

EE314 Experiment 3 Report

Your Name - Your Student Number

1.2.2

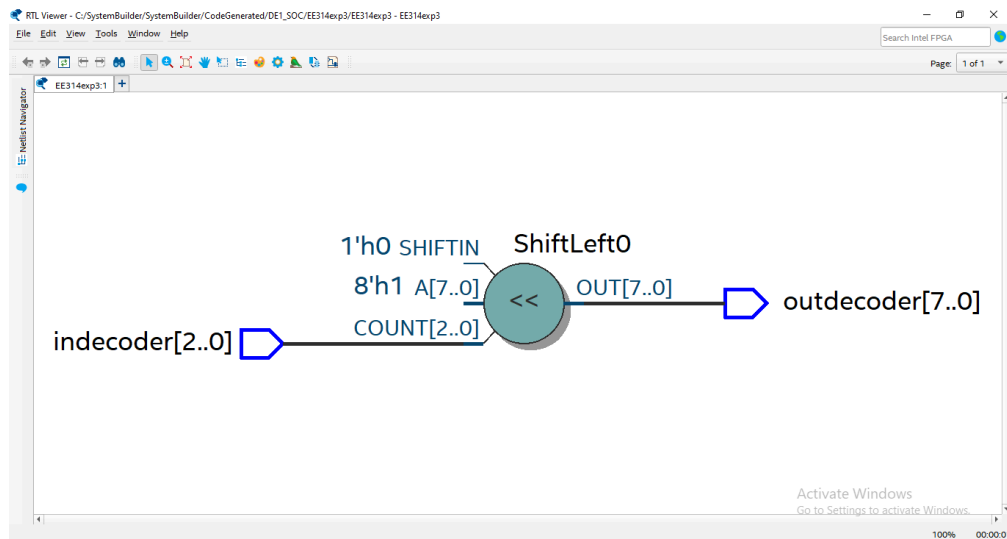


fig 1 rtl schematic of decoder

1.2.3

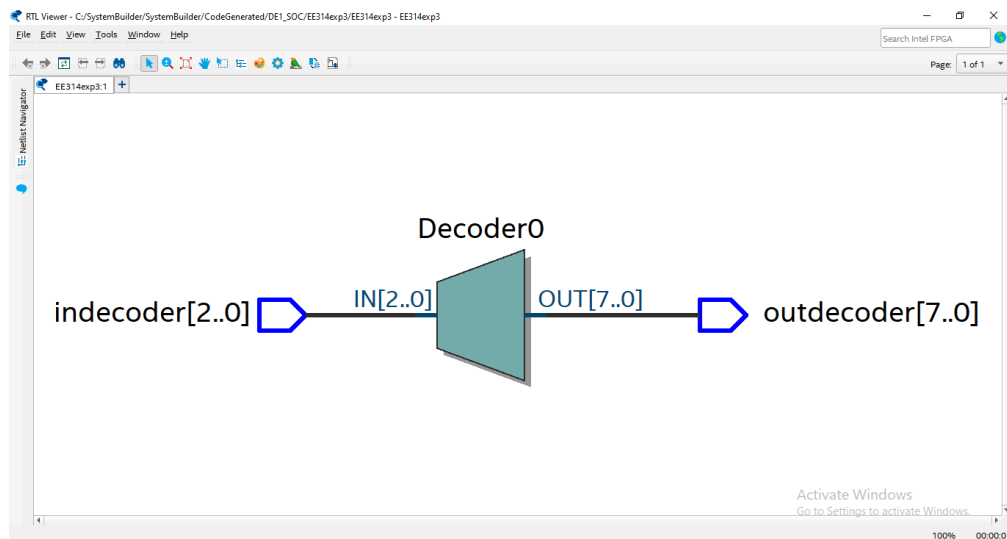


fig 2 rtl schematic of decoder

1.2.4

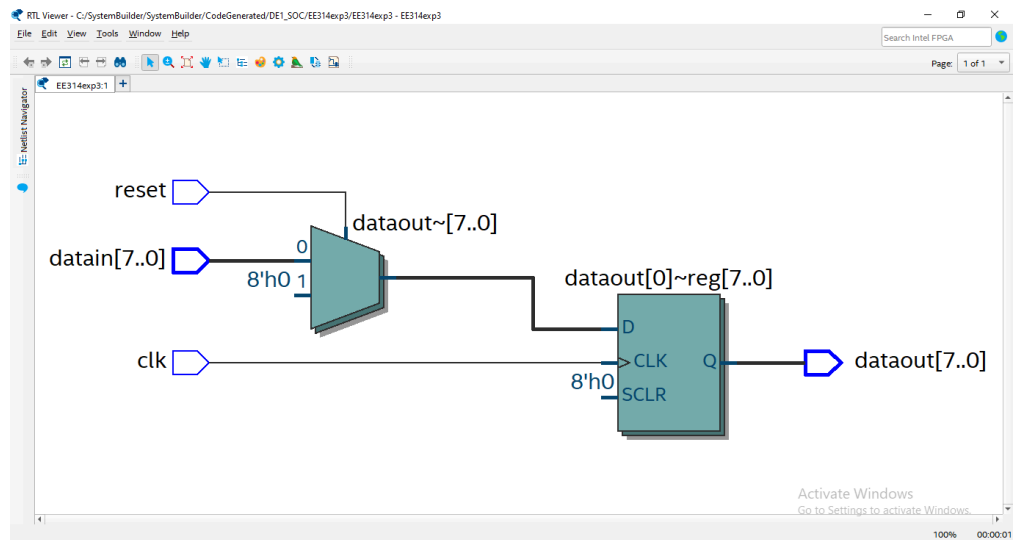


fig # figure name

1.2.5

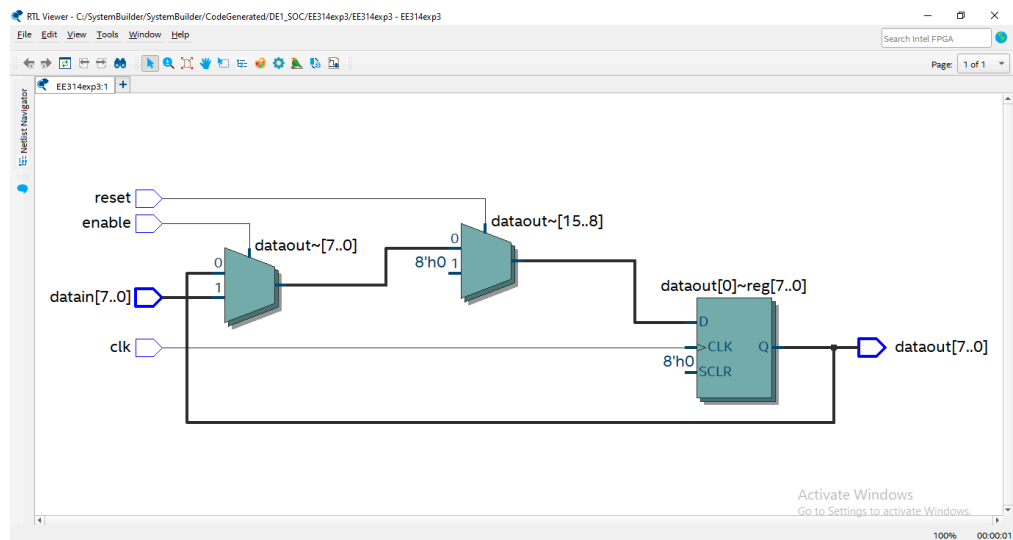


fig # figure name

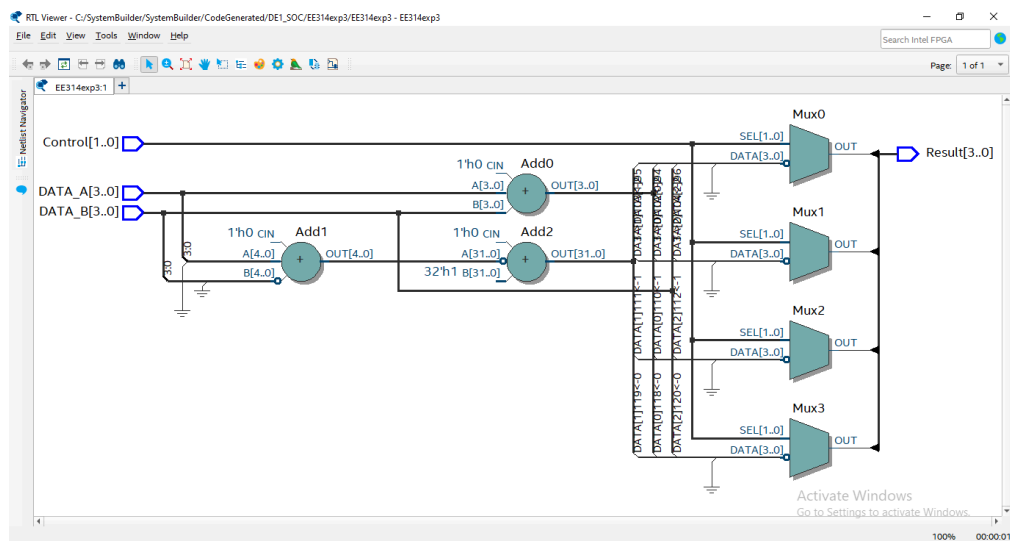


fig # figure name

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Select Anaconda Prompt
Test successful for data_a=7, data_b=-2, control=1. Output: 1001987000.00ns INFO cocotb
for data_a=7, data_b=-2, control=2. Output: 0001988000.00ns INFO cocotb
Test successful for data_a=7, data_b=-1, control=0. Output: 0110990000.00ns INFO cocotb
Test successful for data_a=7, data_b=-1, control=1. Output: 1000991000.00ns INFO cocotb
Test successful for data_a=7, data_b=-1, control=3. Output: 0000993000.00ns INFO cocotb
Test successful for data_a=7, data_b=0, control=0. Output: 0111
Test successful for data_a=7, data_b=0, control=1. Output: 0111
Test successful for data_a=7, data_b=0, control=2. Output: 1111
Test successful for data_a=7, data_b=0, control=3. Output: 0000
Test successful for data_a=7, data_b=1, control=0. Output: 1000
Test successful for data_a=7, data_b=1, control=1. Output: 0110
Test successful for data_a=7, data_b=1, control=2. Output: 1110
Test successful for data_a=7, data_b=1, control=3. Output: 00001001000.00ns INFO cocotb
Test successful for data_a=7, data_b=2, control=0. Output: 10011002000.00ns INFO cocotb
Test successful for data_a=7, data_b=2, control=2. Output: 11011004000.00ns INFO cocotb
Test successful for data_a=7, data_b=2, control=3. Output: 00001005000.00ns INFO cocotb
Test successful for data_a=7, data_b=3, control=0. Output: 10101006000.00ns INFO cocotb
Test successful for data_a=7, data_b=3, control=2. Output: 11001008000.00ns INFO cocotb
Test successful for data_a=7, data_b=3, control=3. Output: 00001009000.00ns INFO cocotb
Test successful for data_a=7, data_b=4, control=1. Output: 00110110000.00ns INFO cocotb
Test successful for data_a=7, data_b=4, control=2. Output: 10111012000.00ns INFO cocotb
Test successful for data_a=7, data_b=5, control=0. Output: 11001014000.00ns INFO cocotb
Test successful for data_a=7, data_b=5, control=2. Output: 10101016000.00ns INFO cocotb
Test successful for data_a=7, data_b=5, control=3. Output: 00001017000.00ns INFO cocotb
Test successful for data_a=7, data_b=6, control=0. Output: 11011018000.00ns INFO cocotb
Test successful for data_a=7, data_b=6, control=2. Output: 10011020000.00ns INFO cocotb
Test successful for data_a=7, data_b=6, control=3. Output: 00001021000.00ns INFO cocotb
Test successful for data_a=7, data_b=7, control=0. Output: 11101022000.00ns INFO cocotb
Test successful for data_a=7, data_b=7, control=3. Output: 00001024000.00ns INFO cocotb
All tests were successful, Well done!
test_alu passed
*****
** TEST STATUS SIM TIME (ns) REAL TIME (s) RATIO (ns/s) **
** alu_test.test_alu PASS 1025000.00 0.60 1704909.67 **
** TESTS=1 PASS=1 FAIL=0 SKIP=0 1025000.00 0.68 1508825.05 **
*****
make[1]: Leaving directory '/c/testttt/Tests'
(base) C:\testttt\Tests>

```

fig # figure name

1.3

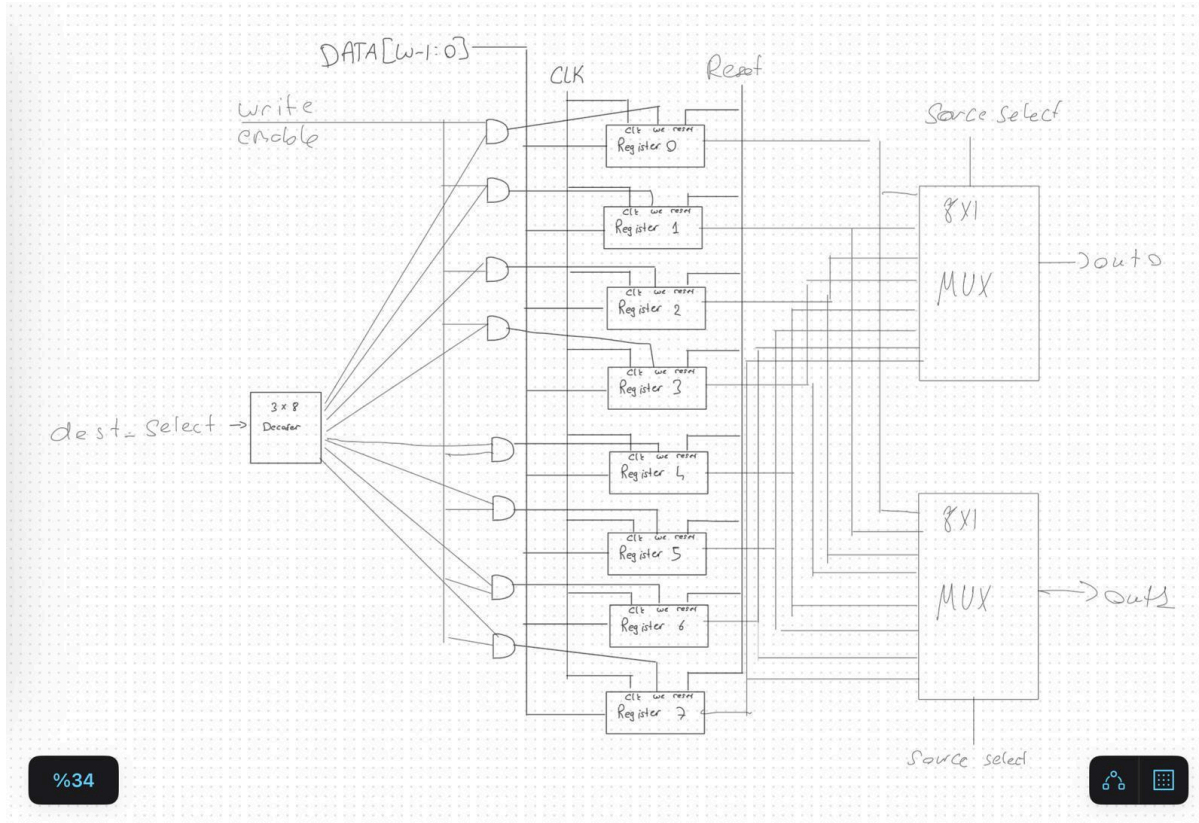


fig # figure name

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Anaconda Prompt
"make" -f Makefile results.xml
make[1]: Entering directory '/c/testtt/Tests'
make[1]: Warning: File '/c/testtt/Tests/./HDL/Register_File.v' has modification time 8312 s in the future
/c/iverilog/bin/iverilog -o sim_build/sim.vvp -D COCOTB_SIM=1 -s Register_File -g2012 -f sim_build/cmds.f /c/testtt/Tests/./HDL/*.v
rm -f results.xml
MODULE=Register_File_test TESTCASE= TOPLEVEL=Register_File TOPLEVEL_LANG=verilog \
/c/iverilog/bin/vvp -H C:/Users/mehme/miniconda3/lib/site-packages/cocotb/libs -m cocotbvpi_icarus sim_build/sim.vvp
--ns INFO gpi ..mbed\gpi_embed.cpp:81 in set_program_name_in_venv Did not detect Python virtual environment. Using sy
stem-wide Python interpreter
--ns INFO gpi ..\gpi\GpiCommon.cpp:101 in gpi_print_registered_impl VPI registered
0.00ns INFO cocotb Running on Icarus Verilog version 12.0 (devel)
0.00ns INFO cocotb Running tests with cocotb v1.9.2 from C:/Users/mehme/miniconda3/lib/site-packages/cocotb
0.00ns INFO cocotb Seeding Python random module with 1746388821
0.00ns INFO cocotb.regression Found test Register_File_test.test_register_file
0.00ns INFO cocotb.regression running test_register_file (1/1)
Testbench for the Register File module.
All tests passed successfully with W = 4 bits!
test_register_file passed
*****
** TEST STATUS SIM TIME (ns) REAL TIME (s) RATIO (ns/s) **
*****
** Register_File_test.test_register_file PASS 929000.00 0.12 8016451.36 **
*****
** TESTS=1 PASS=1 FAIL=0 SKIP=0 929000.00 0.22 4297902.42 **
*****

make[1]: warning: Clock skew detected. Your build may be incomplete.
make[1]: Leaving directory '/c/testtt/Tests'

(base) C:\testtt\Tests>

```

fig # figure name

Appendix

```
@cocotb.test()
async def test_alu(dut):

    test_failed = False # Flag to track overall test failure
    for Ain range(16):
        A= A- 8
        for B in range(16):
            B = B - 8
            for control in range(4):
                dut.DATA_A.value = A
                dut.DATA_B.value = B
                dut.Control.value = control
                await Timer(1, units='us')
                if control == 0:
                    result = A+B
                elif control == 1:
                    result = A - B
                elif control == 2:
                    result = ~B
                elif control == 3:
                    result = 0
                result = result % 16
                if dut.Result.value != result:
                    test_failed = True # Mark overall test as failed
                    cocotb.log.error(
                        f"Mismatch for data_a={A}, data_b={B}, control={control}: Expected
{bin(result)[2:].zfill(4)}, "
                        f"Got {bin(dut.Result.value)[2:].zfill(4)}"
                    )
                    Log_Design(dut)
                else:
                    cocotb.log.info(
                        f"Test succesfull for data_a={A}, data_b={B}, control={control}. Output:
{dut.Result.value}")

    # Final assertion for the overall result
    if test_failed:
        raise AssertionError("Some test cases failed. Check logs for details.")
    else:
        cocotb.log.info("All tests were succesfully passed, Well done!")
```