JADE Interfaces

Version 2018

Contents

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Introduction

An interface is a mechanism that provides a set of methods guaranteed to be available on any implementing class. When a class implements an interface, it agrees to implement all methods defined by the interface. With this contract in place, the implementing classes can participate in useful type-safe callback mechanisms.

Exposing a class via its interface effectively hides the implementation details of the class, as the user is forced to communicate only through the public interface methods.

Classes that implement an interface can be grouped by that interface type; for example, a collection can have a membership of a specified interface.

Using interfaces, non-related classes can be grouped to capture their similarities, without the need to artificially force a class relationship. Think of this as allowing a class to perform multiple roles outside of the role dictated by its class hierarchy.

Tip Interfaces are a useful way to group classes by behavior.

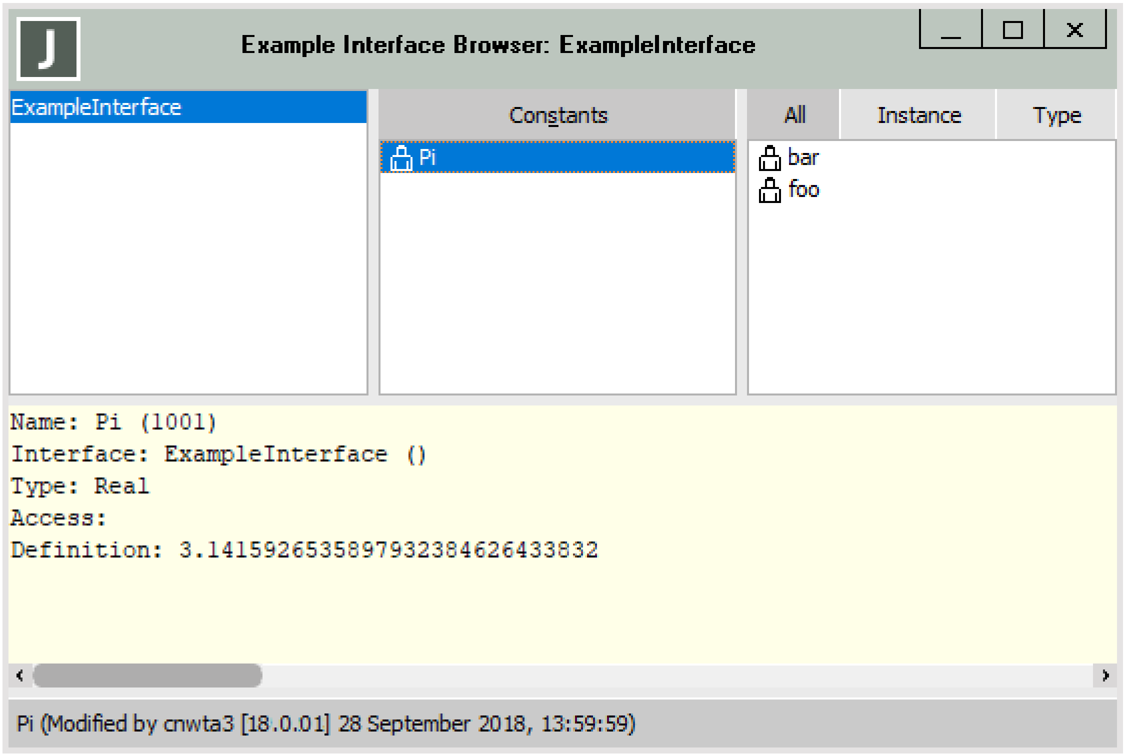
The Interface Browser

JADE allows for the defining of interfaces through the **Interface Browser**, in which you can specify the required methods and constants.

The following actions open the Interface Browser.

- Clicking on the **Browse Interfaces** icon in the browser toolbar.
- Selecting the **Interfaces** command from the Browse menu.
- Pressing Ctrl+N.

An Interface Browser is then opened for the selected schema.



```
Name: Pi (1001)
Interface: ExampleInterface ()
Type: Real
Access:
Definition: 3.14159265358979323846264338 32
```

Pi (Modified by cnwta3 [18.0.01] 28 September 2018, 13:59:59)

The pane at the upper left contains a list of all interfaces defined for the selected schema, the middle pane displays any constants defined for the selected interface, and the pane at the upper right displays the required methods of the selected interface.

Although you may notice that the Interface Browser is similar to the Class Browser, note the following differences.

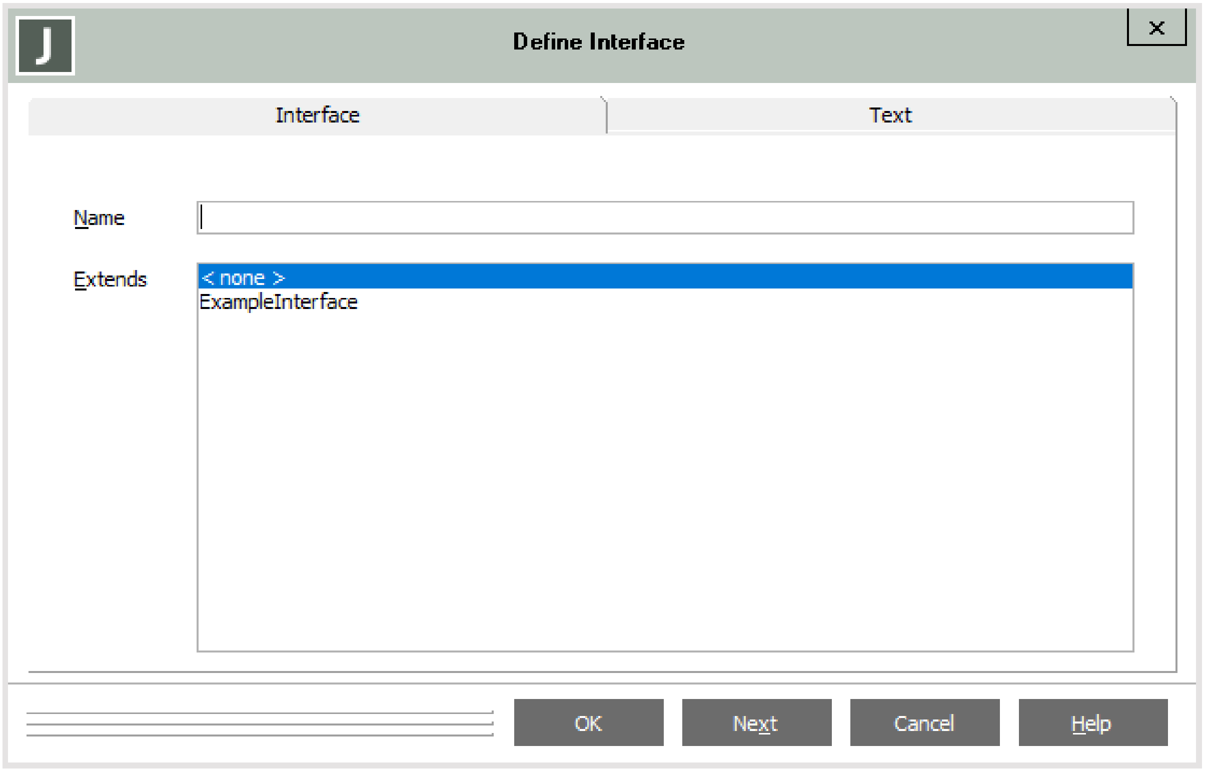
- Interfaces can define constants and methods only.
- Interface methods contain only the method signature; they do not have any implementation.
- Interfaces are always displayed in alphabetical order, with a flat (rather than nested) structure.
- While classes can extend a single superclass only, interfaces can extend any number of *other* interfaces.

Defining an Interface

The following actions create a new interface from the Interface Browser.

- Select the **Add** command from the Interfaces menu.
- Right-click in the pane at the upper left and then select the **Add** command from the pop-up (context) menu.

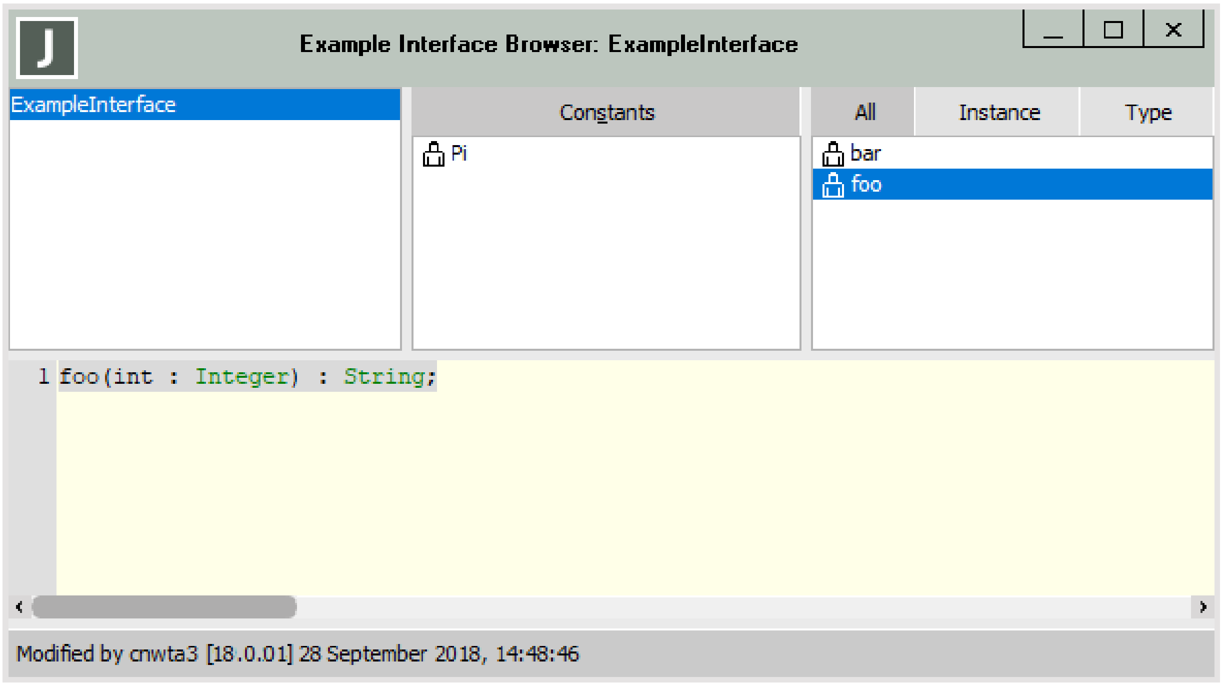
The Define Interface dialog is then displayed.



Enter a unique name for the interface, and whether to extend from one of the existing interfaces. To create the interface, click **Next** to create the interface while keeping the Define Interface dialog open (so that you can create multiple interfaces) or click **OK** to create the interface and close the Define Interface dialog.

Note Most of the normal options for creating a method are disabled for interface methods, because an interface contains the method signatures only. It is up to implementing classes to provide the method sources.

To add parameters or return types to an interface method, select the method in the Interface Browser and then modify the method signature.



```
foo(int : Integer) : String;
```

Modified by cnwta3 [18.0.01] 28 September 2018, 14:48:46

Note Attempting to provide a method body in an interface method will result in a compiler error.

Implementing an Interface

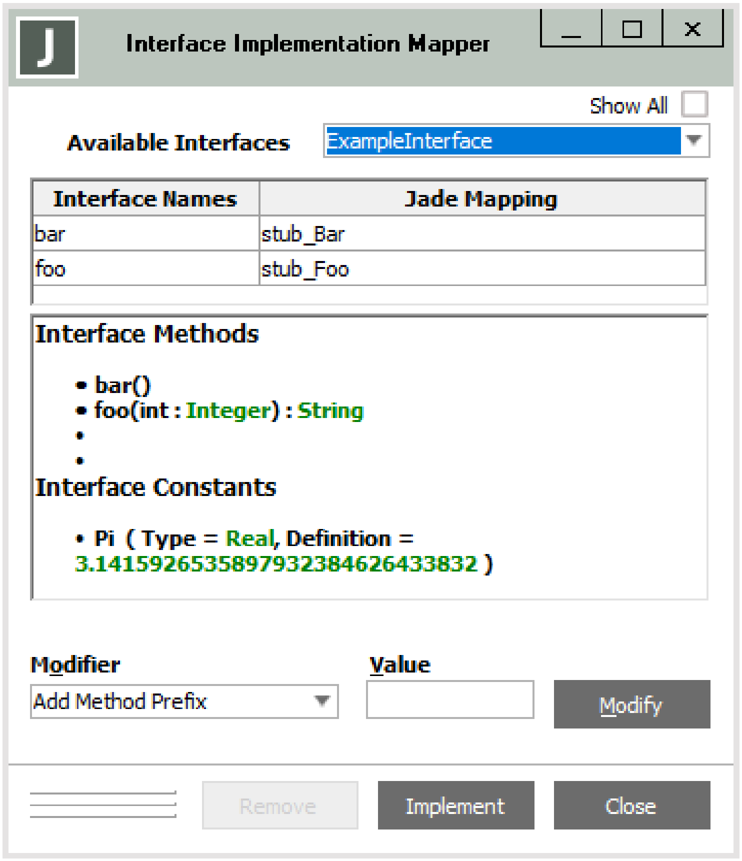
For a class to be able to implement an interface, it must:

- Explicitly indicate that it will provide the specific interface.
- Fulfil all methods of the interface.

To indicate the interfaces a class will implement, select the class in the Class Browser and then open the Interface Implementation Mapper dialog by doing either of the following.

- Selecting the **Interface Mapping** command from the Classes menu.
- Right-clicking the class in the Class Browser and then selecting the **Interface Mapping** command from the popup menu.

To choose an interface to add to the class, select it in the **Available Interfaces** drop-down list box.


Interface Implementation Mapper

Show All

Available Interfaces: ExampleInterface

Interface Names	Jade Mapping
bar	stub_Bar
foo	stub_Foo

Interface Methods

- bar()
- foo(int : Integer) : String
-
-

Interface Constants

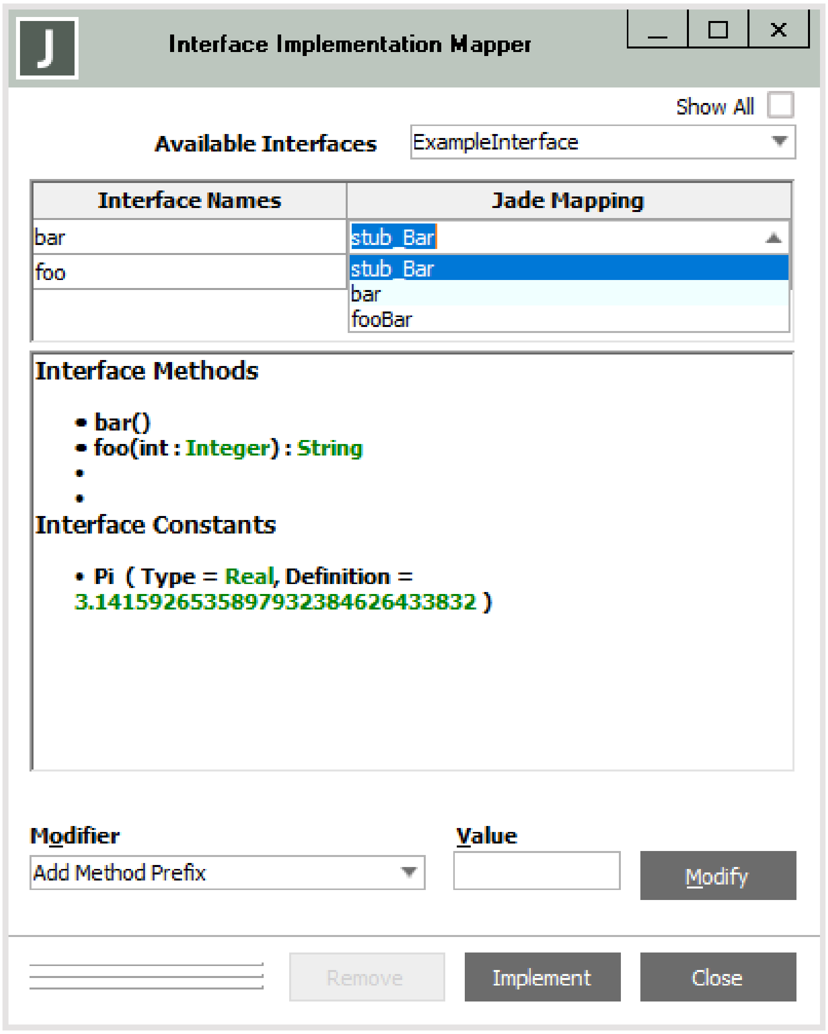
- Pi (Type = Real, Definition = 3.14159265358979323846264338 32)

Modifier: Add Method Prefix

Value:

The details of the interface will be displayed, including the signature of the interface methods and the types and values of the interface constants.

For each of the interface methods, the class must provide an implementation. By default, these will be automatically generated method stubs called **stub_*method-name***. However, you can click on any of these to select an existing method from the class.



ExampleInterface

Interface Names	Jade Mapping
bar	stub_Bar
foo	

stub_Bar
bar
fooBar

Interface Methods

- bar()
- foo(int : Integer) : String

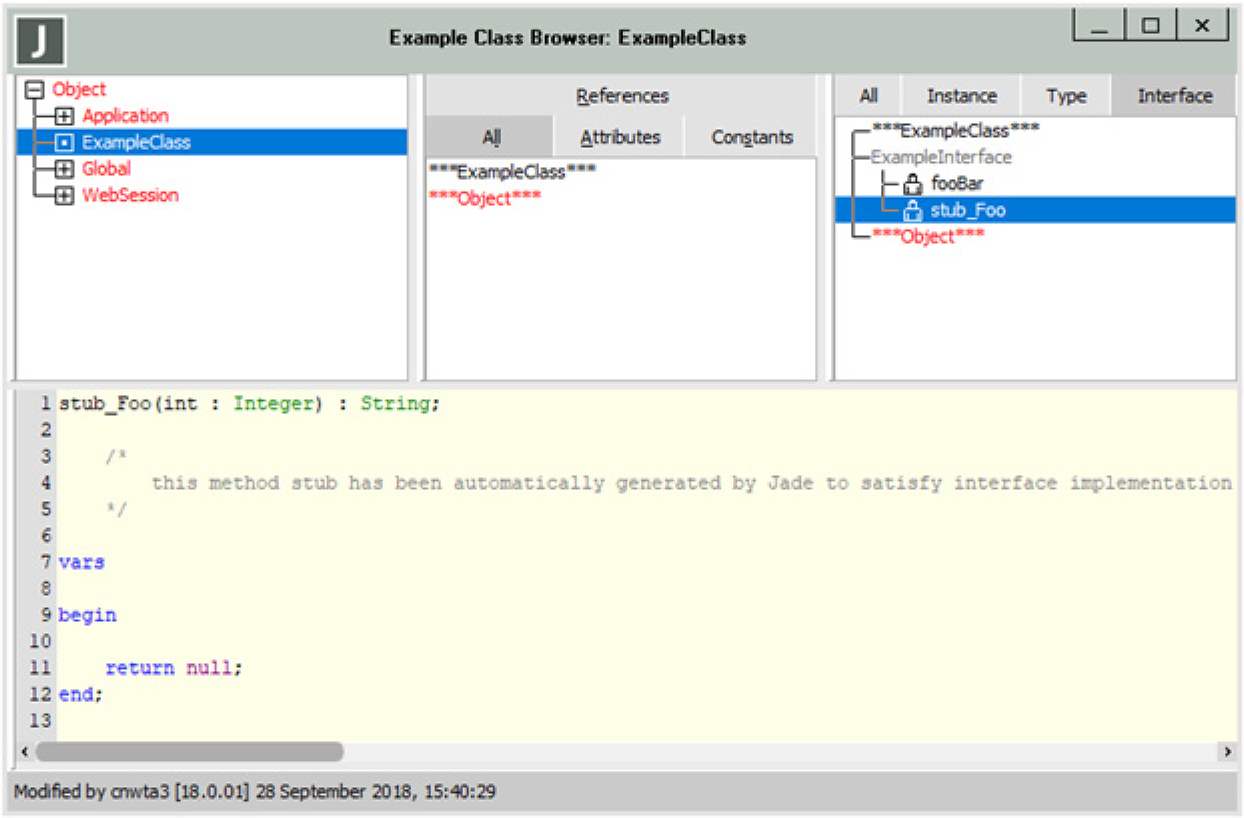
Interface Constants

- Pi (Type = Real, Definition = 3.14159265358979323846264338 32)

Modifier: Add Method Prefix

Note The class method used to implement an interface method does not need to have the same name as the interface method; only the same parameters and return type. A single class method can fulfil the implementation of multiple interface methods if they have compatible method signatures.

To confirm the implementation, click **Implement**. The interface will then be added to the class, and by clicking on the **Interface** tab in the Methods List (the upper right pane) in the Class Browser, you can see the interface methods.



```
stub_Foo(int : Integer) : String;

    /*
        this method stub has been automatically generated by Jade to satisfy interface implementation
    */

vars

begin

    return null;
end;
```

Modified by cnwta3 [18.0.01] 28 September 2018, 15:40:29

Note Any interface method with which no class method was mapped has a stub implementation.

Exercise 1 – Adding the IWithdrawable Interface

In this exercise, you will add an interface to **BankingModelSchema** that provides an alternative to the polymorphism approach used for **Accounts** in Module 9 of the JADE Developer's course.

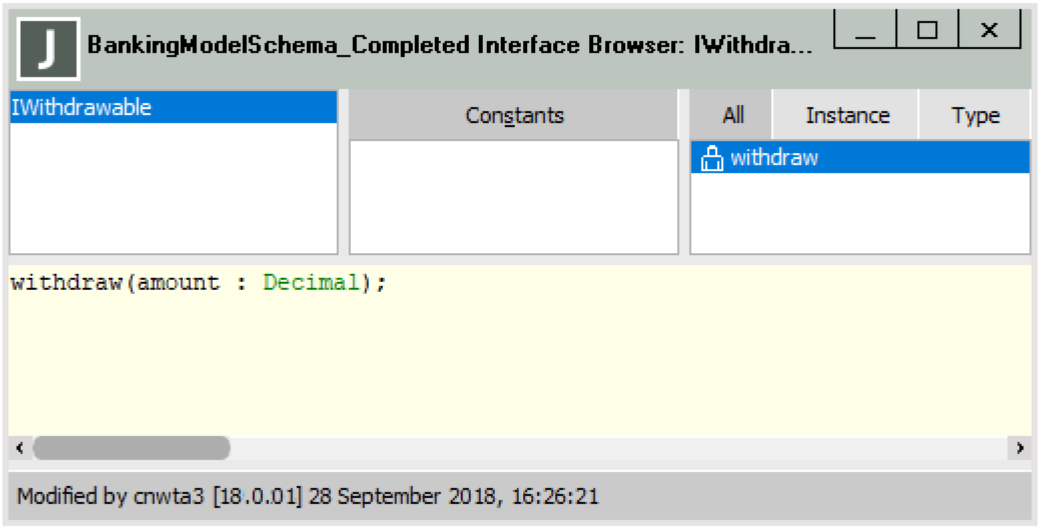
1. Select **BankingModelSchema** in the Schema Browser and then open the Interface Browser.

2. Add a new interface called **IWithdrawable** to the schema.

   Note Interfaces typically have a prefix of **I** or a suffix of **IF**.

3. Add a method called **withdraw** to the **IWithdrawable** interface.

4. Code the **withdraw** method signature, as follows.



```
withdraw(amount : Decimal);
```

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Exercise 2 – Implementing the IWithdrawable Interface

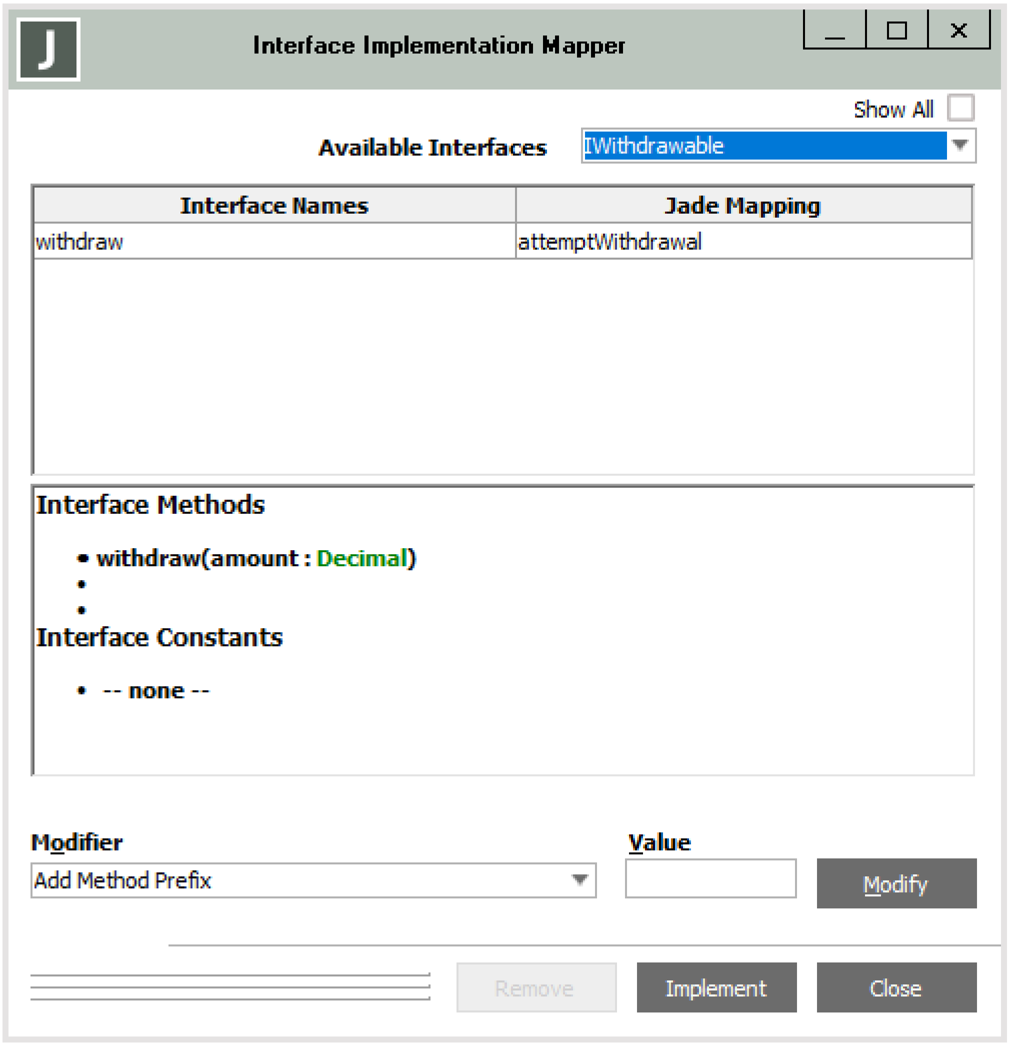
In this exercise, you will implement a variety of methods that all fulfil the **withdraw** interface method in different ways.

1. Add a method called **attemptWithdrawal** to the **ChequeAccount** class and code it as follows.

```
attemptWithdrawal(amount : Decimal) updating;

begin
    write "Cheque Balance: " & self.balance.String;
    write "Overdraft limit: " & self.overdraftLimit.String;
    write "Requested Funds: " & amount.String;
    if amount <= self.balance + self.overdraftLimit then
        beginTransaction;
        self.balance := self.balance - amount;
        commitTransaction;
        write amount.String & " withdrawn successfully.";
        write self.balance.String & " remaining";
    else
        write "Insuffiecent funds: " & (self.balance + self.overdraftLimit).String & " Available";
    endif;
end;
```

2. Select the **ChequeAccount** class in the Class Browser and then open the Interface Implementation Mapper dialog by selecting the **Interface Mapping** command in the Classes menu.



Available Interfaces: IWithdrawable

Interface Names	Jade Mapping
withdraw	attemptWithdrawal

Interface Methods

- withdraw(amount : Decimal)
-
-

Interface Constants

- -- none --

Modifier: Add Method Prefix

Value:

3. Select **IWithdrawable** in the **Available Interfaces** drop-down list box and then enter **attemptWithdrawal** for the **withdraw** method in the **Jade Mapping** column. Click **Implement**, to confirm your action and close the window.

Note While interface methods themselves may not have the **updating** method option, **updating** methods can fulfil interface methods.

4. Add a method called **attemptWithdrawal**, this time to the **SavingsAccount** class, and code it as follows.

```
attemptWithdrawal(amount : Decimal) updating;

begin
    write "Savings Balance: " & self.balance.String;
    write "Requested Funds: " & amount.String;
    if amount <= self.balance then
        beginTransaction;
        self.balance := self.balance - amount;
        commitTransaction;
        write amount.String & " withdrawn successfully.";
        write self.balance.String & " remaining";
    else
        write "Insufficent funds: " & (self.balance).String & " remaining";
    endif;
end;
```

5. Select the **SavingsAccount** class in the Class Browser and then open the Interface Implementation Mapper dialog by selecting the **Interface Mapping** command in the Classes menu.

6. Repeat Step 3 of this instruction.

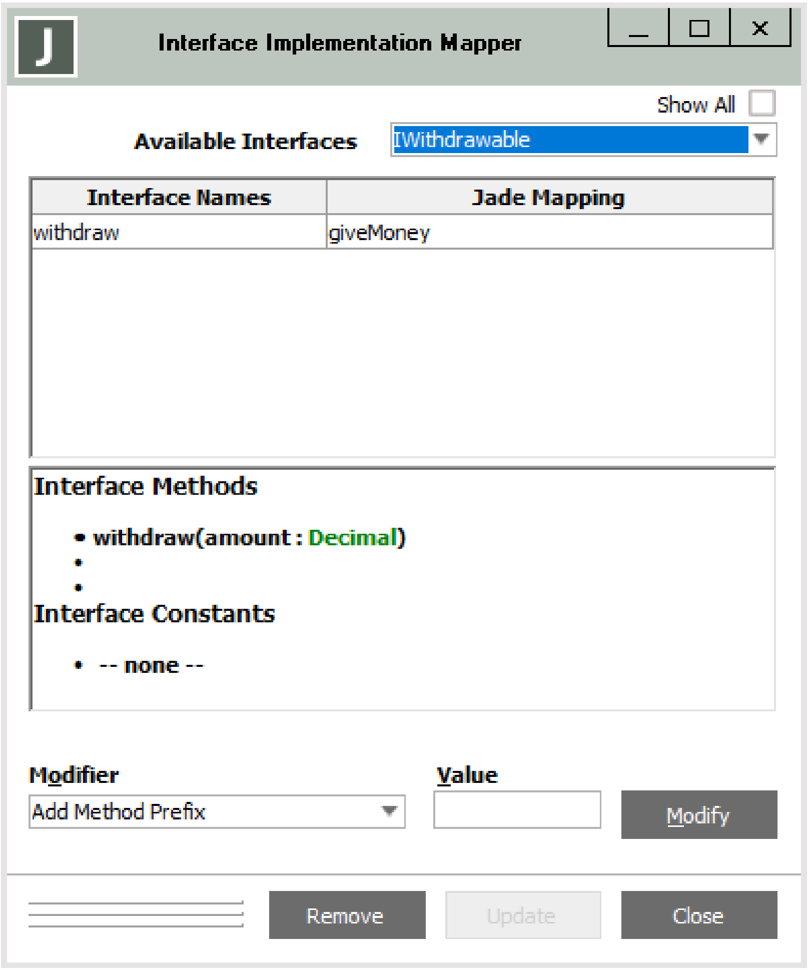
7. Create a new class called **MoneyPit** in **BankingModelSchema**, add a method called **giveMoney**, and code it as follows.

```
giveMoney(amount : Decimal);

begin
    write "Okay, have $" & amount.String;
end;
```

Note The **giveMoney** method is not an updating method. An interface method can have an updating or non-updating method fulfil it.

8. Select the **MoneyPit** class in the Class Browser and open the Interface Implementation Mapper dialog by selecting the **Interface Mapping** command in the Classes menu.


Interface Implementation Mapper

Show All

Available Interfaces: IWithdrawable

Interface Names	Jade Mapping
withdraw	giveMoney

Interface Methods

- withdraw(amount : Decimal)
-
-

Interface Constants

- -- none --

Modifier: Add Method Prefix

Value:

9. Select **IWithdrawable** in the **Available Interfaces** drop-down list box and then enter **giveMoney** for the **withdraw** method in the **Jade Mapping** column. Click **Implement**, to confirm your action and close the window.

Exercise 3 – Testing the IWithdrawable Interface

In this exercise, you will write a **JadeScript** method that puts the three classes that implement **IWithdrawable** interface into a collection and then call the **withdraw** method of each one.

1. Add a new **ObjectArray** subclass called **Withdrawables**, with member type **IWithdrawable**.

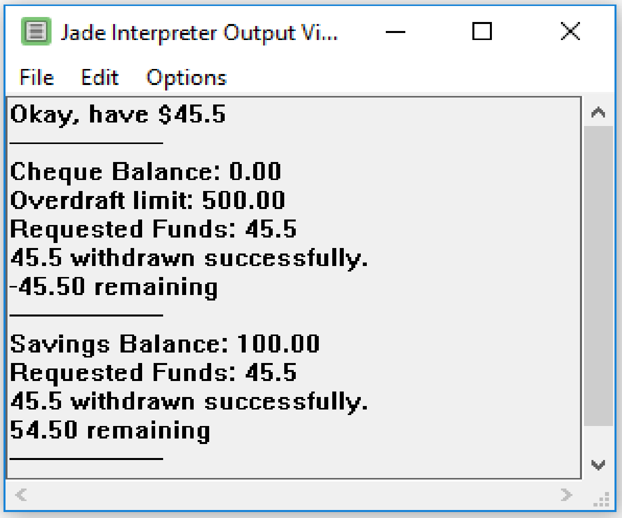
2. Add a new **JadeScript** method called **testInterface**, and code it as follows.

```
testInterface();

vars
    dict     : Withdrawables;
    acc      : IWithdrawable;
    pit      : MoneyPit;
begin
    create pit transient;
    create dict transient;

    dict.add(pit);
    dict.add(ChequeAccount.firstInstance().IWithdrawable);
    dict.add(SavingsAccount.firstInstance().IWithdrawable);
    foreach acc in dict do
        acc.withdraw(45.50);
        write "--------------------";
    endforeach;
epilog
    delete pit;
    delete dict;
end;
```

3. Run the method. Output similar to the following should be displayed.



```
Okay, have $45.5
____________
Cheque Balance: 0.00
Overdraft limit: 500.00
Requested Funds: 45.5
45.5 withdrawn successfully.
-45.50 remaining
____________
Savings Balance: 100.00
Requested Funds: 45.5
45.5 withdrawn successfully.
54.50 remaining
____________
```