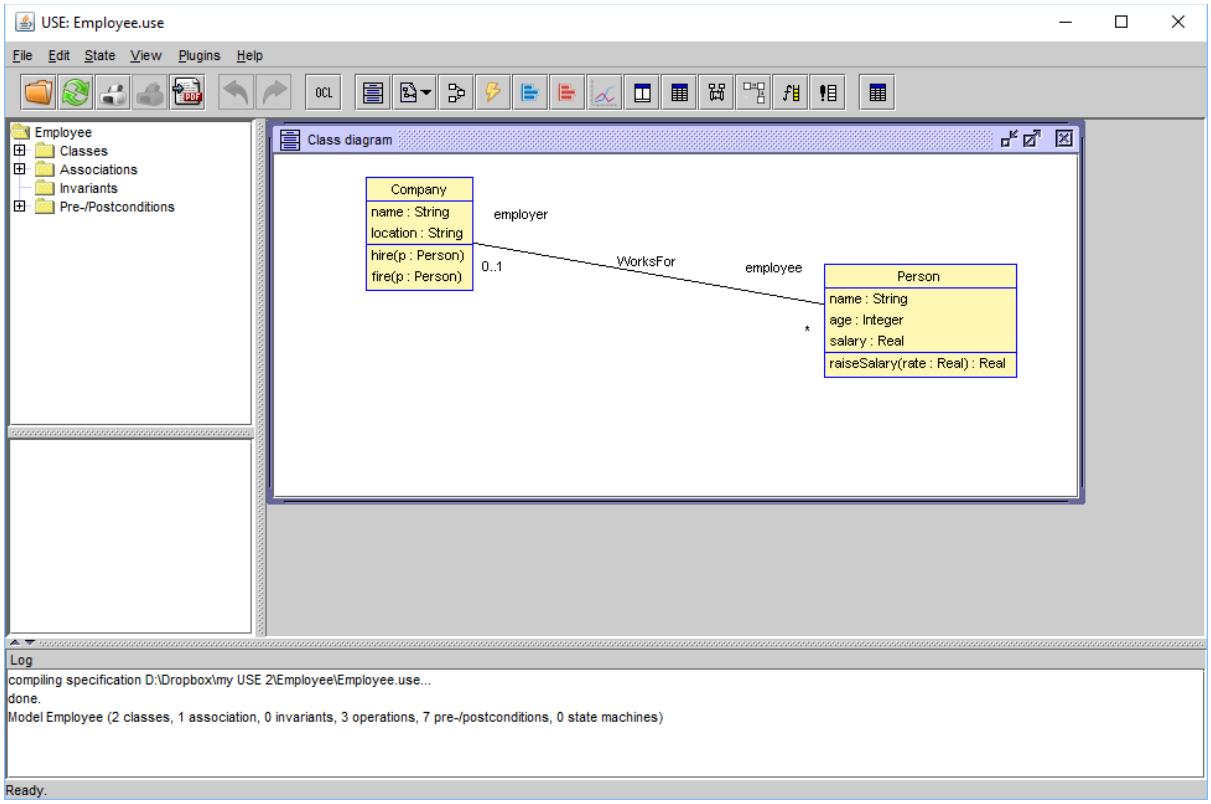
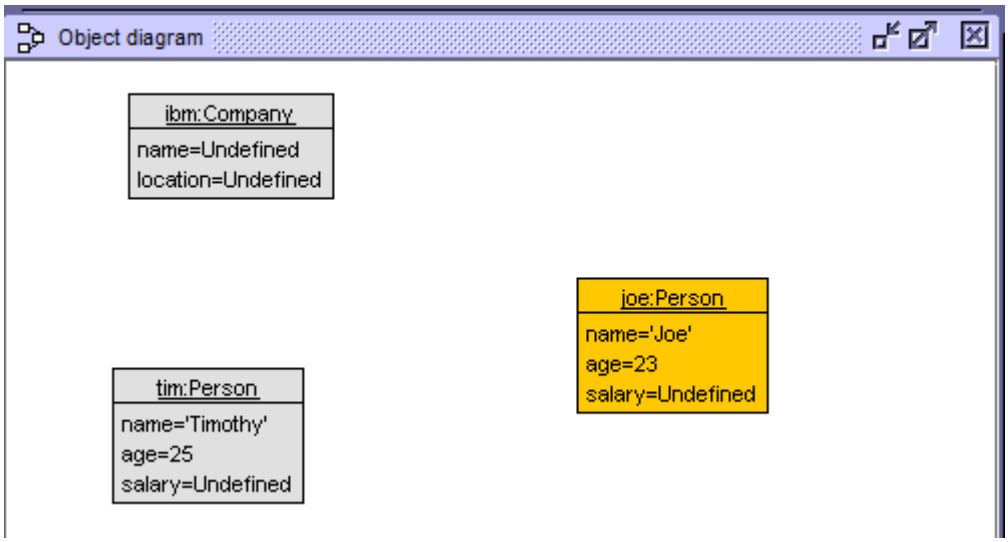
Constraints in USE

Have a look at the constraints introduced to a simple employee specification in **employee.use**. Here we will try to test them.

Run USE and load **Employee.use** and its class layout to get.



Then create a company **ibm** and two person objects as indicated below.



Testing USE Constraints

Here we use the objects created to test the constraint pre and post conditions which form a contract for the operation **hire()**. We will try to "execute" ibm.hire(tim) but recall that hire() has not been implemented in SOIL yet.

Try

`!openter ibm hire(tim)`

```
use> !openter ibm hire(tim)
precondition `hirePre1' is true
precondition `hirePre2' is true
use>
```

You can see the two preconditions are satisfied or true. And then try

`!opexit`

```
use> !opexit
postcondition `hirePost' is false
  self : Company = ibm
  self.employee : Set(Person) = Set{}
  p : Person = tim
  self.employee->includes(p) : Boolean = false
Error: postcondition false in operation call `Company::hire(self:ibm, p:ti
m)'.
use>
```

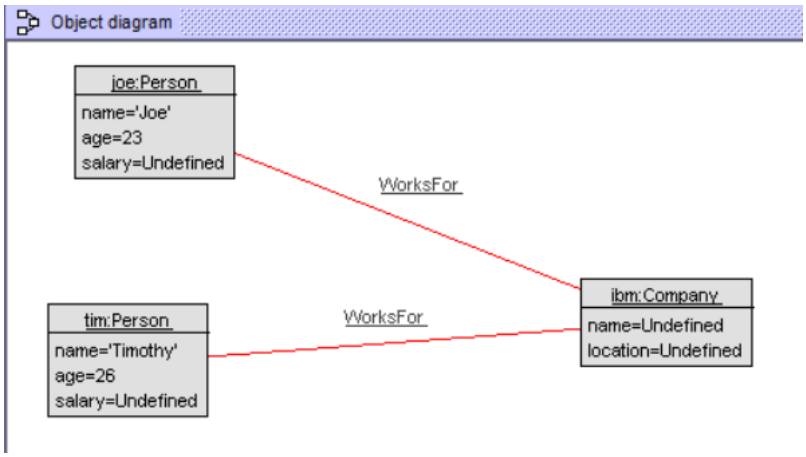
Here the postcondition fails as **tim** has not been added to the **employee** set of **ibm**. There was no SOIL code to implement hire(). So we will try again as follows:

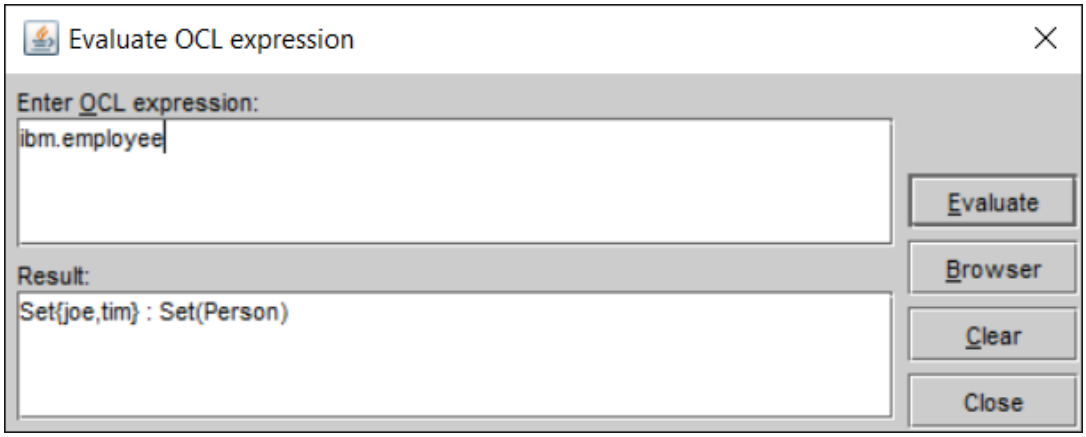
```
use> !openter ibm hire(tim)
precondition `hirePre1' is true
precondition `hirePre2' is true
use> !insert (tim,ibm) into WorksFor
use> !opexit
postcondition `hirePost' is true
use>
```

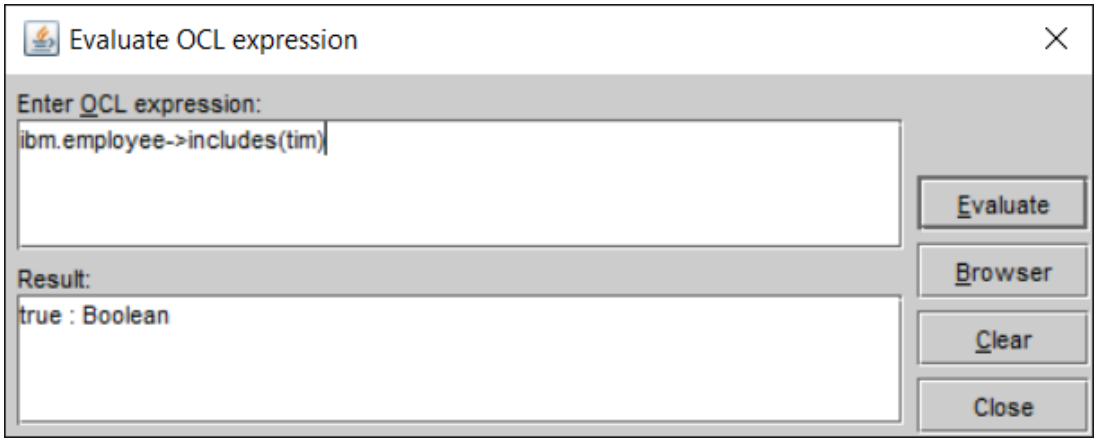
Here we used a SOIL command, `insert (tim,ibm) into WorksFor`, to implement the operation **hire()** and on !opexit we see that the postcondition is true. In other words the contract for **hire()** has been satisfied. The implementation simply consisted of inserting **tim** into the set **employee**, and afterwards opexit checks that he is in fact in this set. In Java or C# the **tim** object would be inserted into possibly an array or a more complicated collection data structure.

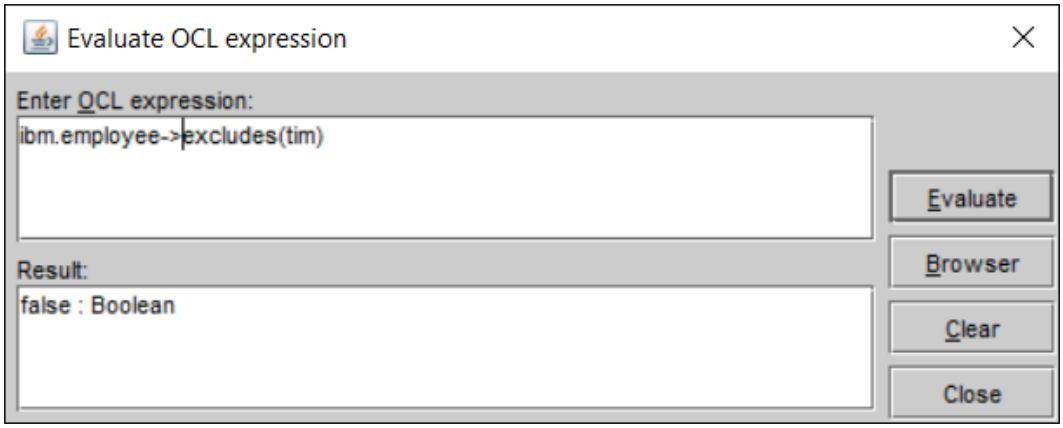
Evaluating OCL Expression

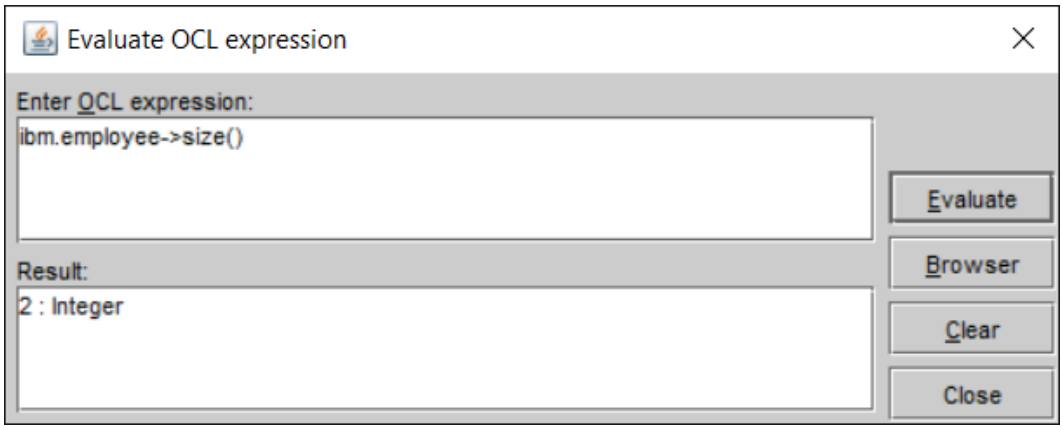
Next, hire joe and then use the USE menu **State | Evaluate OCL expression** to evaluate various OCL expressions as shown below.

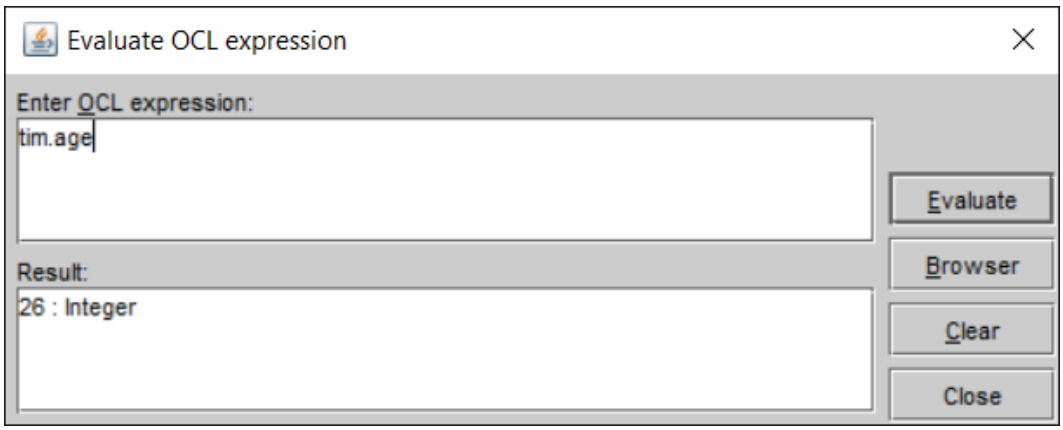


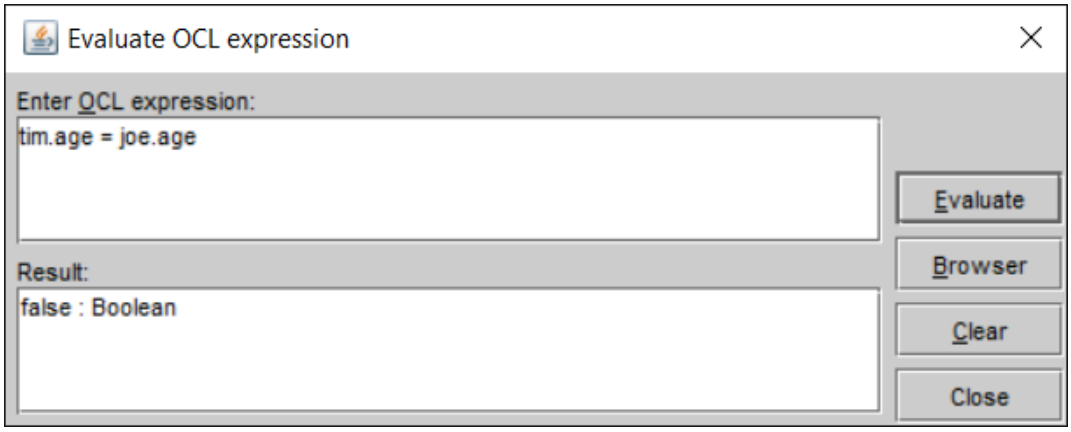




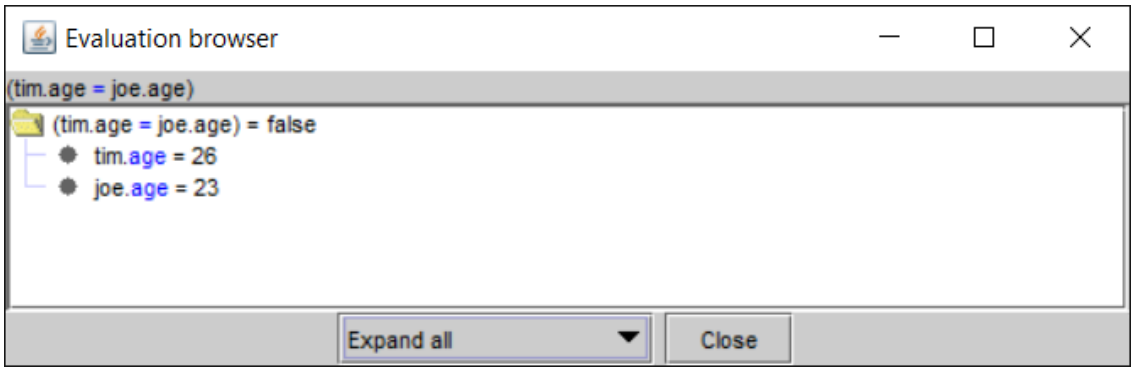

Evaluate OCL expression
Enter OCL expression:
ibm.employee->excludes(tim)
Result:
false : Boolean
Evaluate
Browser
Clear
Close


Evaluate OCL expression
Enter OCL expression:
ibm.employee->size()
Result:
2 : Integer
Evaluate
Browser
Clear
Close

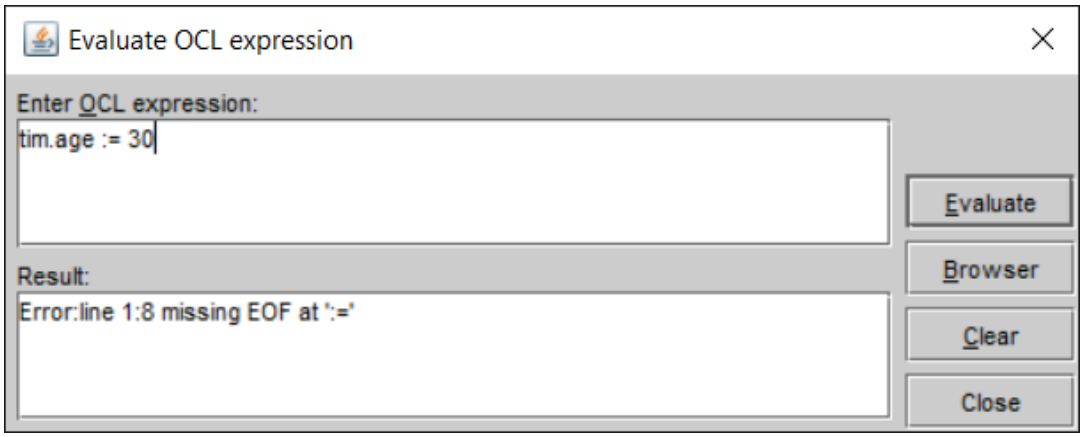

Evaluate OCL expression
Enter OCL expression:
tim.age
Result:
26 : Integer
Evaluate
Browser
Clear
Close

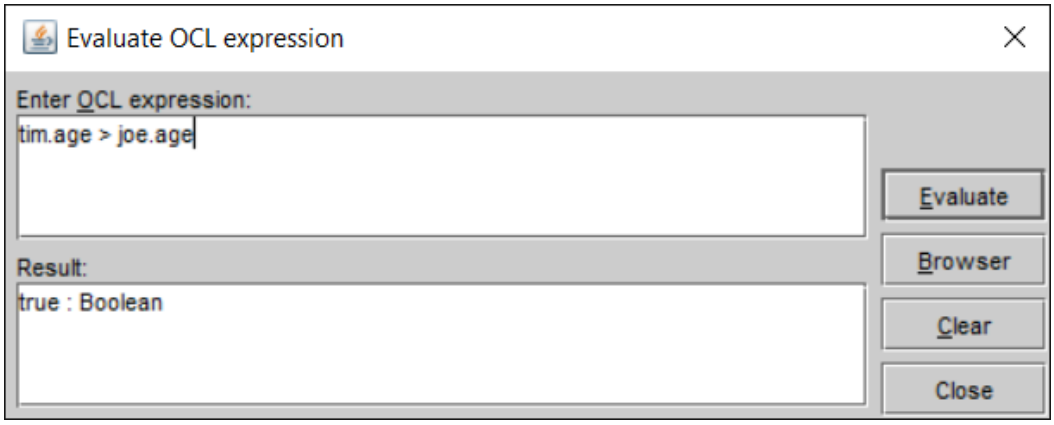


On this, press the **Browser** button to see why the OCL expression is false. This can be useful in debugging OCL expressions.



Note you can't run a SOIL command from within the OCL Evaluator as in:





Press **Browser** to get:

Exercises

1. Add appropriate pre and post conditions to the operation fire(p:Person), si,ilar to hire().
2. Add another postcondition to fire(p:Person) which says tha the personal's salary would be equal to 0 after the operation finished executing.
3. Try to fire tim, are all the pre and post conditions satisfied?
4. If you succeeded in firing tim, try again. What happens?