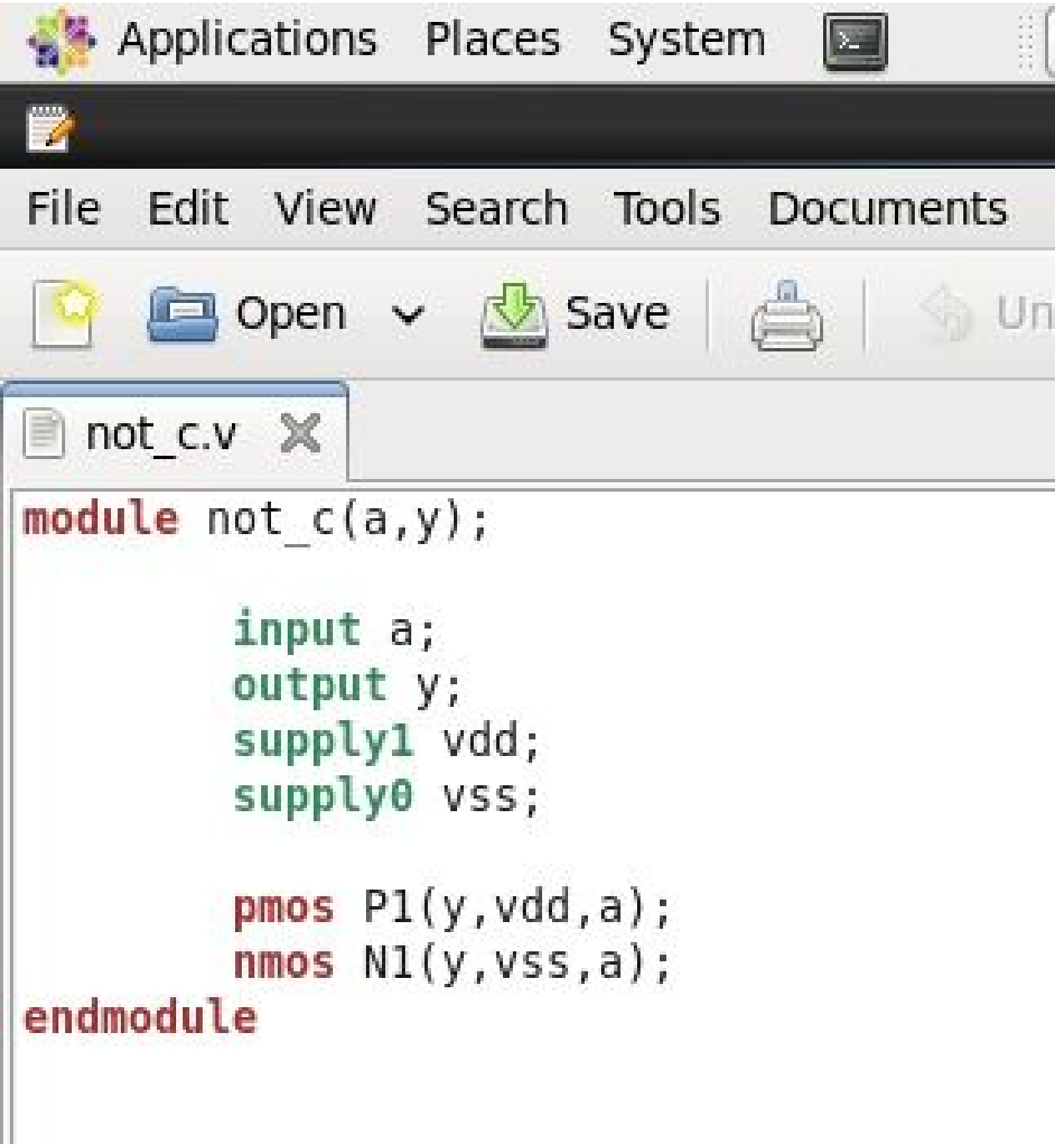
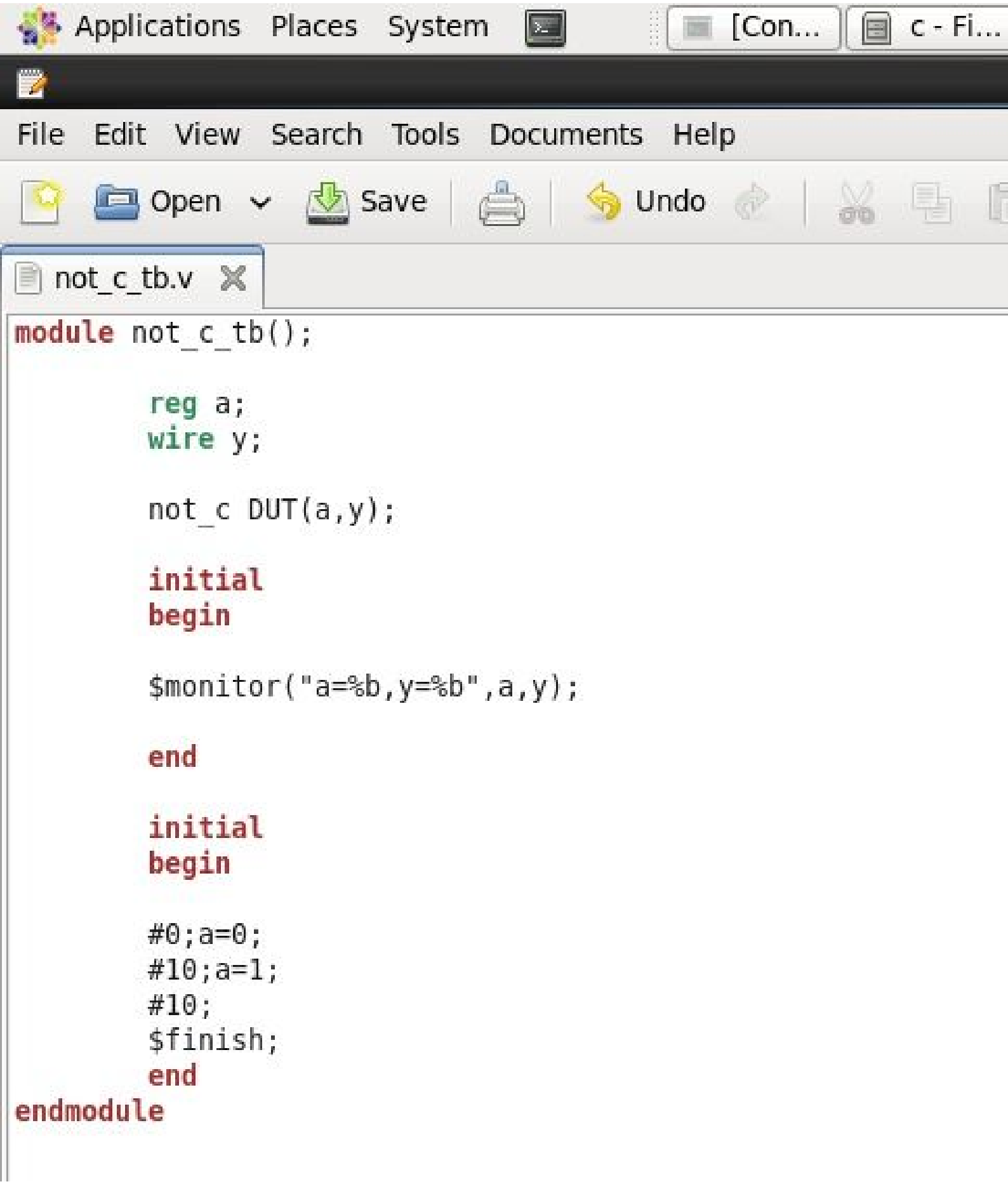
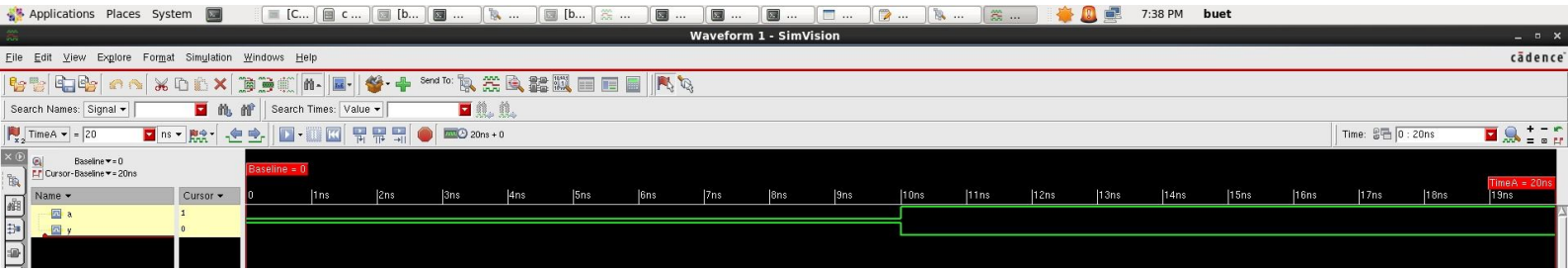
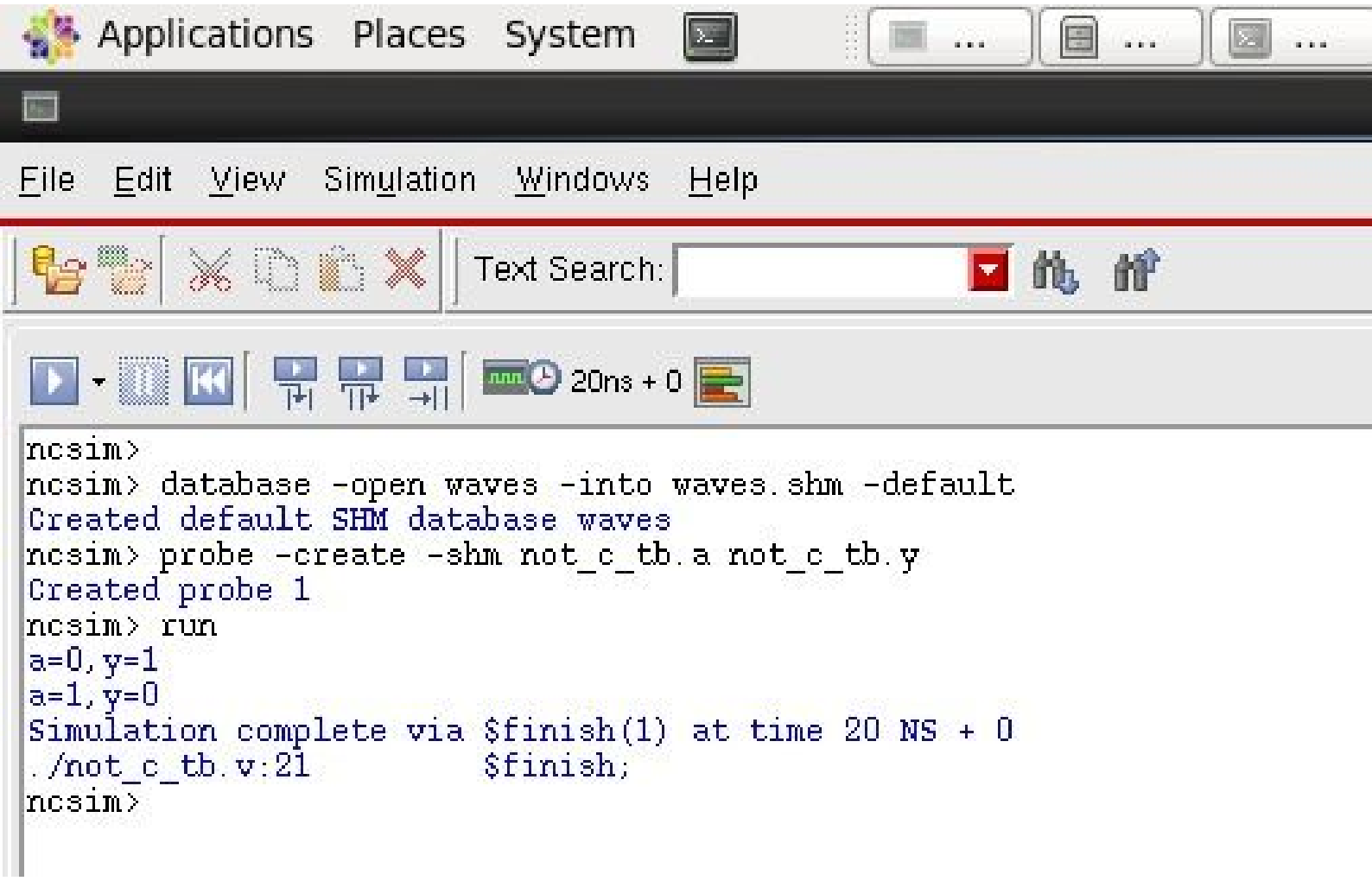
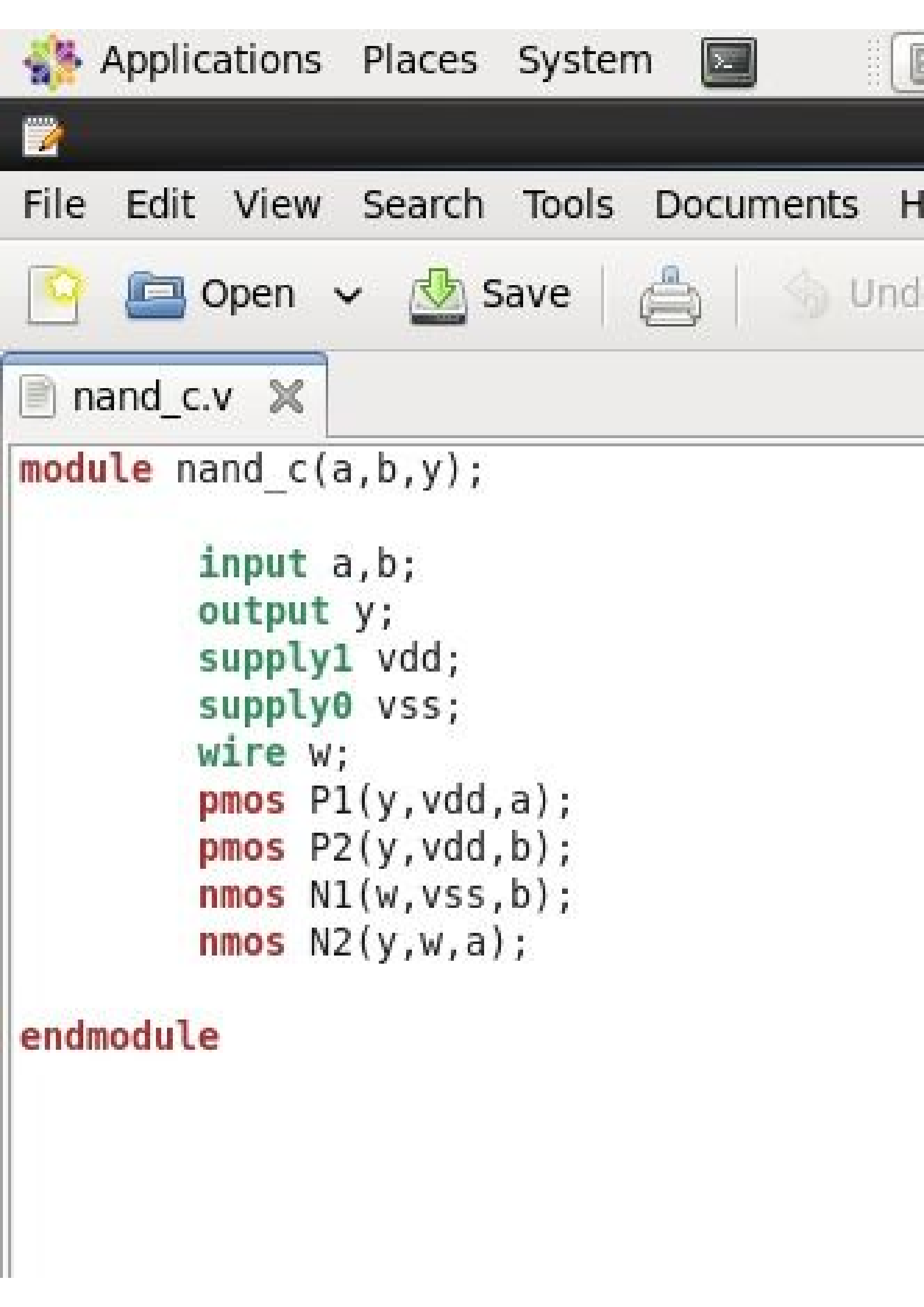

Applications Places System
File Edit View Search Tools Documents
Open
Save
not_c.v
module not_c(a,y);
input a;
output y;
supply1 vdd;
supply0 vss;
pmos P1(y,vdd,a);
nmos N1(y,vss,a);
endmodule




```
module not_c_tb();

        reg a;
        wire y;

        not_c DUT(a,y);

        initial
        begin

        $monitor("a=%b,y=%b",a,y);

        end

        initial
        begin

        #0;a=0;
        #10;a=1;
        #10;
        $finish;
        end
endmodule
```


Applications Places System
7:38 PM buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Send To:
TimeA = 20
ns
20ns + 0
Time: 0 : 20ns
Baseline = 0
Cursor-Baseline = 20ns
Name
Cursor
a
y
1
0
Baseline = 0
TimeA = 20ns
0
1ns
2ns
3ns
4ns
5ns
6ns
7ns
8ns
9ns
10ns
11ns
12ns
13ns
14ns
15ns
16ns
17ns
18ns
19ns


Applications Places System
File Edit View Simulation Windows Help
Text Search:
20ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm not_c_tb.a not_c_tb.y
Created probe 1
ncsim> run
a=0,y=1
a=1,y=0
Simulation complete via $finish(1) at time 20 NS + 0
./not_c_tb.v:21 $finish;
ncsim>




```
module nand_c(a,b,y);

        input a,b;
        output y;
        supply1 vdd;
        supply0 vss;
        wire w;
        pmos P1(y,vdd,a);
        pmos P2(y,vdd,b);
        nmos N1(w,vss,b);
        nmos N2(y,w,a);

endmodule
```

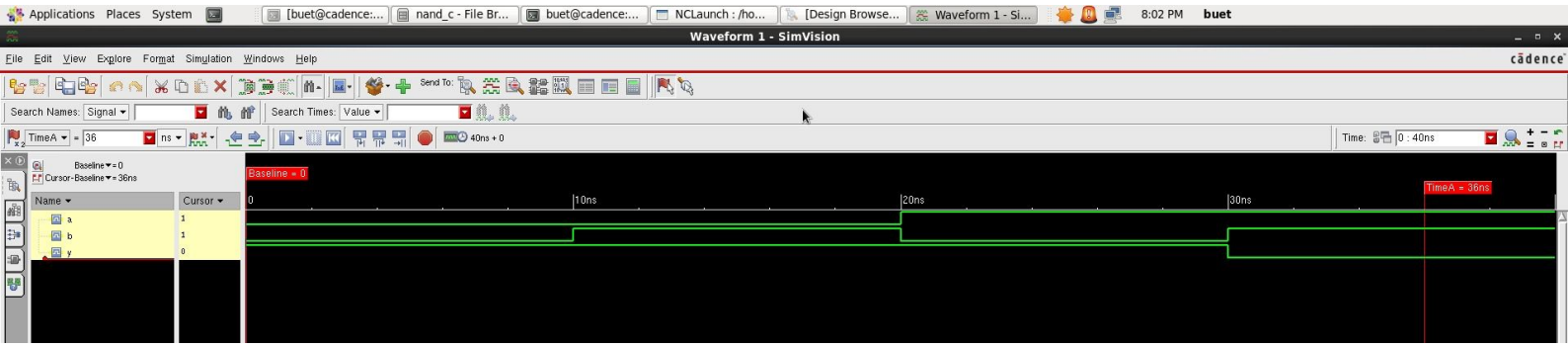
Applications Places System [buet@cadence:~/Doc...

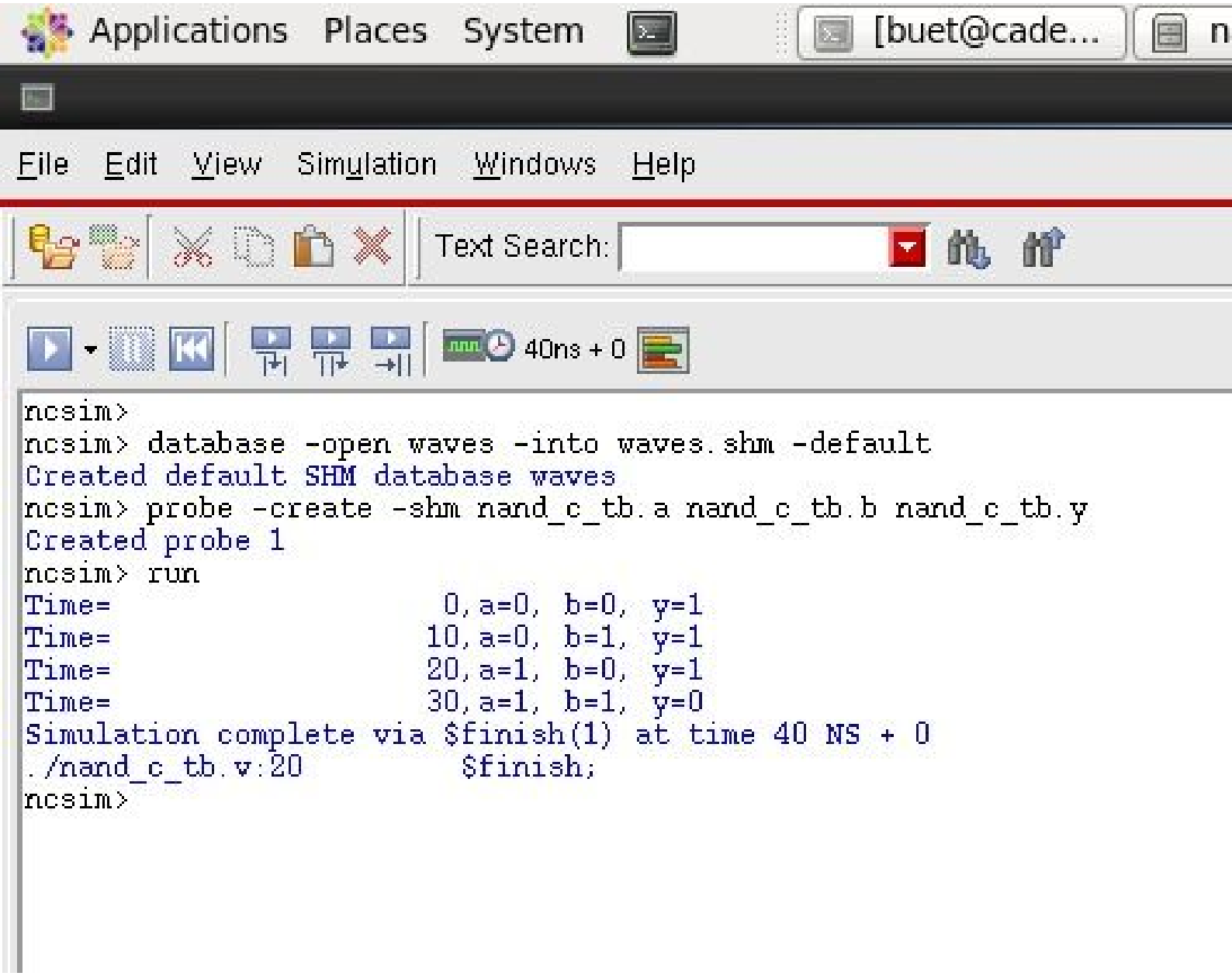
File Edit View Search Tools Documents Help

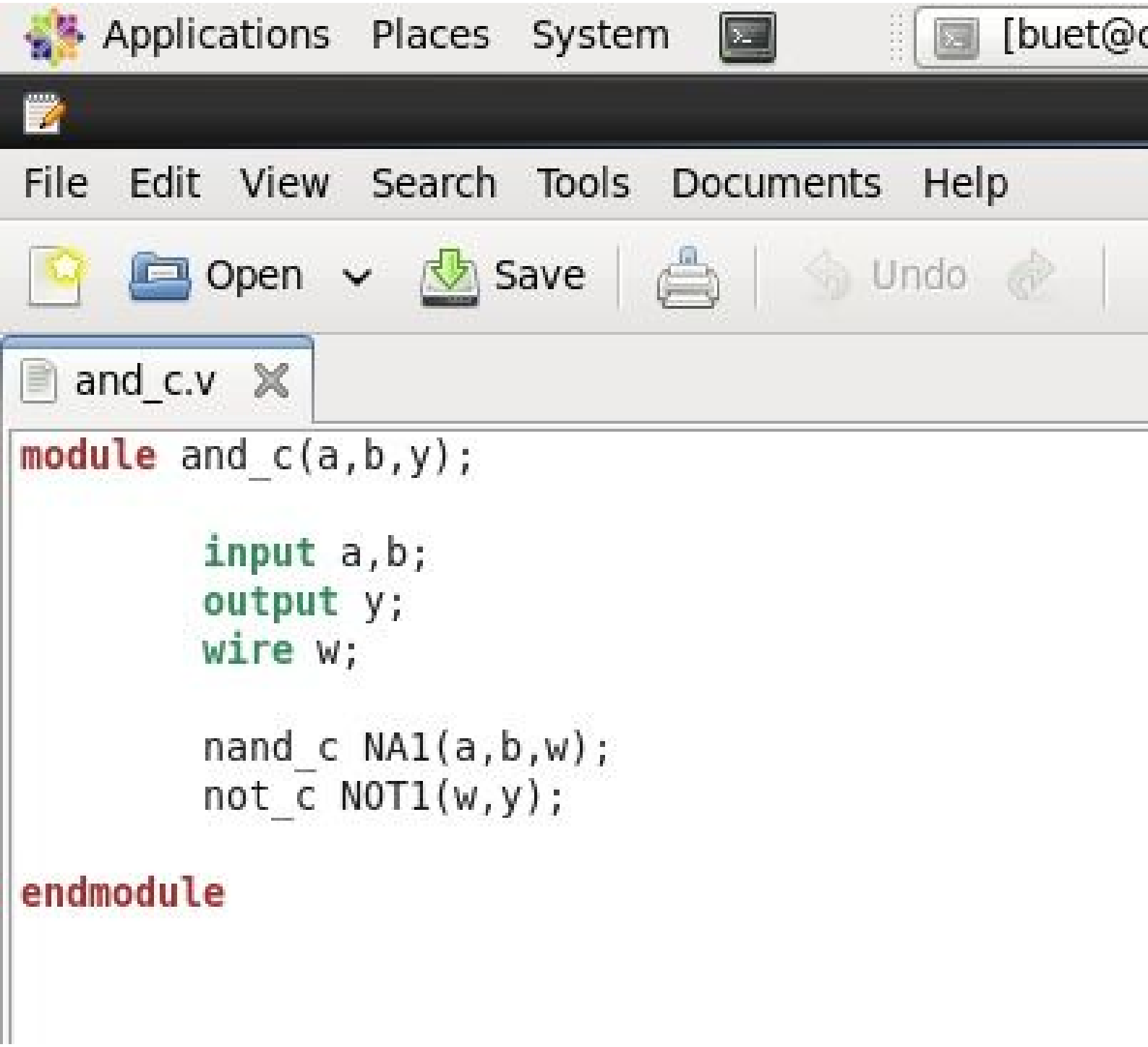
Open Save Undo

nand_c_tb.v

```
module nand_c_tb();

    reg a, b;
    wire y;

    nand_c NA1(a, b, y);

    initial
    begin
        $monitor("Time=%t,a=%b, b=%b, y=%b",$time, a, b, y);
    end

    initial
    begin
        #0;  {a, b} = 2'd0;
        #10; {a, b} = 2'd1;
        #10; {a, b} = 2'd2;
        #10; {a, b} = 2'd3;
        #10;
        $finish;
    end

endmodule
```


Applications Places System
[buet@cadence:...
nand_c - File Br...
buet@cadence:...
NCLaunch : /ho...
[Design Browse...
Waveform 1 - Si...
8:02 PM
buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Send To:
Search Names: Signal
Search Times: Value
TimeA = 36 ns
40ns + 0
Time: 0 : 40ns
Baseline = 0
Cursor-Baseline = 36ns
Name
Cursor
a
b
y
1
1
0
Baseline = 0
0
10ns
20ns
30ns
TimeA = 36ns


Applications Places System
[buet@cade...
File Edit View Simulation Windows Help
Text Search:
40ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm nand_c_tb.a nand_c_tb.b nand_c_tb.y
Created probe 1
ncsim> run
Time= 0, a=0, b=0, y=1
Time= 10, a=0, b=1, y=1
Time= 20, a=1, b=0, y=1
Time= 30, a=1, b=1, y=0
Simulation complete via $finish(1) at time 40 NS + 0
./nand_c_tb.v:20 $finish;
ncsim>


Applications Places System
[buet@
File Edit View Search Tools Documents Help
Open
Save
Undo
and_c.v
module and_c(a,b,y);
input a,b;
output y;
wire w;
nand_c NA1(a,b,w);
not_c NOT1(w,y);
endmodule

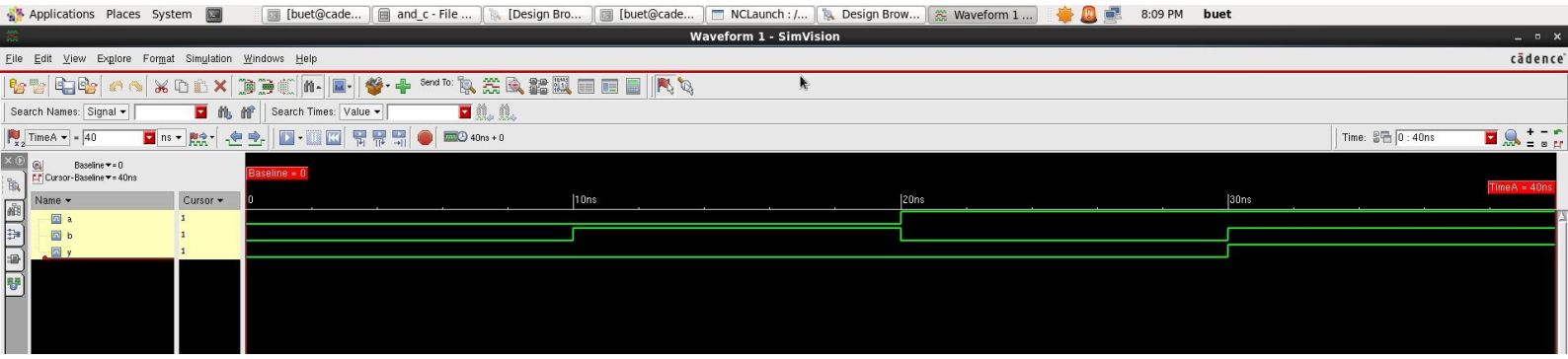
Applications Places System [buet@cadence:~/D... and_c - File E

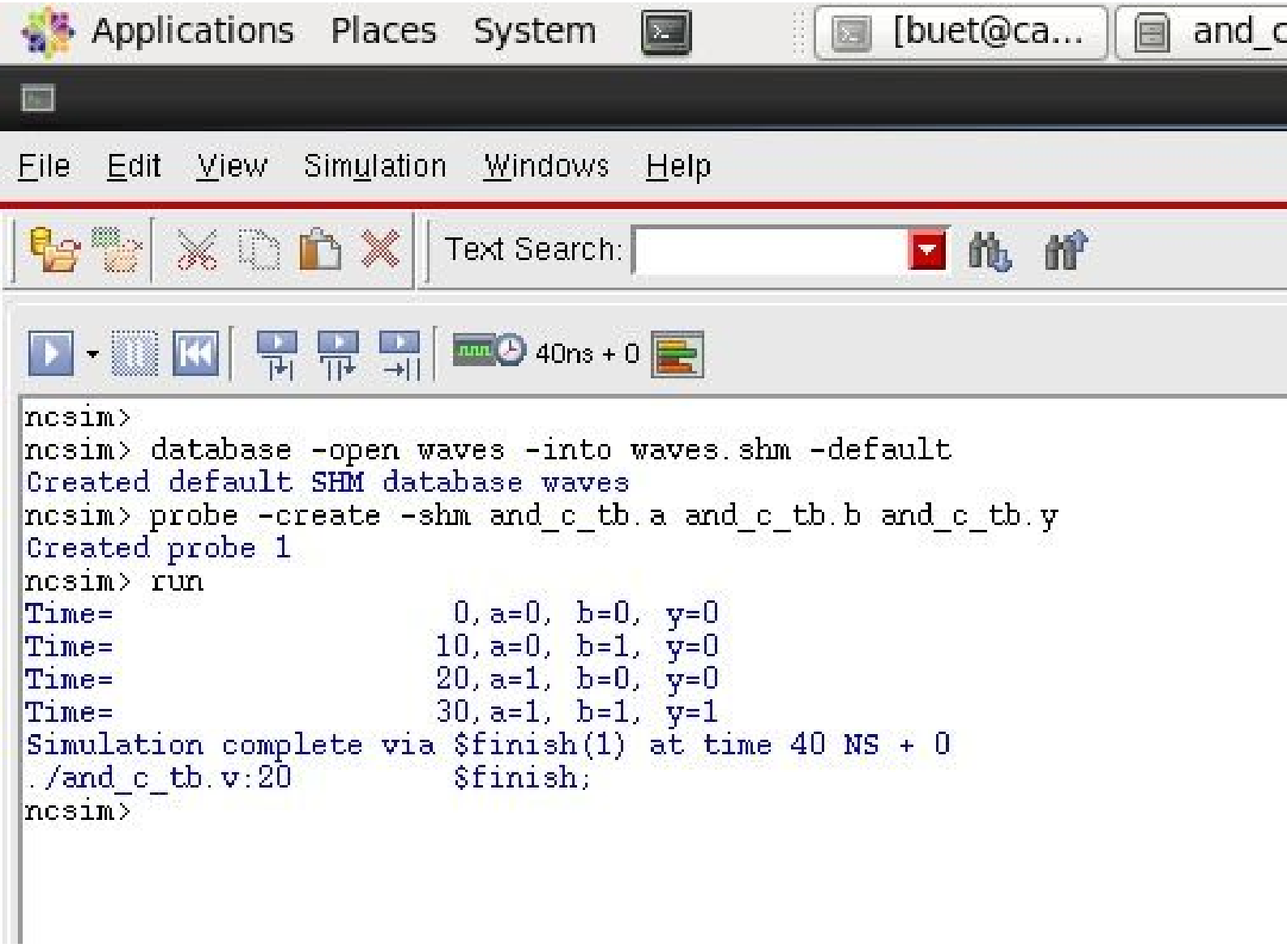
File Edit View Search Tools Documents Help

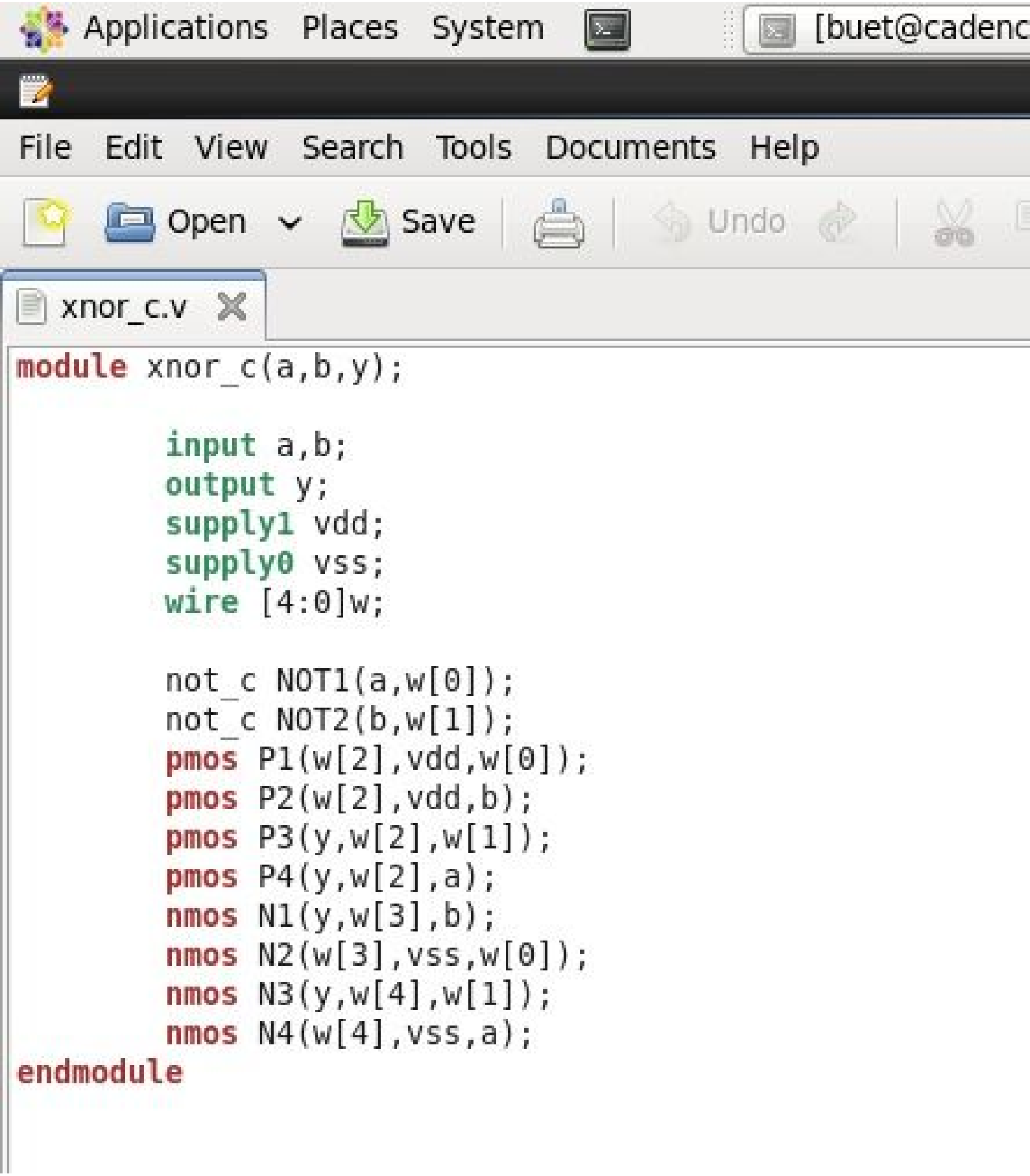
Open Save Undo

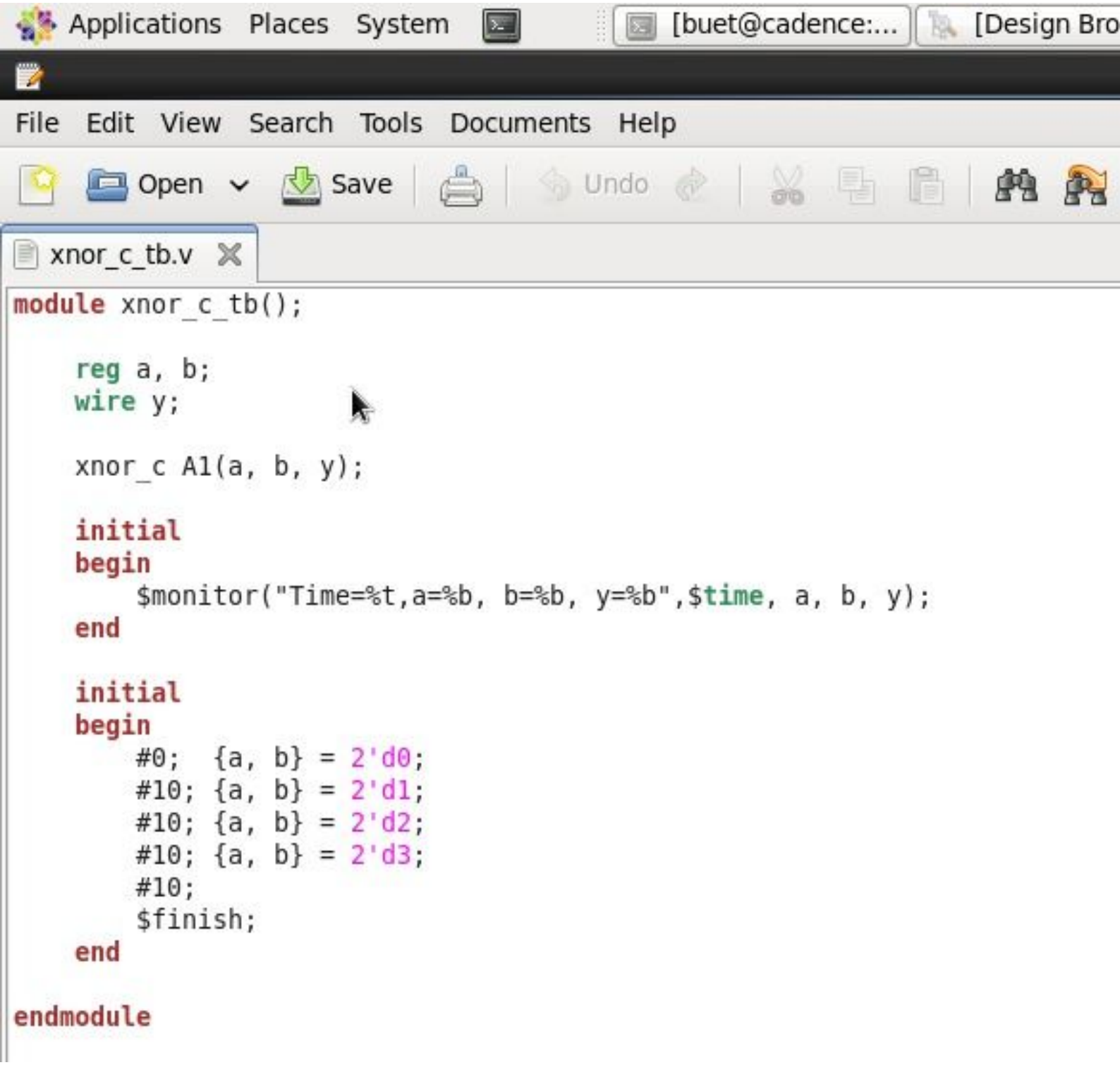
and_c_tb.v

```
module and_c_tb();

    reg a, b;
    wire y;

    and_c A1(a, b, y);

    initial
    begin
        $monitor("Time=%t,a=%b, b=%b, y=%b",$time, a, b, y);
    end

    initial
    begin
        #0;  {a, b} = 2'd0;
        #10; {a, b} = 2'd1;
        #10; {a, b} = 2'd2;
        #10; {a, b} = 2'd3;
        #10;
        $finish;
    end

endmodule
```

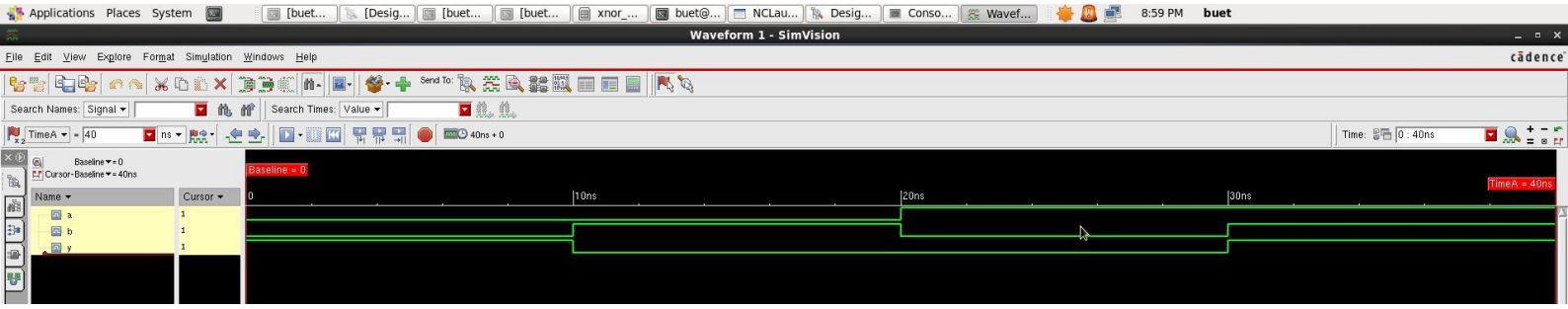

Applications Places System
[buet@cade...
and_c - File ...
[Design Bro...
[buet@cade...
NCLaunch : /...
Design Brow...
Waveform 1 ...
8:09 PM
buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Send To:
Search Names: Signal
Search Times: Value
TimeA
40
ns
40ns + 0
Time: 0 : 40ns
Baseline = 0
Cursor-Baseline = 40ns
Name
Cursor
a
b
y
1
1
1
Baseline = 0
0
10ns
20ns
30ns
TimeA = 40ns

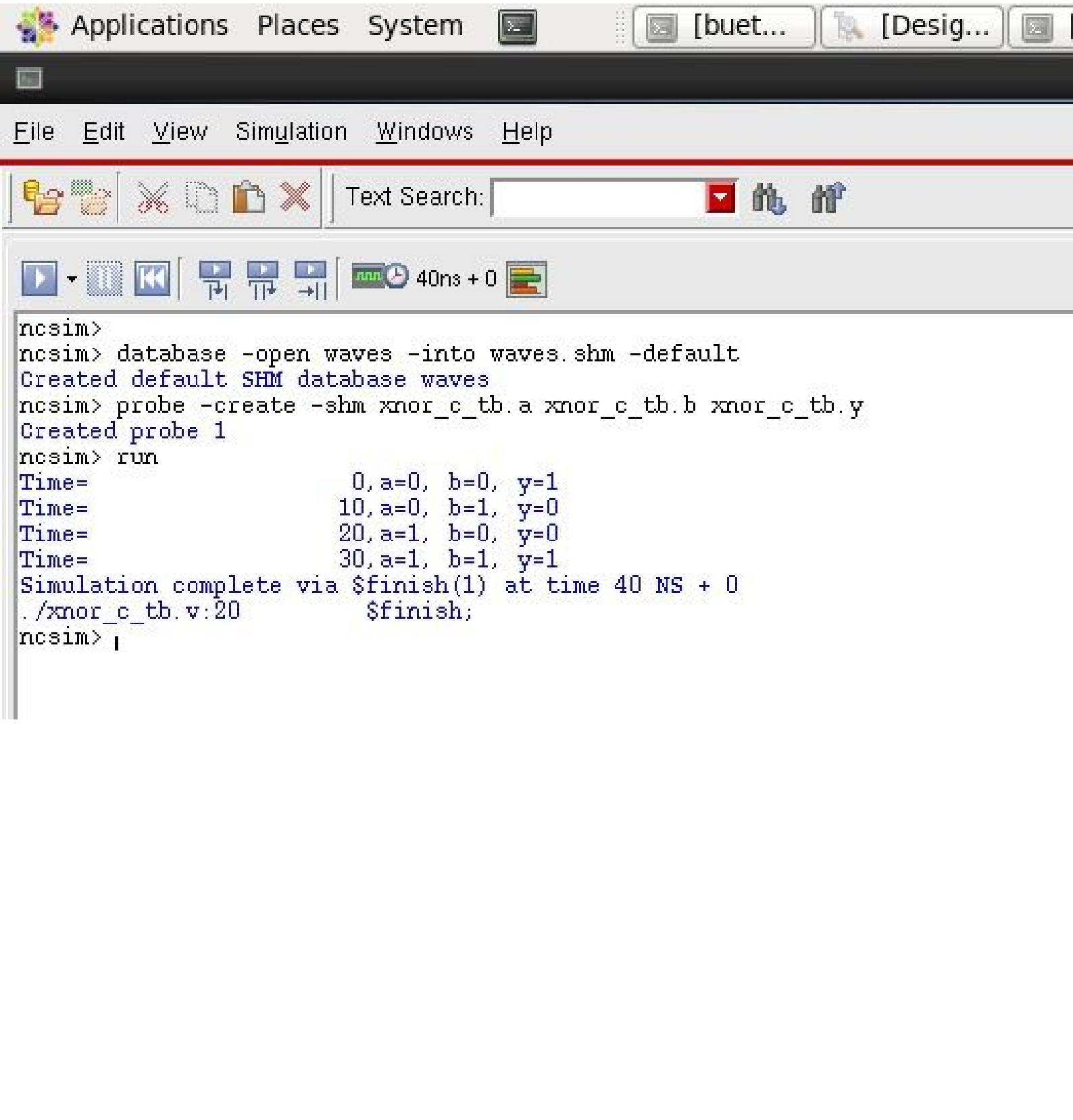

Applications Places System
[buet@ca...
and_c
File Edit View Simulation Windows Help
Text Search:
40ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm and_c_tb.a and_c_tb.b and_c_tb.y
Created probe 1
ncsim> run
Time= 0, a=0, b=0, y=0
Time= 10, a=0, b=1, y=0
Time= 20, a=1, b=0, y=0
Time= 30, a=1, b=1, y=1
Simulation complete via $finish(1) at time 40 NS + 0
./and_c_tb.v:20 $finish;
ncsim>

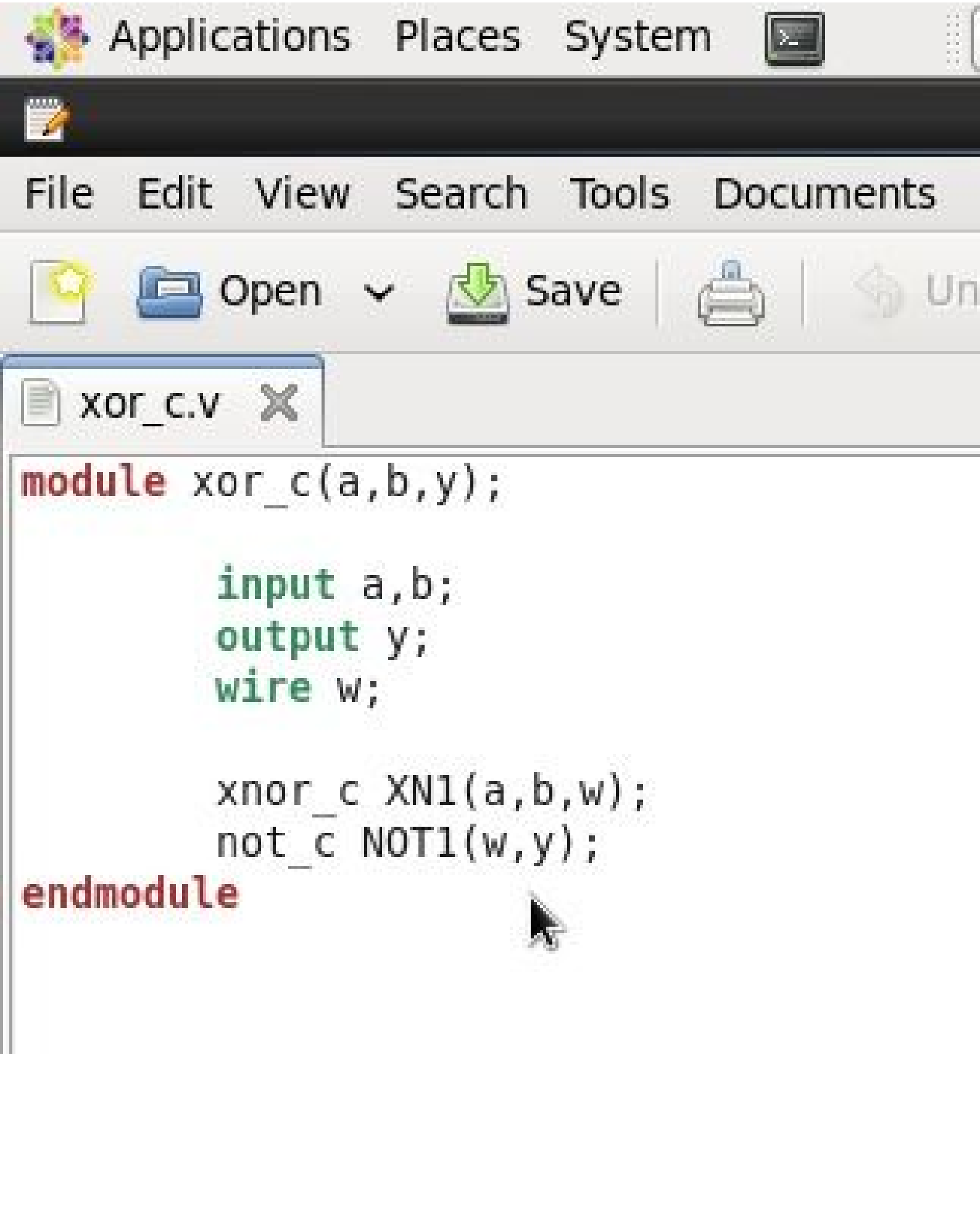

Applications Places System
[buet@cadenc
File Edit View Search Tools Documents Help
Open
Save
Undo
xnor_c.v
module xnor_c(a,b,y);
input a,b;
output y;
supply1 vdd;
supply0 vss;
wire [4:0]w;
not_c NOT1(a,w[0]);
not_c NOT2(b,w[1]);
pmos P1(w[2],vdd,w[0]);
pmos P2(w[2],vdd,b);
pmos P3(y,w[2],w[1]);
pmos P4(y,w[2],a);
nmos N1(y,w[3],b);
nmos N2(w[3],vss,w[0]);
nmos N3(y,w[4],w[1]);
nmos N4(w[4],vss,a);
endmodule

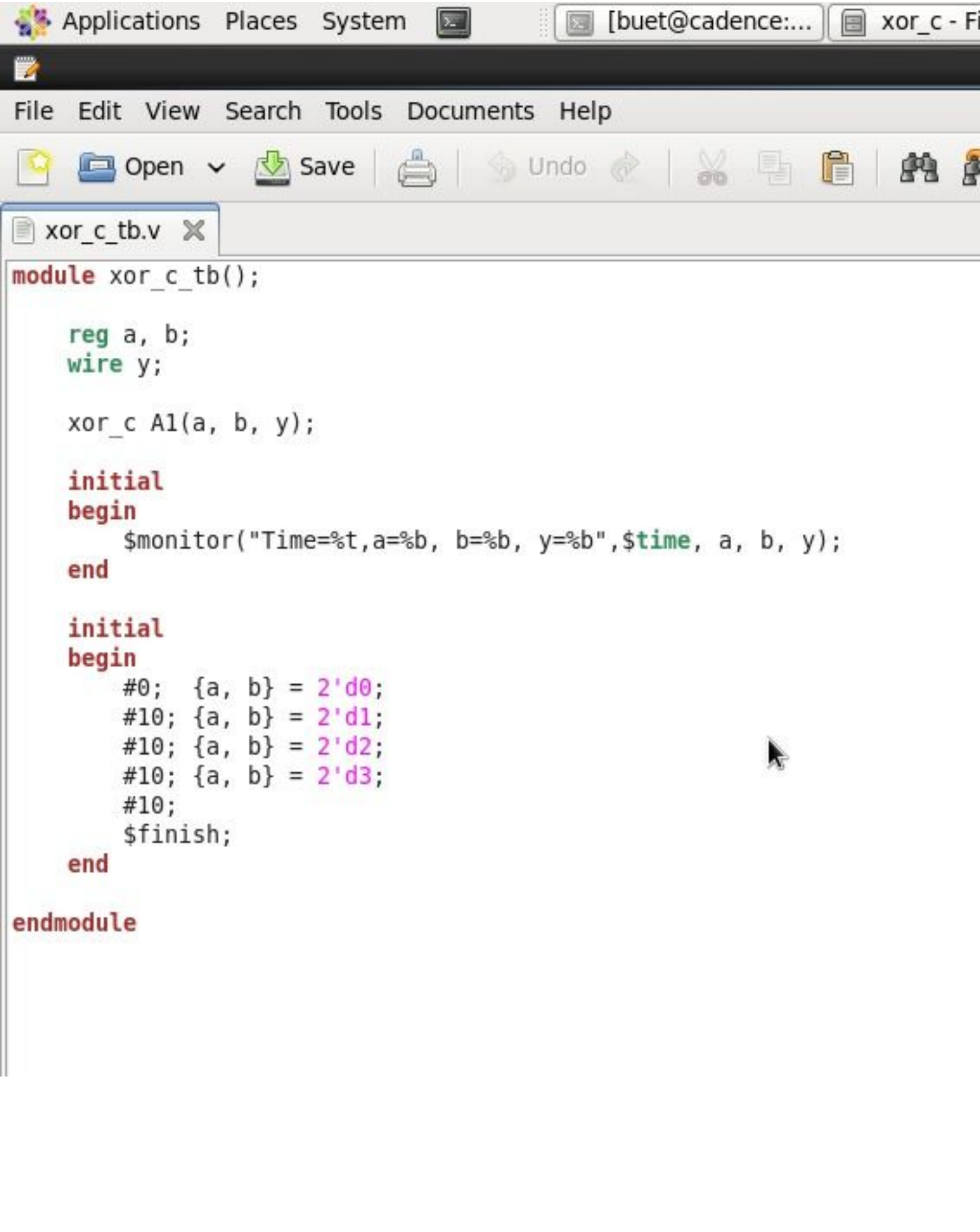


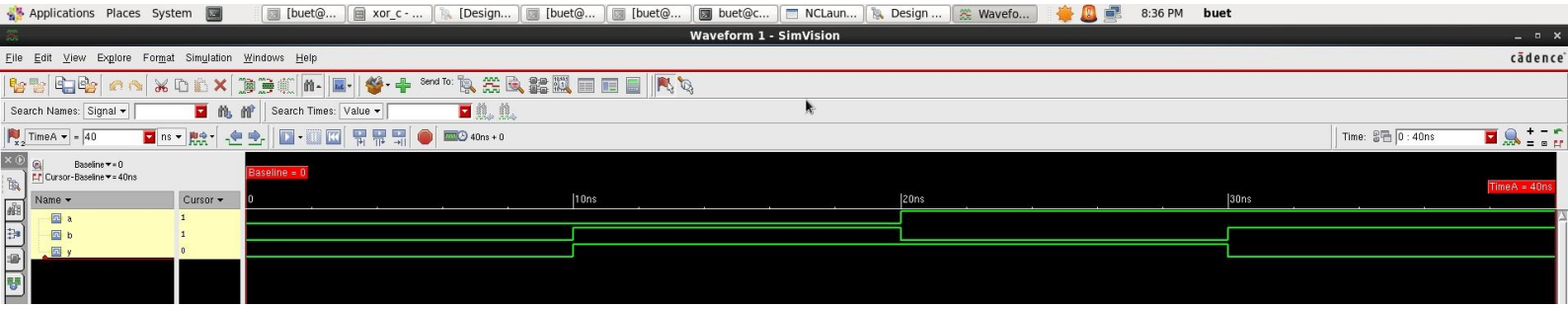

```
module xnor_c_tb();

    reg a, b;
    wire y;

    xnor_c A1(a, b, y);

    initial
    begin
        $monitor("Time=%t,a=%b, b=%b, y=%b",$time, a, b, y);
    end

    initial
    begin
        #0;  {a, b} = 2'd0;
        #10; {a, b} = 2'd1;
        #10; {a, b} = 2'd2;
        #10; {a, b} = 2'd3;
        #10;
        $finish;
    end

endmodule
```

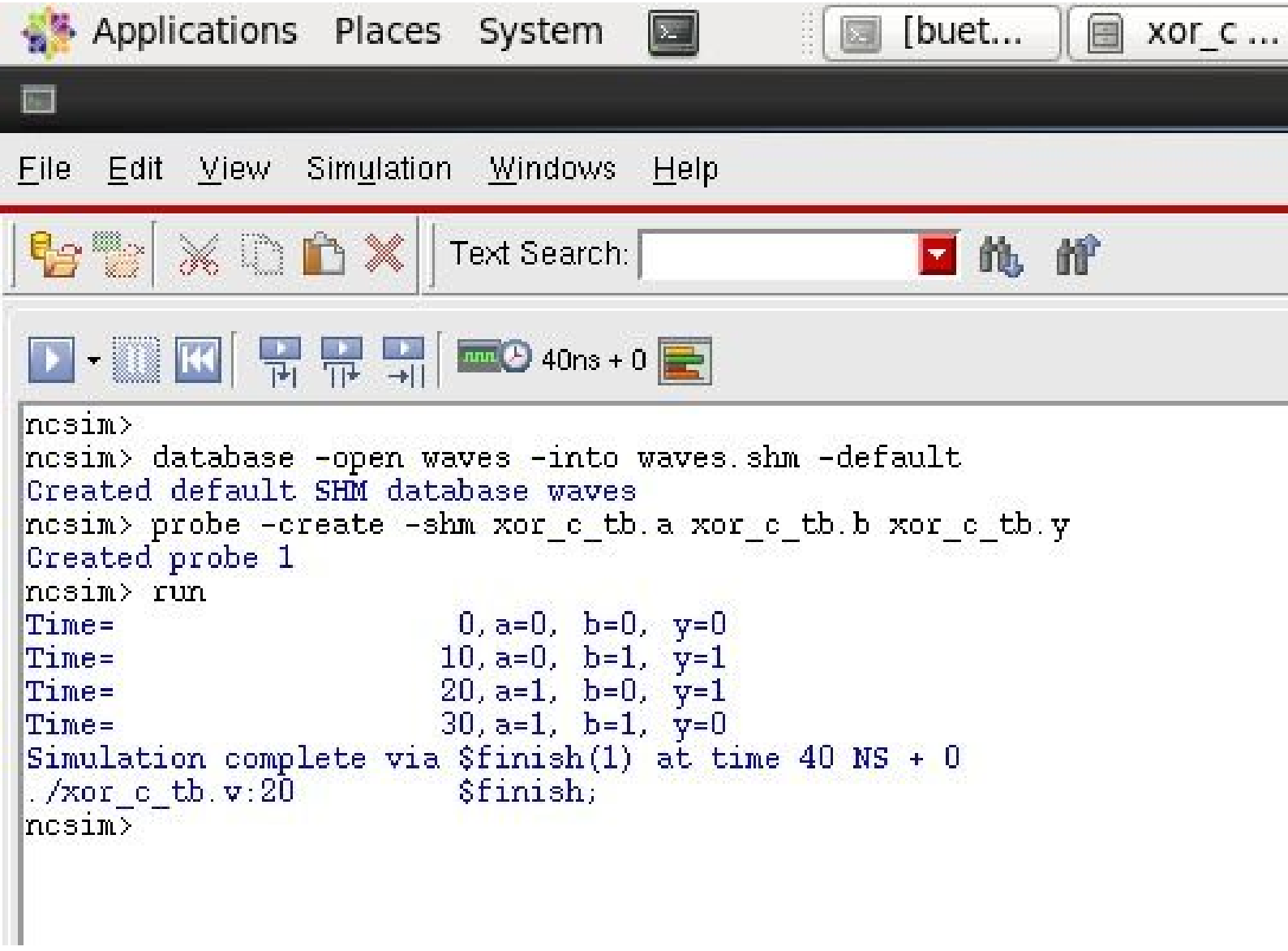

Applications Places System
8:59 PM buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Send To:
TimeA = 40 ns
Time: 0 : 40ns
Baseline = 0
Cursor-Baseline = 40ns
Name
Cursor
a
b
y
1
1
1
Baseline = 0
0
10ns
20ns
30ns
TimeA = 40ns

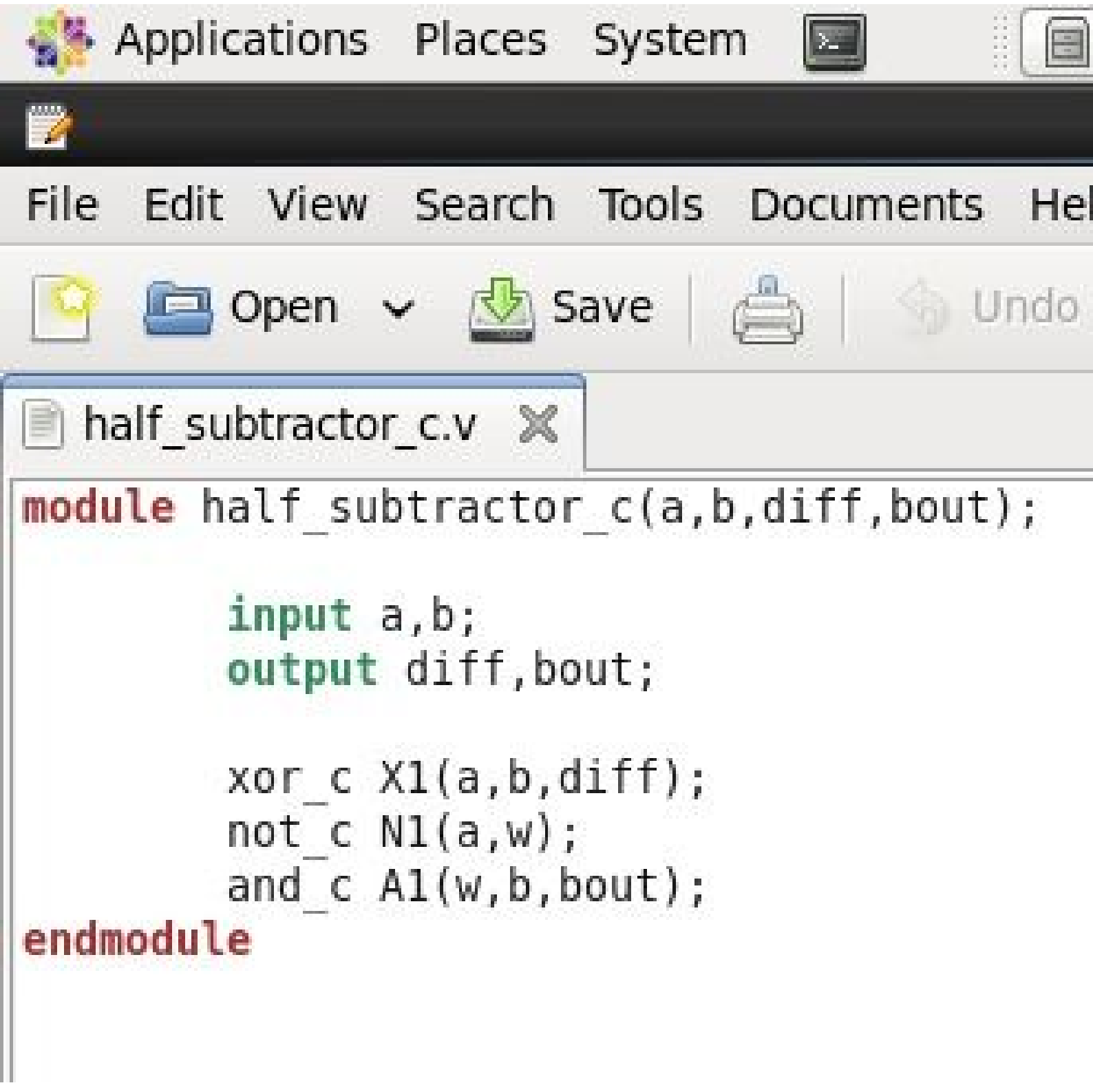

Applications Places System
[buet...
[Desig...
File Edit View Simulation Windows Help
Text Search:
40ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm xnor_c_tb.a xnor_c_tb.b xnor_c_tb.y
Created probe 1
ncsim> run
Time= 0, a=0, b=0, y=1
Time= 10, a=0, b=1, y=0
Time= 20, a=1, b=0, y=0
Time= 30, a=1, b=1, y=1
Simulation complete via $finish(1) at time 40 NS + 0
./xnor_c_tb.v:20 $finish;
ncsim>


Applications Places System
File Edit View Search Tools Documents
Open
Save
xor_c.v
module xor_c(a,b,y);
input a,b;
output y;
wire w;
xnor_c XN1(a,b,w);
not_c NOT1(w,y);
endmodule


Applications Places System
[buet@cadence:...
xor_c - Fi
File Edit View Search Tools Documents Help
Open
Save
Undo
xor_c_tb.v
module xor_c_tb();
reg a, b;
wire y;
xor_c A1(a, b, y);
initial
begin
$monitor("Time=%t,a=%b, b=%b, y=%b",$time, a, b, y);
end
initial
begin
#0; {a, b} = 2'd0;
#10; {a, b} = 2'd1;
#10; {a, b} = 2'd2;
#10; {a, b} = 2'd3;
#10;
$finish;
end
endmodule


Applications Places System
8:36 PM buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Send To:
TimeA = 40
ns
40ns + 0
Time: 0 : 40ns
Baseline = 0
Cursor-Baseline = 40ns
Name
Cursor
a
b
y
1
1
0
Baseline = 0
0
10ns
20ns
30ns
TimeA = 40ns


Applications Places System
[buet...
xor_c ...
File Edit View Simulation Windows Help
Text Search:
40ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm xor_c_tb.a xor_c_tb.b xor_c_tb.y
Created probe 1
ncsim> run
Time= 0, a=0, b=0, y=0
Time= 10, a=0, b=1, y=1
Time= 20, a=1, b=0, y=1
Time= 30, a=1, b=1, y=0
Simulation complete via $finish(1) at time 40 NS + 0
./xor_c_tb.v:20 $finish;
ncsim>


Applications Places System
File Edit View Search Tools Documents Hel
Open
Save
Undo
half_subtractor_c.v
module half_subtractor_c(a,b,diff,bout);
input a,b;
output diff,bout;
xor_c X1(a,b,diff);
not_c N1(a,w);
and_c A1(w,b,bout);
endmodule

Applications Places System half_subtractor_c - File... buet@cadenc

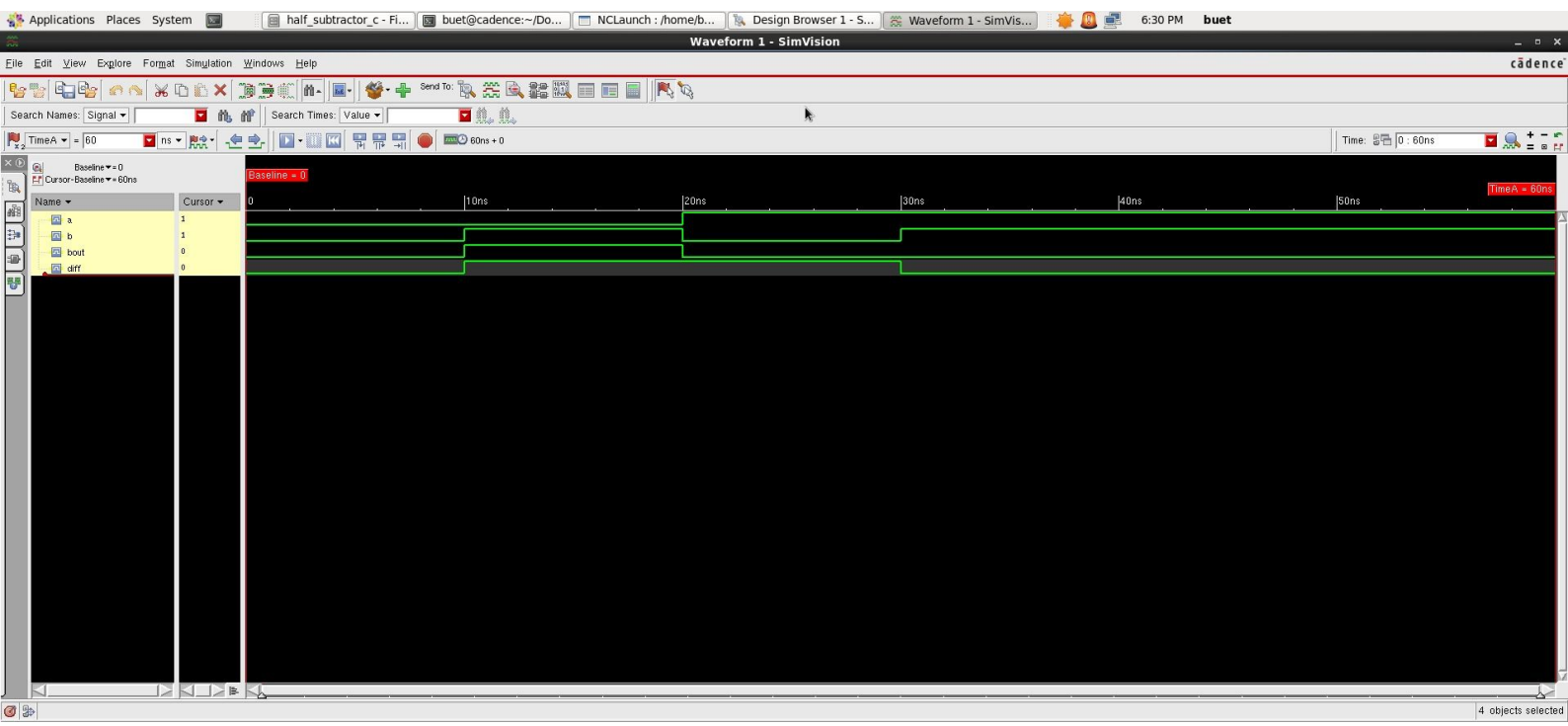
half_su

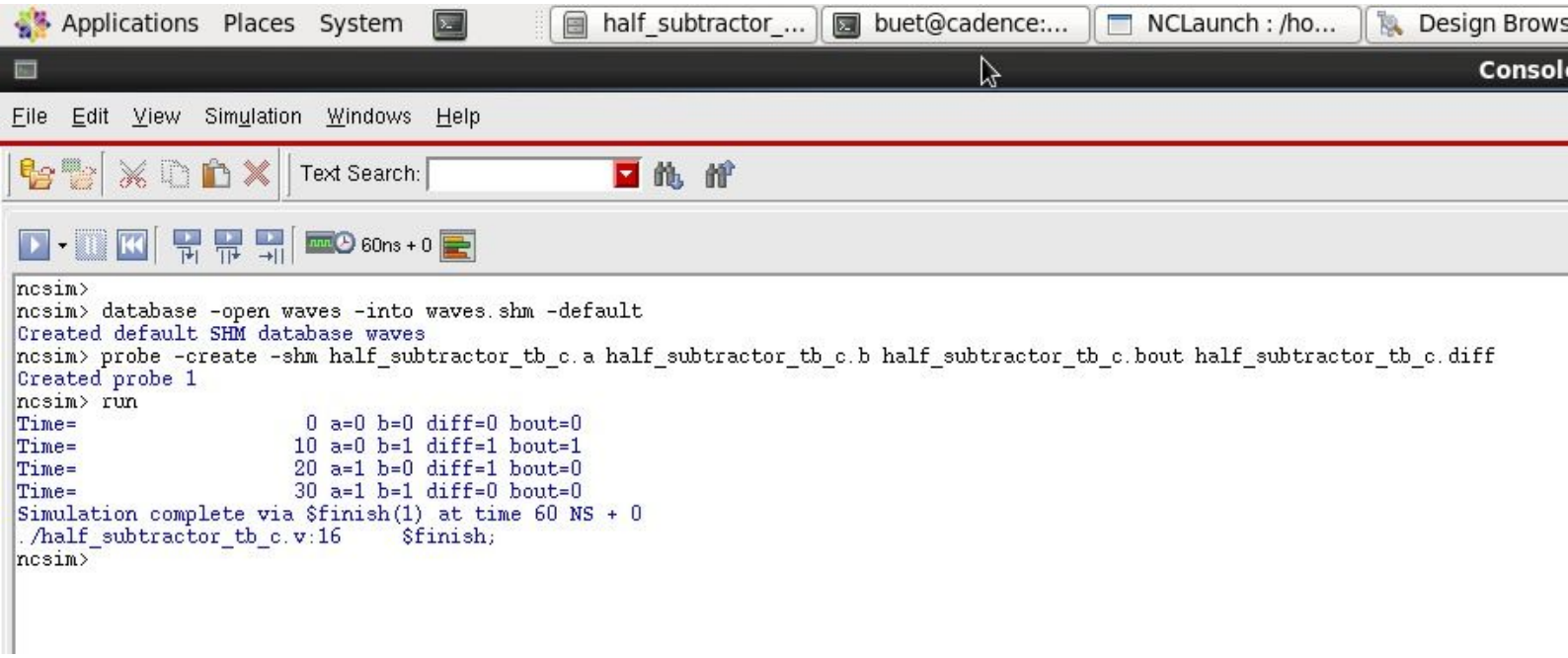
File Edit View Search Tools Documents Help

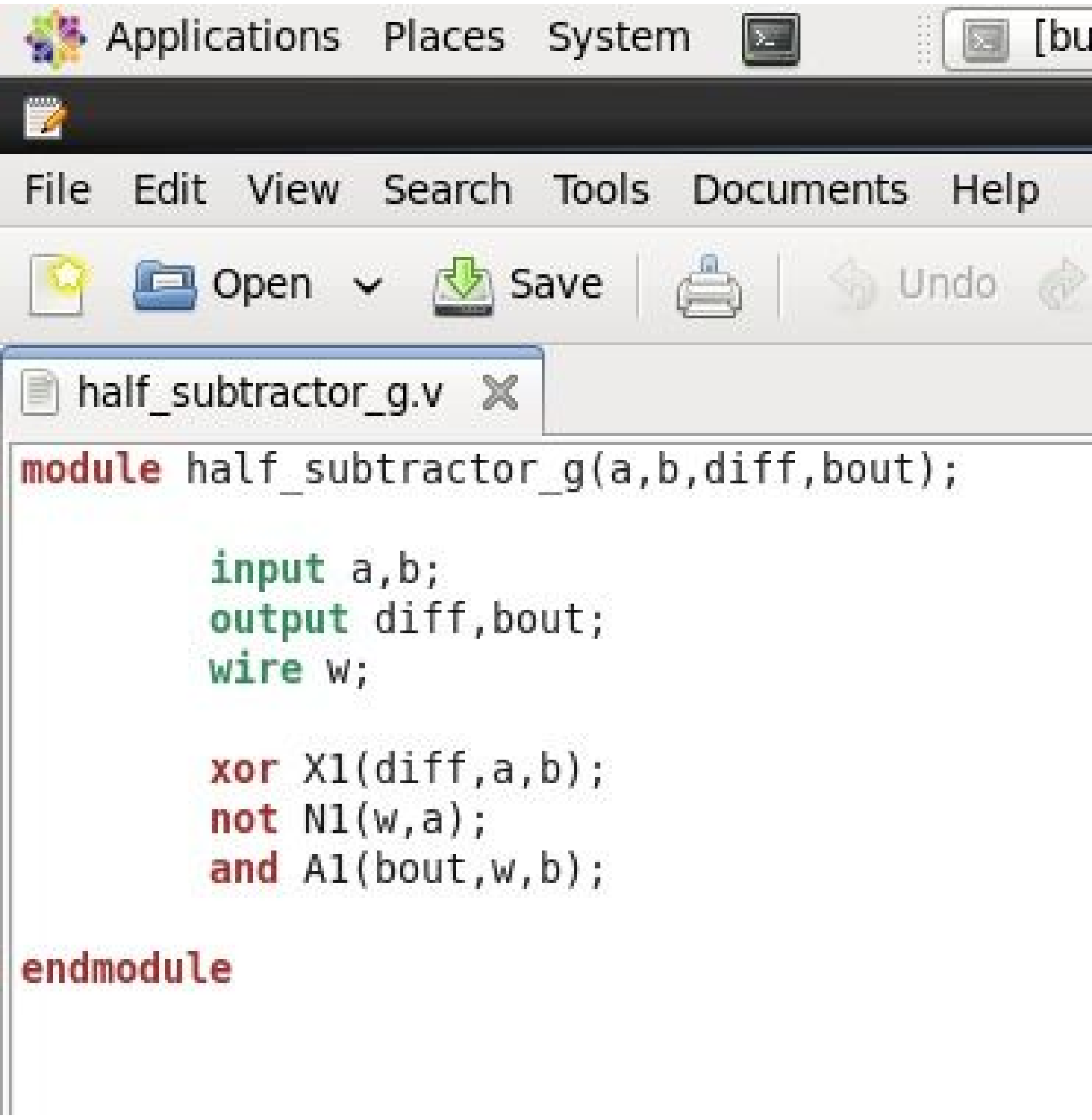
Open Save Undo

half_subtractor_tb_c.v

```
module half_subtractor_tb_c();

        reg a,b;
        wire diff,bout;

        half_subtractor_c HS1(a,b,diff,bout);

        initial
        begin

         #0; {a,b}= 2'd0;
        #10; {a,b}= 2'd1;
        #10; {a,b}= 2'd2;
        #10; {a,b}= 2'd3;
        #30;
        $finish;

        end

        initial
        begin

        $monitor("Time=%t a=%b b=%b diff=%b bout=%b",$time,a,b,diff,bout);

        end
endmodule
```


Applications Places System
half_subtractor_c - Fi...
buet@cadence:~/Do...
NCLaunch : /home/b...
Design Browser 1 - S...
Waveform 1 - SimVis...
6:30 PM
buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Send To:
TimeA = 60 ns
Time: 0 : 60ns
Baseline = 0
Cursor-Baseline = 60ns
Name
Cursor
a
b
bout
diff
1
1
0
0
Baseline = 0
TimeA = 60ns
0
10ns
20ns
30ns
40ns
50ns
4 objects selected


Applications Places System
half_subtractor_...
buet@cadence:...
NCLaunch : /ho...
Design Brows
Consol
File Edit View Simulation Windows Help
Text Search:
60ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm half_subtractor_tb_c.a half_subtractor_tb_c.b half_subtractor_tb_c.bout half_subtractor_tb_c.diff
Created probe 1
ncsim> run
Time= 0 a=0 b=0 diff=0 bout=0
Time= 10 a=0 b=1 diff=1 bout=1
Time= 20 a=1 b=0 diff=1 bout=0
Time= 30 a=1 b=1 diff=0 bout=0
Simulation complete via $finish(1) at time 60 NS + 0
./half_subtractor_tb_c.v:16 $finish;
ncsim>


Applications Places System
File Edit View Search Tools Documents Help
Open
Save
Undo
half_subtractor_g.v
module half_subtractor_g(a,b,diff,bout);
input a,b;
output diff,bout;
wire w;
xor X1(diff,a,b);
not N1(w,a);
and A1(bout,w,b);
endmodule

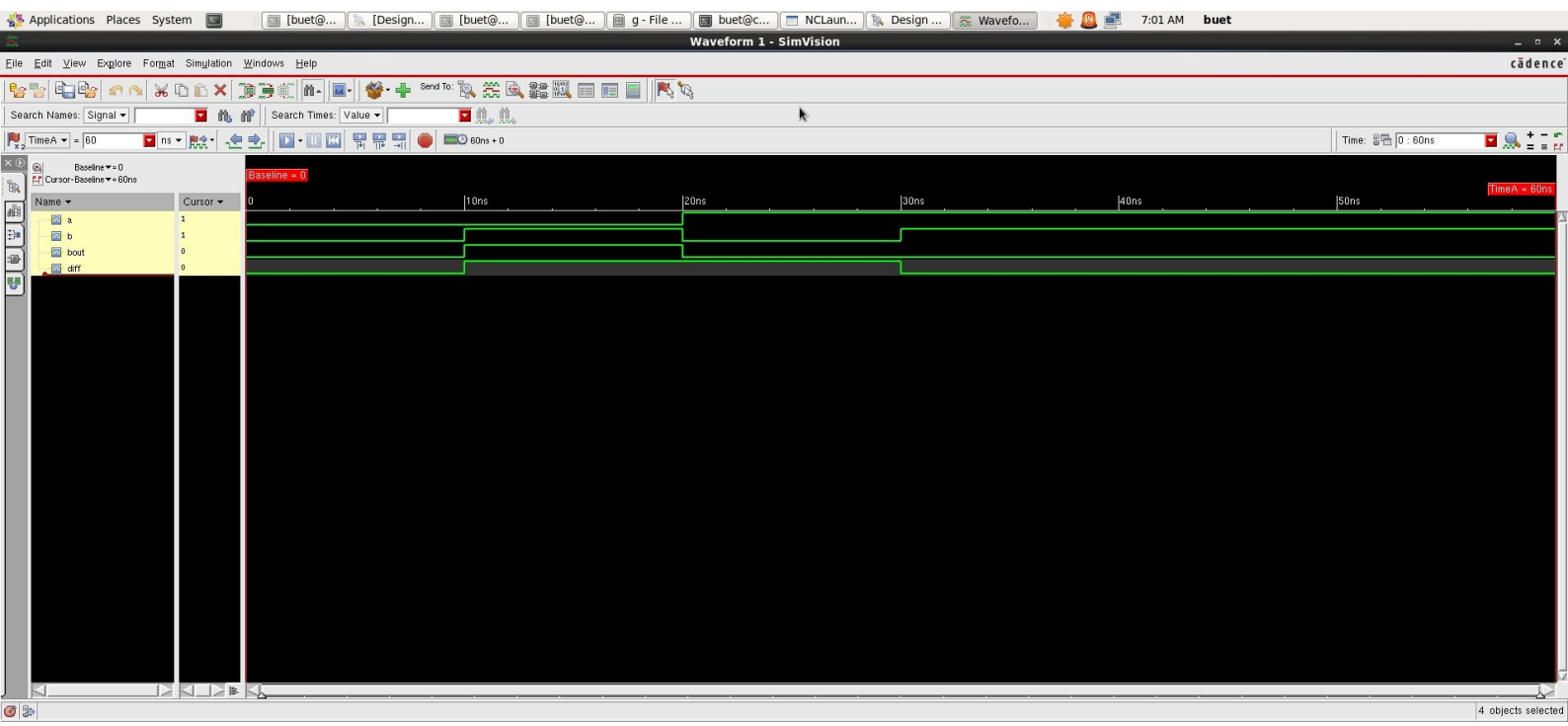
Applications Places System [buet@cadence:... [Design Browse...

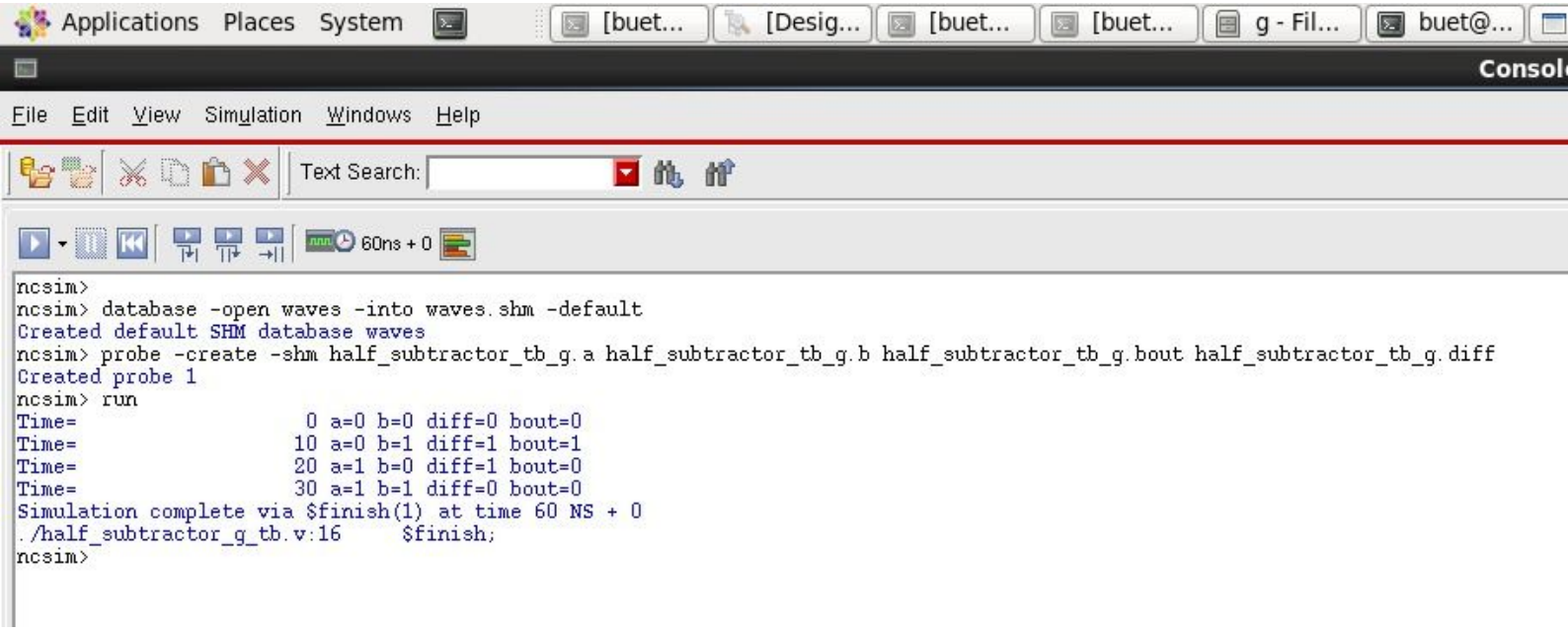
File Edit View Search Tools Documents Help

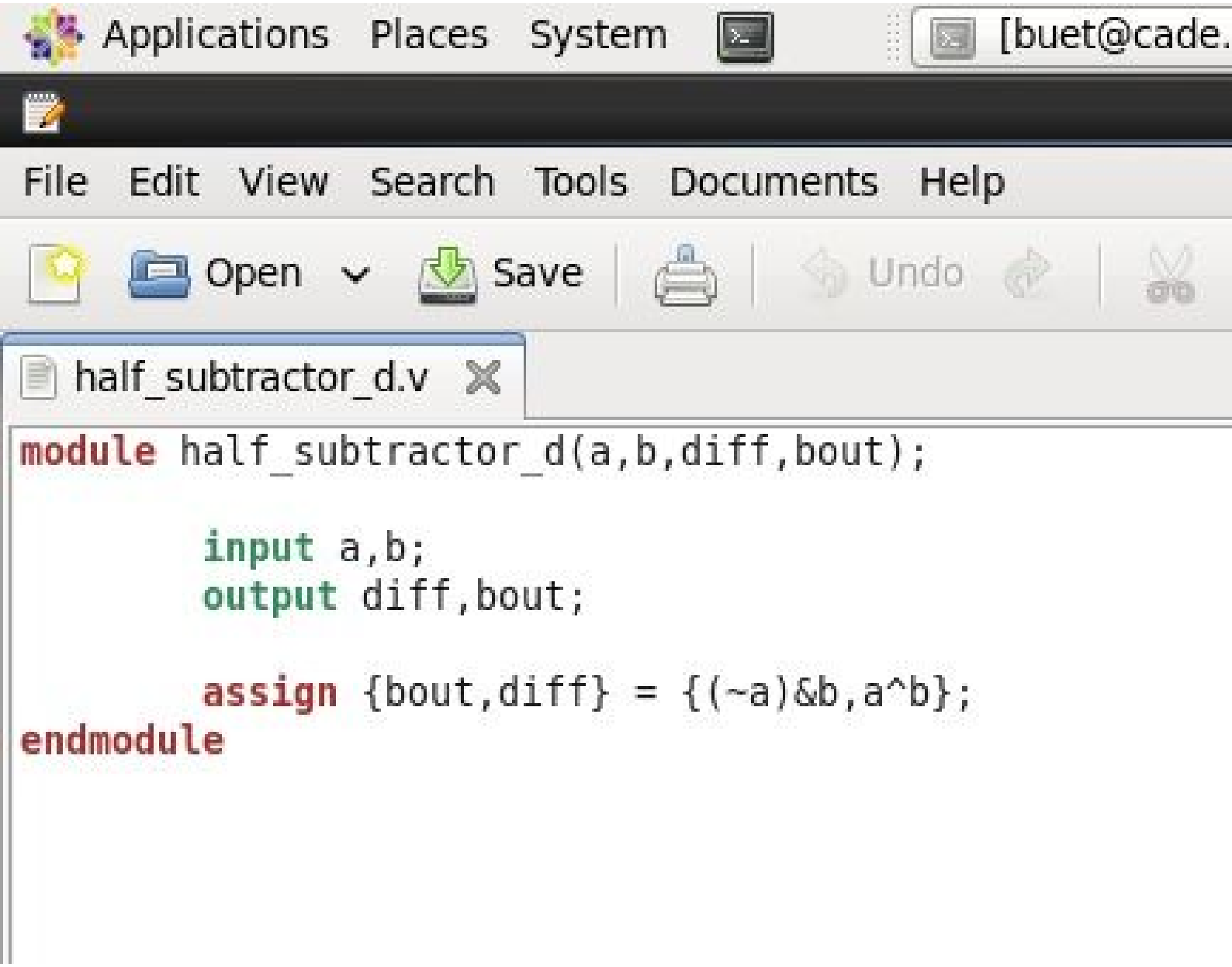
Open Save Undo

half_subtractor_g_tb.v

```
module half_subtractor_tb_g();

        reg a,b;
        wire diff,bout;

        half_subtractor_g HS1(a,b,diff,bout);

        initial
        begin

         #0; {a,b}= 2'd0;
        #10; {a,b}= 2'd1;
        #10; {a,b}= 2'd2;
        #10; {a,b}= 2'd3;
        #30;
        $finish;

        end

        initial
        begin

        $monitor("Time=%t a=%b b=%b diff=%b bout=%b",$time,a,b,diff,bout);

        end
endmodule
```


Applications Places System
7:01 AM buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Send To:
TimeA = 60 ns
Time: 0 : 60ns
Baseline = 0
Cursor-Baseline = 60ns
Name
Cursor
a
b
bout
diff
1
1
0
0
Baseline = 0
0
10ns
20ns
30ns
40ns
50ns
TimeA = 60ns
4 objects selected


Applications Places System
[buet...
[Desig...
[buet...
[buet...
g - Fil...
buet@...
File Edit View Simulation Windows Help
Text Search:
60ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm half_subtractor_tb_g.a half_subtractor_tb_g.b half_subtractor_tb_g.bout half_subtractor_tb_g.diff
Created probe 1
ncsim> run
Time= 0 a=0 b=0 diff=0 bout=0
Time= 10 a=0 b=1 diff=1 bout=1
Time= 20 a=1 b=0 diff=1 bout=0
Time= 30 a=1 b=1 diff=0 bout=0
Simulation complete via $finish(1) at time 60 NS + 0
./half_subtractor_g_tb.v:16 $finish;
ncsim>


Applications Places System
[buet@cade.
File Edit View Search Tools Documents Help
Open
Save
Undo
half_subtractor_d.v
module half_subtractor_d(a,b,diff,bout);
input a,b;
output diff,bout;
assign {bout,diff} = {(~a)&b,a^b};
endmodule

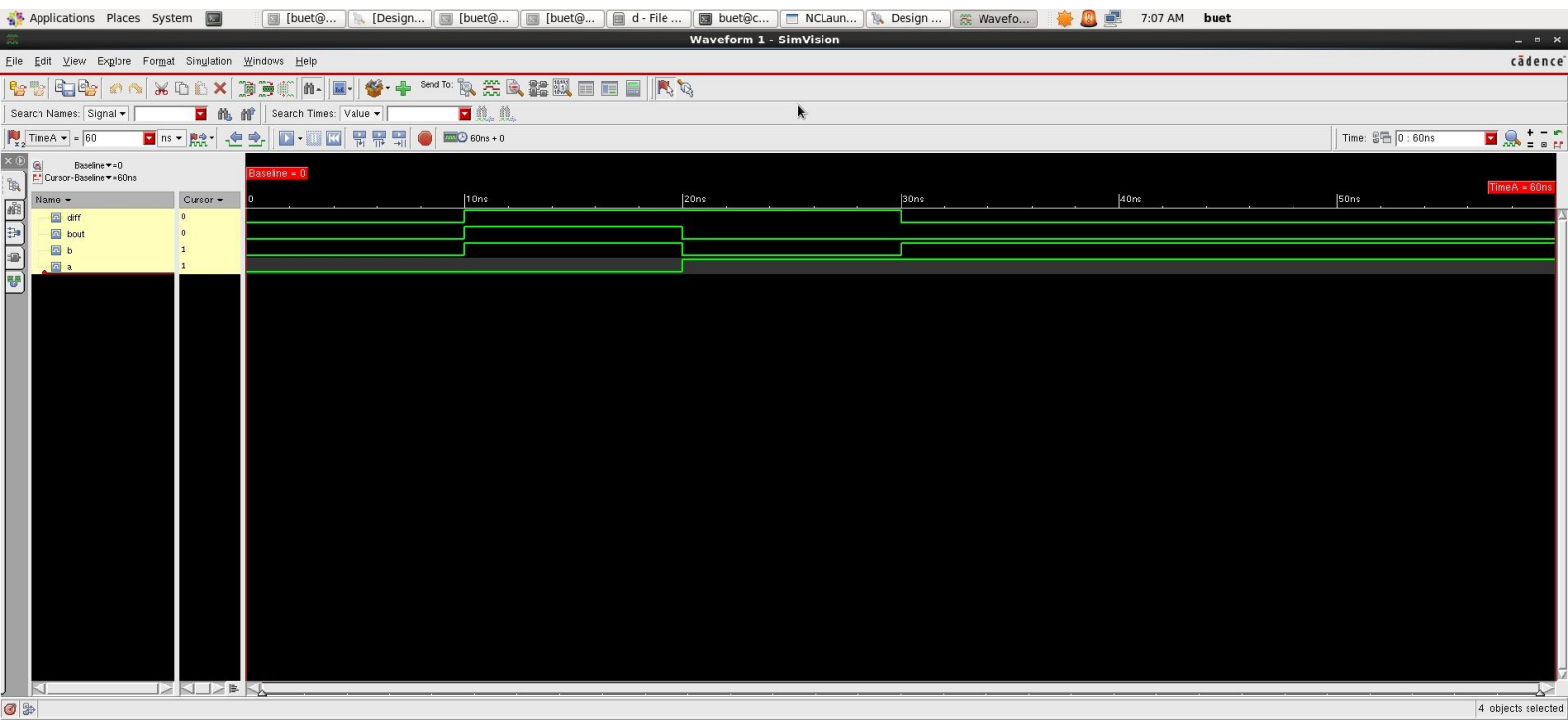
Applications Places System [buet@cade... [Design Bro... [buet

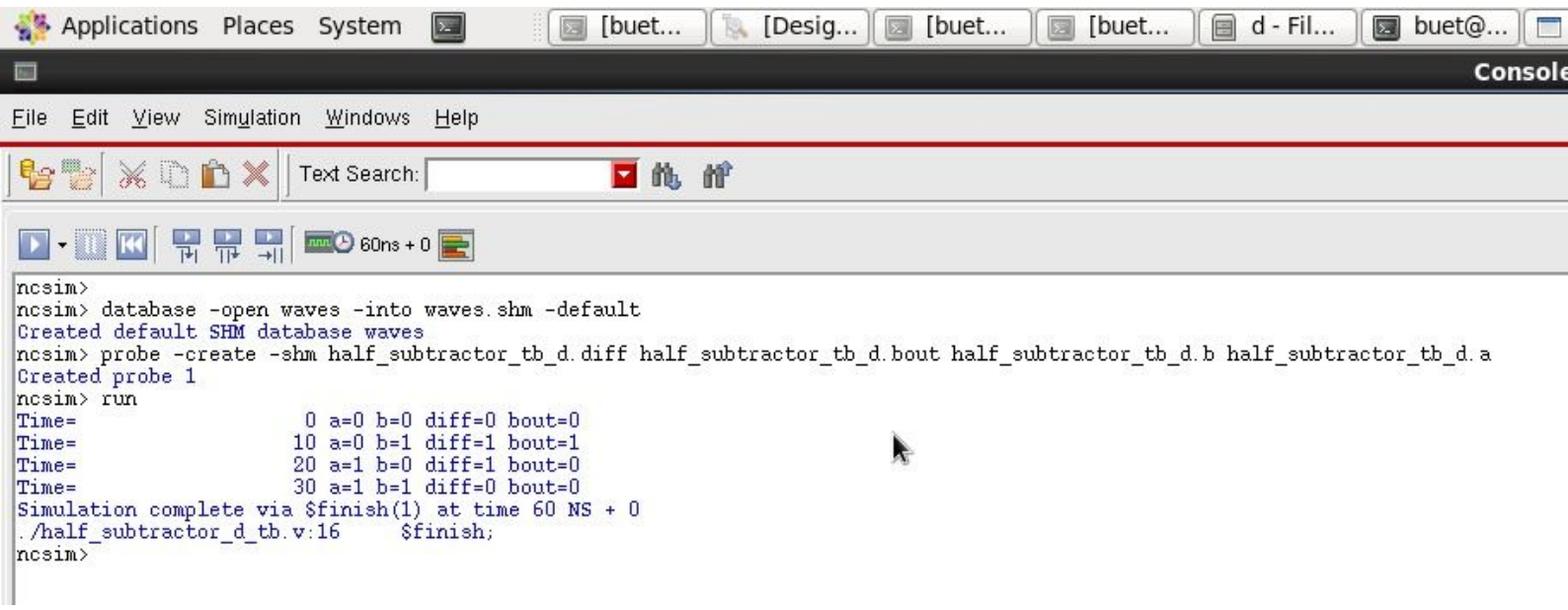
File Edit View Search Tools Documents Help

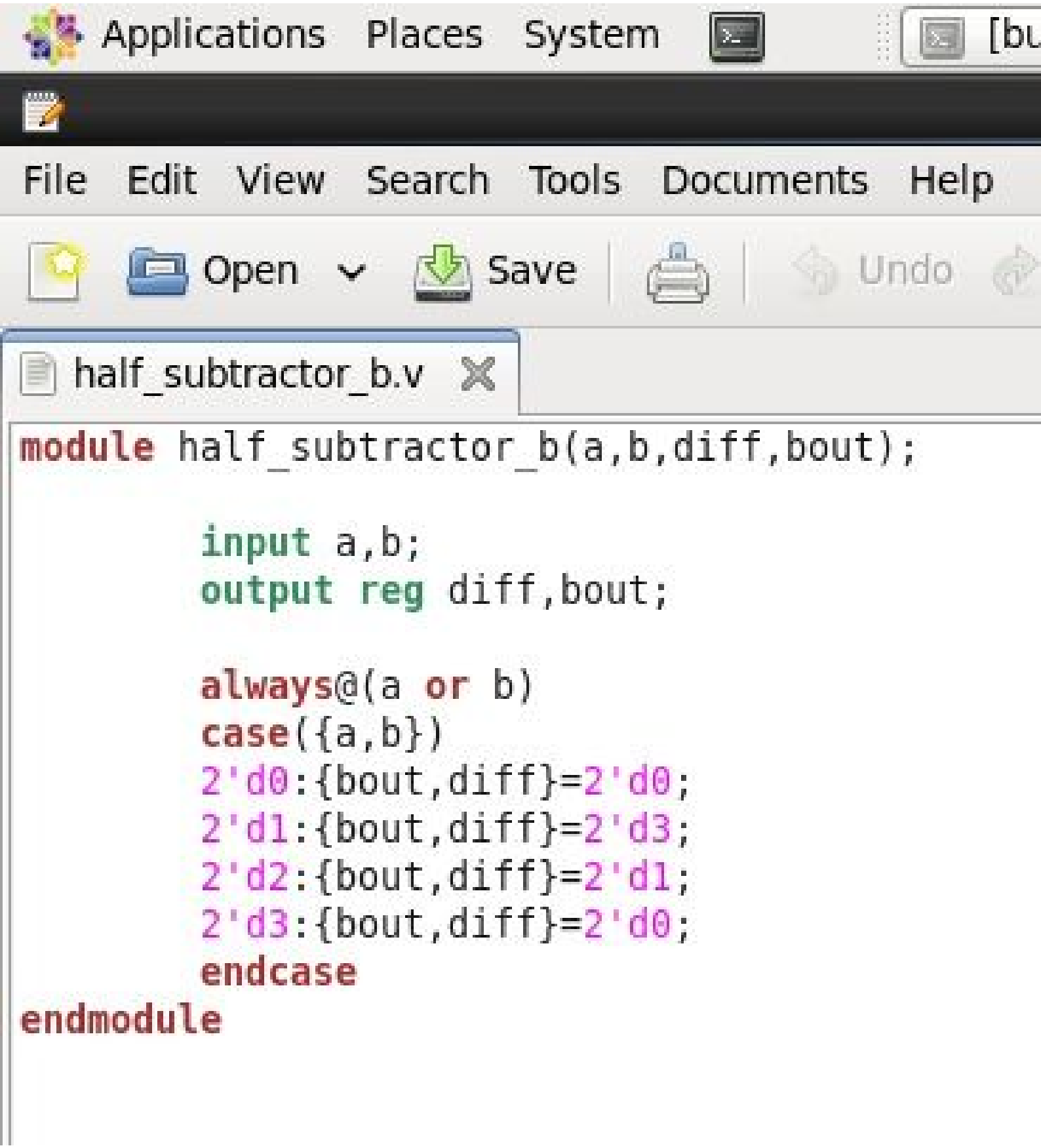
Open Save Undo

half_subtractor_d_tb.v

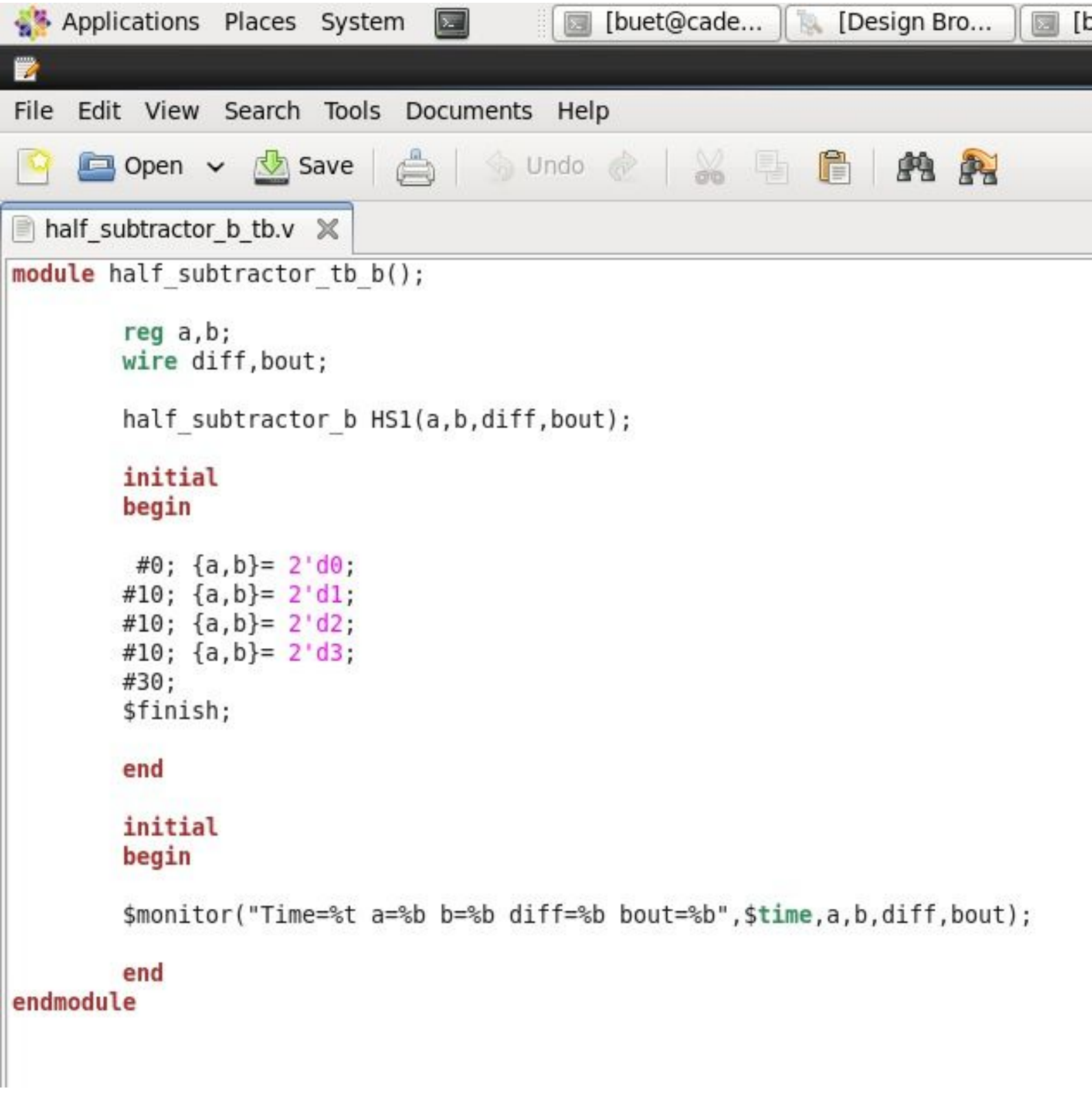
```
module half_subtractor_tb_d();

        reg a,b;
        wire diff,bout;

        half_subtractor_d HS1(a,b,diff,bout);

        initial
        begin

         #0; {a,b}= 2'd0;
        #10; {a,b}= 2'd1;
        #10; {a,b}= 2'd2;
        #10; {a,b}= 2'd3;
        #30;
        $finish;

        end

        initial
        begin

        $monitor("Time=%t a=%b b=%b diff=%b bout=%b",$time,a,b,diff,bout);

        end
endmodule
```


Applications Places System
7:07 AM buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Time: 0 : 60ns
Baseline = 0
TimeA = 60ns
0
10ns
20ns
30ns
40ns
50ns
Name
Cursor
diff
bout
b
a
4 objects selected

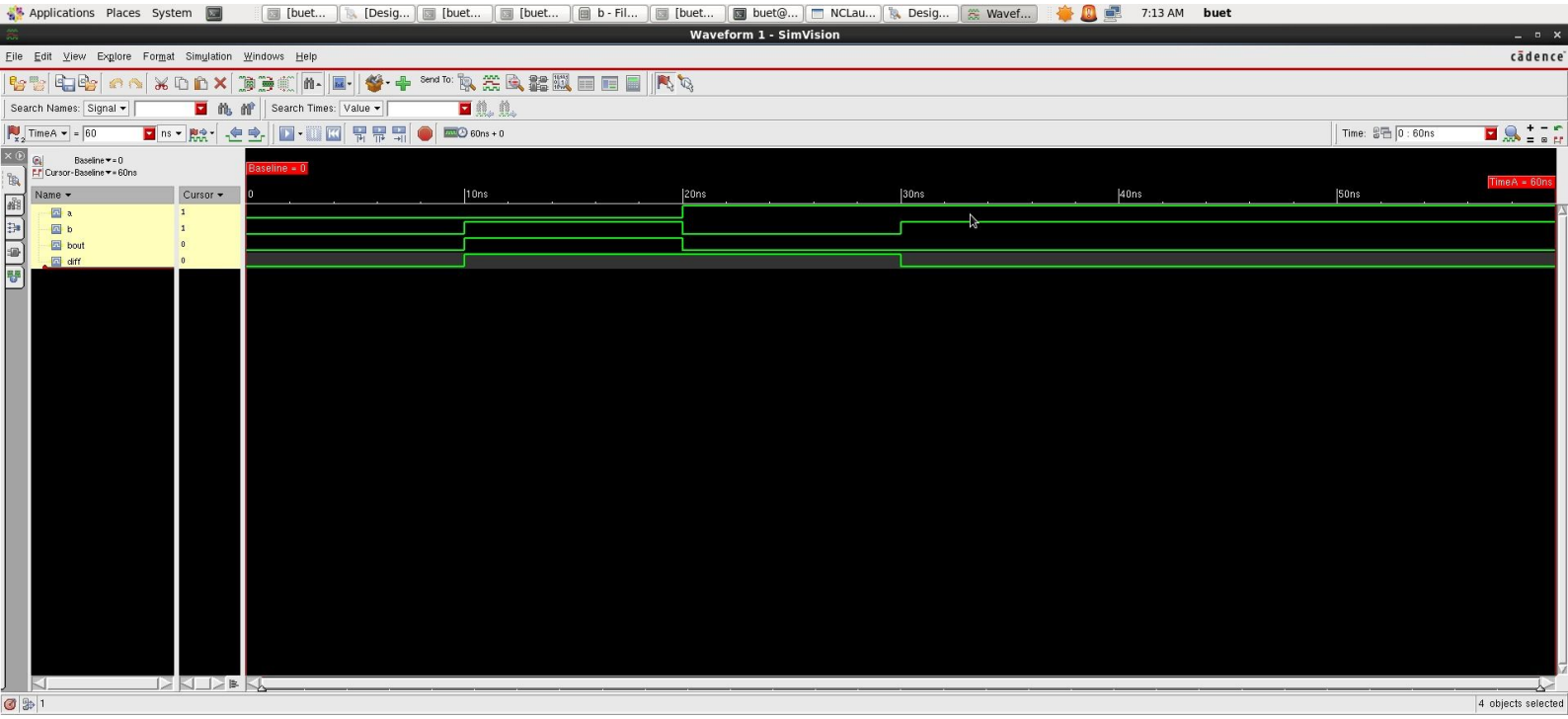

Applications Places System
[buet...
[Desig...
[buet...
[buet...
d - Fil...
buet@...
Console
File Edit View Simulation Windows Help
Text Search:
60ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm half_subtractor_tb_d.diff half_subtractor_tb_d.bout half_subtractor_tb_d.b half_subtractor_tb_d.a
Created probe 1
ncsim> run
Time= 0 a=0 b=0 diff=0 bout=0
Time= 10 a=0 b=1 diff=1 bout=1
Time= 20 a=1 b=0 diff=1 bout=0
Time= 30 a=1 b=1 diff=0 bout=0
Simulation complete via $finish(1) at time 60 NS + 0
./half_subtractor_d_tb.v:16 $finish;
ncsim>

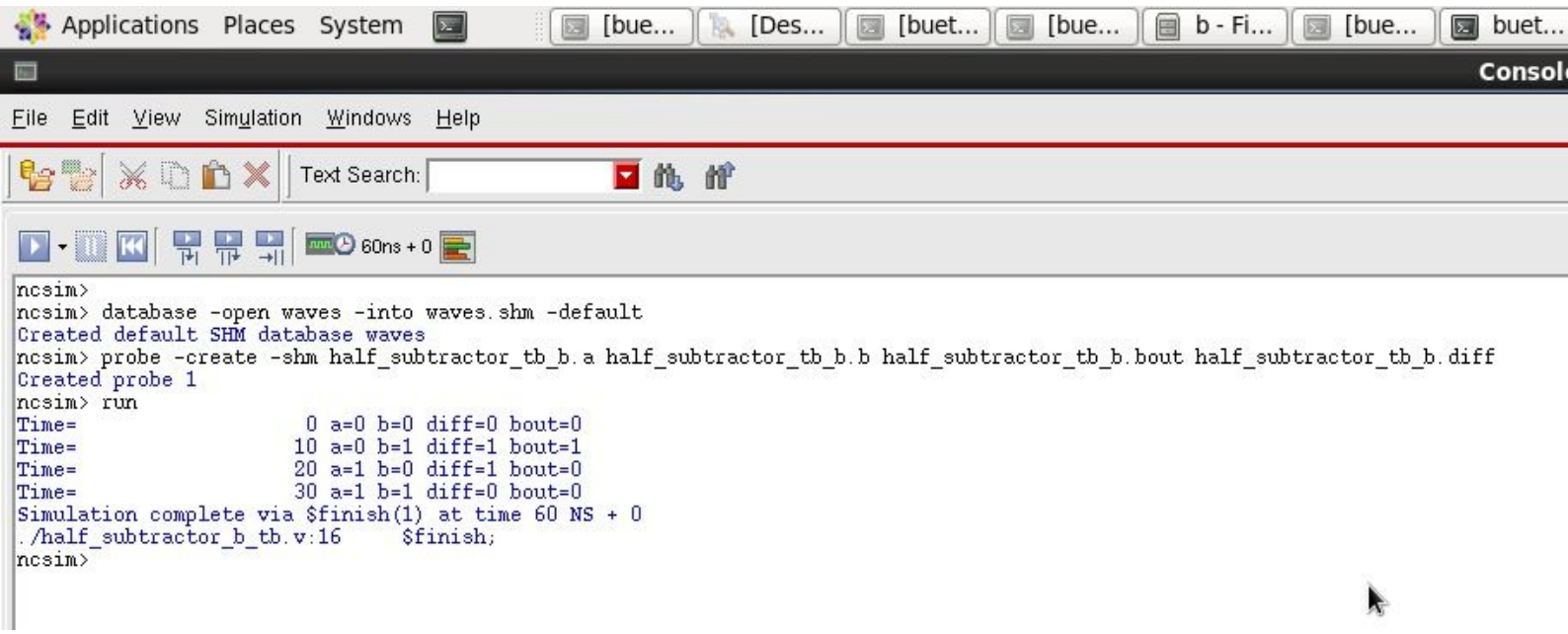


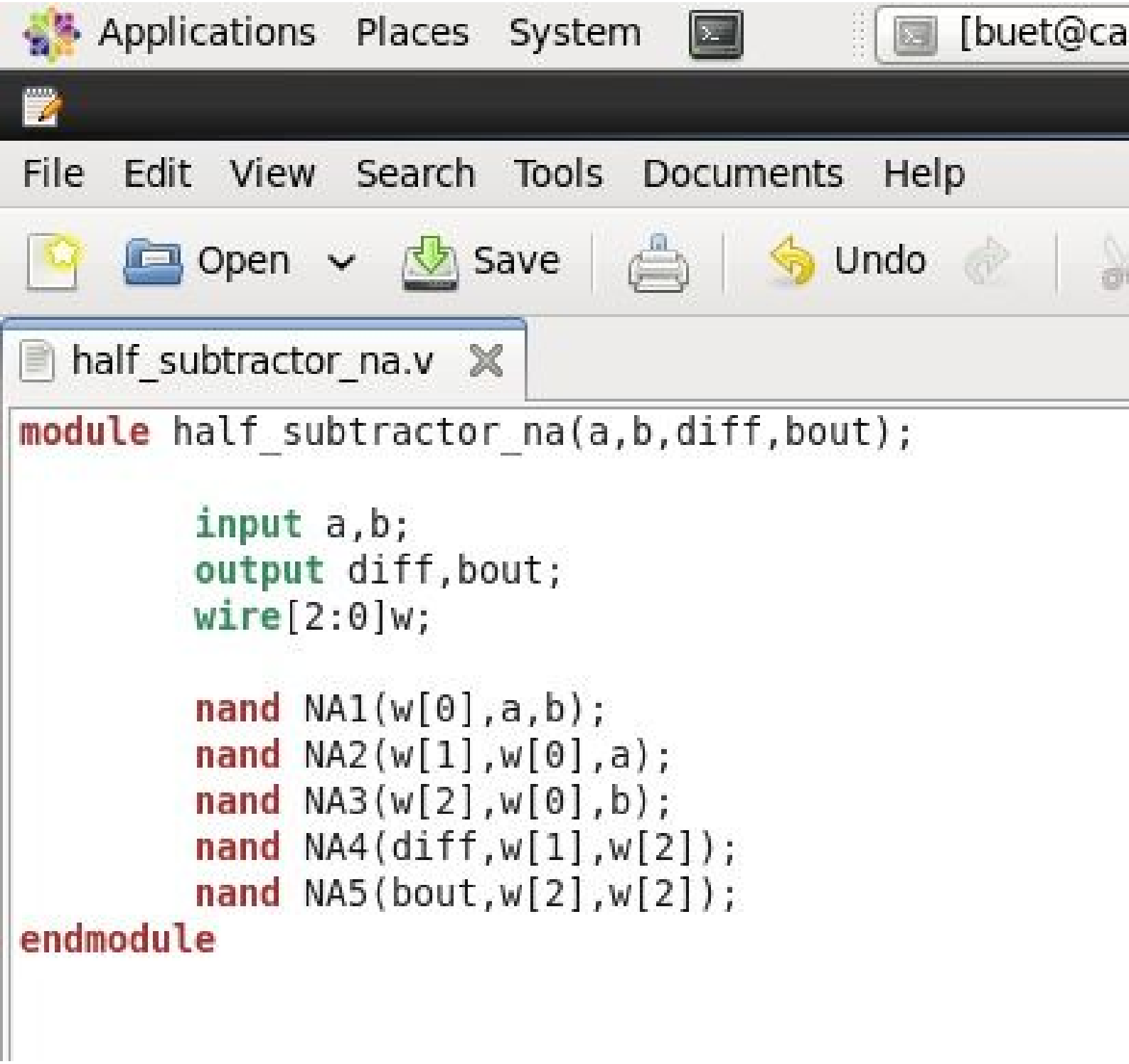

```
module half_subtractor_b(a,b,diff,bout);

        input a,b;
        output reg diff,bout;

        always@(a or b)
        case({a,b})
        2'd0:{bout,diff}=2'd0;
        2'd1:{bout,diff}=2'd3;
        2'd2:{bout,diff}=2'd1;
        2'd3:{bout,diff}=2'd0;
        endcase
endmodule
```




```
module half_subtractor_tb_b();

        reg a,b;
        wire diff,bout;

        half_subtractor_b HS1(a,b,diff,bout);

        initial
        begin

         #0; {a,b}= 2'd0;
        #10; {a,b}= 2'd1;
        #10; {a,b}= 2'd2;
        #10; {a,b}= 2'd3;
        #30;
        $finish;

        end

        initial
        begin

        $monitor("Time=%t a=%b b=%b diff=%b bout=%b",$time,a,b,diff,bout);

        end
endmodule
```


Applications Places System
7:13 AM buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Baseline = 0
Cursor-Baseline = 60ns
Name
Cursor
a
b
bout
diff
Baseline = 0
0
10ns
20ns
30ns
40ns
50ns
TimeA = 60ns
4 objects selected


Applications Places System
[bue...
[Des...
[buet...
[bue...
b - Fi...
[bue...
buet...
File Edit View Simulation Windows Help
Text Search:
60ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm half_subtractor_tb_b.a half_subtractor_tb_b.b half_subtractor_tb_b.bout half_subtractor_tb_b.diff
Created probe 1
ncsim> run
Time= 0 a=0 b=0 diff=0 bout=0
Time= 10 a=0 b=1 diff=1 bout=1
Time= 20 a=1 b=0 diff=1 bout=0
Time= 30 a=1 b=1 diff=0 bout=0
Simulation complete via $finish(1) at time 60 NS + 0
./half_subtractor_b_tb.v:16 $finish;
ncsim>




```
module half_subtractor_na(a,b,diff,bout);

        input a,b;
        output diff,bout;
        wire[2:0]w;

        nand NA1(w[0],a,b);
        nand NA2(w[1],w[0],a);
        nand NA3(w[2],w[0],b);
        nand NA4(diff,w[1],w[2]);
        nand NA5(bout,w[2],w[2]);
endmodule
```

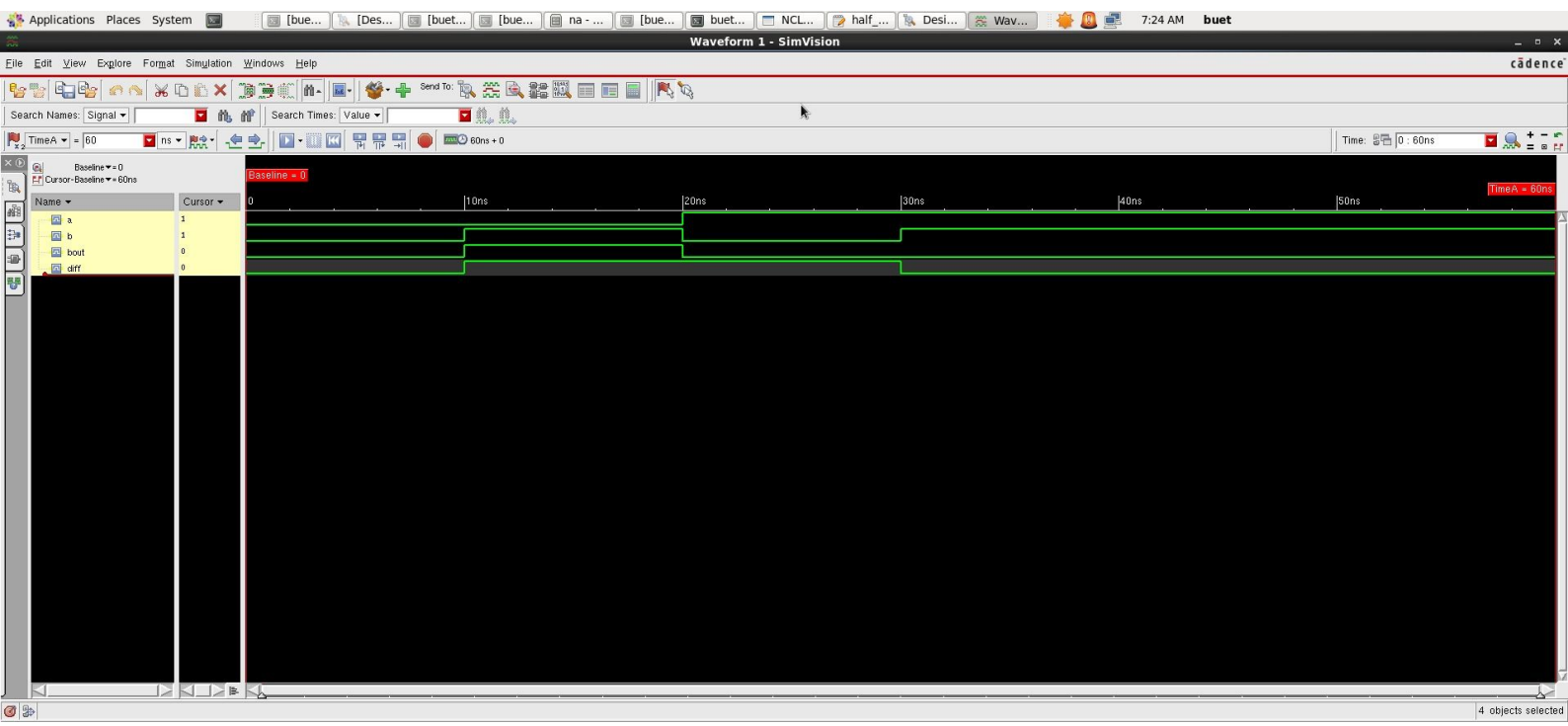
Applications Places System [buet@ca... [Design B... [buet

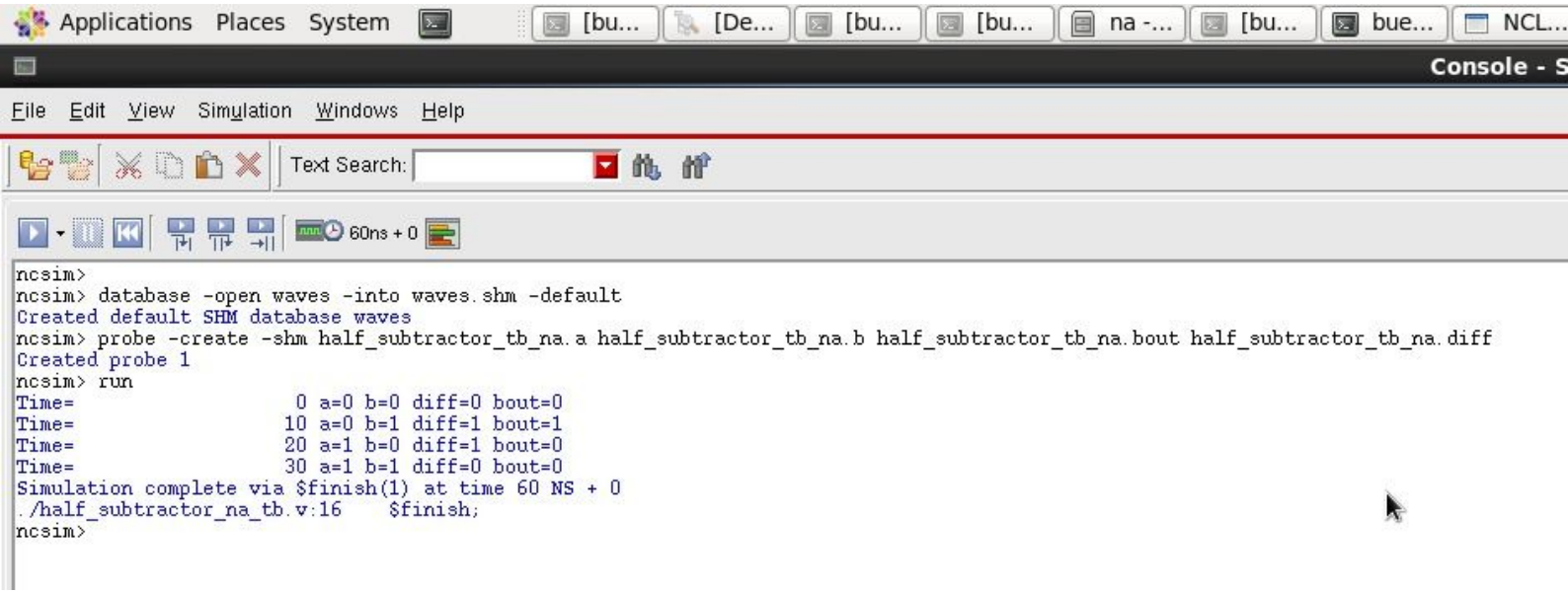
File Edit View Search Tools Documents Help

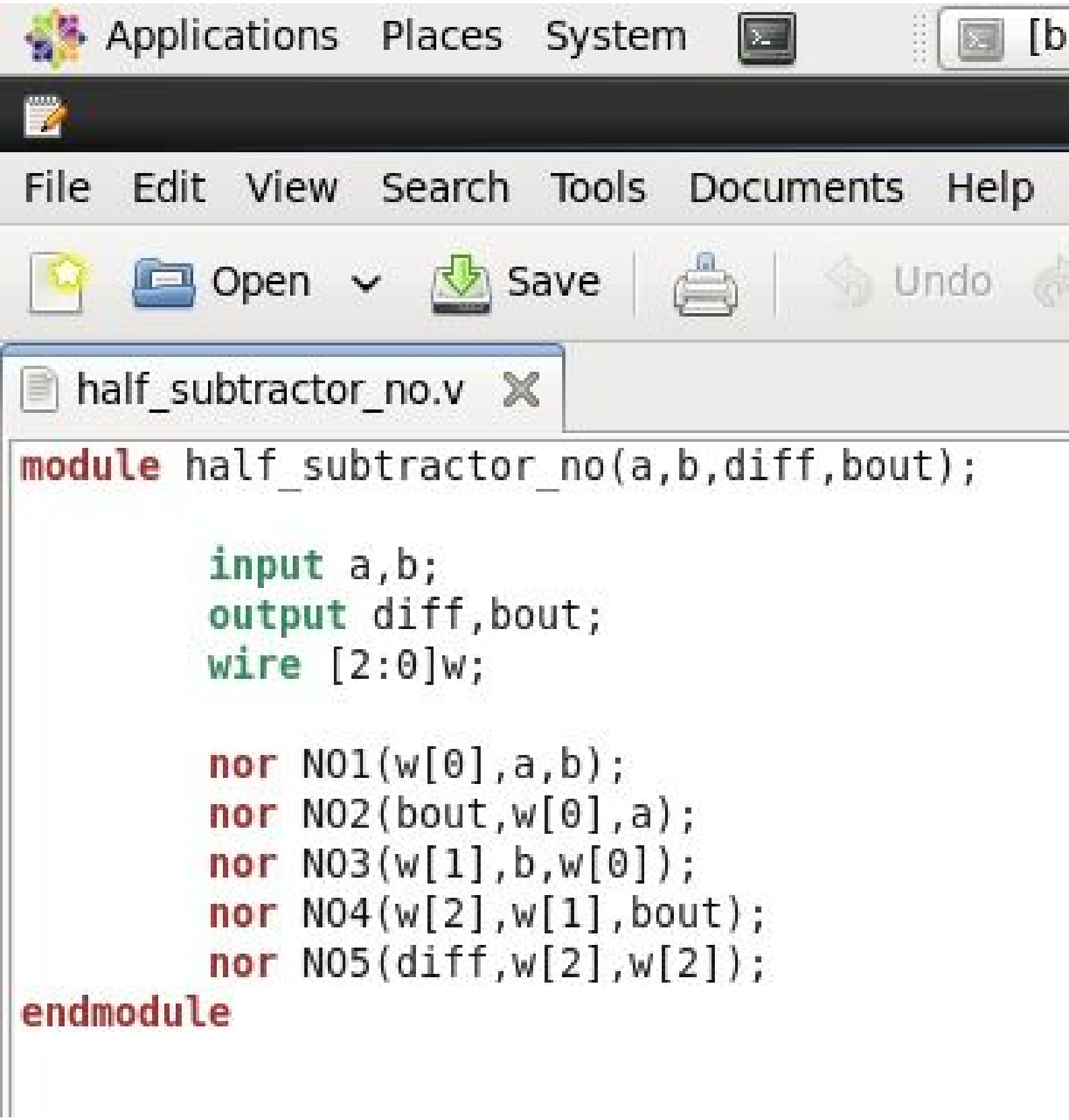
Open Save Undo

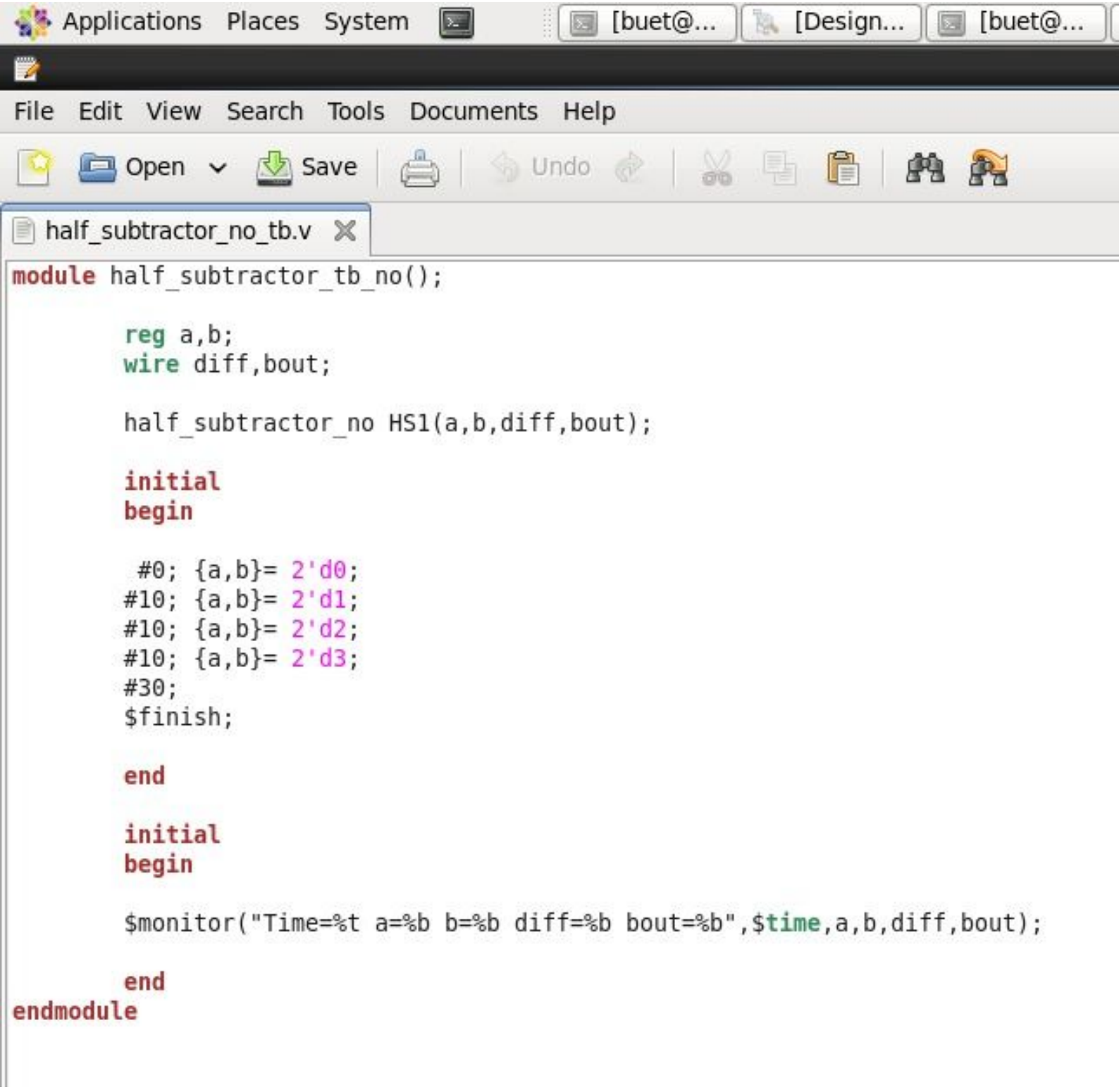
half_subtractor_na_tb.v

```
module half_subtractor_tb_na();

        reg a,b;
        wire diff,bout;

        half_subtractor_na HS1(a,b,diff,bout);

        initial
        begin

         #0; {a,b}= 2'd0;
        #10; {a,b}= 2'd1;
        #10; {a,b}= 2'd2;
        #10; {a,b}= 2'd3;
        #30;
        $finish;

        end

        initial
        begin

        $monitor("Time=%t a=%b b=%b diff=%b bout=%b",$time,a,b,diff,bout);

        end
endmodule
```

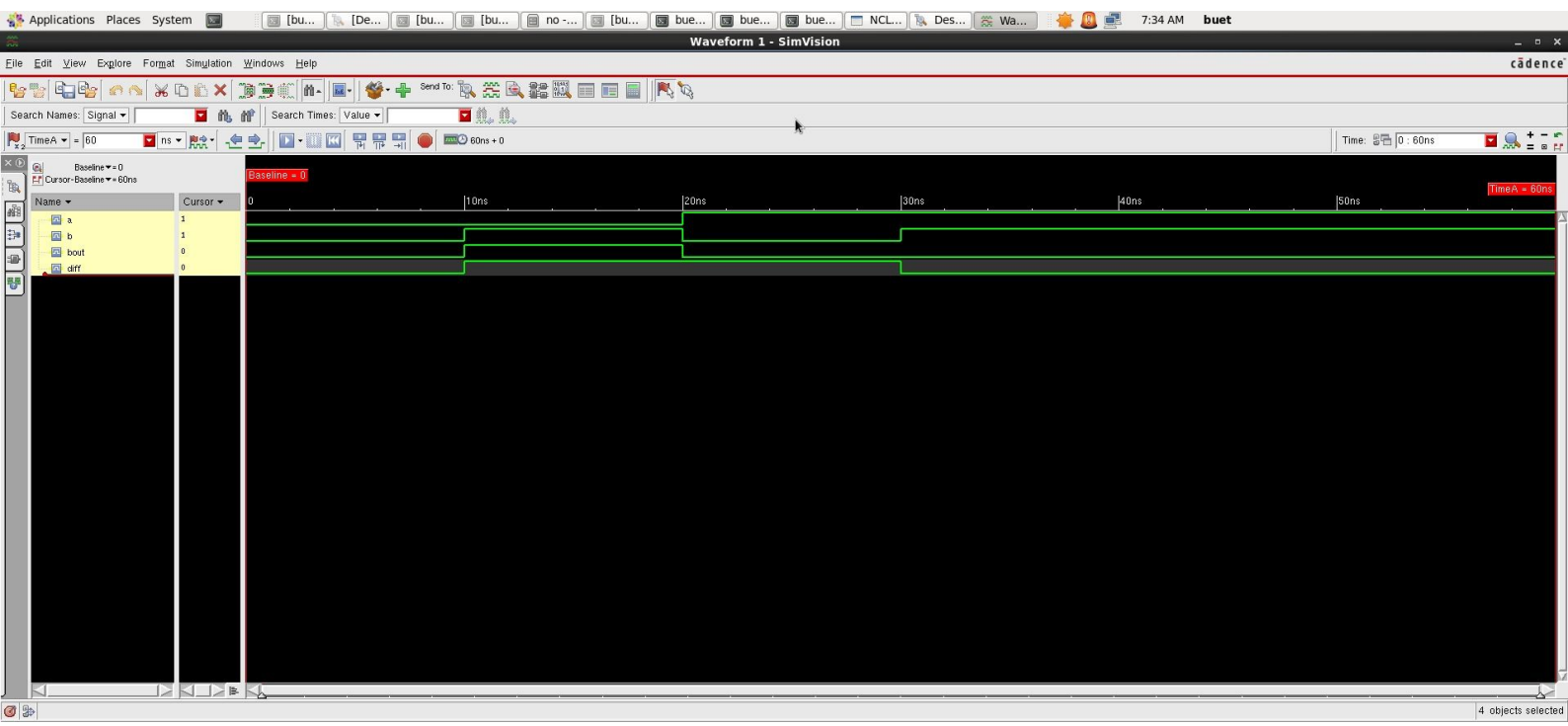

Applications Places System
7:24 AM buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Send To:
TimeA = 60 ns
Time: 0 : 60ns
Baseline = 0
Cursor-Baseline = 60ns
Name
Cursor
a
b
bout
diff
1
1
0
0
Baseline = 0
0
10ns
20ns
30ns
40ns
50ns
TimeA = 60ns
4 objects selected

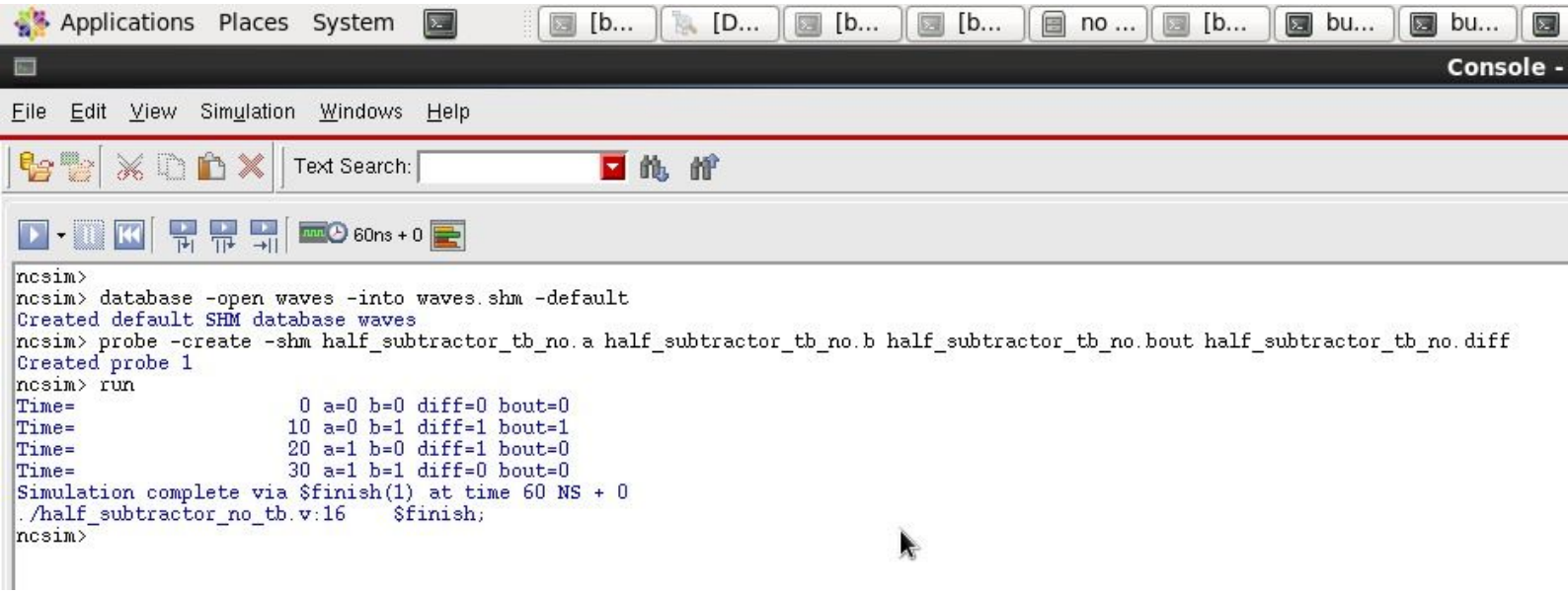

Applications Places System
[bu... [De... [bu... [bu... na -... [bu... bue... NCL...
Console - S
File Edit View Simulation Windows Help
Text Search:
60ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm half_subtractor_tb_na.a half_subtractor_tb_na.b half_subtractor_tb_na.bout half_subtractor_tb_na.diff
Created probe 1
ncsim> run
Time= 0 a=0 b=0 diff=0 bout=0
Time= 10 a=0 b=1 diff=1 bout=1
Time= 20 a=1 b=0 diff=1 bout=0
Time= 30 a=1 b=1 diff=0 bout=0
Simulation complete via $finish(1) at time 60 NS + 0
./half_subtractor_na_tb.v:16 $finish;
ncsim>

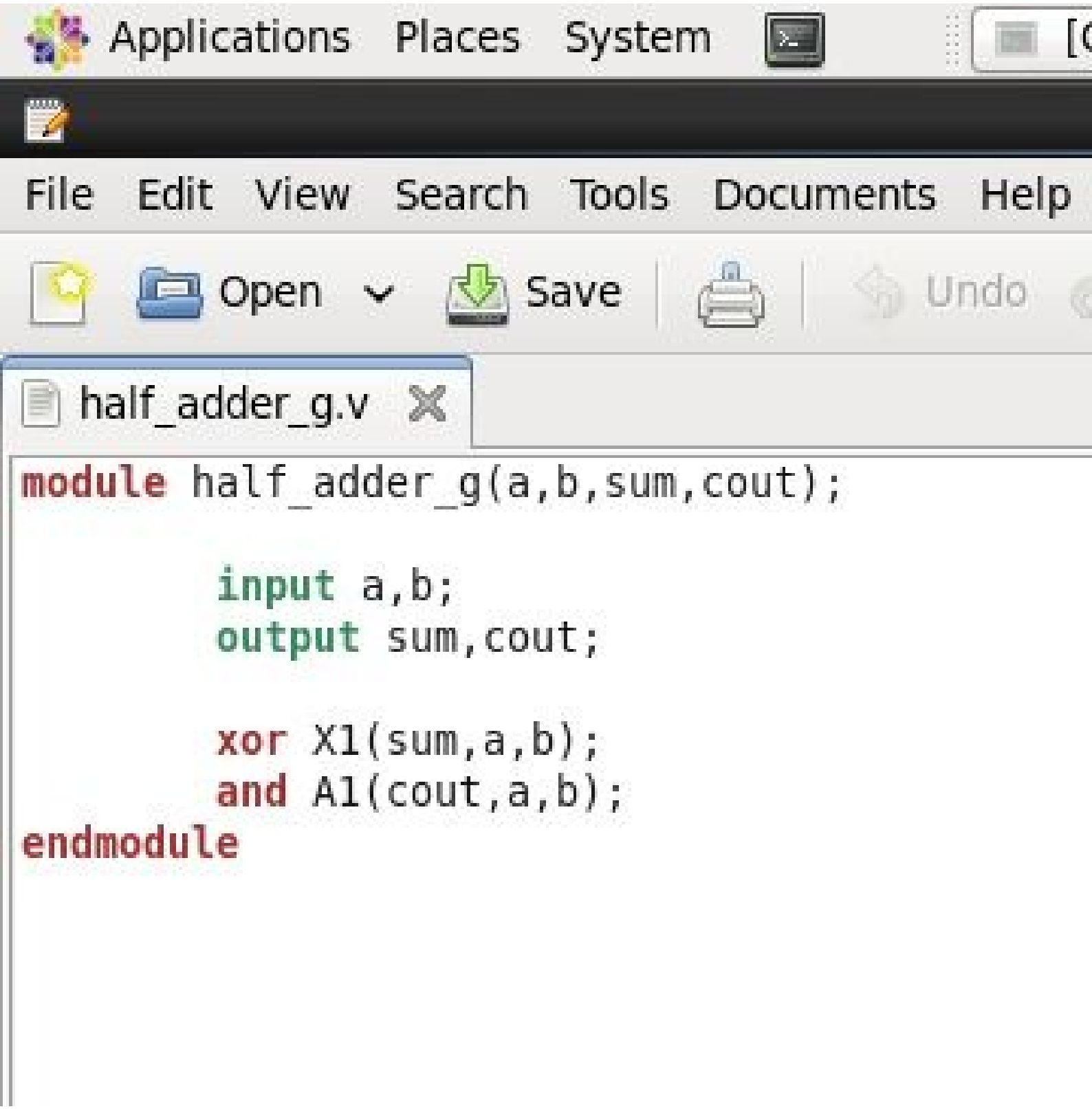

Applications Places System
File Edit View Search Tools Documents Help
Open
Save
Undo
half_subtractor_no.v
module half_subtractor_no(a,b,diff,bout);
input a,b;
output diff,bout;
wire [2:0]w;
nor NO1(w[0],a,b);
nor NO2(bout,w[0],a);
nor NO3(w[1],b,w[0]);
nor NO4(w[2],w[1],bout);
nor NO5(diff,w[2],w[2]);
endmodule




```
module half_subtractor_tb_no();

        reg a,b;
        wire diff,bout;

        half_subtractor_no HS1(a,b,diff,bout);

        initial
        begin

         #0; {a,b}= 2'd0;
        #10; {a,b}= 2'd1;
        #10; {a,b}= 2'd2;
        #10; {a,b}= 2'd3;
        #30;
        $finish;

        end

        initial
        begin

        $monitor("Time=%t a=%b b=%b diff=%b bout=%b",$time,a,b,diff,bout);

        end
endmodule
```


Applications Places System
7:34 AM buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Send To:
TimeA = 60 ns
Time: 0 : 60ns
Baseline = 0
Cursor-Baseline = 60ns
Name
Cursor
a
b
bout
diff
1
1
0
0
Baseline = 0
TimeA = 60ns
0
10ns
20ns
30ns
40ns
50ns
4 objects selected


Applications Places System
Console -
File Edit View Simulation Windows Help
Text Search:
60ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm half_subtractor_tb_no.a half_subtractor_tb_no.b half_subtractor_tb_no.bout half_subtractor_tb_no.diff
Created probe 1
ncsim> run
Time= 0 a=0 b=0 diff=0 bout=0
Time= 10 a=0 b=1 diff=1 bout=1
Time= 20 a=1 b=0 diff=1 bout=0
Time= 30 a=1 b=1 diff=0 bout=0
Simulation complete via $finish(1) at time 60 NS + 0
./half_subtractor_no_tb.v:16 $finish;
ncsim>


Applications Places System
File Edit View Search Tools Documents Help
Open
Save
Undo
half_adder_g.v
module half_adder_g(a,b,sum,cout);
input a,b;
output sum,cout;
xor X1(sum,a,b);
and A1(cout,a,b);
endmodule

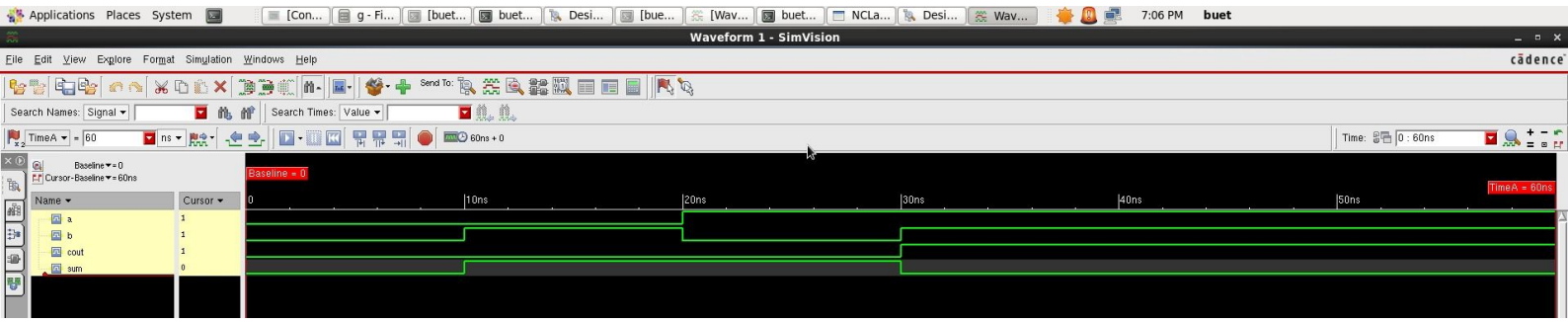
Applications Places System [Console ... g - File Br... [bue

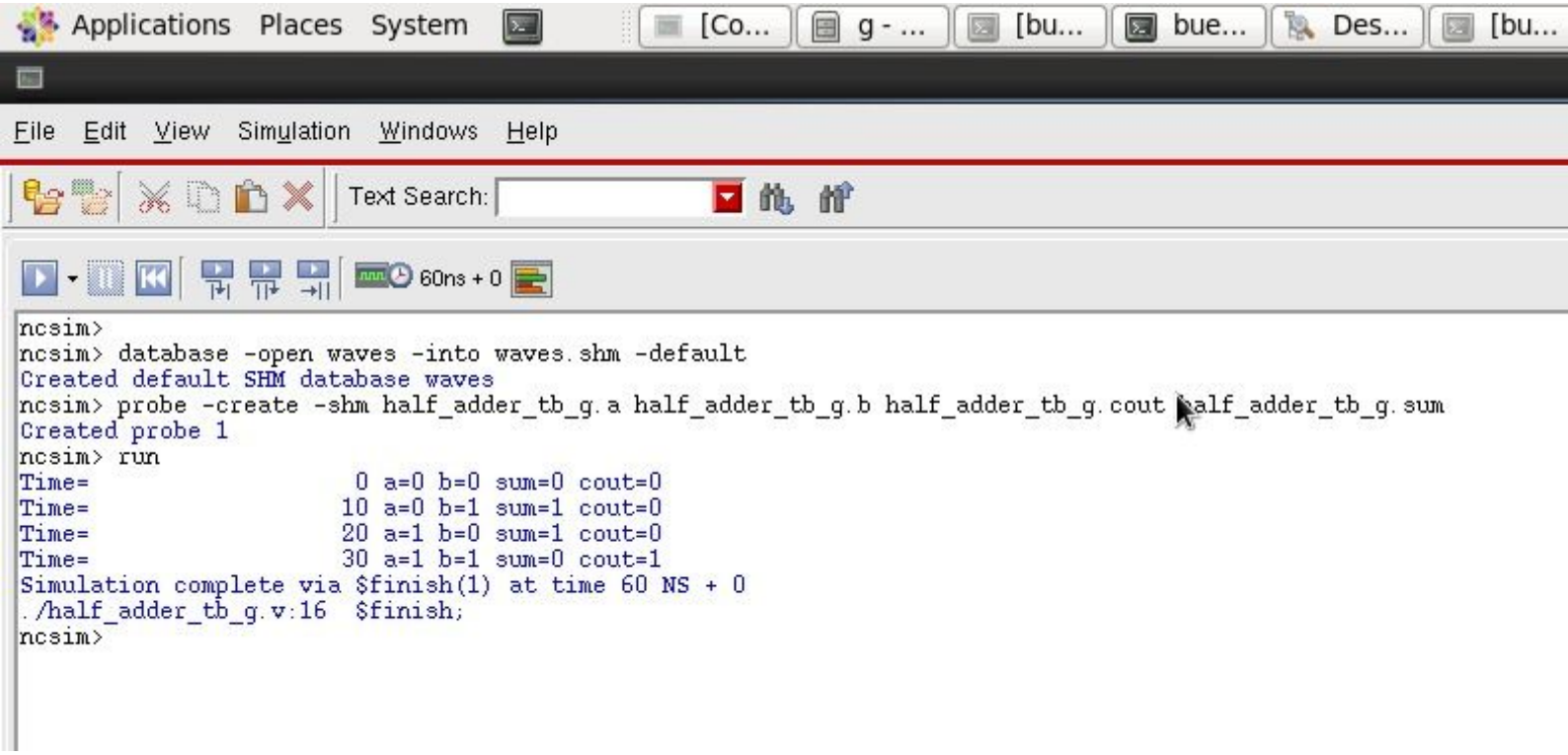
File Edit View Search Tools Documents Help

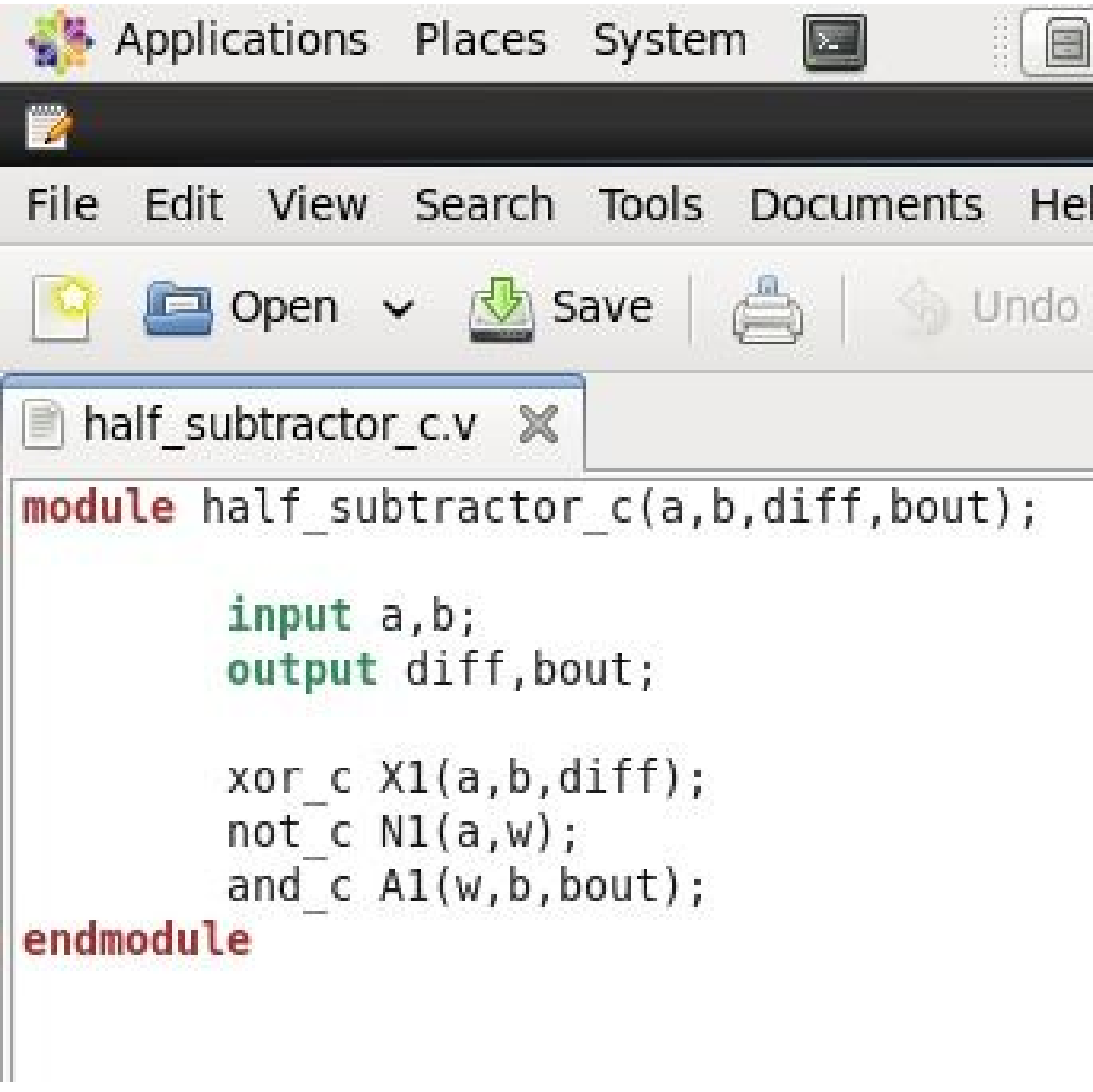
Open Save Undo

half_adder_tb_g.v

```
module half_adder_tb_g();

        reg a,b;
        wire sum,cout;

        half_adder_g HA1(a,b,sum,cout);

        initial
        begin

         #0; {a,b}= 2'd0;
        #10; {a,b}= 2'd1;
        #10; {a,b}= 2'd2;
        #10; {a,b}= 2'd3;
        #30;
        $finish;

        end

        initial
        begin

        $monitor("Time=%t a=%b b=%b sum=%b cout=%b",$time,a,b,sum,cout);

        end
endmodule
```


Applications Places System
7:06 PM buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
TimeA = 60
ns
Time: 0 : 60ns
Baseline = 0
Cursor-Baseline = 60ns
Name
Cursor
a
b
cout
sum
1
1
1
0
Baseline = 0
TimeA = 60ns
0
10ns
20ns
30ns
40ns
50ns


Applications Places System
[Co... g - ... [bu... bue... Des... [bu...
File Edit View Simulation Windows Help
Text Search:
60ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm half_adder_tb_g.a half_adder_tb_g.b half_adder_tb_g.cout half_adder_tb_g.sum
Created probe 1
ncsim> run
Time= 0 a=0 b=0 sum=0 cout=0
Time= 10 a=0 b=1 sum=1 cout=0
Time= 20 a=1 b=0 sum=1 cout=0
Time= 30 a=1 b=1 sum=0 cout=1
Simulation complete via $finish(1) at time 60 NS + 0
./half_adder_tb_g.v:16 $finish;
ncsim>


Applications Places System
File Edit View Search Tools Documents Hel
Open
Save
Undo
half_subtractor_c.v
module half_subtractor_c(a,b,diff,bout);
input a,b;
output diff,bout;
xor_c X1(a,b,diff);
not_c N1(a,w);
and_c A1(w,b,bout);
endmodule

Applications Places System half_subtractor_c - File... buet@cadenc

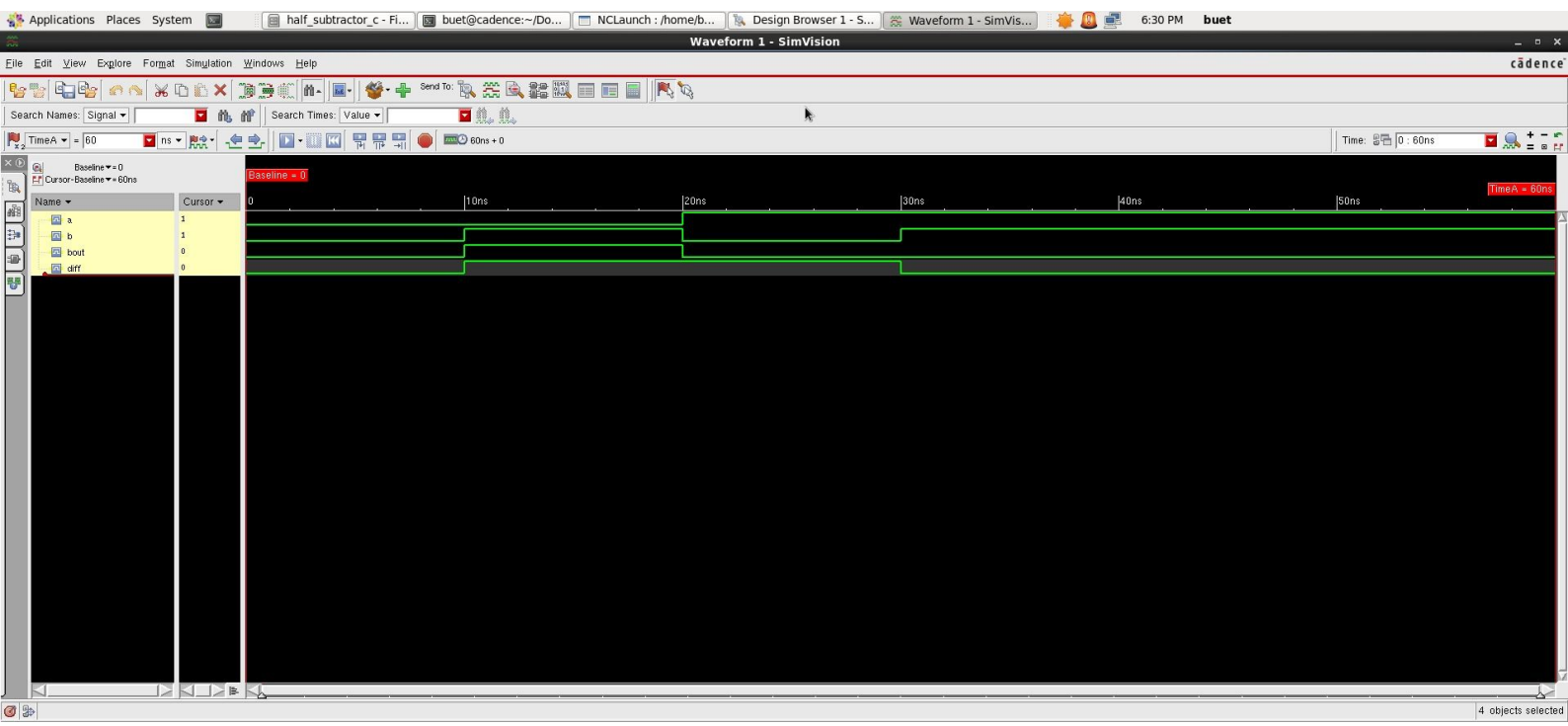
half_su

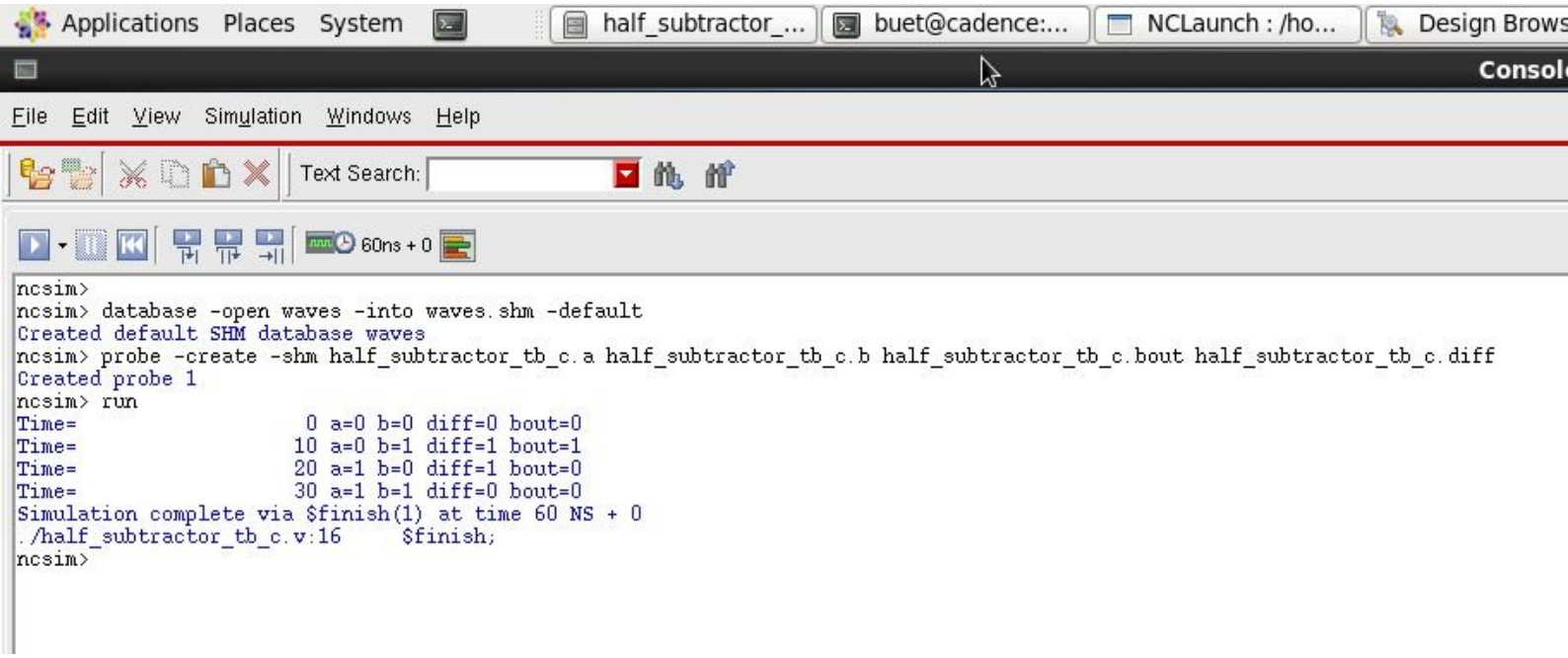
File Edit View Search Tools Documents Help

Open Save Undo

half_subtractor_tb_c.v

```
module half_subtractor_tb_c();

        reg a,b;
        wire diff,bout;

        half_subtractor_c HS1(a,b,diff,bout);

        initial
        begin

         #0; {a,b}= 2'd0;
        #10; {a,b}= 2'd1;
        #10; {a,b}= 2'd2;
        #10; {a,b}= 2'd3;
        #30;
        $finish;

        end

        initial
        begin

        $monitor("Time=%t a=%b b=%b diff=%b bout=%b",$time,a,b,diff,bout);

        end
endmodule
```


Applications Places System
half_subtractor_c - Fi...
buet@cadence:~/Do...
NCLaunch : /home/b...
Design Browser 1 - S...
Waveform 1 - SimVis...
6:30 PM
buet
Waveform 1 - SimVision
File Edit View Explore Format Simulation Windows Help
cadence
Search Names: Signal
Search Times: Value
Send To:
TimeA = 60 ns
Time: 0 : 60ns
Baseline = 0
Cursor-Baseline = 60ns
Name
Cursor
a
b
bout
diff
1
1
0
0
Baseline = 0
TimeA = 60ns
0
10ns
20ns
30ns
40ns
50ns
4 objects selected


Applications Places System
half_subtractor_...
buet@cadence:...
NCLaunch : /ho...
Design Brows
Consol
File Edit View Simulation Windows Help
Text Search:
60ns + 0
ncsim>
ncsim> database -open waves -into waves.shm -default
Created default SHM database waves
ncsim> probe -create -shm half_subtractor_tb_c.a half_subtractor_tb_c.b half_subtractor_tb_c.bout half_subtractor_tb_c.diff
Created probe 1
ncsim> run
Time= 0 a=0 b=0 diff=0 bout=0
Time= 10 a=0 b=1 diff=1 bout=1
Time= 20 a=1 b=0 diff=1 bout=0
Time= 30 a=1 b=1 diff=0 bout=0
Simulation complete via $finish(1) at time 60 NS + 0
./half_subtractor_tb_c.v:16 $finish;
ncsim>