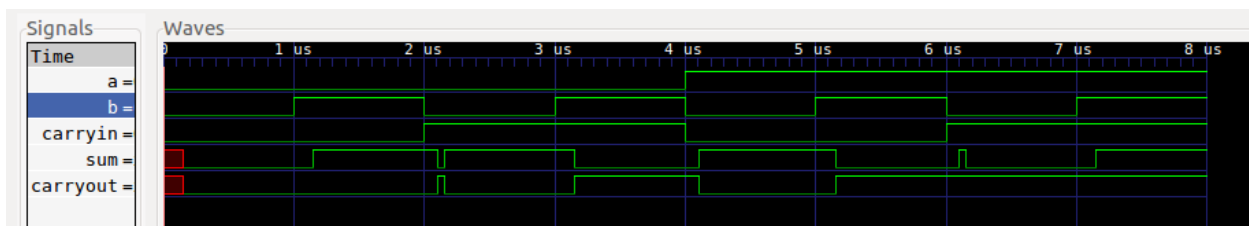


## < Adder >

Test bench

```
comparch@comparch-VirtualBox:~/Desktop/source/hw2$ ./adder.t
a b cin | sum cout | Expected Output
0 0 0 | 0 0 | All false
0 1 0 | 1 0 | sum Only
0 0 1 | 1 0 | sum Only
0 1 1 | 0 1 | carryout Only
1 0 0 | 1 0 | sum Only
1 1 0 | 0 1 | carryout Only
1 0 1 | 0 1 | carryout Only
1 1 1 | 1 1 | All true
```

Waveform

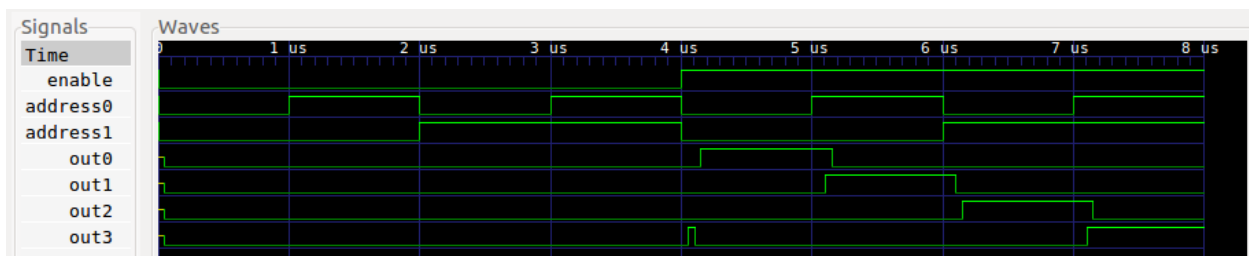


## < Decoder >

Test bench

```
comparch@comparch-VirtualBox:~/Desktop/source/hw2$ ./decoder.t
VCD info: dumpfile decoder.vcd opened for output.
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
```

Waveform



## < Multiplexer >

Test bench

```
comparch@comparch-VirtualBox:~/Desktop/source/hw2$ ./multiplexer.t
VCD info: dumpfile multiplexer.vcd opened for output.
addr0 addr1 in0 in1 in2 in3 | out | Expected Output
0      0      0      0      0      0 | 0 | false
0      0      0      0      0      1 | 0 | false
0      0      0      0      1      0 | 0 | false
0      0      0      0      1      1 | 0 | false
0      0      0      1      0      0 | 0 | false
0      0      0      1      0      1 | 0 | false
0      0      0      1      1      0 | 0 | false
0      0      0      1      1      1 | 0 | false
0      0      1      0      0      0 | 1 | true
0      0      1      0      0      1 | 1 | true
0      0      1      0      1      0 | 1 | true
0      0      1      0      1      1 | 1 | true
0      0      1      1      0      0 | 1 | true
0      0      1      1      0      1 | 1 | true
0      0      1      1      1      0 | 1 | true
0      0      1      1      1      1 | 1 | true
0      1      0      0      0      0 | 0 | false
0      1      0      0      0      1 | 0 | false
0      1      0      0      1      0 | 1 | true
0      1      0      0      1      1 | 1 | true
0      1      0      1      0      0 | 0 | false
0      1      0      1      0      1 | 0 | false
0      1      0      1      1      0 | 1 | true
0      1      0      1      1      1 | 1 | true
0      1      1      0      0      0 | 0 | false
0      1      1      0      0      1 | 0 | false
0      1      1      0      1      0 | 1 | true
0      1      1      0      1      1 | 1 | true
0      1      1      1      0      0 | 0 | false
0      1      1      1      0      1 | 0 | false
0      1      1      1      1      0 | 1 | true
0      1      1      1      1      1 | 1 | true
1      0      0      0      0      0 | 0 | false
1      0      0      0      0      1 | 0 | false
1      0      0      0      1      0 | 0 | false
1      0      0      0      1      1 | 0 | false
1      0      0      1      0      0 | 1 | true
1      0      0      1      0      1 | 1 | true
1      0      0      1      1      0 | 1 | true
1      0      0      1      1      1 | 1 | true
```

1	0	1	0	0	0	0	false
1	0	1	0	0	1	0	false
1	0	1	0	1	0	0	false
1	0	1	0	1	1	0	false
1	0	1	1	0	0	1	true
1	0	1	1	0	1	1	true
1	0	1	1	1	0	1	true
1	0	1	1	1	1	1	true
1	1	0	0	0	0	0	false
1	1	0	0	0	1	1	true
1	1	0	0	1	0	0	false
1	1	0	0	1	1	1	true
1	1	0	1	0	0	0	false
1	1	0	1	0	1	1	true
1	1	0	1	1	0	0	false
1	1	0	1	1	1	1	true
1	1	1	0	0	0	0	false
1	1	1	0	0	1	1	true
1	1	1	0	1	0	0	false
1	1	1	0	1	1	1	true
1	1	1	1	0	0	0	false
1	1	1	1	0	1	1	true
1	1	1	1	1	0	0	false
1	1	1	1	1	1	1	true

Waveform

