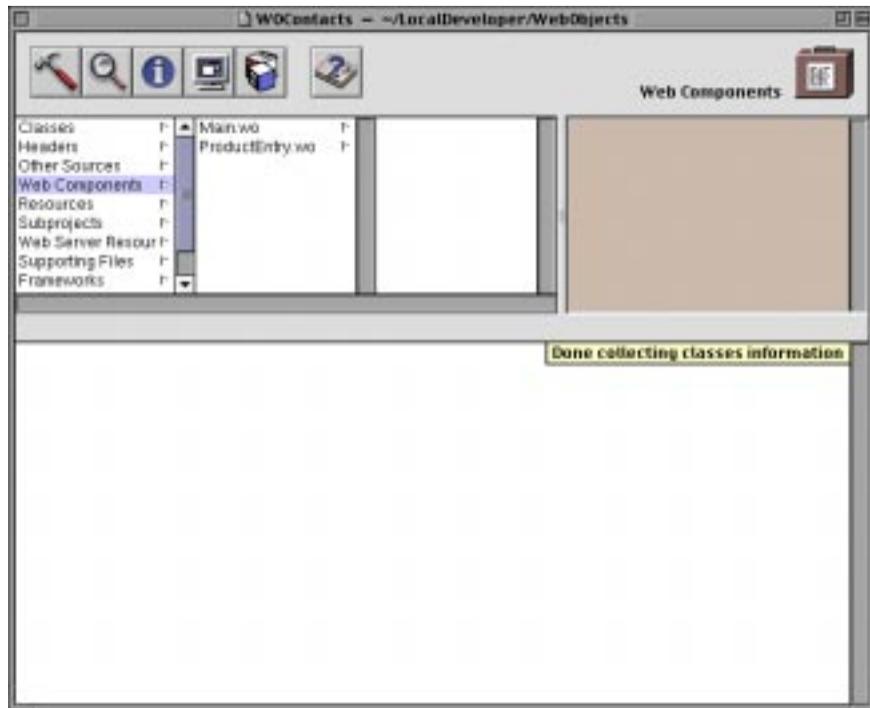


Figure A.55 Addition of the ProductEntry Component

Create the CompanyEntry Page

1. You will now create a screen for the Company table by selecting File->New in Project from the Project Builder's menu. Click on the "Web Component" suitcase and enter CompanyEntry in the Name field as seen in [Figure A.56](#), and click "OK".

A WebObjects Application

WebObjects Application Creation

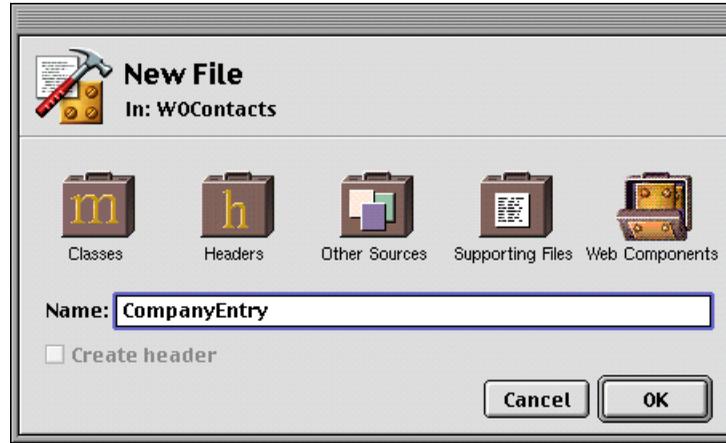


Figure A.56 Creation of the CompanyEntry Component

2. Make sure the "Component Wizard" and "Java" are selected as seen in [Figure A.57](#), and click "Next".

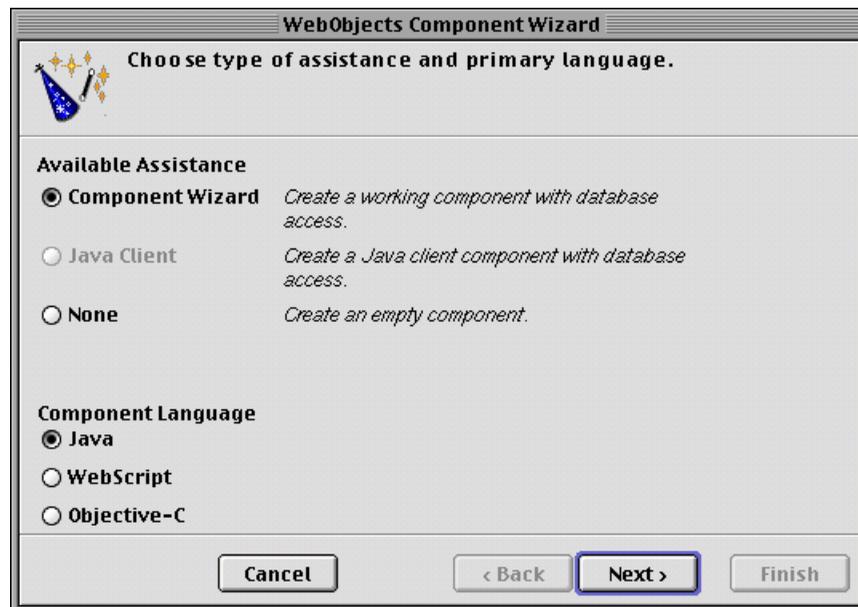


Figure A.57 Choosing the Component Wizard

3. Choose the Company table from the list as seen in [Figure A.58](#), and click "Next".

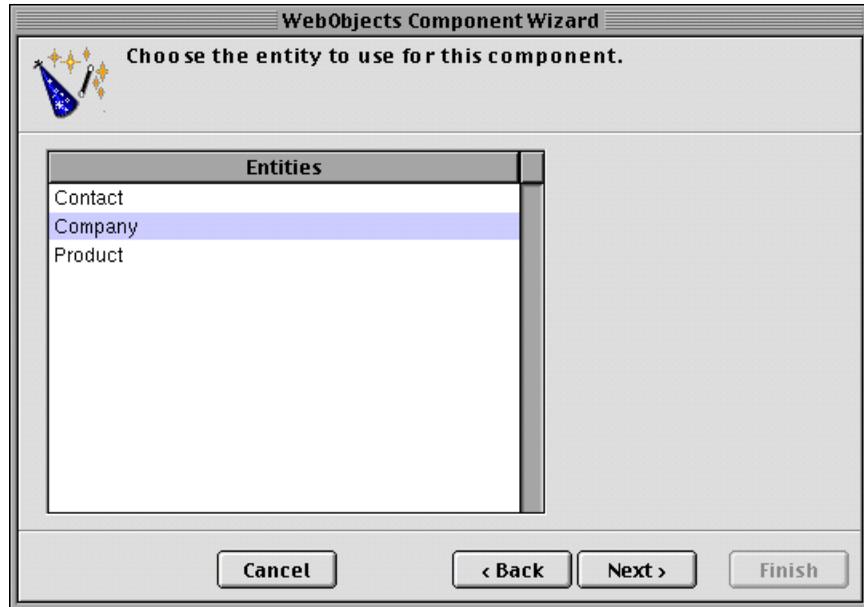


Figure A.58 Choosing the Company Table

4. Select "Selected Record" and "Matching Records" as seen in [Figure A.59](#), and click "Next".

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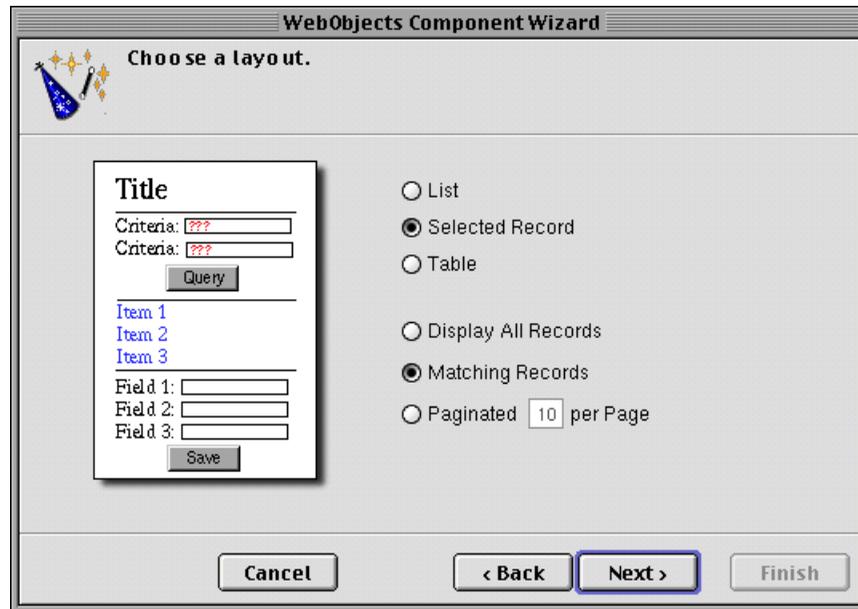


Figure A.59 Choosing the Page Layout

5. Double click name, address1, address2, city, state, zip, country, telephone and email as seen in [Figure A.60](#), and click "Next".

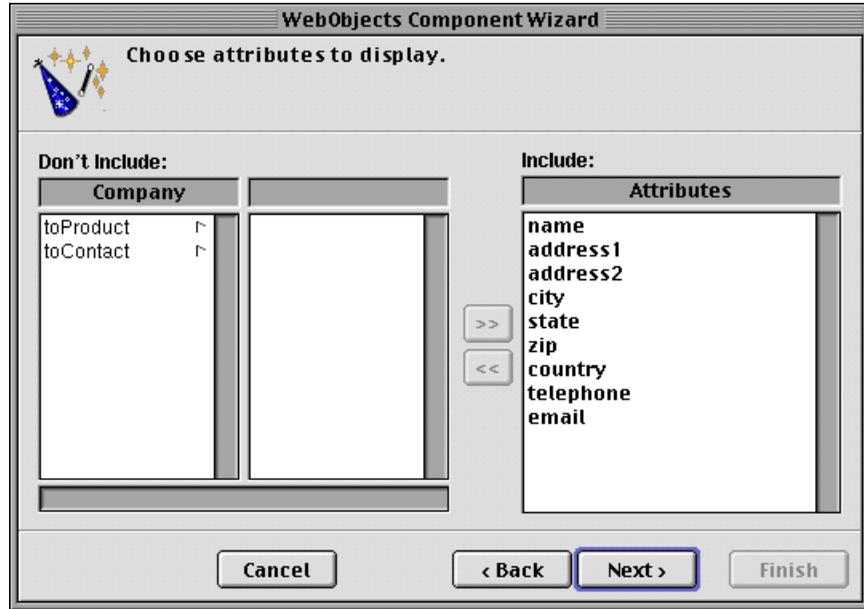


Figure A.60 Choose the Attributes to Display

6. Double click name for the hyperlink value as seen in [Figure A.61](#), and click "Next".

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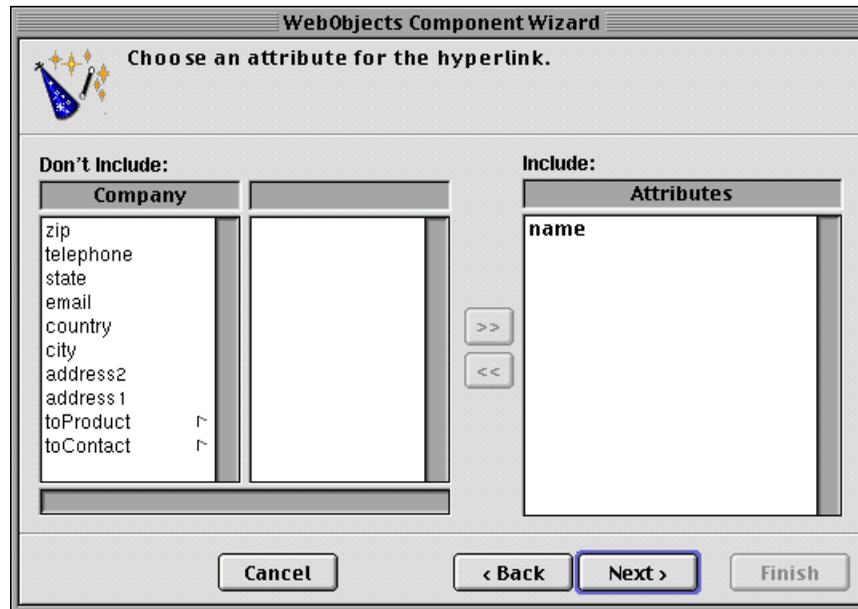


Figure A.61 Choosing the Attribute for the Hyperlink

7. Double click name for the name to query on as seen in [Figure A.62](#), and click "Finish".

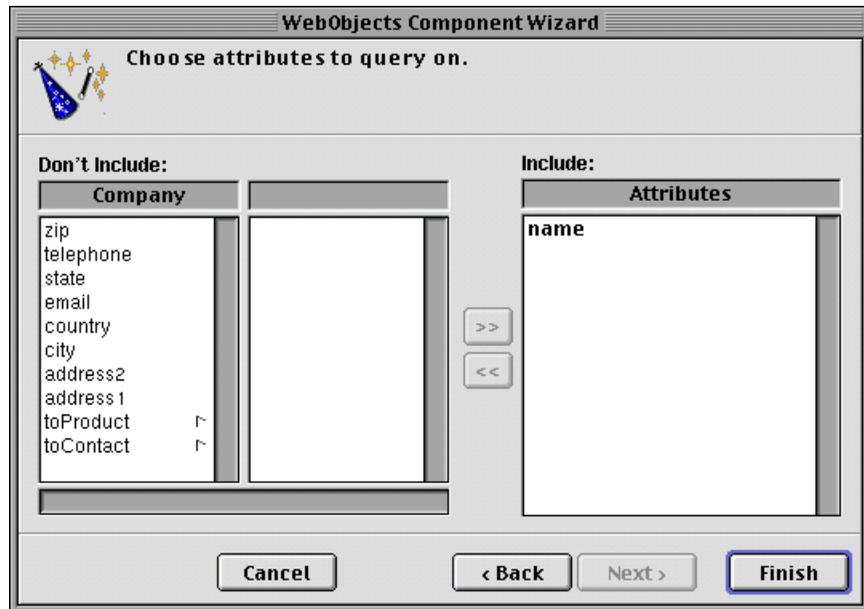


Figure A.62 Choosing the Attribute to Query On

8. Notice that now in ProjectBuilder you will see CompanyEntry.wo under the Main.wo entry as seen in [Figure A.63](#).

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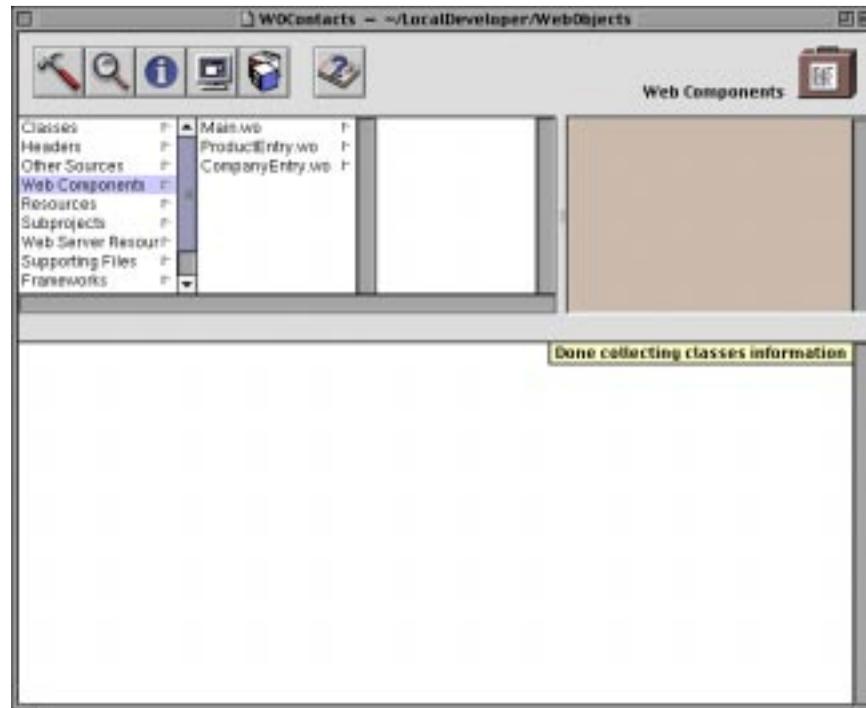


Figure A.63 Addition of the ProductEntry Component

Create the ContactDetails Page

1. It is now time to create the Contact Details page. This is the page that will show all the relationships for a selected Contact. For this we will not automatically include a database table, so all that has to be done is to create an empty component page. To do that, choose File->New in Project from the menu. Click on the "Web Components" suitcase and enter ContactDetails in the Name field as seen in [Figure A.64](#), and click "OK".



Figure A.64 Creation of the ContactDetails Component

2. In the Component Wizard make sure that "None" and "Java" are selected and click "Finish", as seen in [Figure A.65](#).

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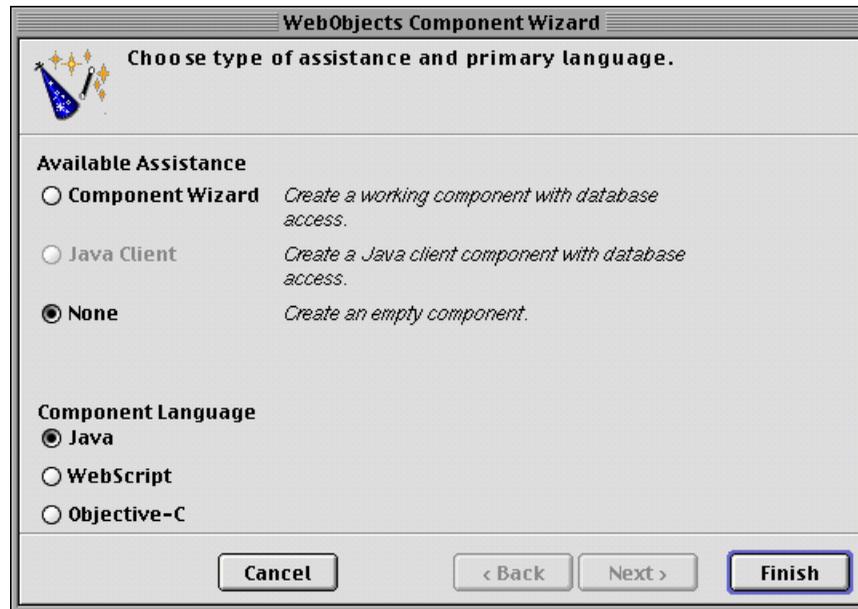


Figure A.65 Creating an Empty Component

3. Notice that now in ProjectBuilder you will see ContactDetails.wo under the Main.wo entry as seen in [Figure A.66](#).

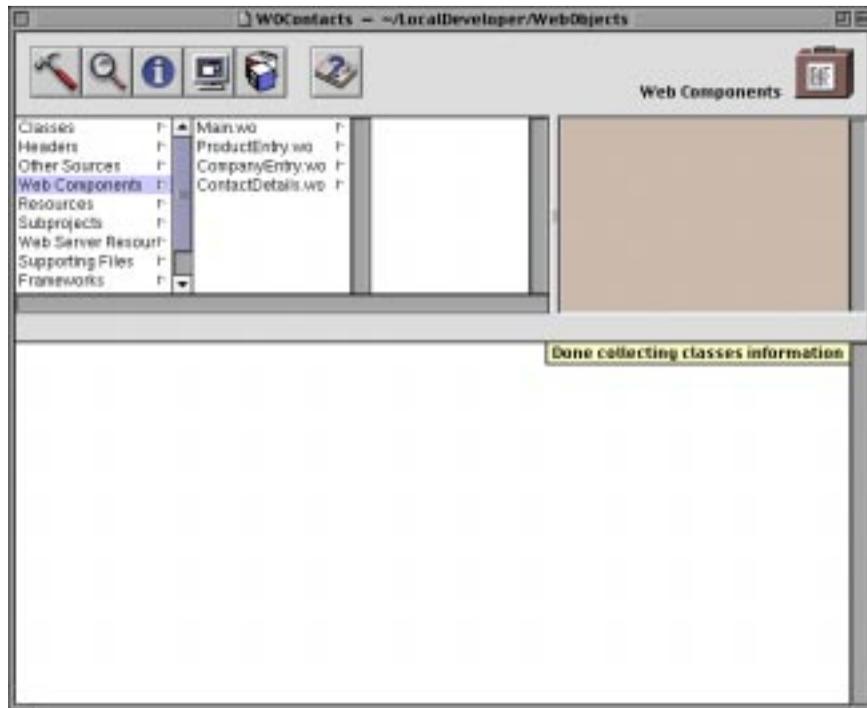


Figure A.66 Addition of ContactDetails Component

Linking the Pages Together

1. Now that all our pages are created, we will need a way to navigate from the main page to the other pages and from each of the other pages back to the main page. This is accomplished by using hyperlinks. In ProjectBuilder, double click the Main.wo entry and you should see your main page as in [Figure A.67](#). If not, select Edit->Layout View from the menu.

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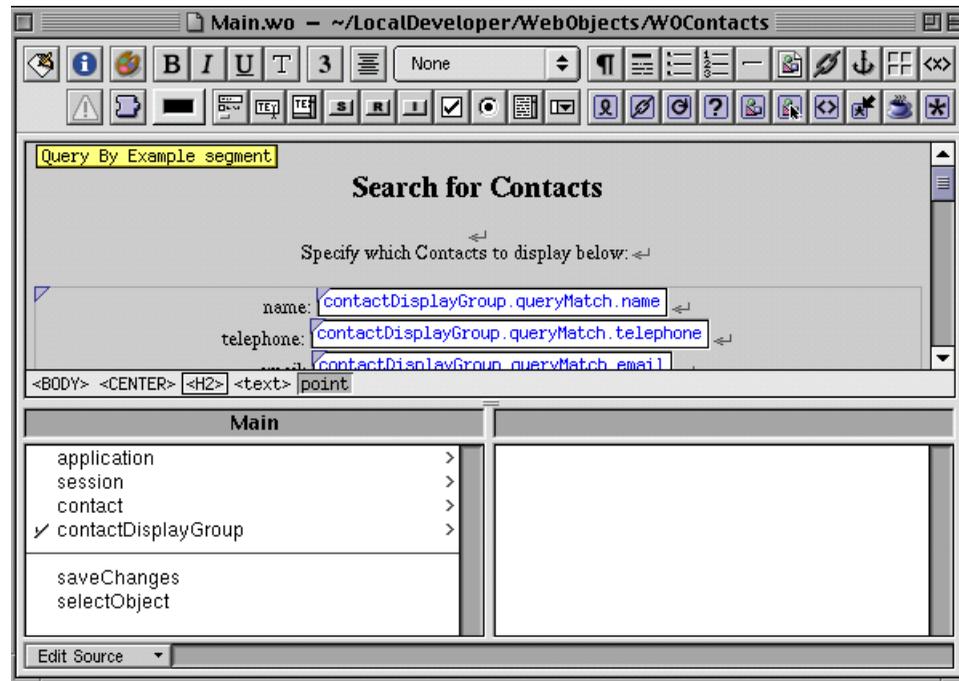


Figure A.67 The Main Contact Page

2. Scroll down to the bottom of the page (below the separation line) and click to place the cursor on the form. From the menu select WObjects->WOHyperlink and enter "Company Entry" to replace "Hyperlink", as seen in [Figure A.68](#).

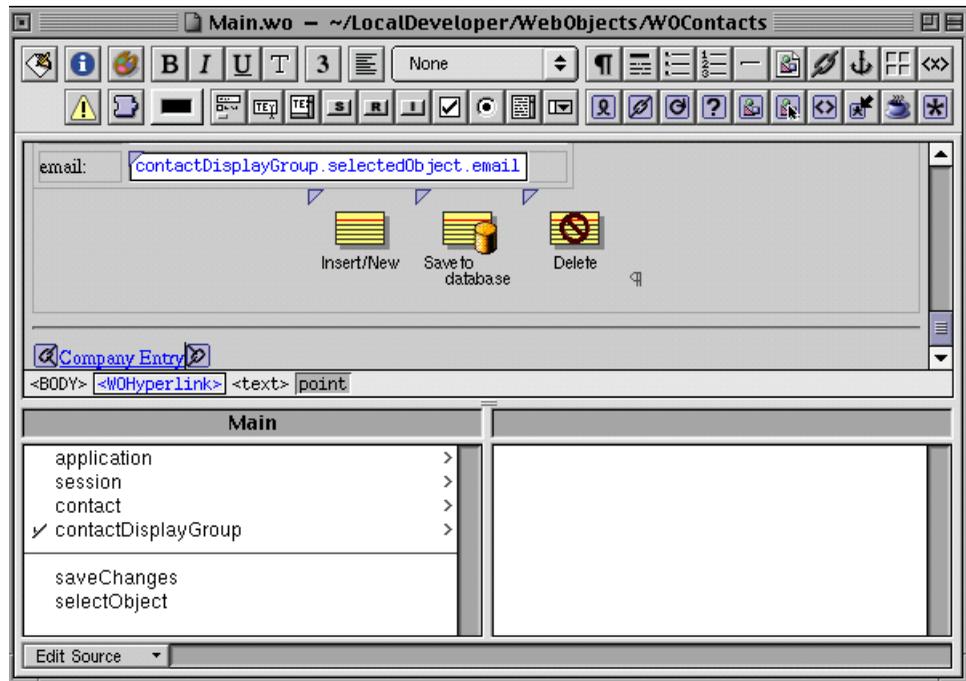


Figure A.68 Adding the Company Entry Hyperlink

3. From the popup button labelled "Edit Source" click and select "Add Action" and enter enterCompanies for the Name: and select Company Entry for the Page returned, as seen in [Figure A.69](#).



Figure A.69 Adding the enterCompanies Action

4. You will now see enterCompanies selected. Select and drag this entry to the "<WOHyperlink>" symbol and click action, as seen in [Figure A.70](#).

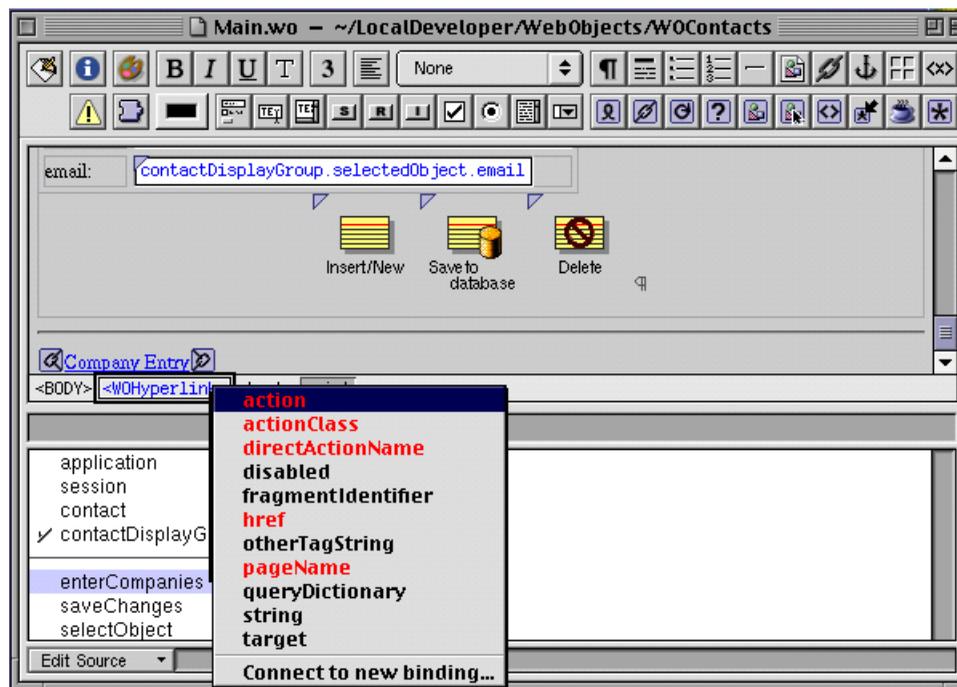


Figure A.70 Linking the Action

5. Click to the right of the "Company Entry" hyperlink (outside the entire link) and hit the "Enter" or "Return" key to place

the next hyperlink on the next line. Repeat the previous steps for the "Product Entry" page as seen in [Figure A.71](#) and [Figure A.72](#) to connect the action "enterProducts".



Figure A.71 Adding the enterProducts Action

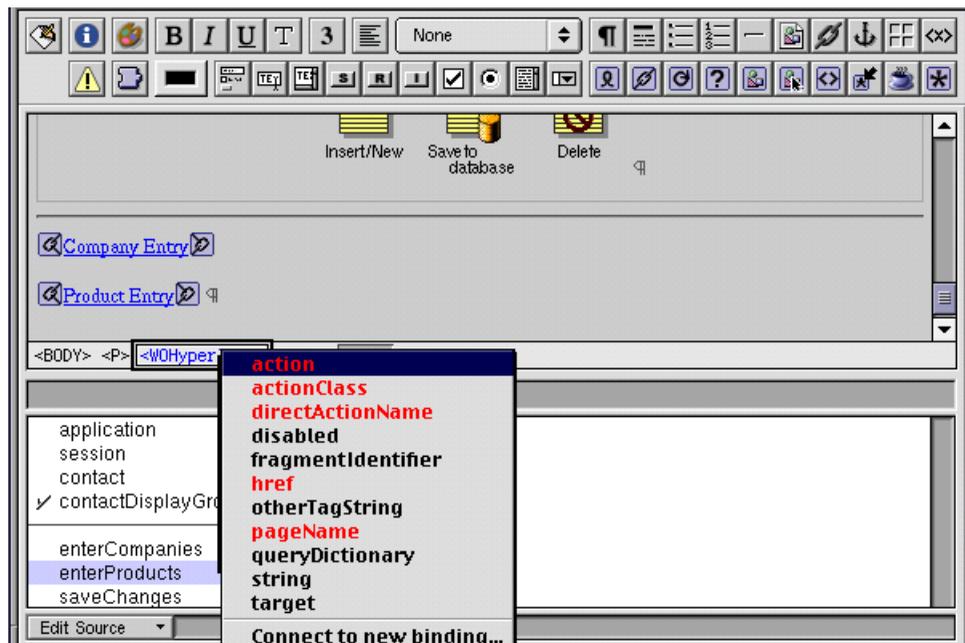


Figure A.72 Linking the Product Entry Hyperlink

6. Click to the right of the "Product Entry" hyperlink (outside the entire link) and hit the "Enter" or "Return" key to place the next hyperlink on the next line. Repeat the previous steps

A WebObjects Application

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for the "Contact Details" page as seen in [Figure A.73](#) and [Figure A.74](#) to connect the action displayDetails.



Figure A.73 Adding the displayDetails Action

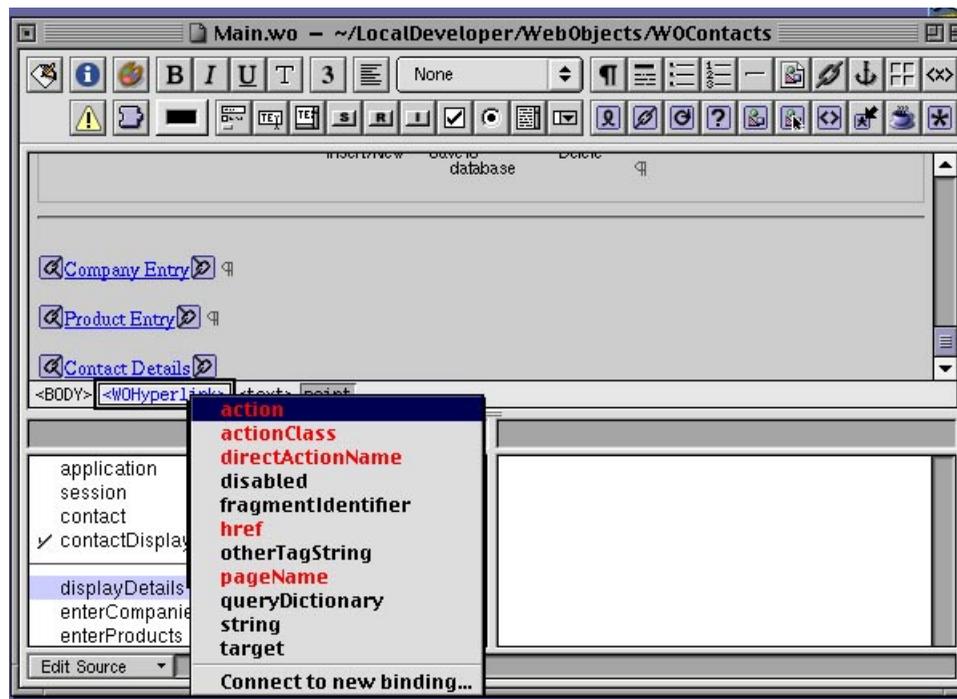


Figure A.74 Creating the Contact Details Hyperlink

7. Save your project.

Create the Main Page Hyperlink

1. With the other windows, you will create a single hyperlink to navigate back to the Main window. From ProjectBuilder double click ProductEntry.wo. Scroll down to the bottom of the page and add a new WOHyperlink as you did on the main page. This time the hyperlink will be "Main Page" and the action will be returnToMainPage, as seen in [Figure A.75](#) and [Figure A.76](#) respectively.

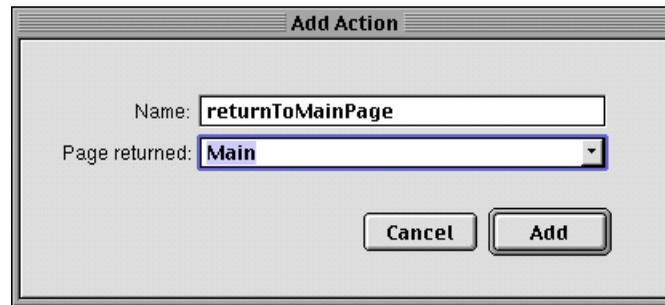


Figure A.75 Creating the returnToMainPage Action

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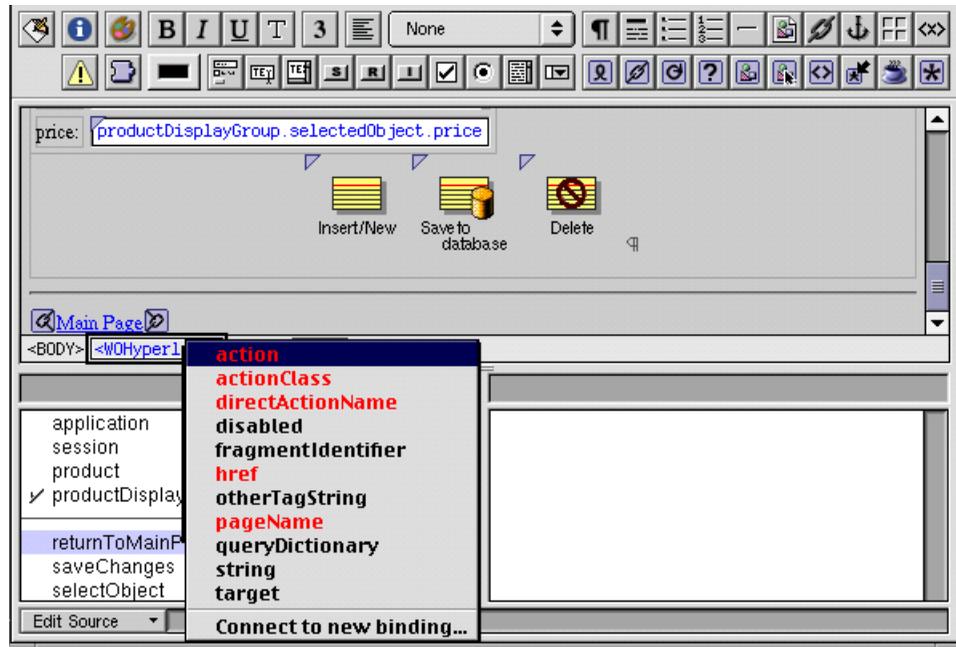


Figure A.76 Creating the Main Page Hyperlink

2. Repeat the above steps for the "CompanyEntry.wo" and "ContactDetails.wo" pages. Save the Project and close all of the web components. This will bring you back to the Project-Builder window.

Testing Navigation

1. To test our navigation we first need to build the project, click on the "Hammer" button to bring up the builder. In the Project Build window, click on the "Hammer" button to begin the build process. When the project has finished building you should see the result as in [Figure A.77](#).

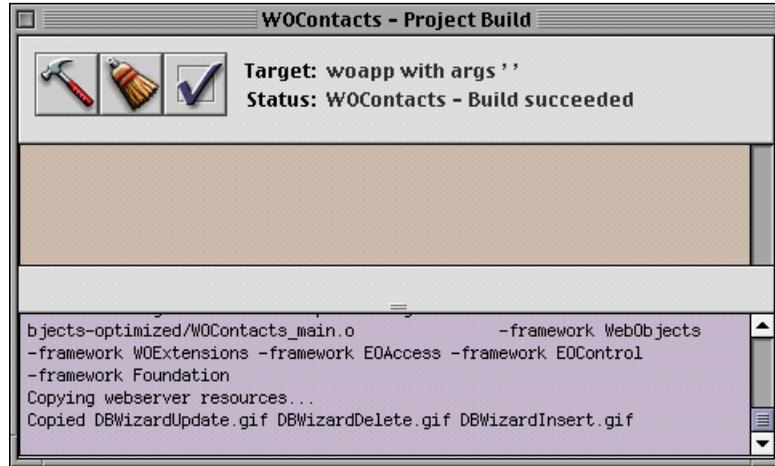


Figure A.77 Building the Application

2. To execute your WebObjects application, go back to the ProjectBuilder window and click on the "Terminal" button. The button next to the "i" information button. This will bring up a Launch panel. Click on the "Terminal" button to execute your application. You are not ready for any data entry yet, just test all the hyperlinks to make sure they work.

Contact Details Page

1. From ProjectBuilder, double click the ContactDetails.wo. Select the left of the "Main Page" hyperlink .
2. Select Elements->Heading->H1. Then enter Contact Details and hit the "Return" or "Enter" key.
3. Next choose Elements->Table. For the Dimensions, choose Rows:3 and Columns:2 as seen in [Figure A.78](#), and click "OK".

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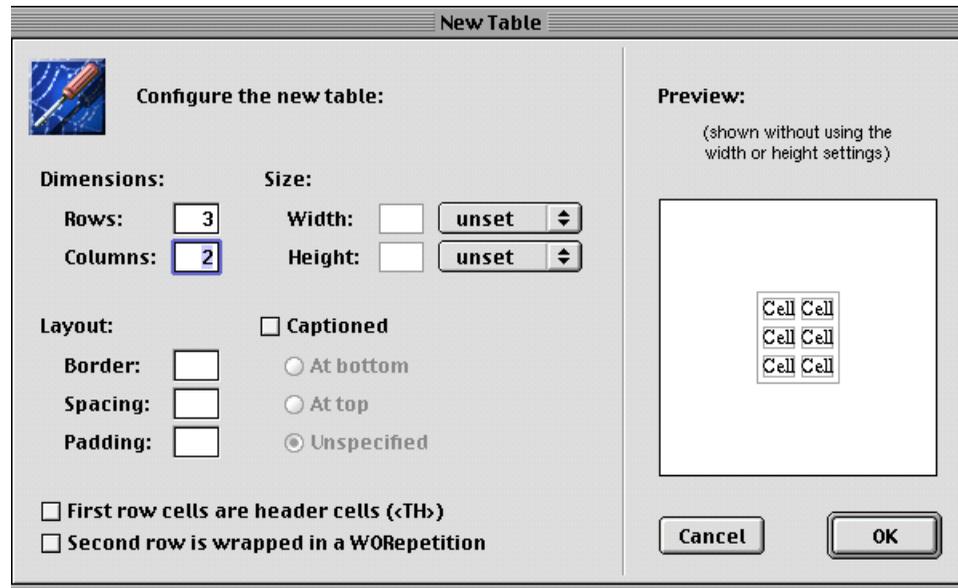


Figure A.78 Adding Page Tables

4. The first "Cell" will be highlighted, enter Name:, then hit the "Tab" key twice to get to the next row. Enter Telephone:, then hit the "Tab" key twice to get to the last row and enter "EMail". Your window should look like [Figure A.79](#).

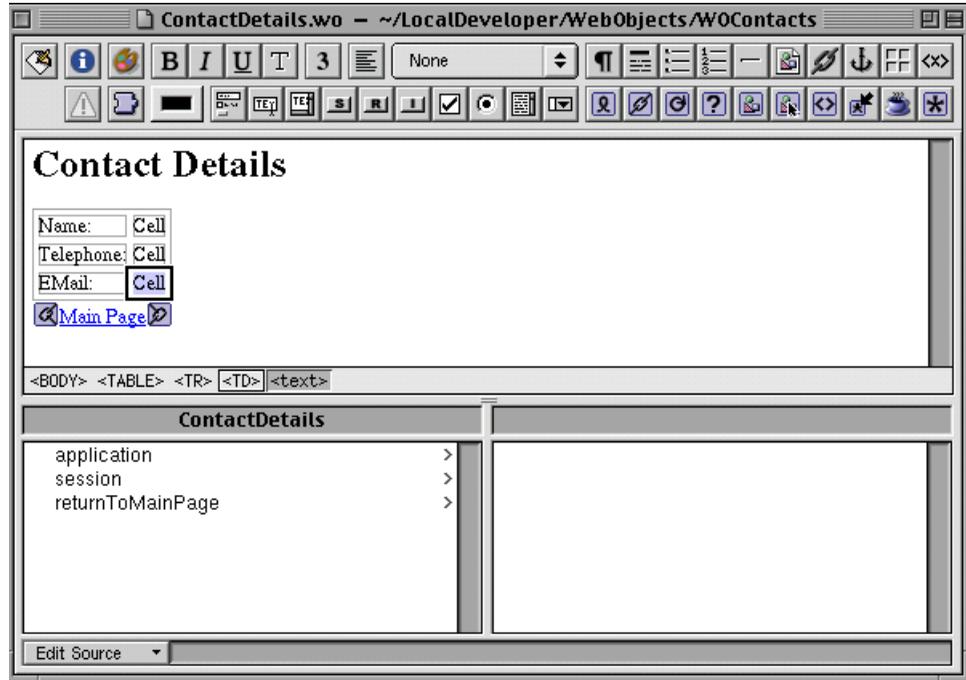


Figure A.79 Adding Table Row Titles

5. Now click to the right of this table and hit the "Return" or "Enter" key for a new line. Next choose Elements->Table. For the Dimensions, choose Rows:2 and Columns:3 also select "First row cells are header cells" and "Second row is wrapped in a WOREpetition" as seen in [Figure A.80](#), and click "OK".

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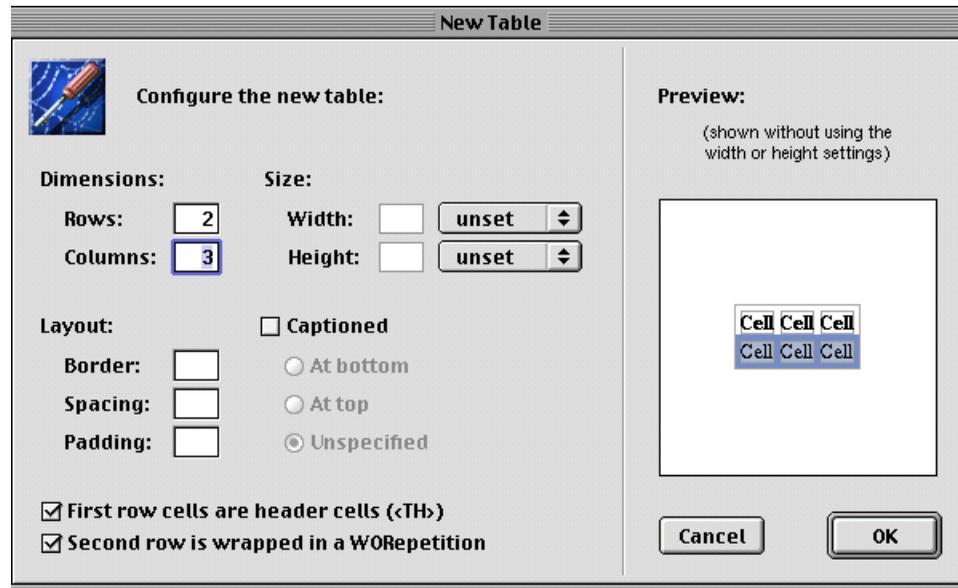


Figure A.80 Adding a Repetition Table

6. The first "Cell" will be highlighted, enter Name:, then hit the "Tab" key to get to the next column. Enter Price:, then hit the "Tab" key to get to the last column and enter Company:, now your window should look like [Figure A.81](#).

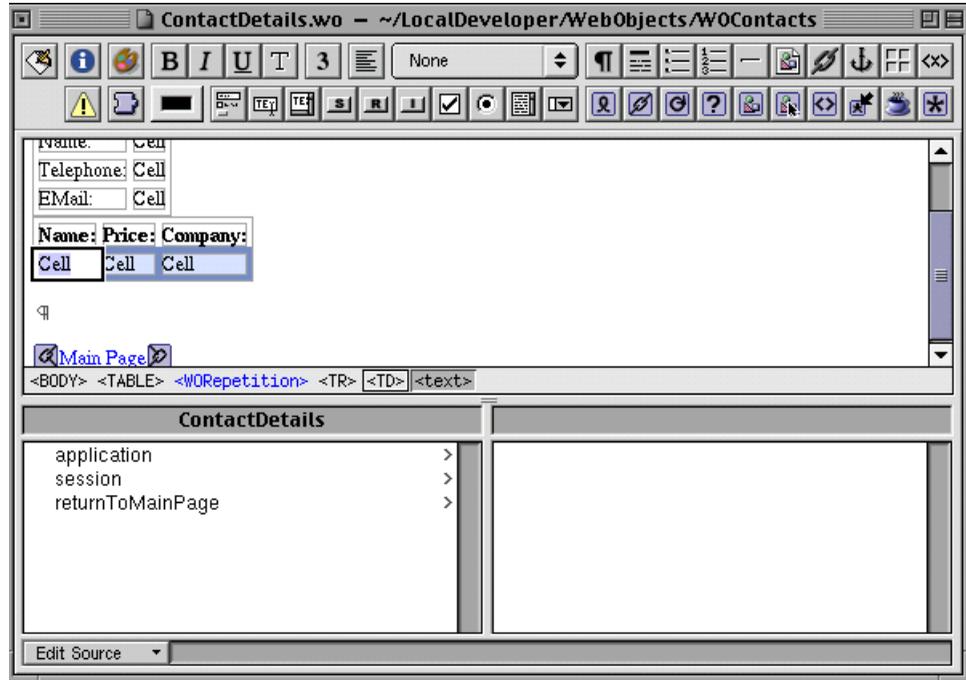


Figure A.81 Adding the Table Row Title

7. Now click to the right of this table for a new line. Next choose Elements->Table. For the Dimensions, choose Rows:9 and Columns:2, also de-select "First row cells are header cells" and "Second row is wrapped in a WOREpetition" as seen in [Figure A.82](#), and click "OK".

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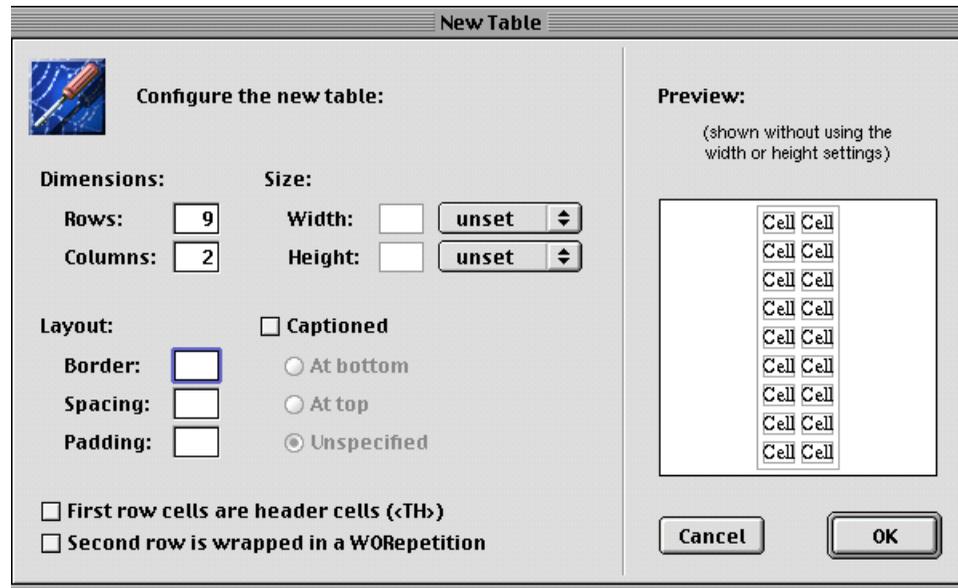


Figure A.82 Adding Company Detail Page Data Tables

8. The first "Cell" will be highlighted, enter Name:, then hit the "Tab" key twice to get to the next row. Enter Address1:, then hit the "Tab" key twice to get to the next row and enter Address2:, then hit the "Tab" key twice to get to the next row and enter City:, then hit the "Tab" key twice to get to the next row and enter "State:" then hit the "Tab" key twice to get to the next row and enter "Zip:", then hit the "Tab" key twice to get to the next row and enter "Country:", then hit the "Tab" key twice to get to the next row and enter "Telephone:", then hit the "Tab" key twice to get to the next row and enter "EMail:". Your window should look like [Figure A.83](#).

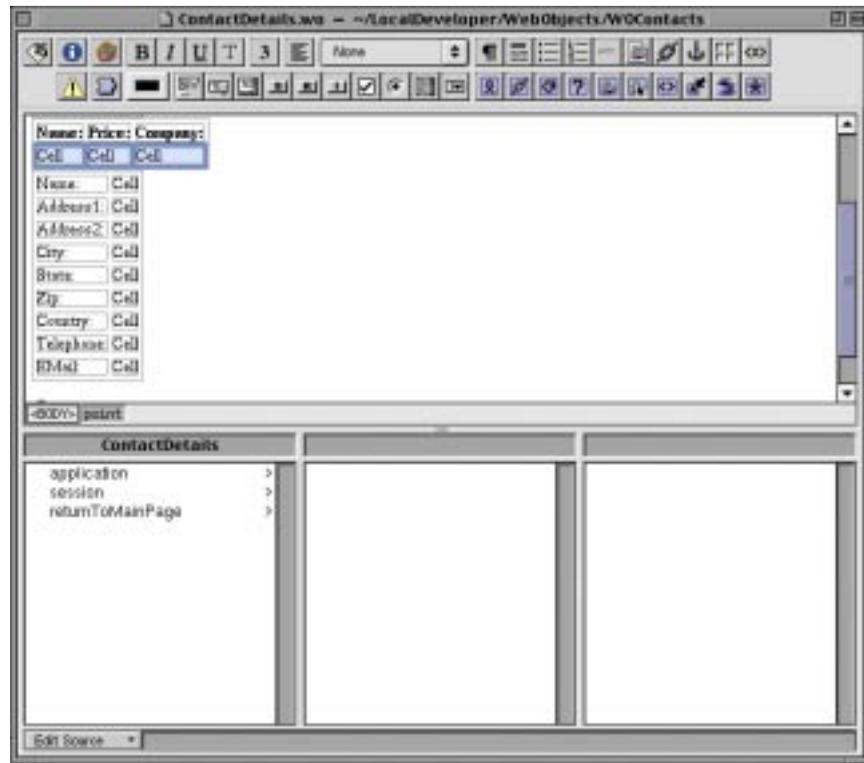


Figure A.83 Adding the Table Row Titles

9. Close this window and from Project Builder double click on the CompanyEntry.wo section. Click next to the right of the "Search for Companys" heading and hit the "Return" or "Enter" key. Next choose Elements->Table. For the Dimensions, choose Rows:2 and Columns:2, also select "First row cells are header cells" and "Second row is wrapped in a WORepetition" as seen in [Figure A.84](#), and click "OK".

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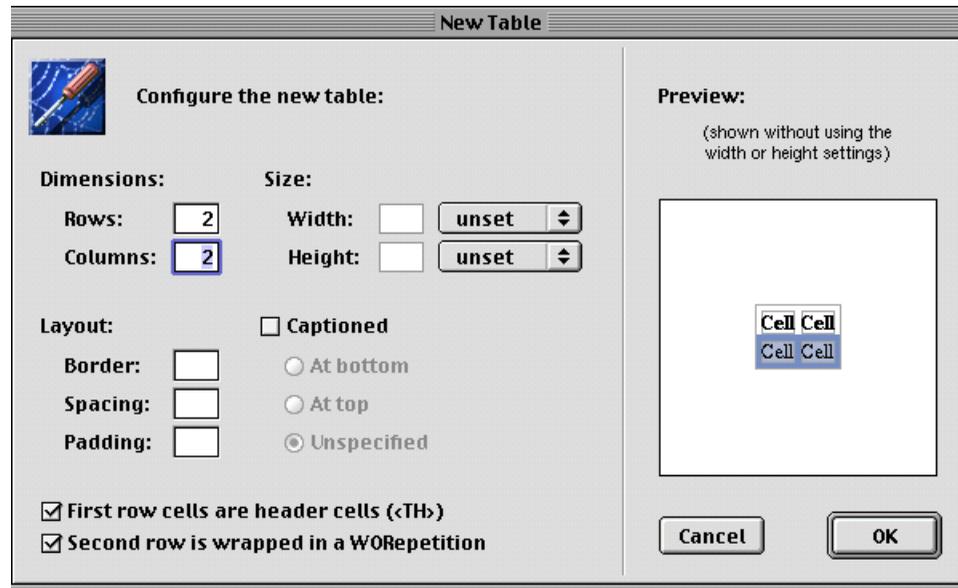


Figure A.84 Adding a Repetition Table

10. The first "Cell" will be highlighted, enter "Contact Name:", then hit the "Tab" key to get to the next column and enter "Contact EMail:". Your window should look like [Figure A.85](#).

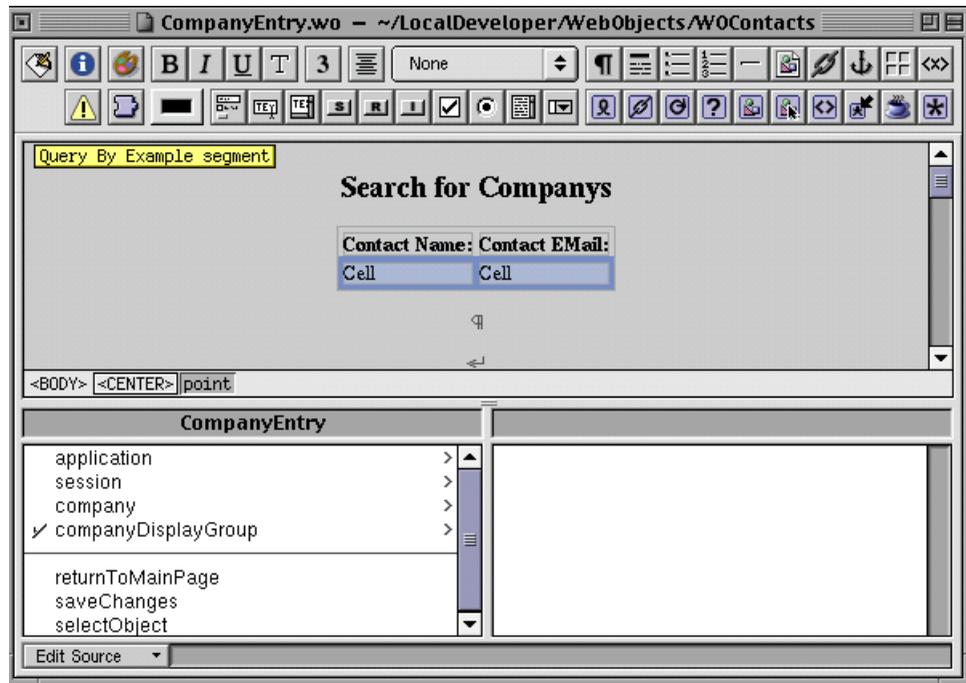


Figure A.85 Adding the Contact Table Rows

11. Click next to the right of the table you just created and choose Elements->Table. For the Dimensions, choose Rows:2 and Columns:2 also select "First row cells are header cells" and "Second row is wrapped in a WOREpetition" as seen in [Figure A.86](#), and click "OK".

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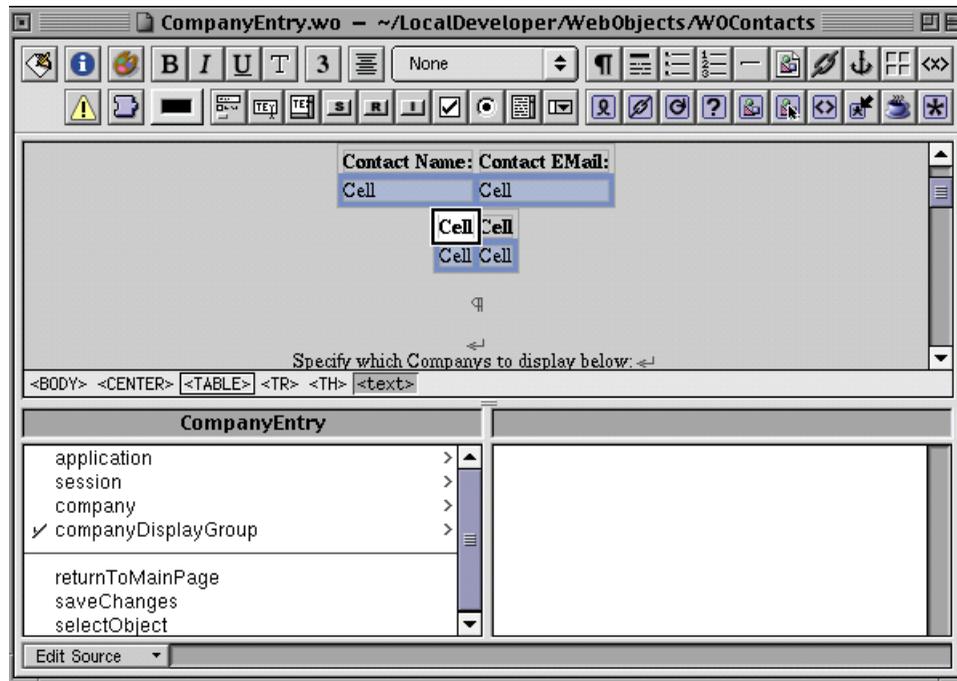


Figure A.86 Adding the Product Table

12. The first "Cell" will be highlighted, enter "Product Name:", then hit the "Tab" key to get to the next column. "Product Price:". Your window should look like [Figure A.87](#).

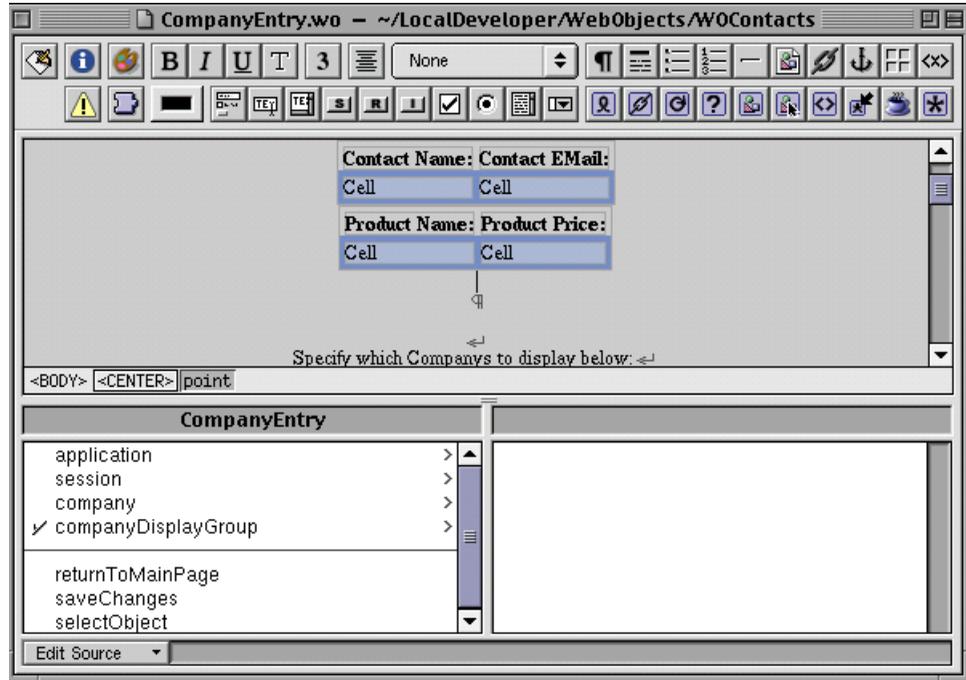


Figure A.87 Adding the Table Column Titles

Connect the Table to the Component Page

1. In order to display the Contact name and Contact EMail, we have to add the Contact table to the page. Click on the ProjectBuilder window. Select the "Resources" from the left column. Double click on the "Contacts.eomodeld" to bring up the EOModler application. In EOModeler select the Contact table and drop it onto your CompanyEntry page as seen in [Figure A.88](#).

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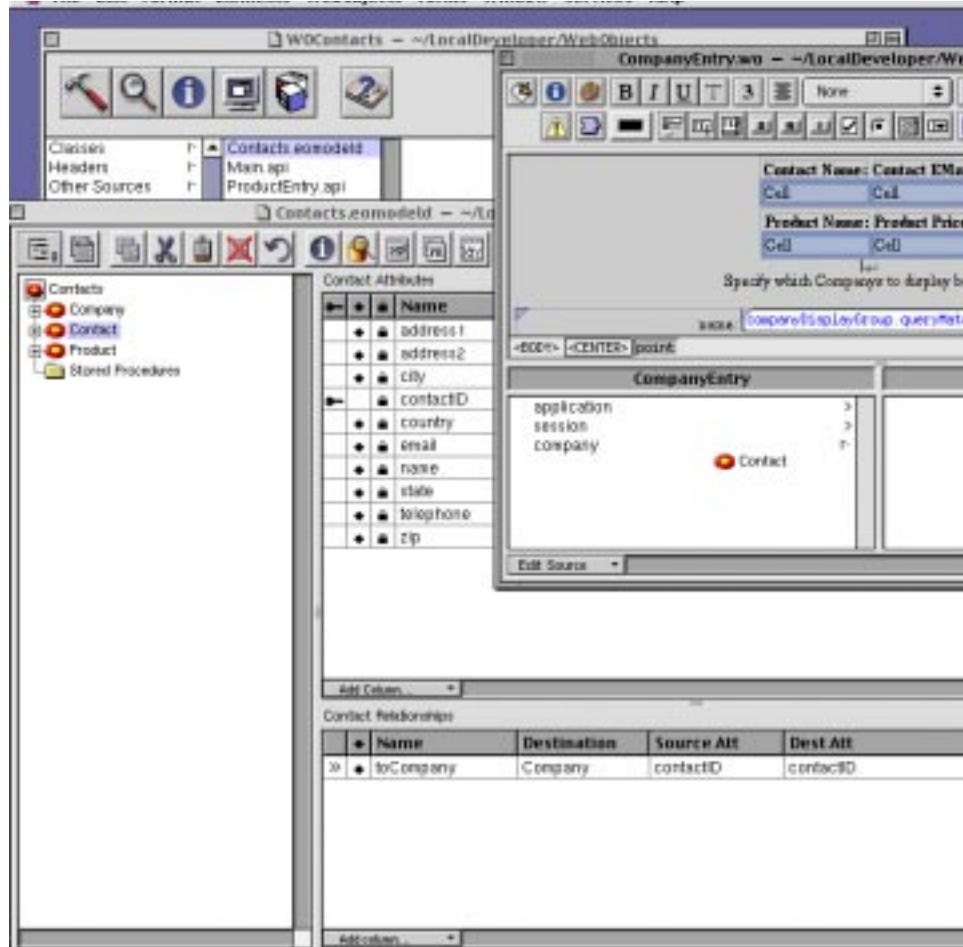


Figure A.88 Adding the Contact Table to the Component

2. Click "Add and Configure" on the panel for your contactDisplayGroup as seen in [Figure A.89](#).



Figure A.89 Create contactDisplayGroup

3. Select "Fetches on Load" to ensure that data is loaded into the form when it is displayed, and name for Sorting Ascending and click "OK" as seen in [Figure A.90](#).

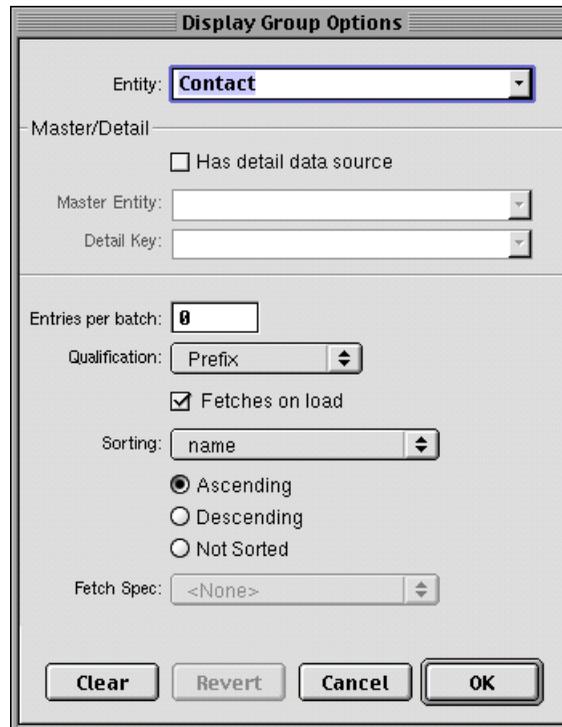


Figure A.90 Configure the Contact displayGroup

4. Repeat the same for the Product table so you can display the Product names and Product Prices. Notice that you now have three display groups in your page as seen in [Figure A.91](#).

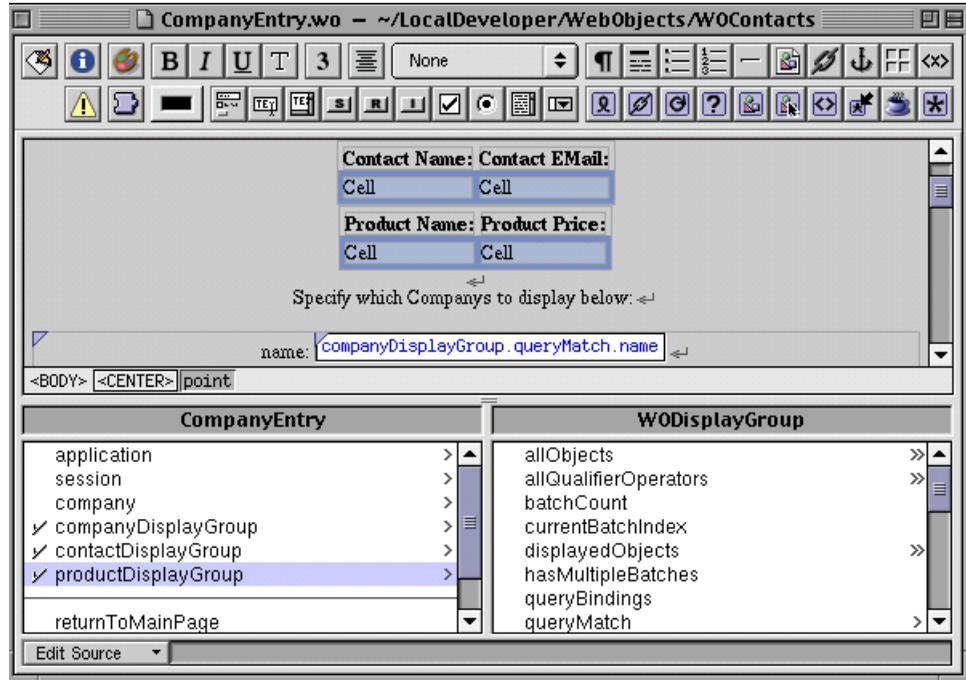


Figure A.91 Create the productDisplayGroup

5. Now that you have access to the Contact and Product tables, you need to have an object that will map to the data. This is where you will add two objects. The first will be a contact object. From the web page's Edit Source popup button in the lower left frame of the window, select Add Key and enter contact of Type "Contact" and check "An instance variable", "A method returning the value" and "A method setting the value" and click "Add" as see in [Figure A.92](#).

A WebObjects Application

WebObjects Application Creation

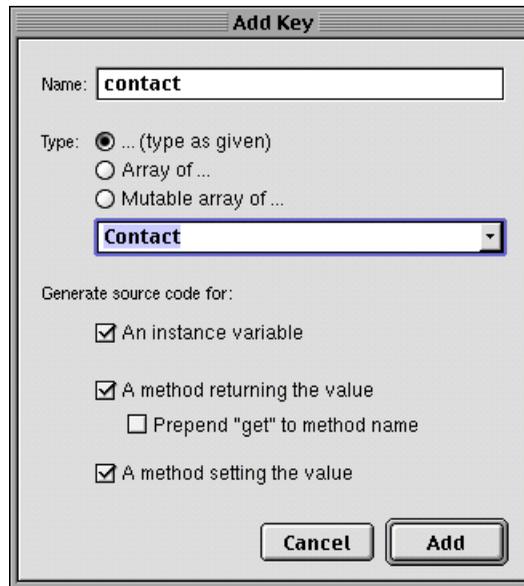


Figure A.92 Create the contact Data Object

6. Repeat the same for a product of object type Product. When you have completed this your page should look like [Figure A.93](#).

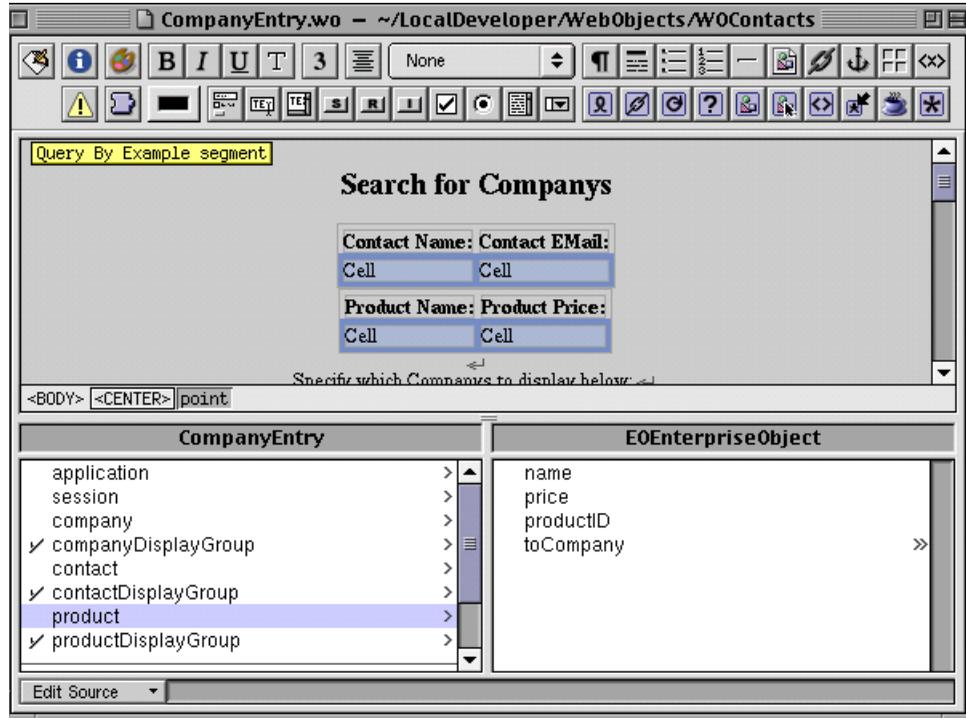


Figure A.93 Create the product Data Object

1. Now that you have all the data links in place, it is time to make page variables to hold the database values. Double click "Cell" under Contact Name: .
2. Choose WebObjects->WOString from the menu. Click the WOString you just created and choose WebObjects->WOHyperlink from the menu. Your page should look like [Figure A.94](#).

A WebObjects Application

WebObjects Application Creation

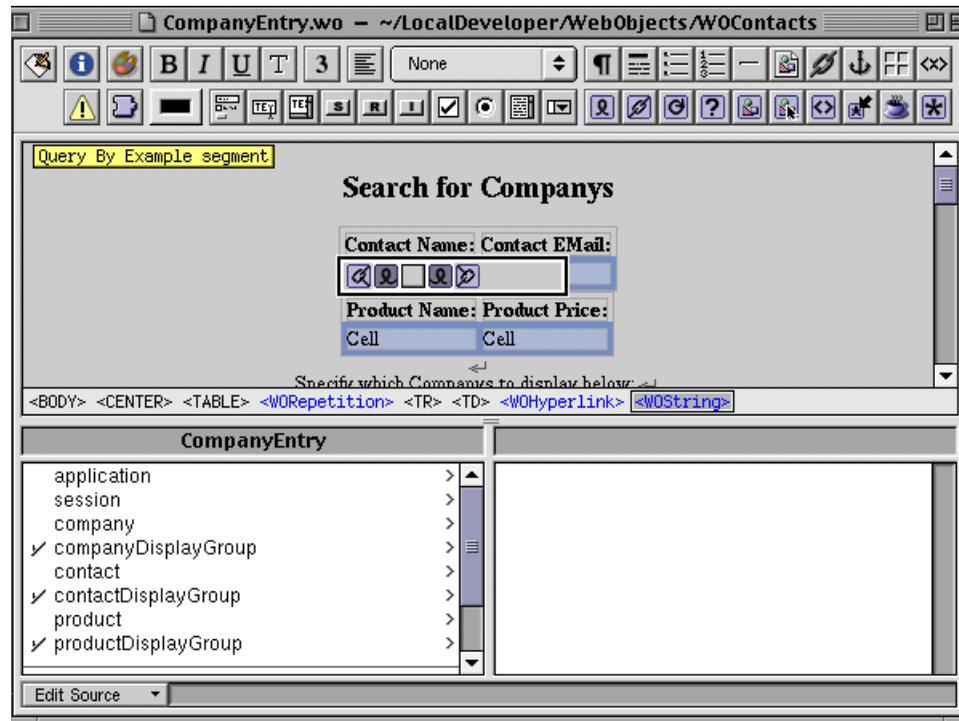


Figure A.94 Adding contact Name Field for the Contact Table

3. Tab to the next "Cell" and choose WebObjects->WOString from the menu, and your window now should look like [Figure A.95](#).

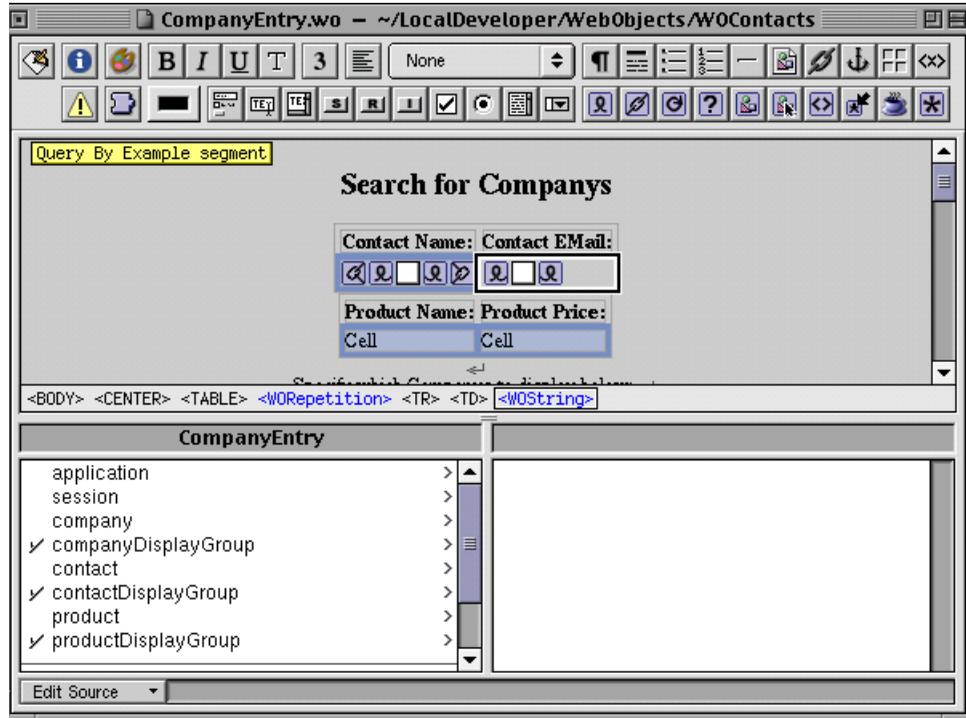


Figure A.95 Adding contact EMail Field for the Contact Table

4. Repeat the same for the Product Name and Product Price so your page will look like [Figure A.96](#). Don't forget to make the WOString and WOHyperlink for the Product Name as you did for the Contact Name:.

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WebObjects Application Creation

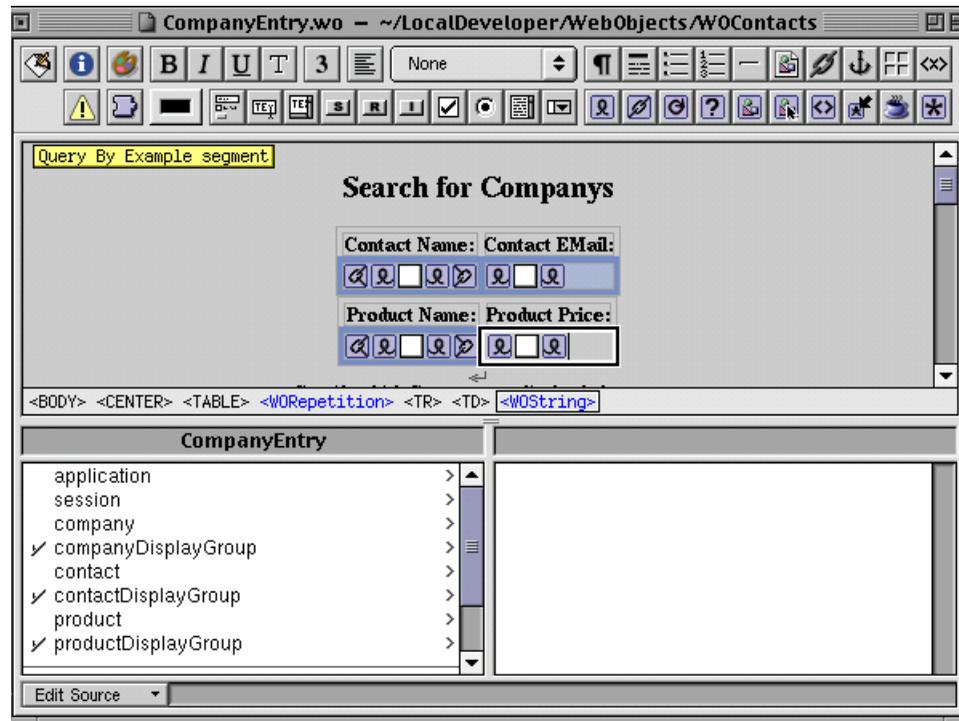


Figure A.96 Complete the Product data Area

5. To display what contact and product was chosen we will have to place a table to display these values. Click to the right of the Product Name Product Price table and select Elements->Table from the menu. Make the Rows:2 and Columns:2 and deselect the "First row cells are header cells" and "Second row is wrapped in WORepetition" and click "OK", as seen in [Figure A.97](#).

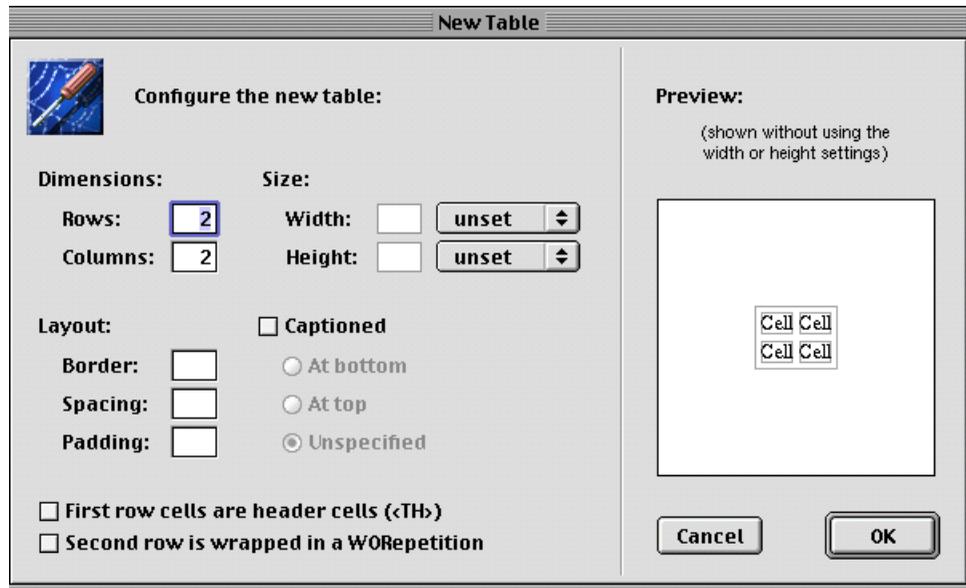


Figure A.97 Configure the Selected Values Table

6. The first "Cell" will be highlighted, enter Contact:, then hit the "Tab" key twice to get to the next row. Enter Product:, so your window should look like [Figure A.98](#).

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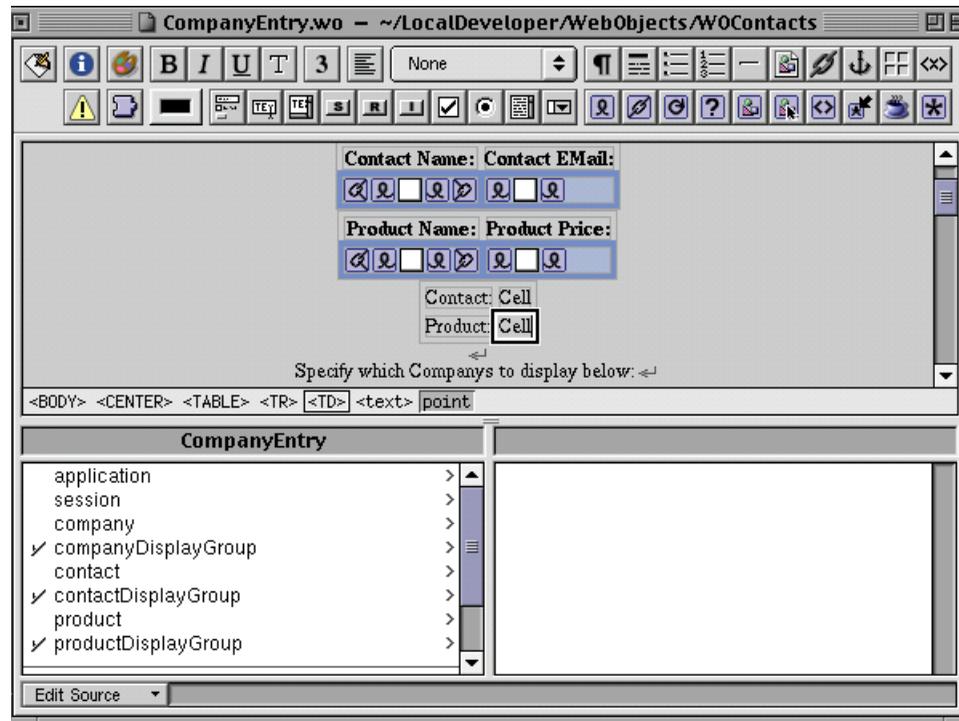


Figure A.98 Add the Selected Values Row Title

7. To hold the selected values you will double click the "Cell" next to Contact: and select WebObjects->WOString from the menu. Repeat this for the Product "Cell" and your table should look like [Figure A.99](#).

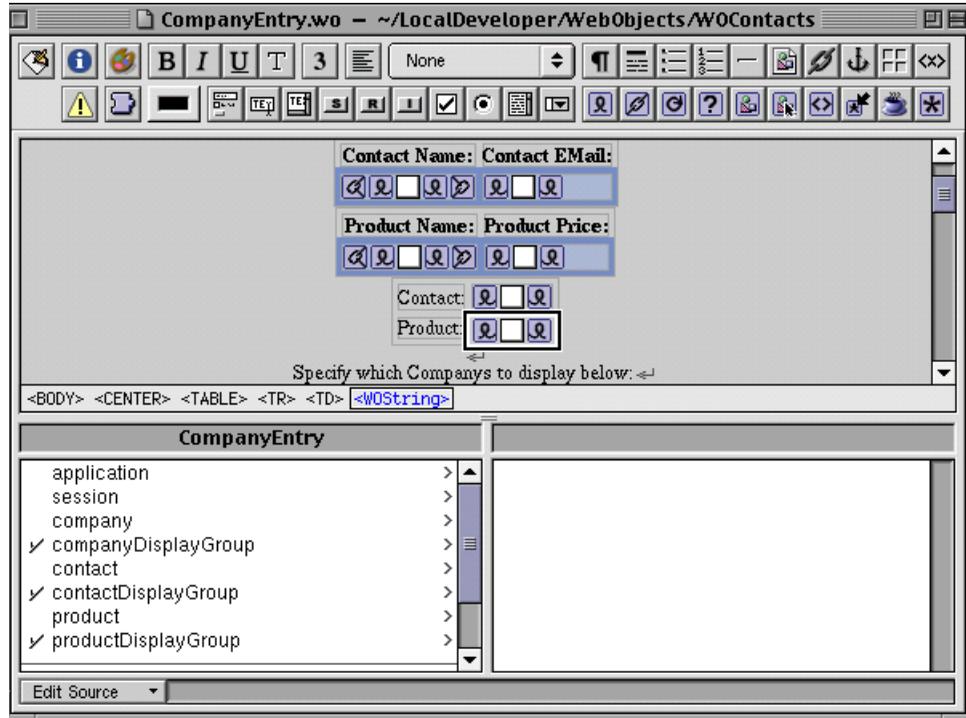


Figure A.99 Add the Selected Values Column data

8. Now you have to make the data connections that will connect the database data values to the proper page elements. Click the WOSTring field under Contact Name and from the list of instance variables choose contact, name and drag it to the WOSTring and select value from the selections as seen in [Figure A.100](#).

A WebObjects Application

WebObjects Application Creation

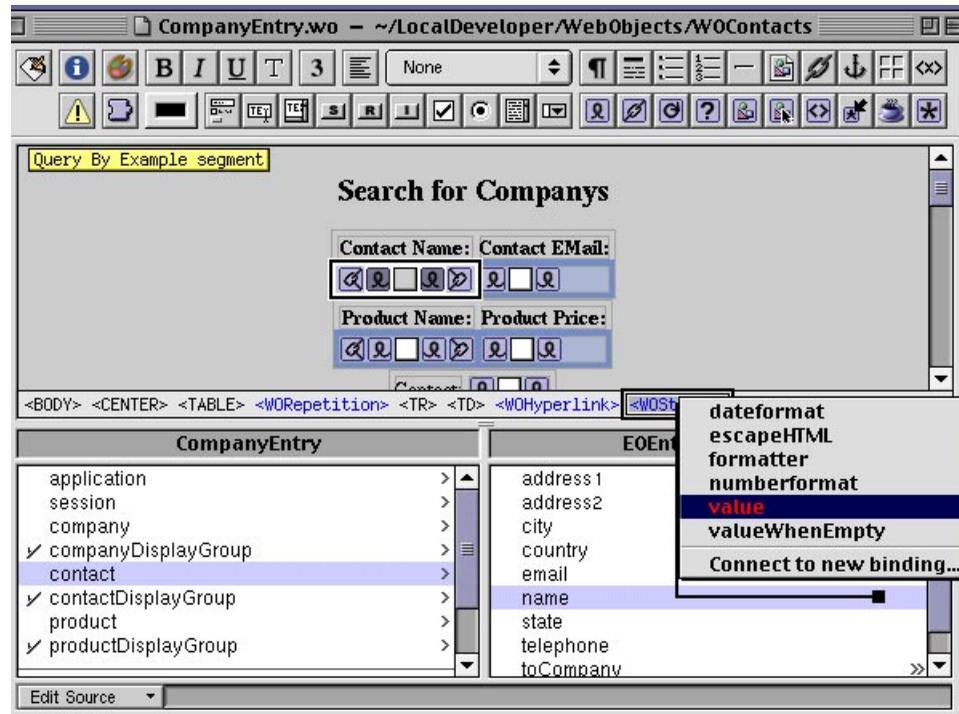


Figure A.100 Make the Contact Name value connection

9. Repeat this for the corresponding values for the Contact EMail and for the product name and price values as seen in [Figure A.101](#).

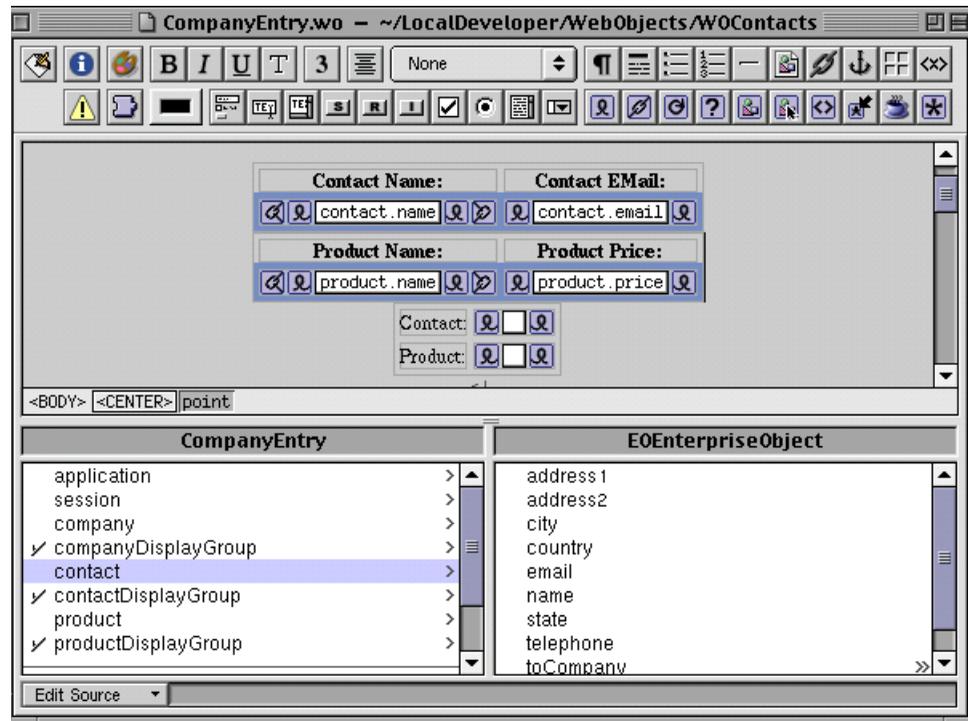


Figure A.101 All Connections completed

1. To know what object was selected from the Contact list and the Product list we will add the selected object from each of the display groups that represent the Contact and Product tables. Click on the WOSTring field next to the "Contact:" cell and from the list of instance variables navigate to the contactDisplayGroup.selectedObject.name and drag it to the WOSTring and select value as seen in [Figure A.102](#).

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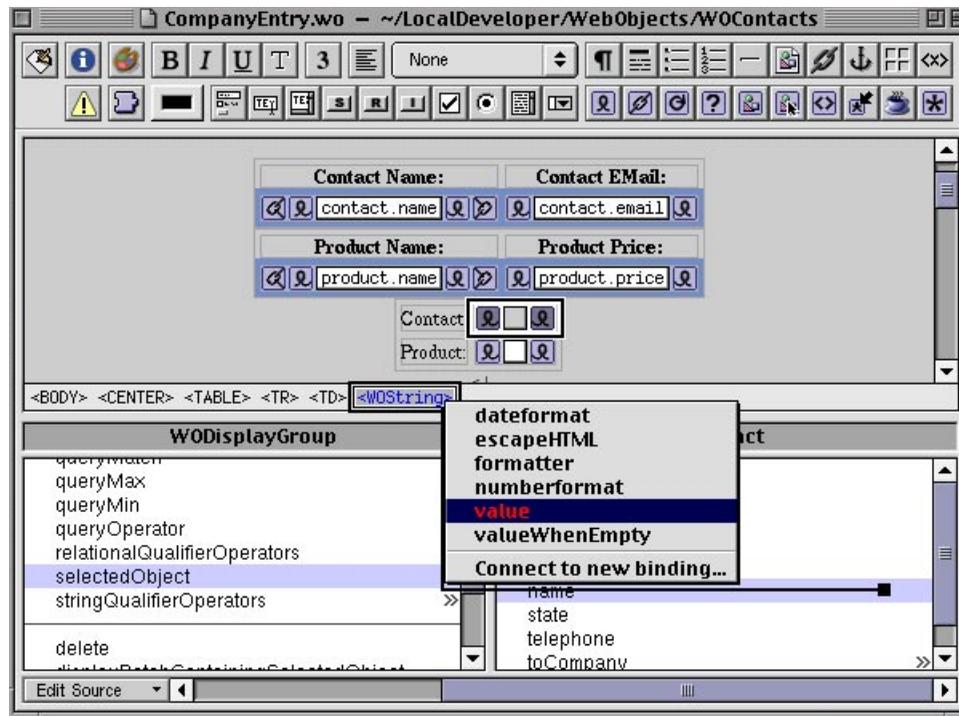


Figure A.102 Contact Selected Value Connection

2. Repeat the same for the productDisplayGroup.selectedObject.name as seen in [Figure A.103](#).

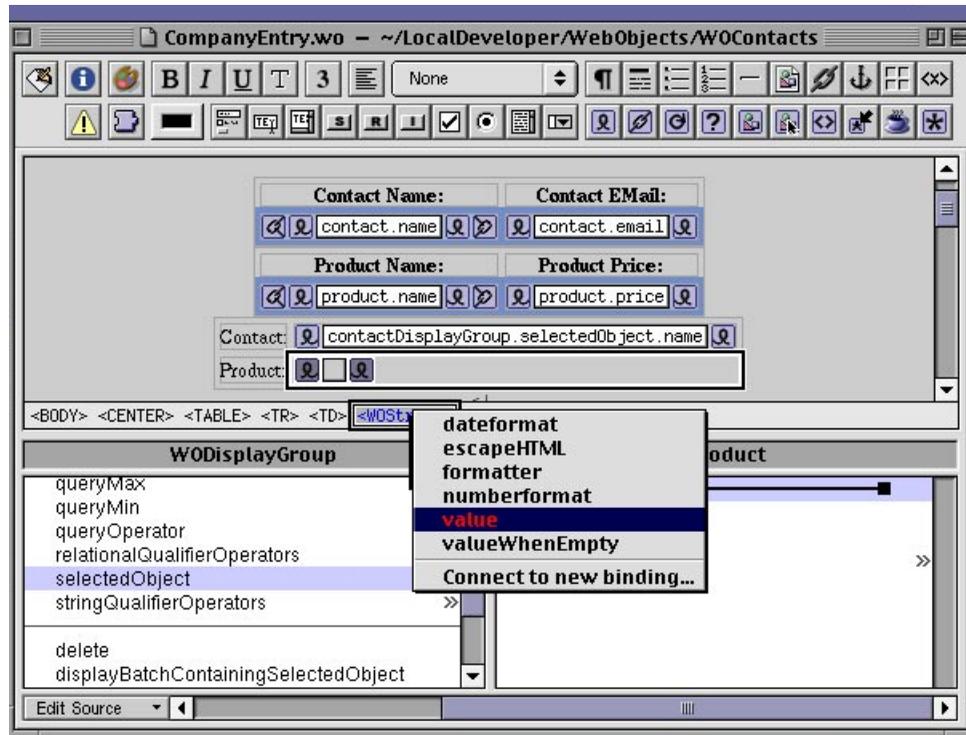


Figure A.103 Make the Product Value Connection

3. The final task is to connect the repetition of the Contact Name to the Contact table and the Product Name to the Product table. Select the contact.name WOSTring field. Then click on the <WORepetition> entry. select the contactDisplayGroup.displayedObjects as the list as seen in [Figure A.104](#).

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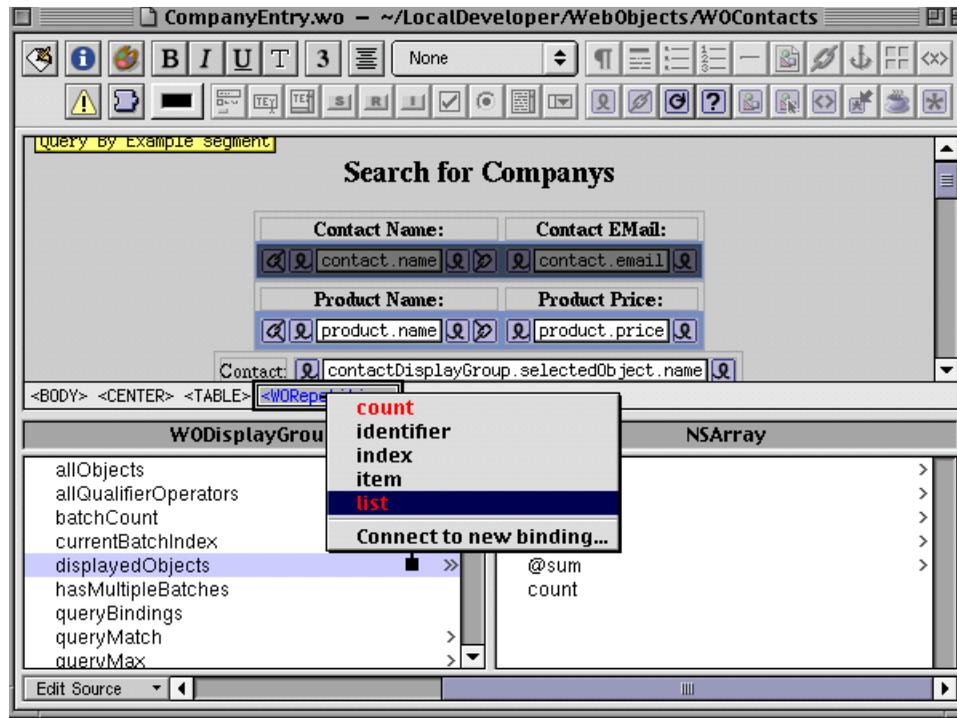


Figure A.104 Connecting the Data Value List Connection

1. Now that you have cancelled the list objects, you have to declare of what object type is the list made of. This is where we will connect the contact object to the item. Select the contact object and drag to the <WOREpetition> and choose "item" from the list as seen in [Figure A.105](#).

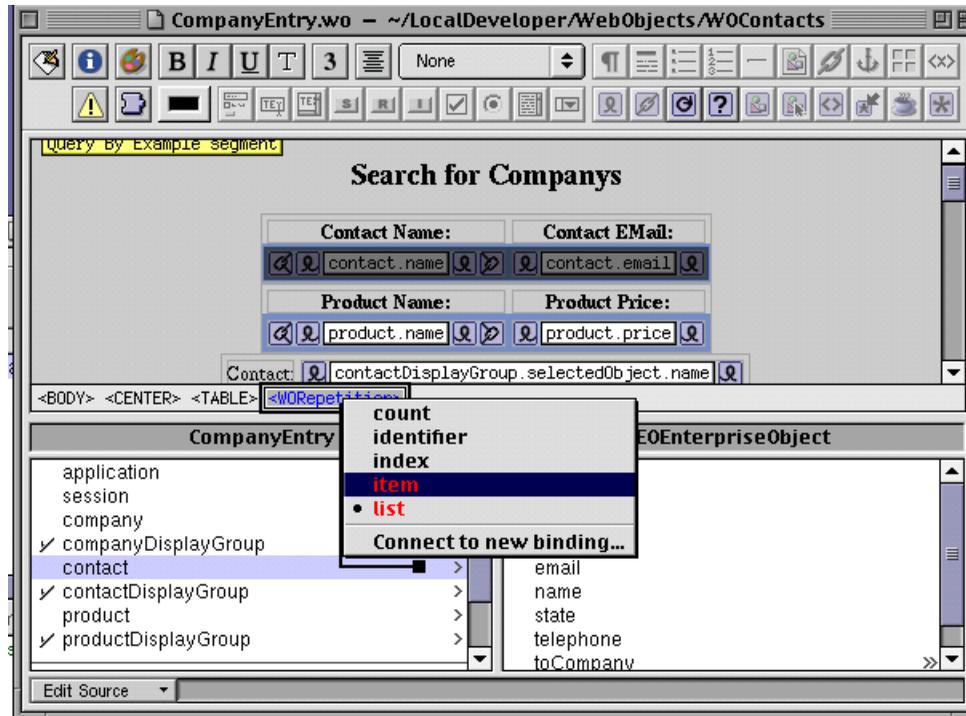


Figure A.105 Connect the Data Object for the Repetition

2. Repeat the above steps for the product object and product-DisplayGroup.displayedObjects
3. Now we need a method to respond to the <WOHyperlink> selection of a contact object. So a selectContactObject will have to be created as follows:

Listing 0.1 selectContactObject method

```
public void selectContactObject() {  
    contactDisplayGroup.selectObject(contact);  
}
```

Place this code right below the selectObject() method.

4. Now that the method is in our project, it is time to connect the WOHyperlink to this action. Select and drag the select-

A WebObjects Application

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ContactObject entry to the <WOHyperlink> entry and choose action from the list as seen in [Figure A.106](#).

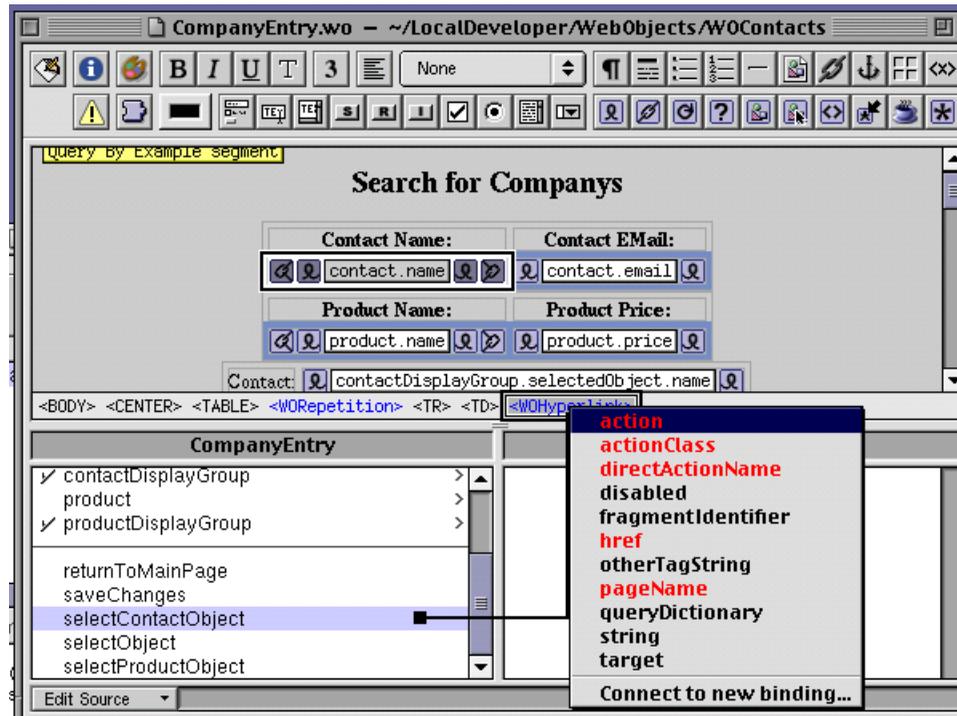


Figure A.106 Connecting the Action for the Hyperlink

5. Now we need a method to respond to the <WOHyperlink> selection of a product object. To edit the source, select from the "Edit Source" popup button "View Source File". Add the following selectProductObject method to the java source.

Listing 0.2 selectProductObject method

```
public void selectProductObject() {  
    productDisplayGroup.selectObject(product);  
}
```

Place this code right below the selectContactObject () method.

6. Now that the method is in our project, it is time to connect the WOHyperlink to this action. Select and drag the selectProductObject entry to the <WOHyperlink> entry and choose action from the list as seen in [Figure A.107](#).

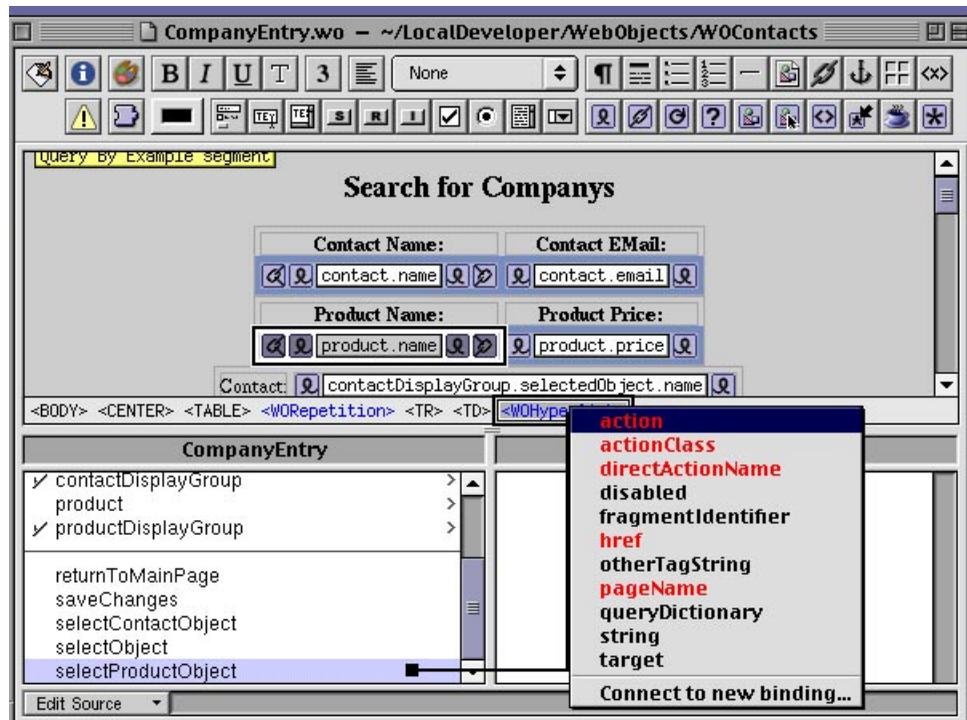


Figure A.107 Connect the Action for the Product Name Hyperlink

Congratulations, all of your connections have been made. Your page should look like [Figure A.108](#).

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WebObjects Application Creation

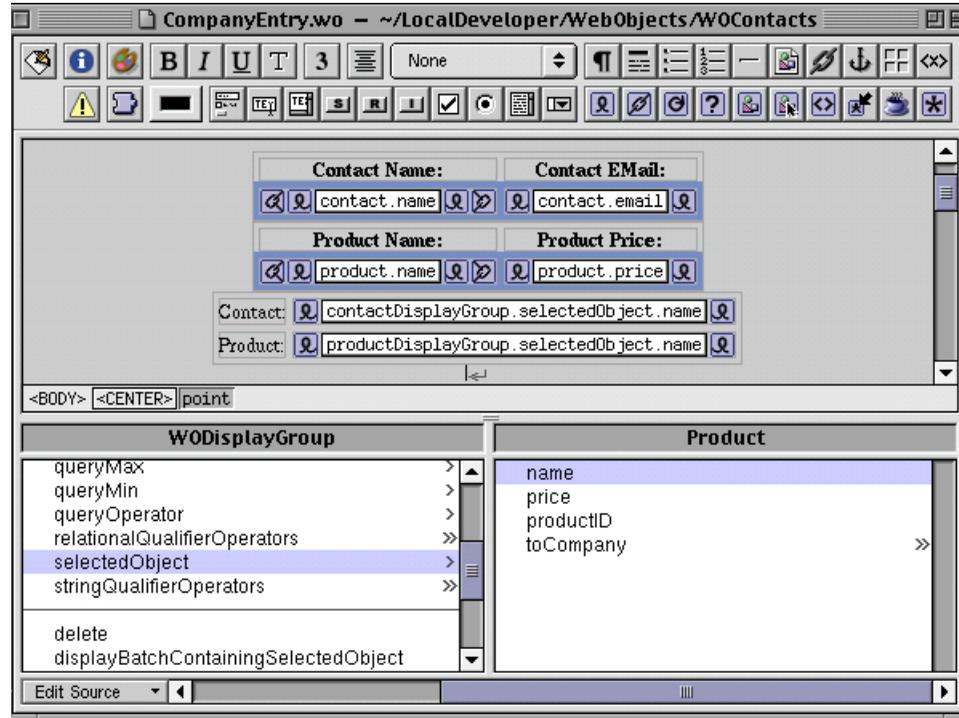


Figure A.108 All Connections Completed

1. The last thing that you have to do is modify the `saveChanges()` method to get the selected values from the page to actually be stored in the database. The modifications to the method appear in bold below:

Listing 0.3 saveChanges method

```
public void saveChanges() throws Exception {  
    EOEnterpriseObject aCompany =  
(EOEnterpriseObject)companyDisplayGroup.selectedObject();  
    EOEnterpriseObject aContact =  
(EOEnterpriseObject)contactDisplayGroup.selectedObject();  
    EOEnterpriseObject aProduct =  
(EOEnterpriseObject)productDisplayGroup.selectedObject();
```

```
aCompany.addObjectToBothSidesOfRelationshipWithKey(aContact,  
"toContact");  
  
aCompany.addObjectToBothSidesOfRelationshipWithKey(aProduct,  
"toProduct");  
  
    try {  
        this.session().defaultEditingContext().saveChanges();  
    } catch (Exception exception) {  
        // An error occurred during the save. You could  
present an error page which  
        // explains the reason for the save failure.  
        // The default is to raise an exception which  
presents a diagnostic page.  
        System.err.println("Cannot save changes ");  
        throw exception;  
    }  
}
```

2. To edit the source select from the "Edit Source" popup button "View Source File" and find the saveChanges method and enter the modification and save the project.

Additions to the ContactDetails Page

1. From the ProjectBuilder window, choose the "ContactDetails.wo" page. Double click the "Cell" field next to Name:. Choose WebObjects->WOString from the menu, hit the "Tab" twice and add another WOString for the Telephone: and hit "Tab" twice to add another WOString for the EMAIL: "Cell" value, as seen in [Figure A.109](#).

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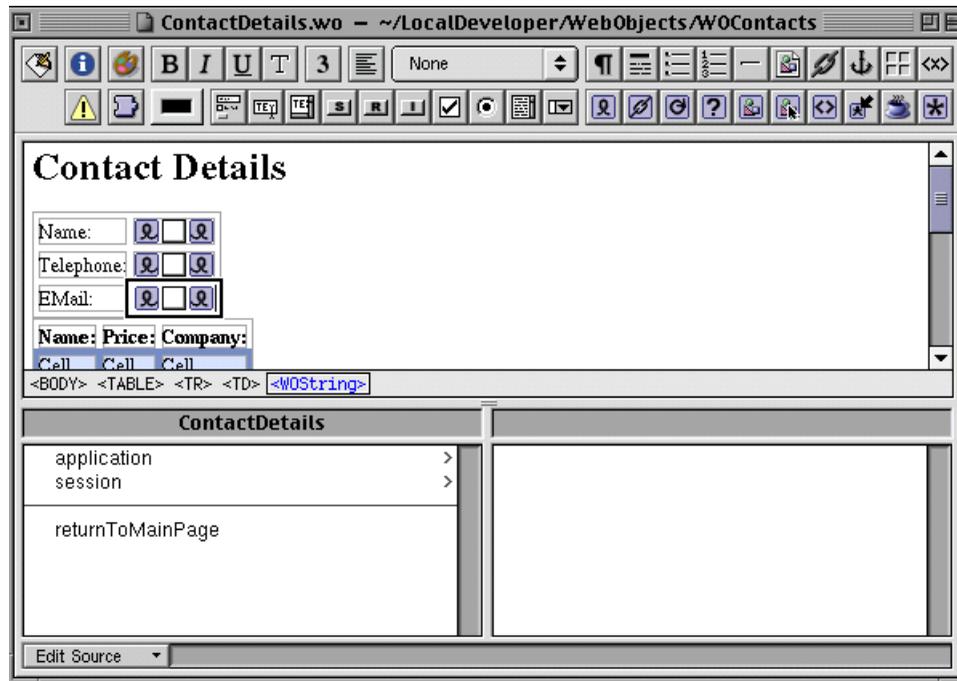


Figure A.109 Adding the data Value Fields

2. Double click on the "Cell" value on the table, under the Name: column. Choose WebObjects->WOString from the menu, hit the "Tab" and add another WOString for the Price: and hit "Tab" to add another WOString for the Company: "Cell" value, as seen in [Figure A.110](#).

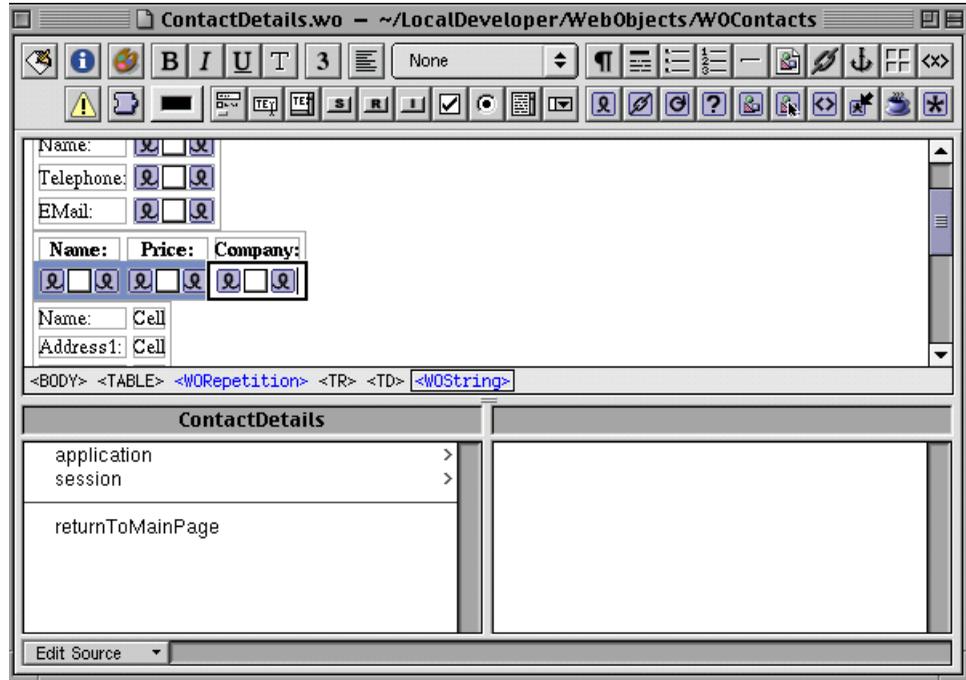


Figure A.110 Add the data Value Fields for the Repetition

3. Double click the "Cell" field next to Name:. Choose WebObjects->WOString from the menu, hit the "Tab" twice and add another WOString for the Address1: and hit "Tab" twice to add another WOString for all the other table: "Cell" values, as seen in [Figure A.111](#).

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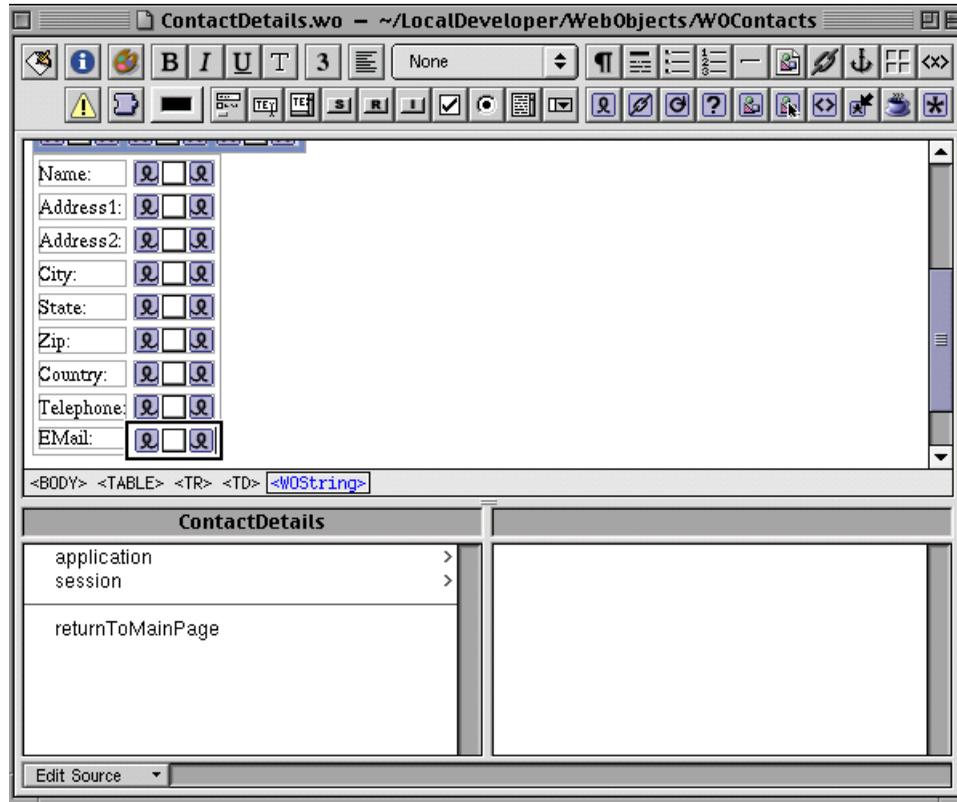


Figure A.111 Adding the data Value Fields for the Company Details

4. To connect the selected contact coming from the main page, a contact object will be added to this page. From the "Edit Source" popup button select Add Key with the Name of selectedContact and Type of Contact with "An instance variable", "A method returning the value" and "A method setting the value" checked as seen in [Figure A.112](#), and click "Add".

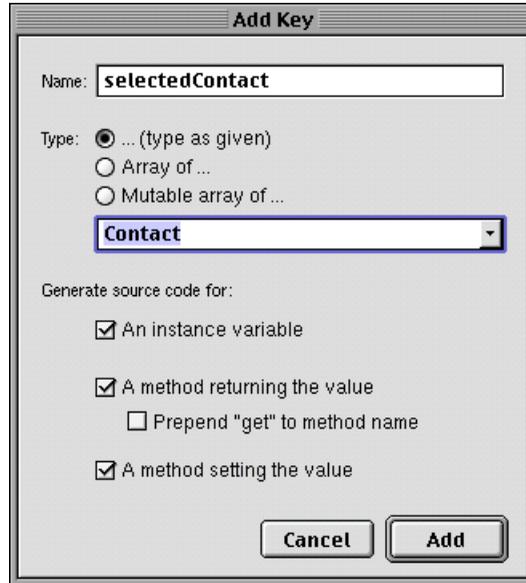


Figure A.112 Create the Data Variable for the selectedContact

5. Now it is time to make the connections to the database values. Select the WOString to the right of the "Name:" field at the top of the page. Choose the selectedContact.name value and drag it to the <WOString> entry and select value from the list as seen in [Figure A.113](#).

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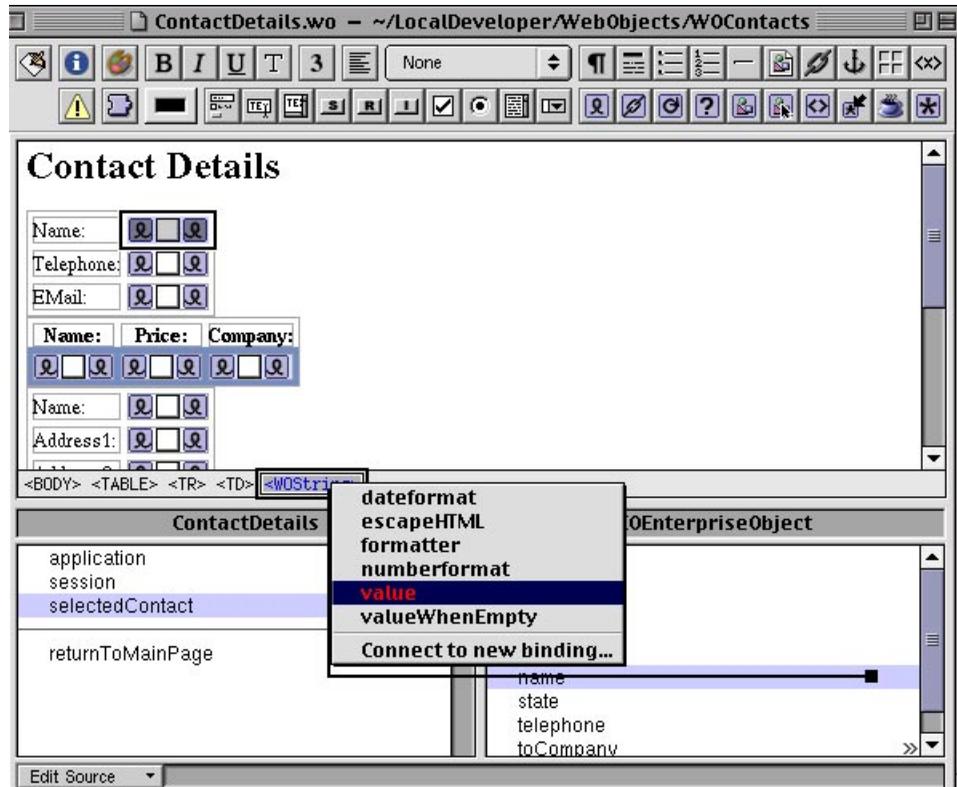


Figure A.113 Connecting the selectedContact Name Value

6. Repeat the above for the Telephone and EMail values as seen in [Figure A.114](#).

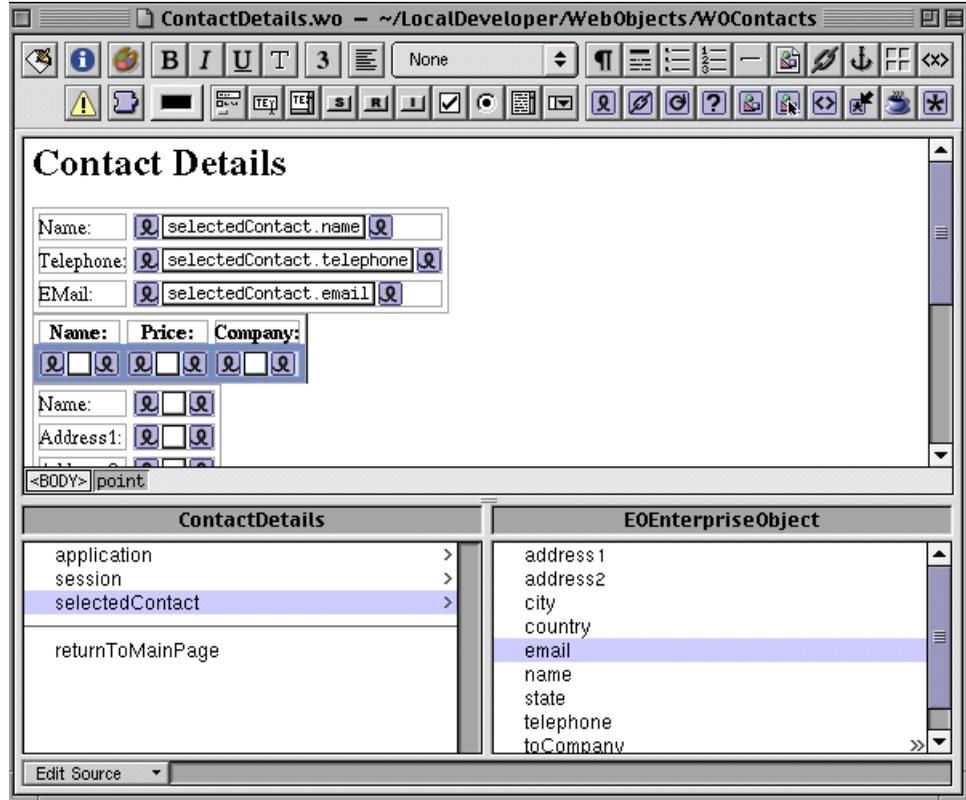


Figure A.114 selectedContact data Values connected

1. To be able to access the Company table values, first a company object will be added, then a companyDisplayGroup will be added. To add the company object, select from the "Edit Source" popup button select Add Key with the Name of company and Type of Company with "An instance variable", "A method returning the value" and "A method setting the value" checked as seen in [Figure A.115](#), and click "Add".

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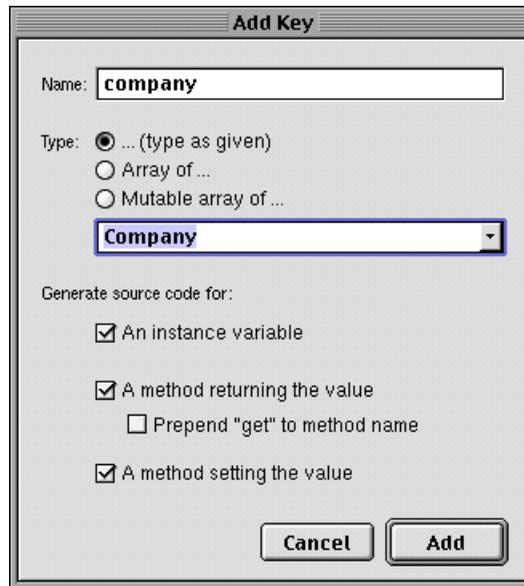


Figure A.115 Create a company Data Object

2. Now to add the companyDisplayGroup, select the Company table in EOModeler and drag it into the ContactDetails page as seen in [Figure A.116](#).

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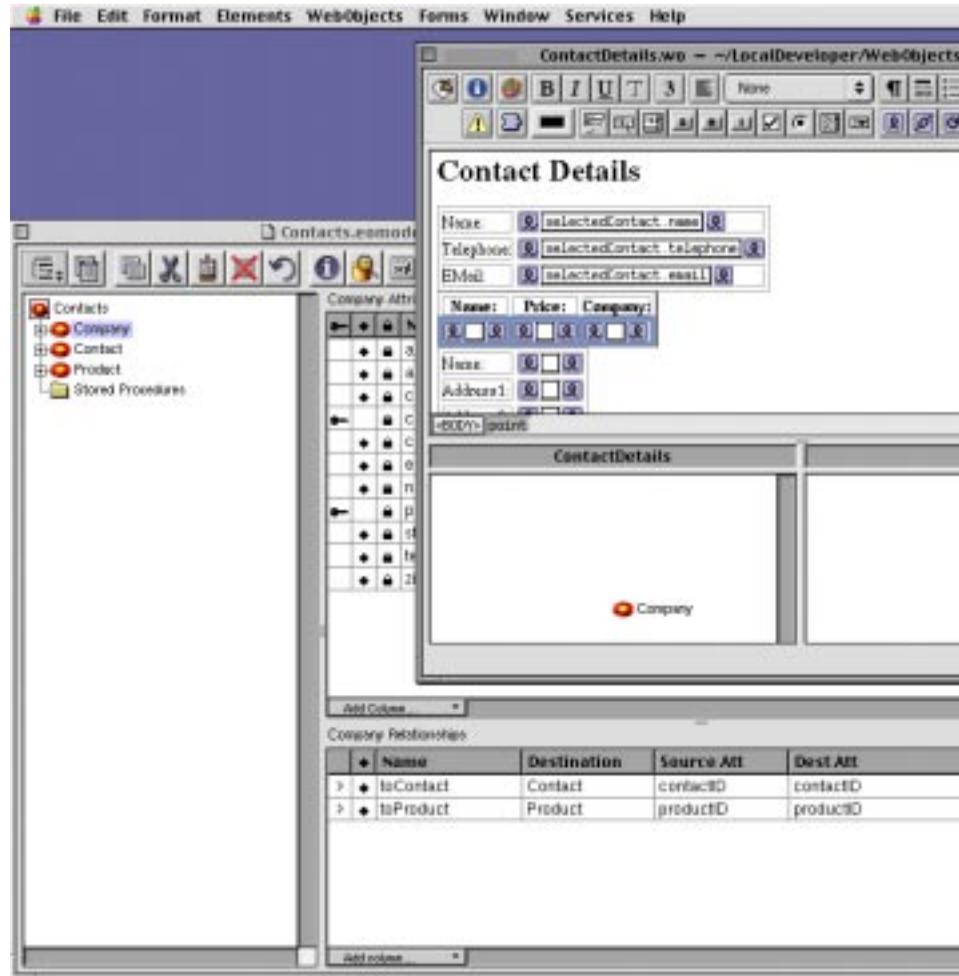


Figure A.116 Add the Company Data Table to the Component

A WebObjects Application

WebObjects Application Creation

3. Click on the “Add & Configure” button as seen in [Figure A.117](#).



Figure A.117 Create the companyDisplayGroup

4. For the Display Group Options, check "Has detail data source", Master Entity: Contact and Detail Key: to Company, check "Fetches on load and name in Ascending Order as seen in [Figure A.118](#), click "OK".

The screenshot shows the 'Display Group Options' dialog box. The 'Entity' dropdown is set to 'Company'. Under the 'Master/Detail' section, 'Has detail data source' is checked, 'Master Entity' is 'Contact', and 'Detail Key' is 'toCompany'. 'Entries per batch' is 0, 'Qualification' is 'Prefix', 'Fetches on load' is checked, 'Sorting' is 'name', and 'Fetch Spec' is '<None>'. Buttons for 'Clear', 'Revert', 'Cancel', and 'OK' are at the bottom.

Figure A.118 Configure the Company Display Group

5. To add the values for the Product Name, Product Price and Company Name the following will be connected. For the repetition select the WOString under the Name: title in the "Name, Price and Company" repetition.
6. Then select the <WORepetition> field. From the list select the companyDisplayGroup.displayedObjects and drag to the <WORepetition> and select list as seen in [Figure A.119](#).

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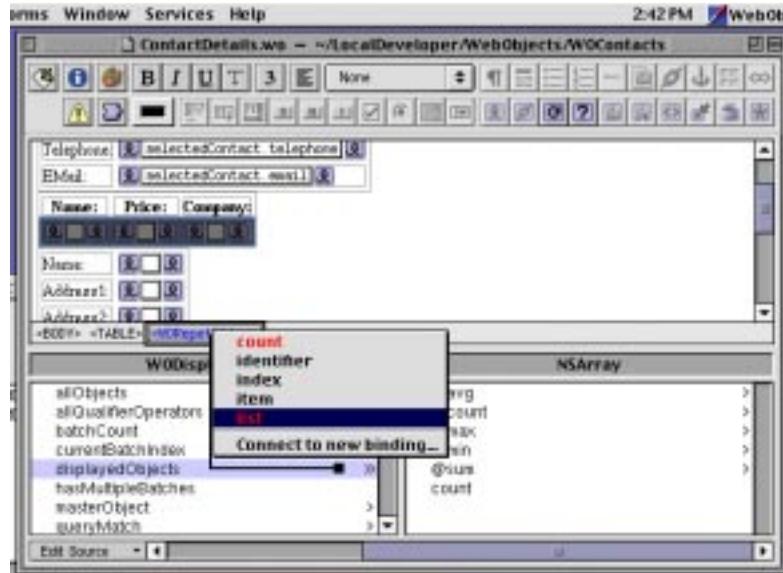


Figure A.119 Define the Display Group Repetition List

7. Now with the list identified, the list object type must be declared. Select the company object and drag it to the <WORepetition> and select item as seen in [Figure A.120](#).

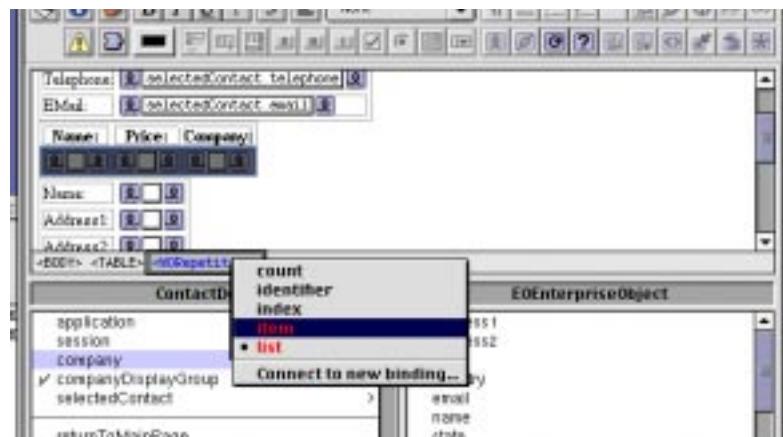


Figure A.120 Define the Object for the Repetition

8. Now we will make the field connections to the database. Select the WOString for the Name field in the repetition and

drag the company.toProduct.name for the value as seen in [Figure A.121](#). Do the same for the company.toProduct.price.

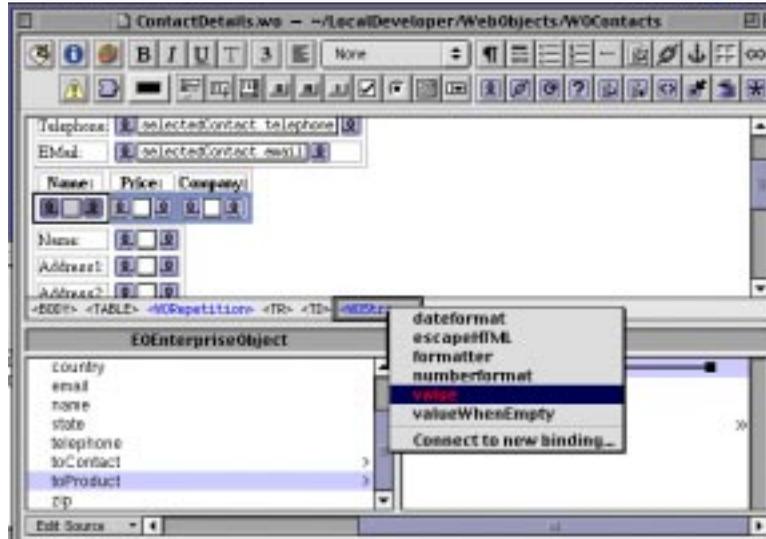


Figure A.121 Making the Field Connections to the Database

9. For the final column in the repetition select the company.name and drag that to the selected WOString for the "Company" field and select value. All three of the fields are now connected as seen in [Figure A.122](#).

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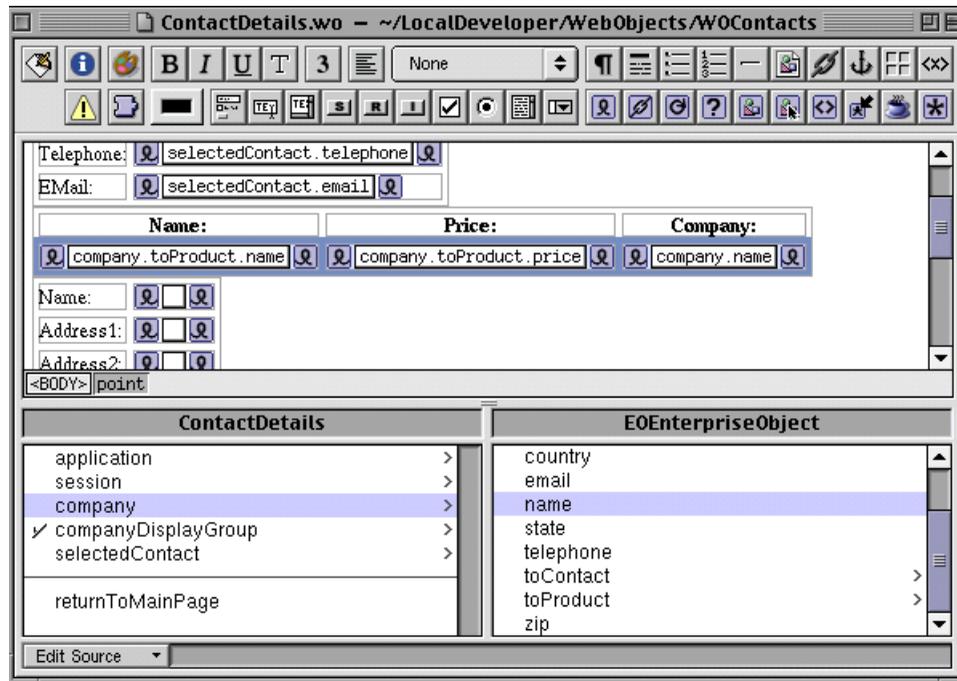


Figure A.122 The Repetition Defined

10. Finally we need to connect the company's database values to the last table. The database values will come from the `companyDisplayGroup.selectedObject` value.
11. Select the WOString field next to the Name entry. Click `companyDisplayGroup.selectedObject.name` and drag it to the `<WOString>` and select value as seen in [Figure A.123](#).

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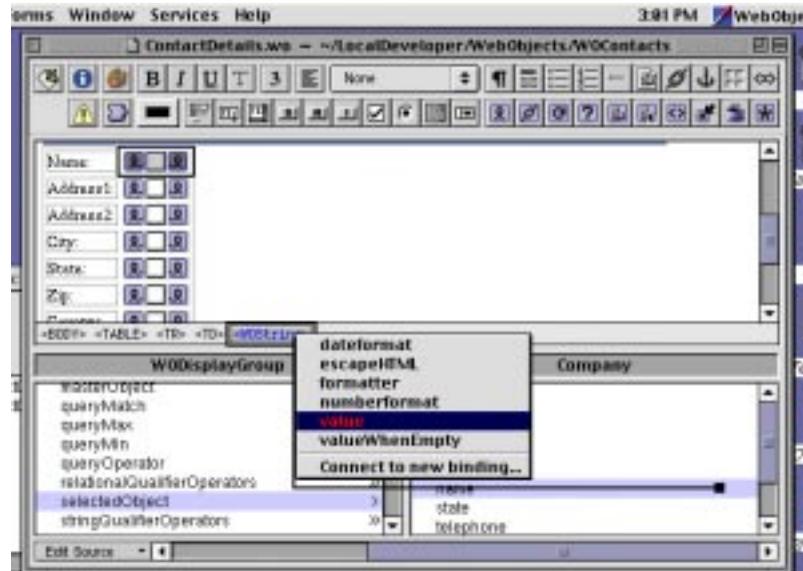


Figure A.123 Making the Company data Value Connections

12. Follow the same steps for all of the company fields. When you are finished, your page should look like [Figure A.124](#).

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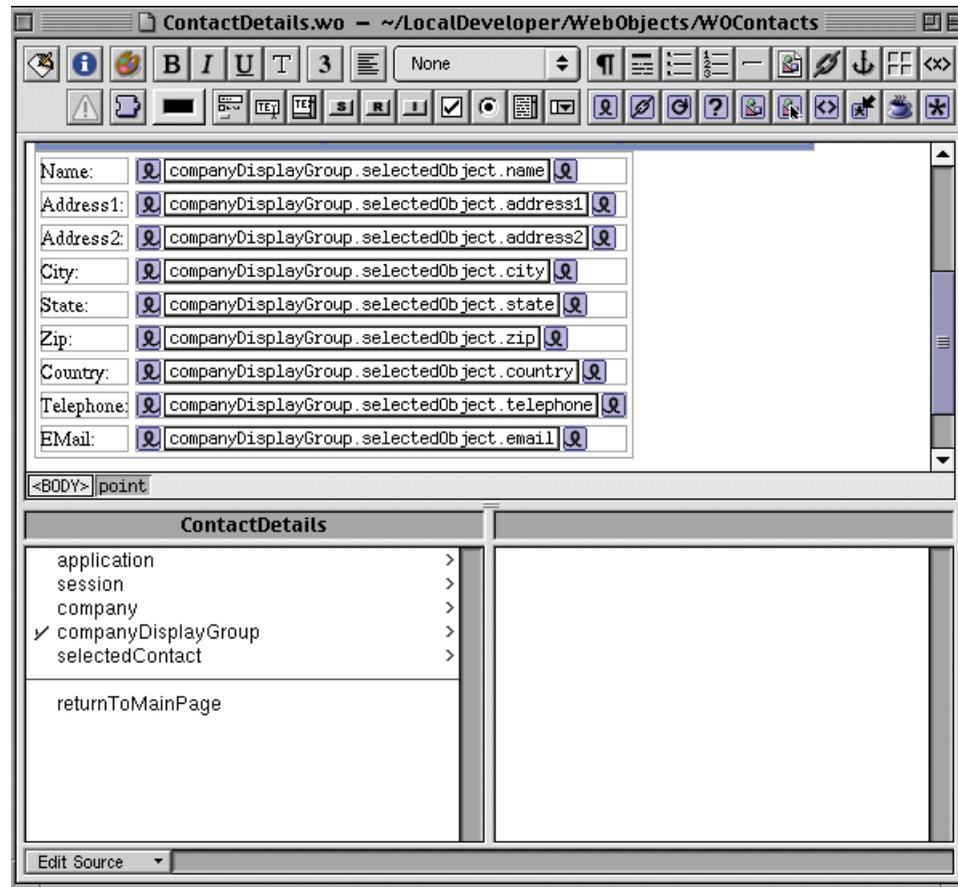


Figure A.124 All Company data Connections Completed

1. Finally if there are more than one company we want to display the details for the selected company. To allow for the selection of a particular company, select the company.name WOString in the table. Choose WebObjects->WOHyperlink from the menu as seen in [Figure A.125](#).

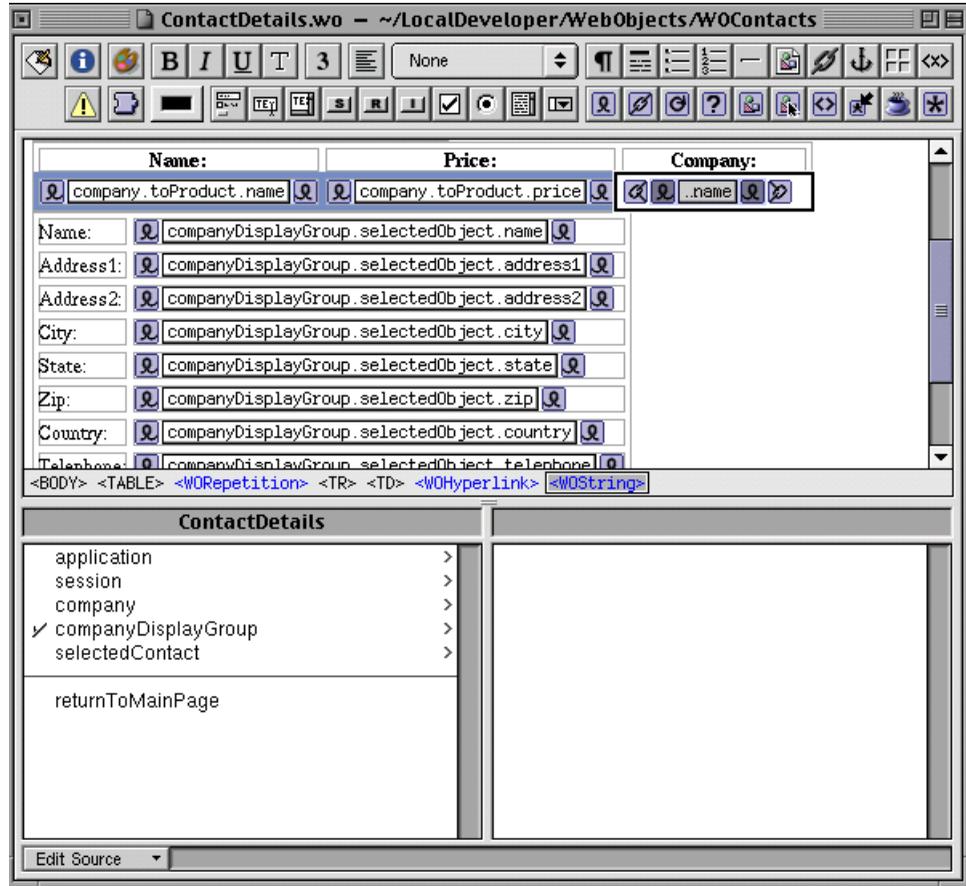


Figure A.125 Adding the Company Hyperlink

2. From the "Edit Source" popup button select View Source, and add the following method:

Listing 0.4 selectObject method

```
public WOComponent selectObject() {  
    companyDisplayGroup.selectObject(company);  
    return null;  
}
```

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3. Now back in the page select the company.name and select the <WOHyperlink> and from the list click on selectObject and drag to the <WOHyperlink> and choose action as seen in [Figure A.126](#).

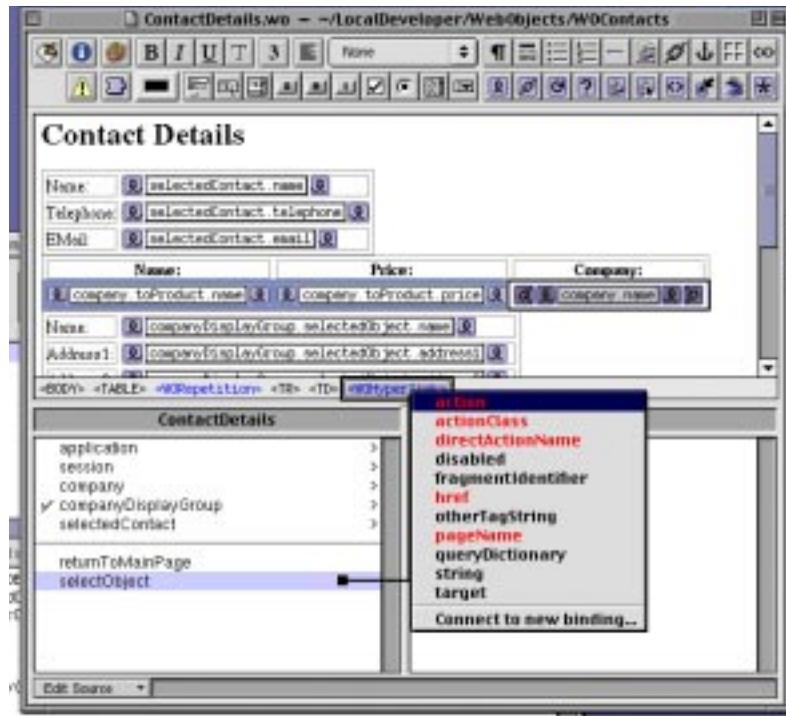


Figure A.126 Adding the Action to the Hyperlink

Passing of Contact Objects

1. Add the following [Listing 0.5](#) displayDetails method to Main.java. This will pass the selected Contact object to the Contact Detail Page.

Listing 0.5 Main.java

```
public ContactDetails displayDetails() {
    ContactDetails nextPage =
(ContactDetails)pageWithName("ContactDetails");
```

```
// Initialize your component here
    EOEnterpriseObject selection =
(EOEnterpriseObject)contactDisplayGroup.selectedObject();
    nextPage.setSelectedContact(selection);

    return nextPage;
}
```

2. Add the following highlighted line of code, see [Listing 0.6](#) to the `selectedContact` method to the `ContactDetails.java`. This will set the contact into the Master Company object.

Listing 0.6 ContactDetails.java

```
public void setSelectedContact(EOEnterpriseObject
newSelectedContact) {
    selectedContact = newSelectedContact;
    companyDisplayGroup.setMasterObject(newSelectedContact);
}
```

Congratulations, you have completed your first WebObjects application using FrontBase as your database. In the next section you are going to build and run your application.

Running the WOContacts Application

Building the Application

1. From the ProjectBuilder window, you will see the "Hammer" button as in [Figure A.127](#).

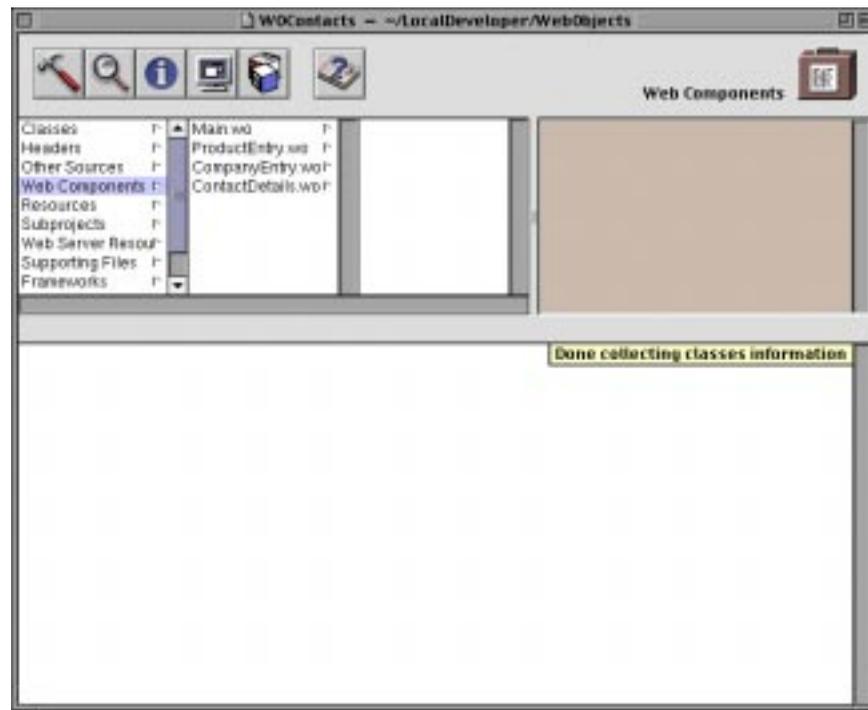


Figure A.127 The Hammer Button

2. Click on the "Hammer" button to bring up ProjectBuilder's Build Panel as seen in [Figure A.128](#).

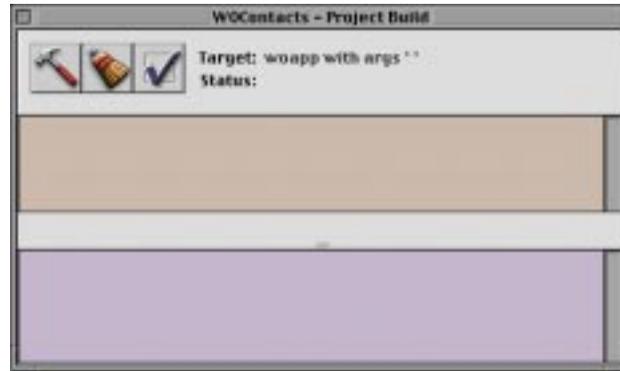


Figure A.128 The Build Panel

3. Click on the "Hammer" button from this window and you will start the application building process. When the project has completed building you will see [Figure A.129](#).

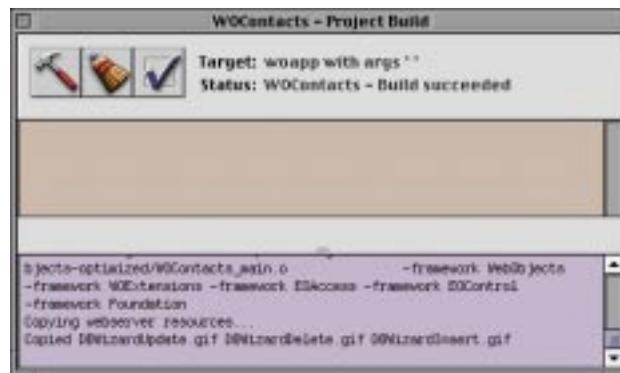


Figure A.129 A Successful Build

Running the Application

1. Back in ProjectBuilder's window, you will see an "Terminal" button. Click on this and you will bring up the Launch window. Click on the "Terminal" button in this panel and your web application will launch and bring up your web browser with your Main.wo page. See [Figure A.130](#).

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Running the WOContacts Application

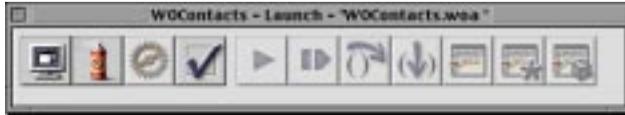


Figure A.130 The Launch Panel

Adding Contacts

1. Click on the Insert/New Button and enter a new contact, and then click on the Save to Database as seen in [Figure A.131](#).

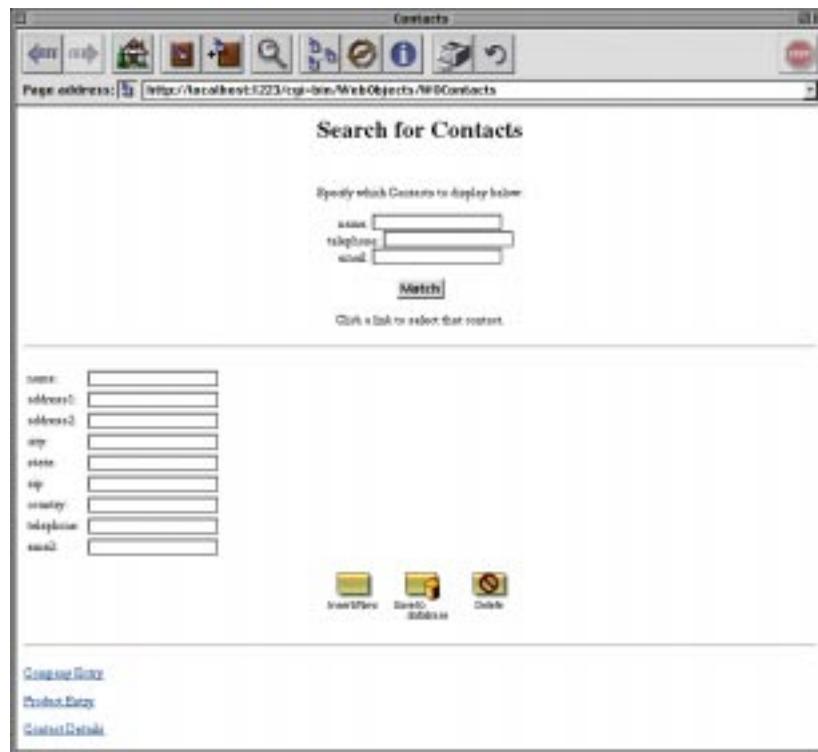


Figure A.131 Add a New Contact

2. Add one more contact as seen in [Figure A.132](#). After saving to the database, clicking on the telephone hypertext fields will bring up the entered information for each contact.

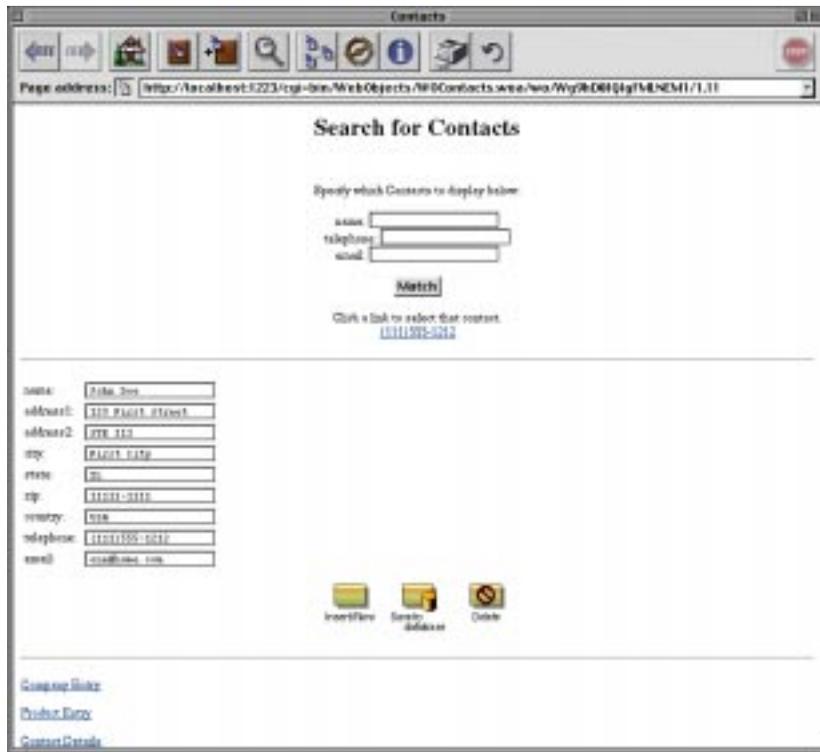


Figure A.132 Displaying the Entered Contacts

Adding Products

1. Now click on the Product Entry hyperlink and enter two products as you entered two contacts. Remember, click Insert/New and enter the information. Then click Save to database as seen in [Figure A.133](#).

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Running the WOContacts Application



Figure A.133 Saving the Products

2. From the Product Entry page, click on the Main Page hyperlink to return you to the Contact Entry page. In the Contact Entry page click on the Match button to bring up your contact list and select your second contact from the telephone hyperlink as seen in [Figure A.134](#).

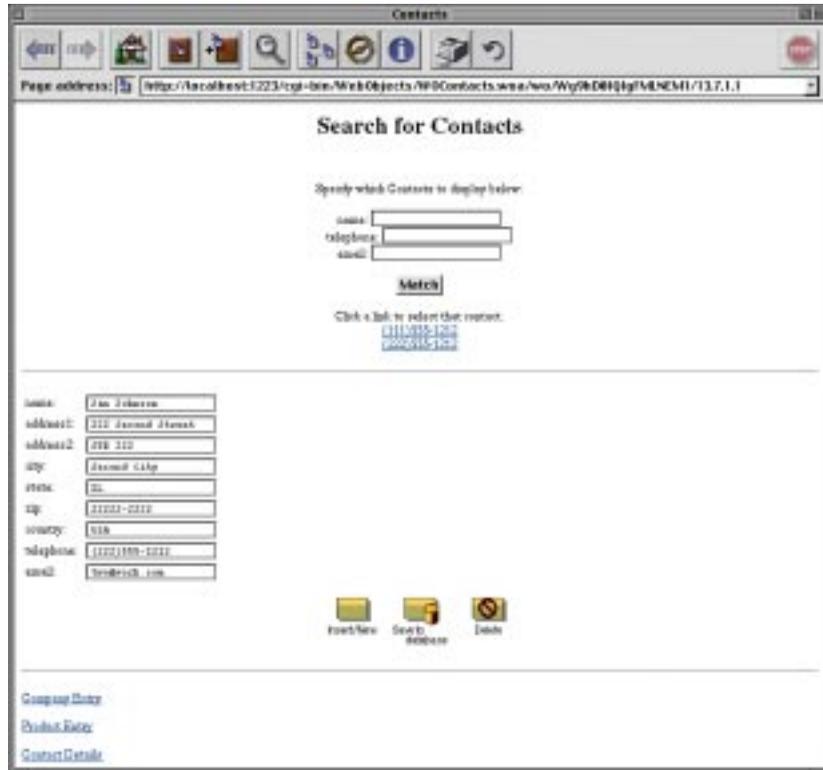


Figure A.134 Selecting a Contact

Adding Companies

1. Now click on Company Entry hyperlink to enter two Companies. To enter the company information you will have to first select a contact name. Next, select a product name as seen in [Figure A.135](#).

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Running the WOContacts Application

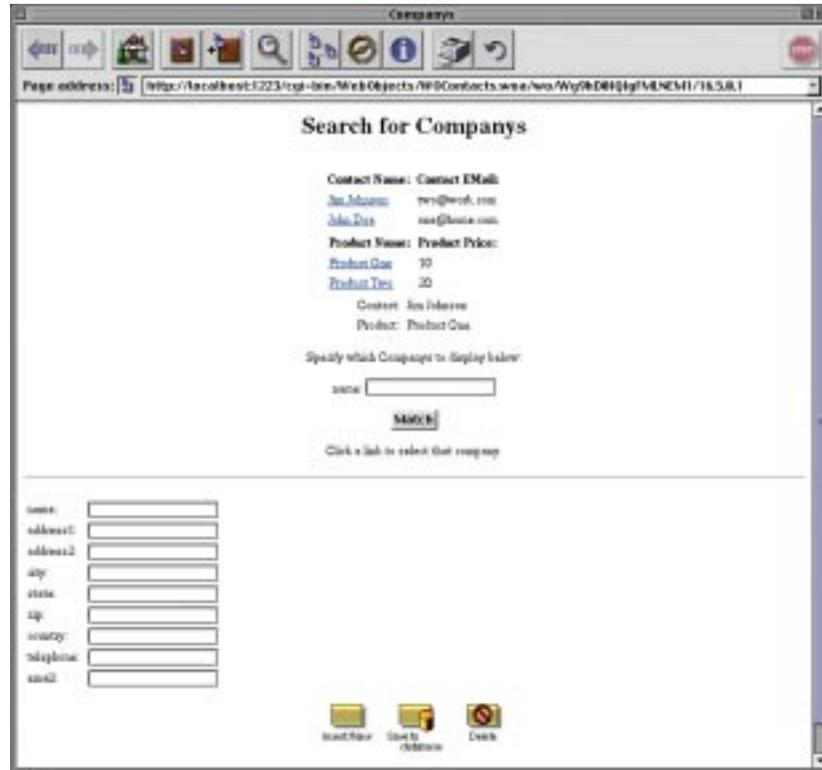


Figure A.135 Adding the Company

2. To enter the company will now be the same as all the other entry steps. Click on the Insert/New, enter the information then click on the Save to Database. Using these steps, enter Three Companies as seen in [Figure A.136](#).

NOTE: Remember to select a different Contact and Product **BEFORE** clicking the Insert/New button and entering the information then clicking the Save to Database button.

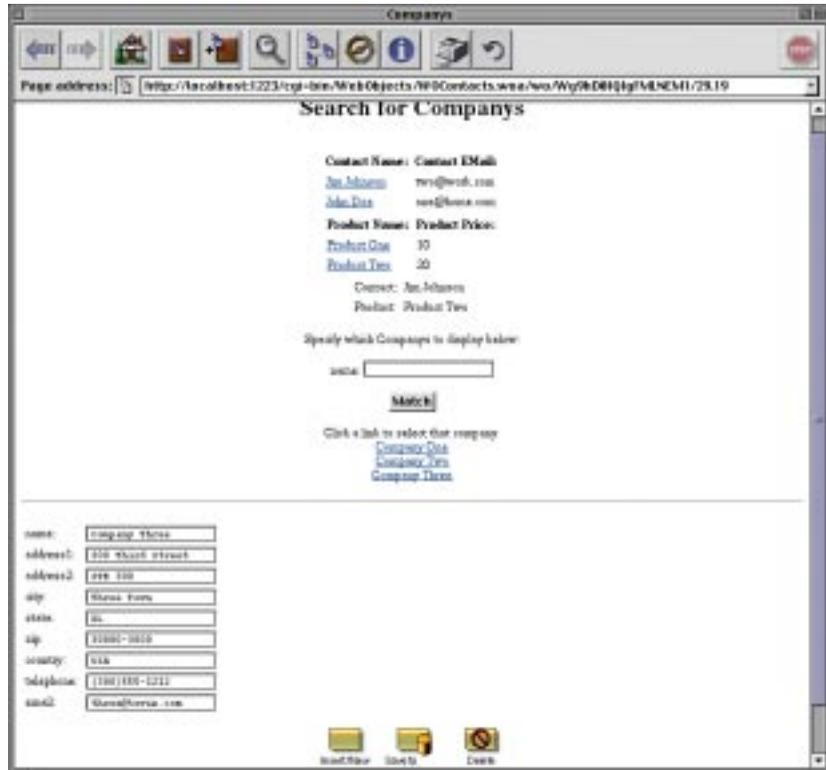


Figure A.136 Saving the Company

Displaying Company Details

1. With the entry completed, click on the Main Page hyperlink to return to the main Contact Entry page. At the Main page click on the "Match" button and choose a Contact, then click on the Contact Details page.

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2. From the Contact Details page, the First Company is displayed [Figure A.137](#). Click on your second company in the list and you will see that company's information listed as seen in [Figure A.138](#).

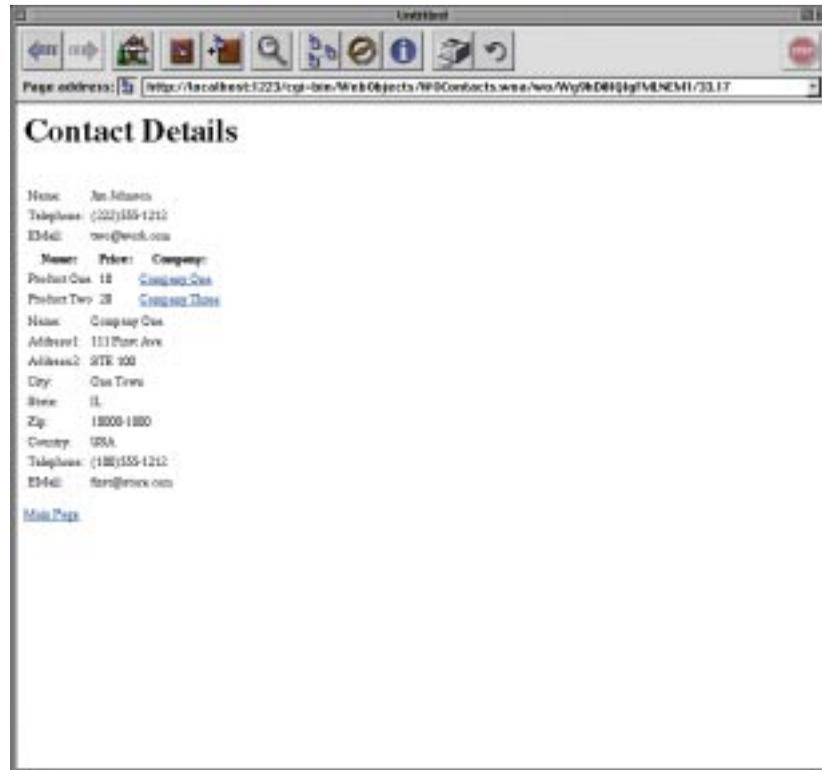


Figure A.137 Displaying the First Contact Detail Entry

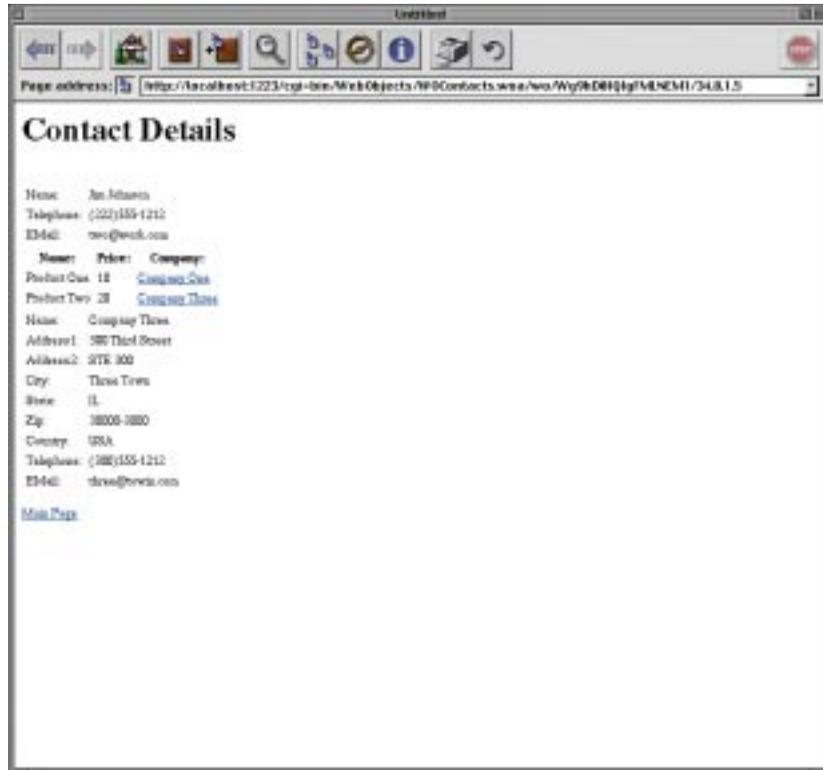


Figure A.138 **Displaying the Second Contact Detail Entry**

Congratulations, you have completed this exercise. While this is not a ready-for-primetime application, that would include page formatting and error checking, it demonstrates how the WebObjects framework was able to integrate with the FrontBase database framework with relative ease.

Summary

It cannot be overlooked what the database has stored for this application. There are three tables; Contact, Company and Product, all with relationships to each other that are resolved on the Contact Details page. This is quite an accomplishment for a web based application.

I hope this exercise has offered some insight into web based database applications. As always, if you have any questions please visit the FrontBase website at www.frontbase.com, for further information, support or to download your FREE copy of FrontBase and license string.

From all of us at FrontBase, Thank You for taking time to read/develop the steps to build this application.

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