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**Chapter 8 HW**

**Overview:**

In this assignment we created our first full-blown test bench (minus a DUT). This test bench generated IPV4 packets and calls a scoreboard to determine if they were properly formed. We also added call back hooks into our scoreboard that allowed us to create a new test that corrupted packets without modifying our test bench environments. Additionally, we extend our packet class to create a bad\_packet class that corrupted the CRC checksum on 2% percent of the packets.

**Directions on Running Solution:**

To execute our test programs run the following commands within our project directory:

1. ***make factory***
2. ***vsim -c test -do "run -all" +TESTNAME=TestGood***
3. ***vsim -c test -do "run -all" +TESTNAME=Test\_v3***
4. ***vsim -c test -do "run -all" +TESTNAME=TestBad***

**Transcript Windows:** bash console showing compilation of project and running each project without recompiling. To enable you to better see where each step begins and ends we’ve bolded and italicized each command that was run on the bash console.

***[joshuas2@manticore Homework9]$ make factory***

vlib work

vmap work work

Modifying modelsim.ini

vlog -mfcu -sv packet\_pkg.sv scoreboard\_pkg.sv package\_test.sv factory\_pkg.sv test\_program.sv

QuestaSim-64 vlog 10.1c Compiler 2012.07 Jul 27 2012

-- Compiling package packet\_pkg

\*\* Warning: packet\_pkg.sv(85): (vlog-LRM-7047) Return type of virtual method 'copy' in class 'packet' is a subtype of the method return type in the superclass. For strict LRM compliance the return types must match.

-- Compiling package scoreboard\_pkg

-- Importing package packet\_pkg

-- Compiling package package\_test

-- Importing package scoreboard\_pkg

-- Compiling package factory\_pkg

-- Compiling package packet\_pkg\_sv\_unit

-- Importing package factory\_pkg

-- Importing package package\_test

-- Importing package packet\_pkg

-- Importing package scoreboard\_pkg

-- Compiling program test

Top level modules:

test

***[joshuas2@manticore Homework9]$ vsim -c test -do "run -all" +TESTNAME=TestGood***

Reading /net/fpga2/questasim10.1c/questasim/tcl/vsim/pref.tcl

# 10.1c

# vsim +TESTNAME=TestGood -do {run -all} -c test

# \*\* Note: (vsim-3812) Design is being optimized...

# \*\* Warning: packet\_pkg.sv(85): (vopt-LRM-7047) Return type of virtual method 'copy' in class 'packet' is a subtype of the method return type in the superclass. For strict LRM compliance the return types must match.

# \*\* Warning: factory\_pkg.sv(22): (vopt-2250) Function "register" has no return value assignment.

# // Questa Sim-64

# // Version 10.1c linux\_x86\_64 Jul 27 2012

# //

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# //

# Loading sv\_std.std

# Loading work.packet\_pkg(fast)

# Loading work.scoreboard\_pkg(fast)

# Loading work.package\_test(fast)

# Loading work.factory\_pkg(fast)

# Loading work.packet\_pkg\_sv\_unit(fast)

# Loading work.test(fast)

# run -all

# Factory:

# The name: TestBad maps to the class: '{me:@registry\_\_3@1}

# The name: TestGood maps to the class: '{me:@registry\_\_1@1}

# The name: Test\_v3 maps to the class: '{me:@registry\_\_2@1}

# factory\_pkg.factory.get\_test found TESTNAME=TestGood

# Create\_object called with TestGood which maps to key TestGood and class class {Environment env;}/packet\_pkg\_sv\_unit::TestGood extends class {}/factory\_pkg::component

# Running Good Test:

# 10000:Test Finished with 1000 comparisons.

# Break in Task packet\_pkg\_sv\_unit/TestGood::run\_test at TestGood.sv line 17

# Stopped at TestGood.sv line 17

VSIM 2> quit

***[joshuas2@manticore Homework9]$ vsim -c test -do "run -all" +TESTNAME=Test\_v3***

Reading /net/fpga2/questasim10.1c/questasim/tcl/vsim/pref.tcl

# 10.1c

# vsim +TESTNAME=Test\_v3 -do {run -all} -c test

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# Loading work.package\_test(fast)

# Loading work.factory\_pkg(fast)

# Loading work.packet\_pkg\_sv\_unit(fast)

# Loading work.test(fast)

# run -all

# Factory:

# The name: TestBad maps to the class: '{me:@registry\_\_3@1}

# The name: TestGood maps to the class: '{me:@registry\_\_1@1}

# The name: Test\_v3 maps to the class: '{me:@registry\_\_2@1}

# factory\_pkg.factory.get\_test found TESTNAME=Test\_v3

# Create\_object called with Test\_v3 which maps to key Test\_v3 and class class {Environment env;}/packet\_pkg\_sv\_unit::Test\_v3 extends class {}/factory\_pkg::component

# Running v3 Test:

# 510: ERROR for version, expected=0x3 != actual=0x4

# 510: ERROR for header checksum, expected=0x9554 != actual=0xe554

# 770: ERROR for version, expected=0x3 != actual=0x4

# 770: ERROR for header checksum, expected=0xe8d6 != actual=0x98d6

# 1150: ERROR for version, expected=0x3 != actual=0x4

# 1150: ERROR for header checksum, expected=0x1357 != actual=0x6357

# 2150: ERROR for version, expected=0x3 != actual=0x4

# 2150: ERROR for header checksum, expected=0xd77e != actual=0xa77e

# 2270: ERROR for version, expected=0x3 != actual=0x4

# 2270: ERROR for header checksum, expected=0x85bb != actual=0xf5bb

# 3370: ERROR for version, expected=0x3 != actual=0x4

# 3370: ERROR for header checksum, expected=0x8a1a != actual=0xfa1a

# 4540: ERROR for version, expected=0x3 != actual=0x4

# 4540: ERROR for header checksum, expected=0xdb0a != actual=0xab0a

# 8630: ERROR for version, expected=0x3 != actual=0x4

# 8630: ERROR for header checksum, expected=0xc14c != actual=0xb14c

# 10000: Corrupted 8 Packets

# 10000:Test Finished with 1000 comparisons.

# Break in Task packet\_pkg\_sv\_unit/Test\_v3::run\_test at Test\_v3.sv line 20

# Stopped at Test\_v3.sv line 20

VSIM 2> quit

***[joshuas2@manticore Homework9]$ vsim -c test -do "run -all" +TESTNAME=TestBad***

Reading /net/fpga2/questasim10.1c/questasim/tcl/vsim/pref.tcl

# 10.1c

# vsim +TESTNAME=TestBad -do {run -all} -c test

# // Questa Sim-64

# // Version 10.1c linux\_x86\_64 Jul 27 2012

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# Loading work.scoreboard\_pkg(fast)

# Loading work.package\_test(fast)

# Loading work.factory\_pkg(fast)

# Loading work.packet\_pkg\_sv\_unit(fast)

# Loading work.test(fast)

# run -all

# Factory:

# The name: TestBad maps to the class: '{me:@registry\_\_3@1}

# The name: TestGood maps to the class: '{me:@registry\_\_1@1}

# The name: Test\_v3 maps to the class: '{me:@registry\_\_2@1}

# factory\_pkg.factory.get\_test found TESTNAME=TestBad

# Create\_object called with TestBad which maps to key TestBad and class class {Environment env;}/packet\_pkg\_sv\_unit::TestBad extends class {}/factory\_pkg::component

# Running Good Test:

# 1160: ERROR for header checksum, expected=0xd2f5 != actual=0x2d0a

# 1490: ERROR for header checksum, expected=0x4d96 != actual=0xb269

# 1950: ERROR for header checksum, expected=0xf2ba != actual=0xd45

# 2250: ERROR for header checksum, expected=0x4dd1 != actual=0xb22e

# 3000: ERROR for header checksum, expected=0xb4f8 != actual=0x4b07

# 3050: ERROR for header checksum, expected=0xcab4 != actual=0x354b

# 3330: ERROR for header checksum, expected=0xf55e != actual=0xaa1

# 3440: ERROR for header checksum, expected=0x3d12 != actual=0xc2ed

# 4350: ERROR for header checksum, expected=0x103 != actual=0xfefc

# 4360: ERROR for header checksum, expected=0x83f8 != actual=0x7c07

# 4480: ERROR for header checksum, expected=0x4d78 != actual=0xb287

# 5550: ERROR for header checksum, expected=0x3e63 != actual=0xc19c

# 7440: ERROR for header checksum, expected=0x354a != actual=0xcab5

# 9170: ERROR for header checksum, expected=0x612b != actual=0x9ed4

# 10000:Send 14 Bad Packets

# 10000:Test Finished with 1000 comparisons.

[joshuas2@manticore Homework9]$