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Due 9/21/2018

## HW 0b010

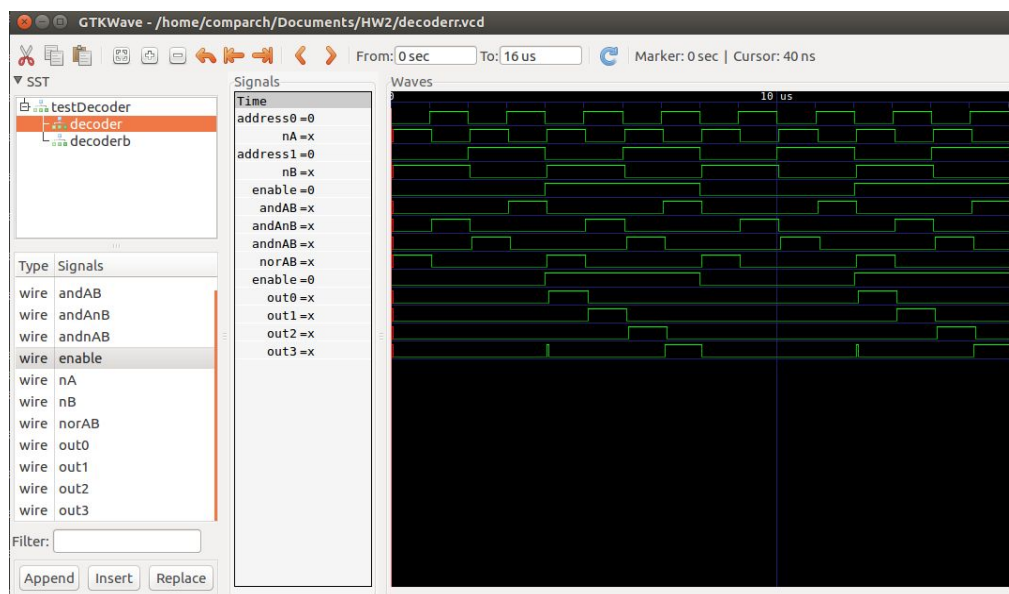
For this homework, I had to create test benches and structural versions of three different circuits: a decoder, an adder, and a multiplexer. Each of the circuits are documented below.

### Decoder

```
comparch@comparchVM:~/Documents/HW2$ ./decoder
VCD info: dumpfile decoderr.vcd opened for output.

Structural Decoder Test Bench:
En A0 A1 | 00 01 02 03 | Expected Output
0 0 0 | 0 0 0 0 | All false
0 1 0 | 0 0 0 0 | All false
0 0 1 | 0 0 0 0 | All false
0 1 1 | 0 0 0 0 | All false
1 0 0 | 1 0 0 0 | 00 Only
1 1 0 | 0 1 0 0 | 01 Only
1 0 1 | 0 0 1 0 | 02 Only
1 1 1 | 0 0 0 1 | 03 Only

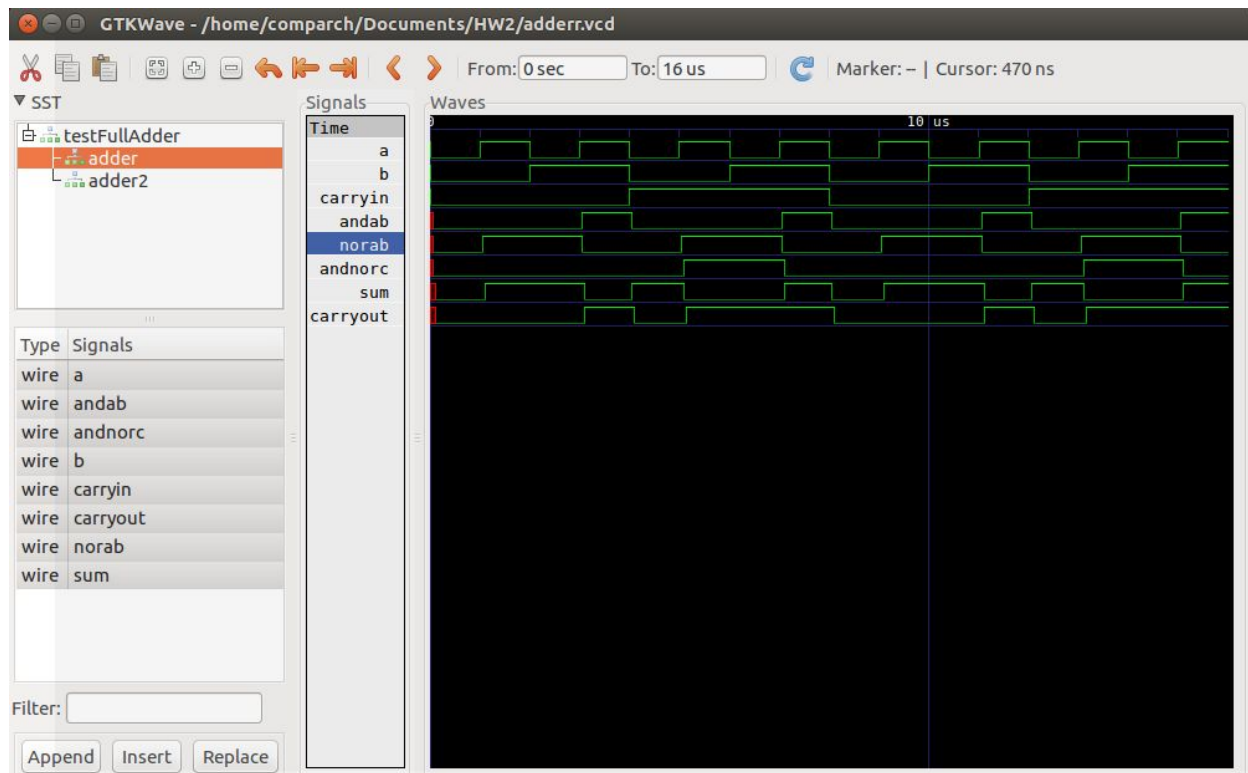
Behavioral Decoder Test Bench:
En A0 A1 | 00 01 02 03 | Expected Output
0 0 0 | 0 0 0 0 | All false
0 1 0 | 0 0 0 0 | All false
0 0 1 | 0 0 0 0 | All false
0 1 1 | 0 0 0 0 | All false
1 0 0 | 1 0 0 0 | 00 Only
1 1 0 | 0 1 0 0 | 01 Only
1 0 1 | 0 0 1 0 | 02 Only
1 1 1 | 0 0 0 1 | 03 Only
```



# Adder

```
comparch@comparchVM:~/Documents/HW2$ ./adder
Structural Adder Test Bench:
carryin | a b | sum | carryout | Expected sum | Expected carryout
0        | 0 0 | 0   | 0         | 0             | 0
0        | 1 0 | 1   | 0         | 1             | 0
0        | 0 1 | 1   | 0         | 1             | 0
0        | 1 1 | 0   | 1         | 0             | 1
1        | 0 0 | 1   | 0         | 1             | 0
1        | 1 0 | 0   | 1         | 0             | 1
1        | 0 1 | 0   | 1         | 0             | 1
1        | 1 1 | 1   | 1         | 1             | 1

Behavioral Adder Test Bench:
carryin | a b | sum | carryout | Expected sum | Expected carryout
0        | 0 0 | 0   | 0         | 0             | 0
0        | 1 0 | 1   | 0         | 1             | 0
0        | 0 1 | 1   | 0         | 1             | 0
0        | 1 1 | 0   | 1         | 0             | 1
1        | 0 0 | 1   | 0         | 1             | 0
1        | 1 0 | 0   | 1         | 0             | 1
1        | 0 1 | 0   | 1         | 0             | 1
1        | 1 1 | 1   | 1         | 1             | 1
```



# Multiplexer

```
comparch@comparchVM:~/Documents/HW2$ ./multiplexer
VCD info: dumpfile multiplexerr.vcd opened for output.
```

## Structural Multiplexer Test Bench:

select0	select1	00	01	02	03	Output	Expected Output
0	0	0	0	0	0	0	in0
0	0	1	0	0	0	1	in0
1	0	0	0	0	0	0	in1
1	0	0	1	0	0	1	in1
0	1	0	0	0	0	0	in2
0	1	0	0	1	0	1	in2
1	1	0	0	0	0	0	in3
1	1	0	0	0	1	1	in3

## Behavioral Multiplexer Test Bench:

select0	select1	00	01	02	03	Output	Expected Output
0	0	0	0	0	0	0	in0
0	0	1	0	0	0	1	in0
1	0	0	0	0	0	0	in1
1	0	0	1	0	0	1	in1
0	1	0	0	0	0	0	in2
0	1	0	0	1	0	1	in2
1	1	0	0	0	0	0	in3
1	1	0	0	0	1	1	in3

