

# Crystal Reports

## Creating Crystal Reports User Function Libraries (UFLs) in Delphi

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### Overview

This document describes how to create a Crystal User Function Library (UFL) DLL in Delphi 3 or higher. User Function Libraries can be used to create customized functions in formulas for the Seagate Crystal Reports formula language.

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## Introduction

Version 3.0 or higher of Delphi is required to create automation servers containing User Defined Functions. There are six primary steps to creating User Defined Functions in an automation server in Delphi:

1. Create the Project
2. Create the Automation Object
3. Add Methods to the Type Library
4. Register the Type Library
5. Create the User-Defined Functions
6. Build the Project

## Create the Project

When Delphi first opens, it creates a default project and form for you.

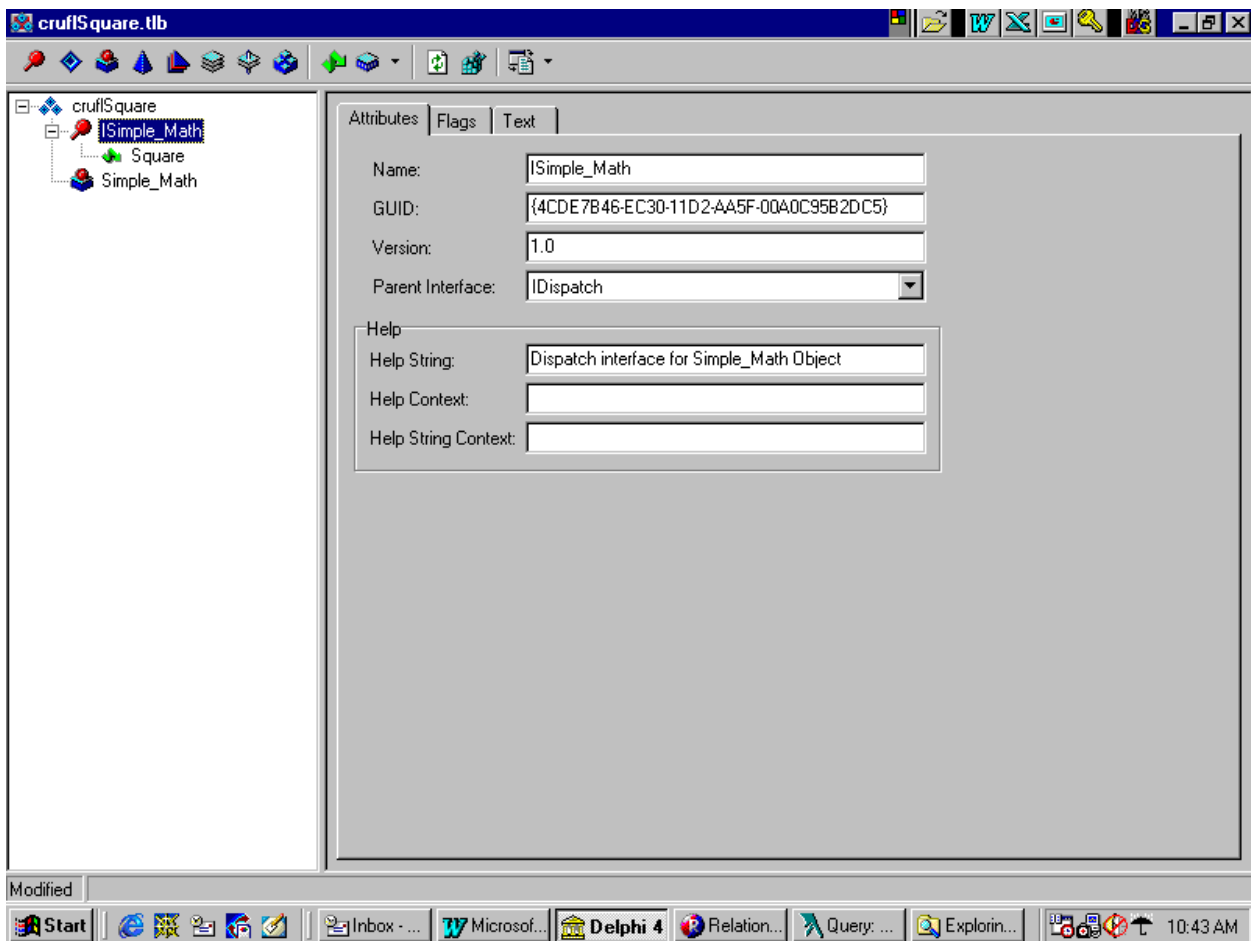
1. Choose the New command from the File menu.
2. Click the ActiveX Tab in the New Items dialog box, and double-click the ActiveX Library icon. Delphi creates a default ActiveX Library for you.
3. The U2LCOM.DLL UFL will only read functions exposed by Automation Servers named with a CRUFL prefix. For example, CRUFLMyFunctions is a valid project name for your Automation Server. Choose the Save Project As command from the File menu, and save your Delphi project. The project should be named CRUFLxxx.DPR, where xxx is a name of your choice.

## Create the Automation Object

1. Choose the New command from the File menu again.
2. Click the ActiveX Tab in the New Items dialog box, and double-click the Automation Object icon. The Automation Object Wizard appears.
3. Enter a class name appropriate to the functions you will create. Make sure Instancing is set to Multiple Instance, and click OK. The Type Library Editor appears.
4. Make sure the name of the type library for your project matches the project name you created earlier. If not, change the name of the type library to CRUFLxxx, where xxx is the name you chose.

## Add Methods to the Type Library

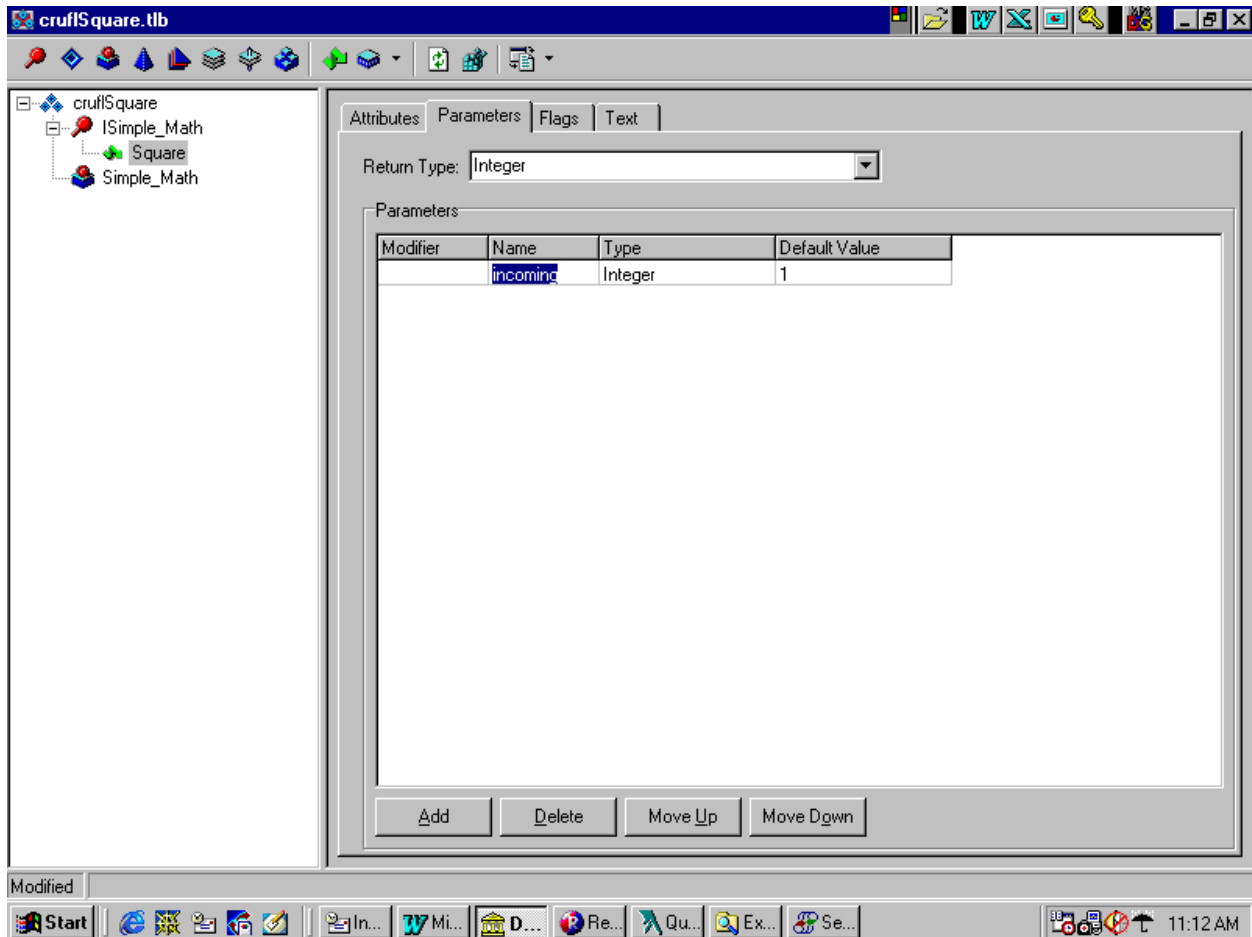
1. The methods in the class you specified when you created the type library will become User Defined Functions that appear in the Seagate Crystal Reports Formula Editor.
2. Right-click the interface for your type library (in the Object list (left) pane of the Type Library Editor). The interface name is identical to the class name you specified preceded by an I (refer to image below).
3. Choose New from the menu that appears, and choose Method. A new method appears below the interface in the Object list pane. In the image below (Delphi 4), the Square method has just been created off the ISimple\_Math interface:



4. Name the method according to the function you want to create.
5. If you are using Delphi 3: On the Attributes Tab for the method, declare your function. For example:

```
function Square (Number: double): double;
```

6. If you are using Delphi 4: The method name should appear on the Attributes tab. Click the Parameters tab. This is where you can set the return type of the method and where you will add the parameters of the method. To add a parameter, click the Add button and specify at least a name and type for the parameter (refer to image below).



For complete information on how to declare functions in Delphi, refer to your Delphi documentation. The U2LCOM.DLL UFL supports most standard Delphi data types and arrays. For complete information on how the Seagate Crystal Reports Formula Editor interprets Delphi data types and arrays, see the Delphi and Seagate Crystal Reports Data Types section below.

Continue creating methods for all User Defined Functions you want to appear in the Seagate Crystal Reports Formula Editor.

## Register the Type Library

Click the Register Type Library toolbar button in the Type Library Editor. Delphi creates your type library and registers it on your system. A message should appear indicating that the ActiveX Automation server was successfully registered. Click OK on the message box. If the type library is not registered successfully on your system, recreate the type library and object methods over again. If you continue to have problems, refer to your Delphi documentation on creating type libraries.

## Create the User-Defined Functions

Minimize the Type Library Editor, and locate the declaration of the method you created for your type library in the Unit1.pas unit.

Enter code for the function as desired. For example if you created a method called Square in the Type Library Editor, then your code could look like this (note that the function header, begin, and end statements should already be created for you):

```
function TSimple_Math.Square(incoming: Double): Double;  
  
begin  
  
    result := Number * Number;  
  
end;
```

(note that the function declaration, begin, and end statements should be already created for you):

Continue coding all methods that you declared for the interface.

## Build the Project

Save all files in your project, and choose Build All from the Project menu. Delphi builds your automation server, and the methods you declared are now available from the Seagate Crystal Reports Formula Editor.

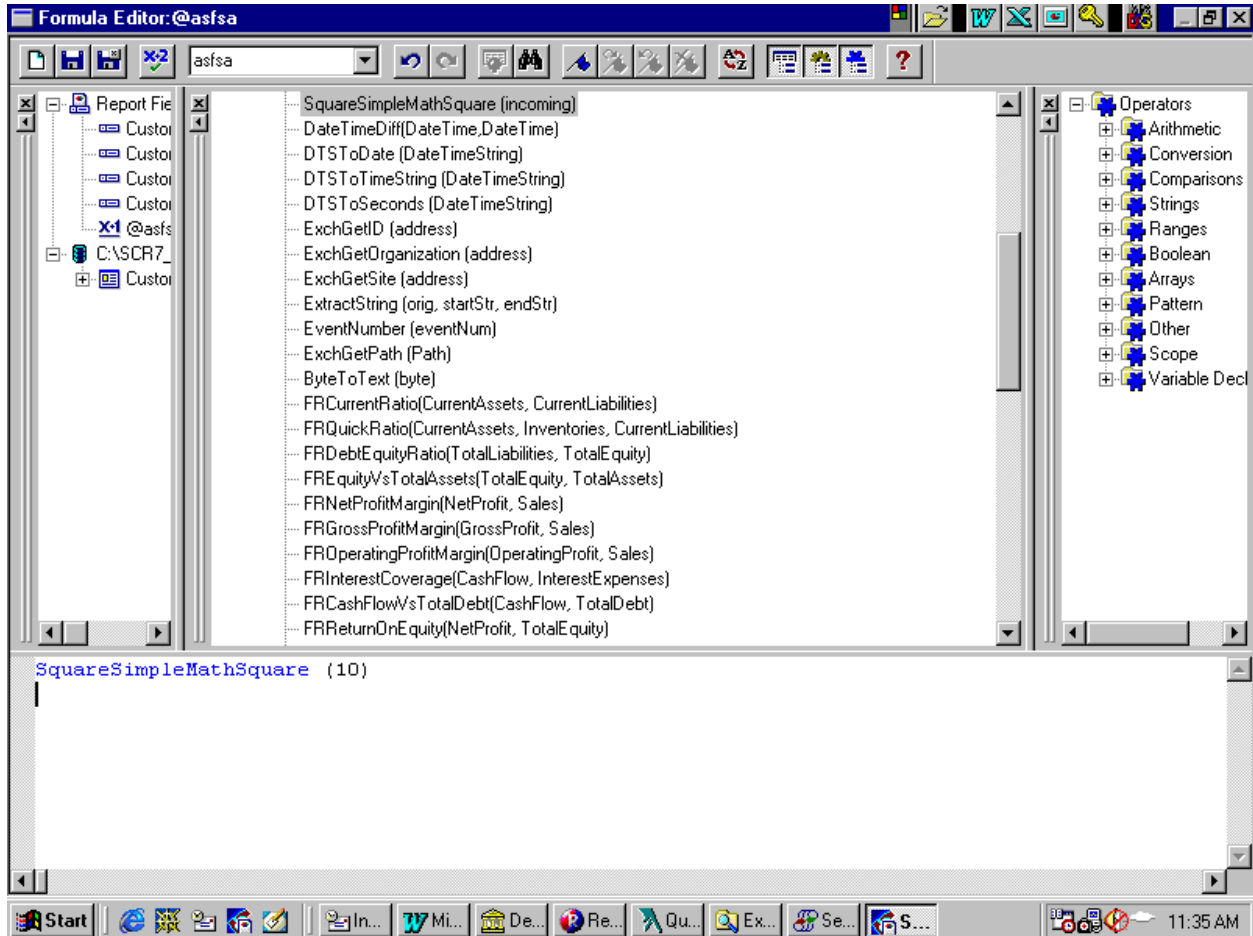
Important Note:

Generally the function should appear under the “Additional Functions” section in the Formula Editor’s function list (although it may appear in another section). The name of the function however may not be the method name created in Delphi. For example, from the sample code above, the Square function appeared in the Crystal Formula Editor as:

SquareConversionSquare (number)

with the class name (Conversion) appearing surrounded by the method name (which appears twice).

Here is how the function appears in the Formula Editor (highlighted in gray):



## Delphi and Seagate Crystal Reports Data Types

Seagate Crystal Reports will support most common Delphi data types provided through a User-Defined Function developed in Delphi 3.0. With Delphi 4.0 there are slight changes, for example instead of String type it is a WideString. The following table shows how Seagate Crystal Reports converts the most common Delphi data types to data types supported by the Formula Editor:

Delphi Type	Crystal Type	
ShortInt	NumberVarInteger	NumberVar
LongInt	NumberVar	
Real	NumberVarSingle	NumberVar
Double	NumberVar	

Currency	CurrencyVar
Date	DateVar
Boolean	BooleanVar
String	StringVar

## Contacting Crystal Decisions for Technical Support

We recommend that you refer to the product documentation and that you visit our Technical Support web site for more resources.

**Self-serve Support:**

<http://support.crystaldecisions.com/>

**Email Support:**

<http://support.crystaldecisions.com/support/answers.asp>

**Telephone Support:**

<http://www.crystaldecisions.com/contact/support.asp>