

CoCoA-5 - Bug #1717

CRASH: equality test to a FUNCTION

01 Dec 2022 11:43 - John Abbott

Status:	Closed	Start date:	01 Dec 2022
Priority:	Urgent	Due date:	
Assignee:	John Abbott	% Done:	100%
Category:	bug	Estimated time:	1.11 hour
Target version:	CoCoA-5.4.2	Spent time:	1.15 hour
Description			
Julian Danner reported the following crash via email:			
<pre>/**/ use R:=QQ[x]; phi := CoeffEmbeddingHom(R); phi = func() endfunc; CoCoAInterpreter: Interpreter.C:1581: boost::intrusive_ptr<CoCoA::InterpreterNS::RightValue> CoCoA ::InterpreterNS::RuntimeEnvironment::binaryOperatorDispatch(boost::intrusive_ptr<const CoCoA::In terpreterNS::RightValue>, boost::intrusive_ptr<const CoCoA::InterpreterNS::RightValue>, boost::intru sive_ptr<CoCoA::InterpreterNS::RightValue> (* (*) [24]) (CoCoA::InterpreterNS::RuntimeEnvironment*, boost::intrusive_ptr<const CoCoA::InterpreterNS::RightValue>, boost::intrusive_ptr<const CoCoA::In terpreterNS::RightValue>, const CoCoA::LexerNS::CharPointer&, const CoCoA::LexerNS::CharPointer&), const CoCoA::LexerNS::CharPointer&, const CoCoA::LexerNS::CharPointer&): Assertion `leftOp->getTy pe()->dispatchIndex == rightIndex' failed.</pre>			
<pre>Process cocoa5 aborted (core dumped)</pre>			
Ouch! It was originally a typo := mistyped as =			

History

#1 - 01 Dec 2022 11:45 - John Abbott

Most likely the bug is in `intrusive_ptr<RightValue> RuntimeEnvironment::binaryOperatorDispatch` around line 1520 in `Interpreter.C`

#2 - 01 Dec 2022 11:51 - John Abbott

- Status changed from *New* to *In Progress*

- % Done changed from 0 to 10

The relevant assert is at `Interpreter.C:1581`

A slightly shorter failing case is:

```
func() endfunc = IdentityHom(ZZ);
```

In many cases CoCoA detects that FUNCTION cannot be compared to the other type, but RINGHOM is not so reported. Odd!

#3 - 01 Dec 2022 12:17 - John Abbott

- Status changed from *In Progress* to *Resolved*
- Assignee set to *John Abbott*
- % Done changed from 10 to 70

Here is what I found.

The decision about which types may be compared with `=` is determined by `opEqualMap`.

This had a fn pointer to `opEqual_Function_Function` which just threw an exception ("Functions cannot be compared").

However if there is no entry in `OpEqualMap` for (FUNCTION,FUNCTION) then essentially the same error mesg is produced ("I don't know how to ...").

Note that `RINGHOM` is regarded as a subtype of `FUNCTION` via function `bool TYPE::isProperSubtypeOf` around `Interpreter.C:1467`. I am loath to change that function for fear that it might break something e.g. when using a `RINGHOM` in a "function call context".

Instead I have removed the (FUNCTION,FUNCTION) entry from `opEqualMap` and from `opNotEqualMap`.

All `CoCoA-5` tests pass.

Now `CoCoA-5` reacts as follows:

```
/**/ func() endfunc = IdentityHom(ZZ);  
--> ERROR: I don't know how to evaluate operator = between FUNCTION and RINGHOM  
--> func() endfunc = IdentityHom(ZZ);  
-->      ^
```

I think this resolves the issue. Comments? Criticisms?

#4 - 14 Dec 2022 16:23 - John Abbott

- Status changed from *Resolved* to *Closed*
- % Done changed from 70 to 100
- Estimated time set to 1.11 h

We are satisfied that this is a good resolution.