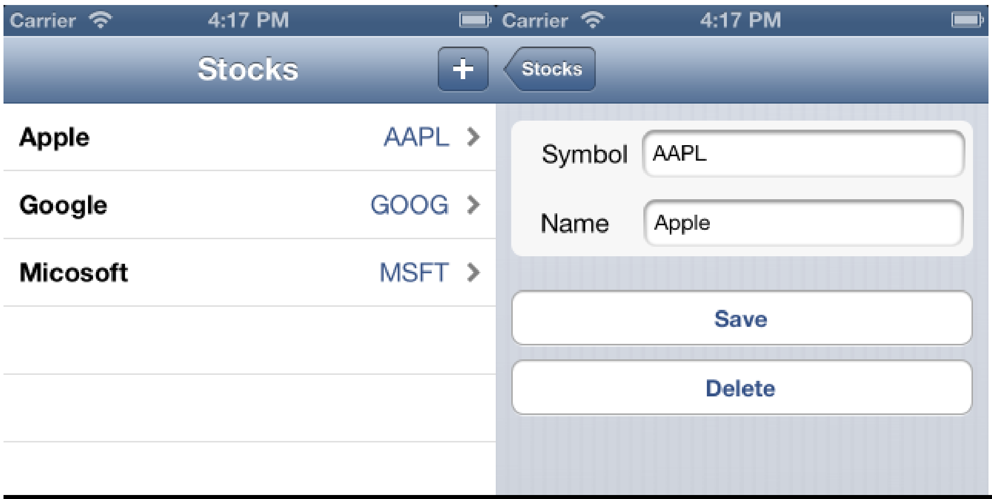
Part 5 - Using Data in an App

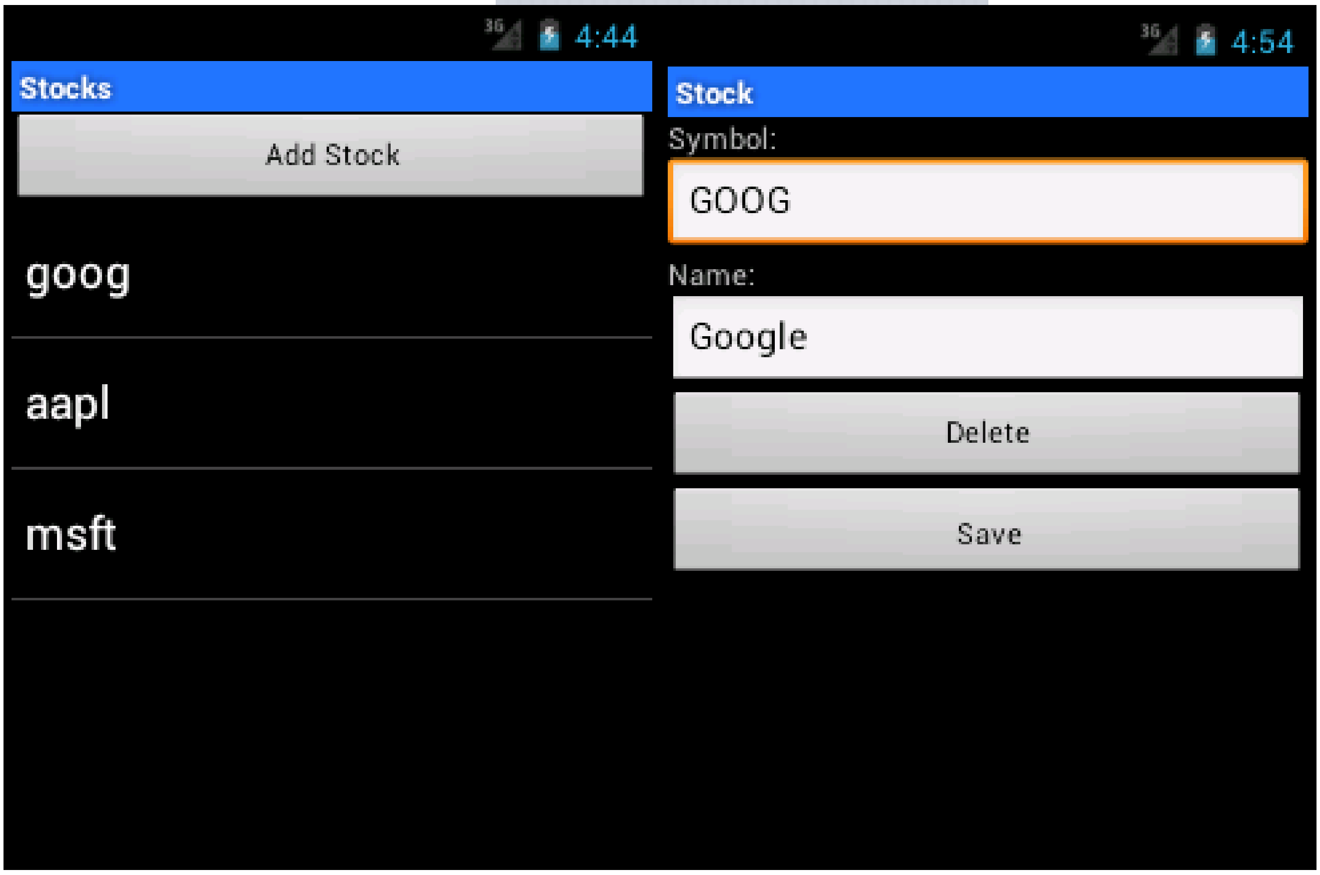
The DataAccess_Adv sample shows a working application that allows user-input and CRUD (Create, Read, Update and Delete) database functionality. The application consists of two screens: a list and a data entry form. All the data access code is re-usable in iOS and Android without modification.

After adding some data the application screens look like this on iOS and Android respectively:



Apple AAPL
Google GOOG
Micosoft MSFT

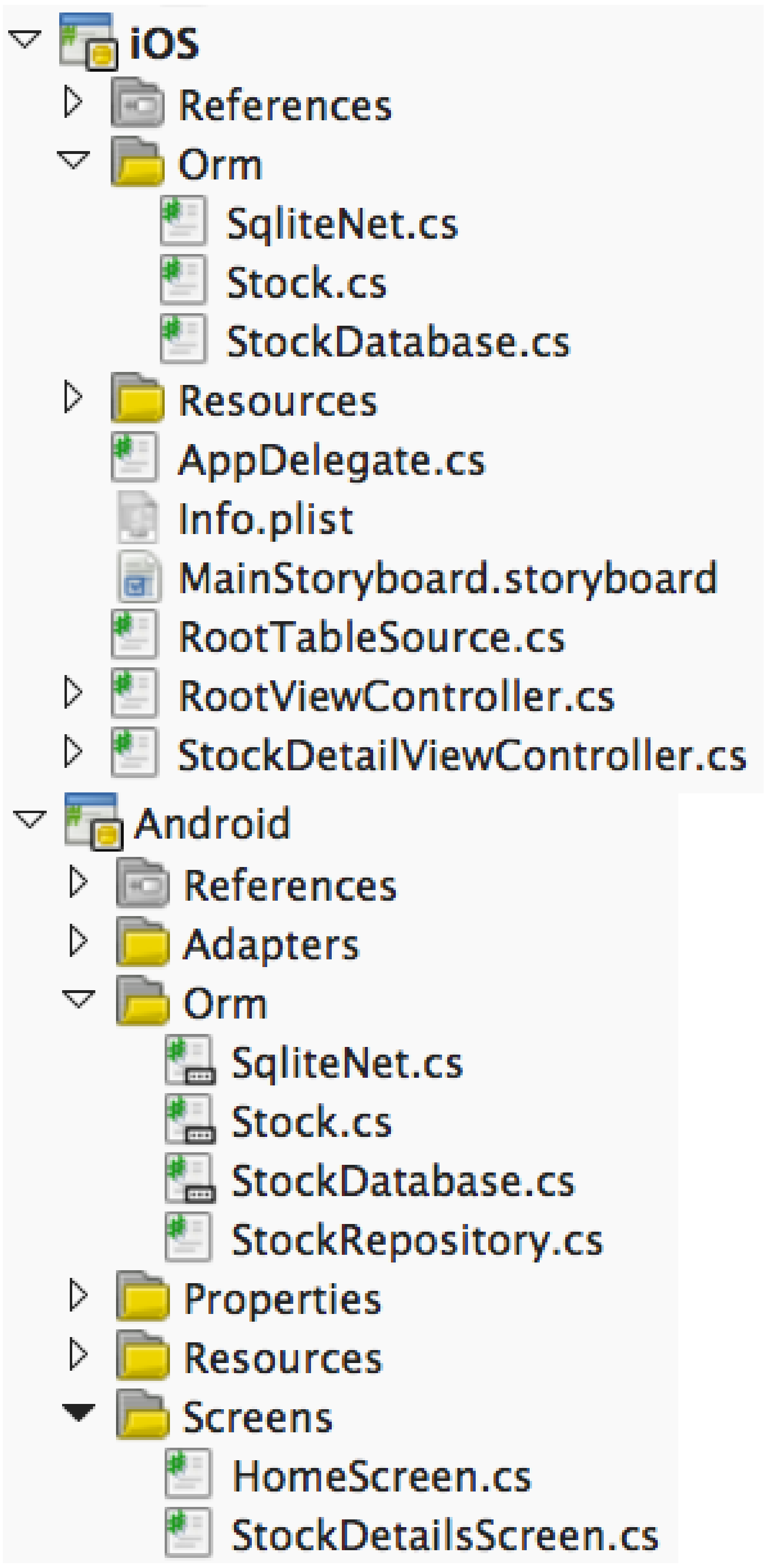
Symbol AAPL
Name Apple



goog
aapl
msft

Symbol: GOOG
Name: Google

The projects are shown below – the contents of the Orm directory are identical on each platform (except for the StockRepository in Android). It is the code in these files that is shown in this section.



```
iOS
    References
    Orm
        SqliteNet.cs
        Stock.cs
        StockDatabase.cs
    Resources
    AppDelegate.cs
    Info.plist
    MainStoryboard.storyboard
    RootTableSource.cs
    RootViewController.cs
    StockDetailViewController.cs
Android
    References
    Adapters
    Orm
        SqliteNet.cs
        Stock.cs
        StockDatabase.cs
        StockRepository.cs
    Properties
    Resources
    Screens
        HomeScreen.cs
        StockDetailsScreen.cs
```

The native UI code (for the ViewControllers and Activities in iOS and Android respectively) is out of scope for this document. Refer to the iOS Working with Tables and Cells and the Android ListViews and Adapters documents for more information on the UI controls.

Read

There are a couple of read operations in the sample:

- Reading the list
- Reading individual records

The two methods in the StockDatabase class are:

`public IEnumerable`

Each platform renders the data differently: iOS uses a UITableView and Android uses a ListView.

Create and Update

To simplify the application code, a single save method is provided that does an Insert or Update depending on whether the PrimaryKey has been set. Because the Id property is marked with a [PrimaryKey] attribute you should not set it in your code. This method will detect whether the value has been previous saved (by checking the primary key property) and either insert or update the object accordingly:

`public int SaveStock (Stock item) { lock (locker) { if (item.Id != 0) { Update (item); return item.Id; } else { return Insert (item); } } }` Real world applications will usually require some validation (such as required fields, minimum lengths or other business rules). Good cross-platform applications implement as much of the validation logical as possible in shared code, passing validation errors back up to the UI for display according to the platform's capabilities.

Delete

Unlike the `Insert` and `Update` methods, the `Delete` method can accept just the primary key value rather than a complete `Stock` object. In this example a `Stock` object is passed into the method but only the Id property is passed on to the `Delete` method.

`public int DeleteStock(Stock stock) { lock (locker) { return Delete`

Using a pre-populated seed SQLite database file

Some applications are shipped with a database already populated with data. You can easily accomplish this in your mobile application by shipping an existing SQLite database file with your app and copying it to a writable directory before accessing it. Because SQLite is a standard file format that is used on many platforms, there are a number of tools available to create an SQLite database file:

- **MonoDevelop** – From the Tools > Database menu you can create or open SQLite files.
- **SQLite Manager Firefox Extension** – Works on Mac and Windows and produces files that are compatible with iOS and Android.
- **Command Line** – See www.sqlite.org/sqlite.html.

When creating a database file for distribution with your app, take care with the naming of tables and columns to ensure they match what your code expects, especially if you're using SQLite.NET which will expect the names to match your C# classes and properties (or the associated custom attributes).

iOS

For iOS, include the sqlite file in your application and ensure it is marked with Build Action: Content. Place the code in the FinishedLaunching to copy the file to a writable directory *before* you call any data methods. The following code will copy an existing database called data.sqlite, only if it doesn't already exist.

```
// Copy the database across (if it doesn't exist) var appdir = NSBundle.MainBundle.ResourcePath;
var seedFile = Path.Combine (appdir, "data.sqlite"); if (!File.Exists (Database.DatabaseFilePath))
File.Copy (seedFile, Database.DatabaseFilePath);
```

Any data access code (whether ADO.NET or using SQLite.NET) that executes after this has completed will have access to the prepopulated data.

Android

To ensure that some code runs before anything else in your Android app, you can place it in the first Activity to load or you can create an Application subclass that is loaded before any activities. The same below shows an Application subclass that copies an existing database file *data.sqlite* out of the **/Resources/Raw/** directory.

```
[Application] public class YourAndroidApp : Application { public override void OnCreate () {
base.OnCreate (); var docFolder = Environment.GetFolderPath(Environment.SpecialFolder.Personal);
Console.WriteLine ("Data path:" + Database.DatabaseFilePath); var dbFile = Path.Combine(docFolder,
"data.sqlite"); // FILE NAME TO USE WHEN COPIED if (!System.IO.File.Exists(dbFile)) { var s =
Resources.OpenRawResource(Resource.Raw.data); // DATA FILE RESOURCE ID FileStream writeStream = new
FileStream(dbFile, FileMode.OpenOrCreate, FileAccess.Write); ReadWriteStream(s, writeStream); } }
// readStream is the stream you need to read // writeStream is the stream you want to write to
private void ReadWriteStream(Stream readStream, Stream writeStream) { int Length = 256; Byte[]
buffer = new Byte[Length]; int bytesRead = readStream.Read(buffer, 0, Length); // write the
required bytes while (bytesRead > 0) { writeStream.Write(buffer, 0, bytesRead); bytesRead =
readStream.Read(buffer, 0, Length); } readStream.Close(); writeStream.Close(); } }
```