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CompArch HW2 Writup:

Behavioral Decoder
En A0 A1|| O0 O1 O2 O3 | 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 | O0 Only
1 1 0 || 0 1 0 0 | O1 Only
1 0 1 || 0 0 1 0 | O2 Only
1 1 1 || 0 0 0 1 | O3 Only

Structural Decoder
En A0 A1|| O0 O1 O2 O3 | Expected Output
0 0 0 || 0 0 0 0 | All false
0 1 0 || 0 0 0 0 | All false
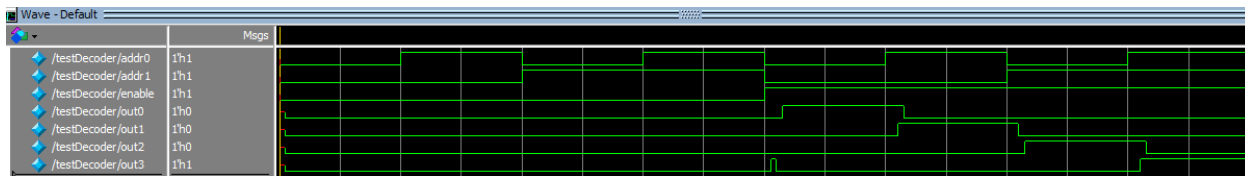# 0 0 1 || 0 0 0 0 | All false
0 1 1 || 0 0 0 0 | All false
1 0 0 || 1 0 0 0 | O0 Only
1 1 0 || 0 1 0 0 | O1 Only
1 0 1 || 0 0 1 0 | O2 Only
1 1 1 || 0 0 0 1 | O3 Only

Behavioral Multiplexer
A0 A1| in0 in1 in2 in3 || Out | Expected Output
0 0| 0 0 0 0 || 0 | False
0 0| 1 0 0 0 || 1 | True
0 0| 1 1 1 1 || 1 | True
1 0| 0 0 0 0 || 0 | False
1 0| 0 1 0 0 || 1 | True
1 0| 1 1 1 1 || 1 | True
0 1| 0 0 0 0 || 0 | False
0 1| 0 0 1 0 || 1 | True
0 1| 1 1 1 1 || 1 | True
1 1| 0 0 0 0 || 0 | False
1 1| 0 0 0 1 || 1 | True
1 1| 1 1 1 1 || 1 | True

Structural Multiplexer

```
# A0 A1| in0 in1 in2 in3 || Out | Expected Output
# 0  0|  0   0   0   0  || 0 | False
# 0  0|  1   0   0   0  || 1 | True
# 0  0|  1   1   1   1  || 1 | True
# 1  0|  0   0   0   0  || 0 | False
# 1  0|  0   1   0   0  || 1 | True
# 1  0|  1   1   1   1  || 1 | True
# 0  1|  0   0   0   0  || 0 | False
# 0  1|  0   0   1   0  || 1 | True
# 0  1|  1   1   1   1  || 1 | True
# 1  1|  0   0   0   0  || 0 | False
# 1  1|  0   0   0   1  || 1 | True
# 1  1|  1   1   1   1  || 1 | True
```
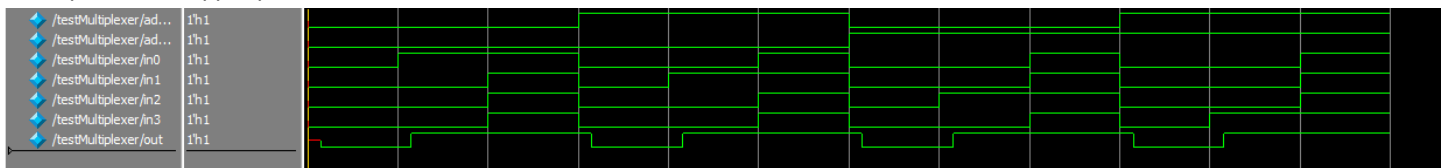

Behavioral FullAdder

```
# A B CarryIn || Sum  CarryOut | Expected Output
# 0 0 0 ||  0  0 | All false
# 0 0 1 ||  1  0 | Sum only
# 0 1 0 ||  1  0 | Sum only
# 0 1 1 ||  0  1 | Carryout only
# 1 0 0 ||  1  0 | Sum only
# 1 0 1 ||  0  1 | CarryOut only
# 1 1 0 ||  0  1 | CarryOut only
# 1 1 1 ||  1  1 | All true
```

Structural FullAdder

```
# A B CarryIn || Sum  CarryOut | Expected Output
# 0 0 0 ||  0  0 | All false
# 0 0 1 ||  1  0 | Sum only
# 0 1 0 ||  1  0 | Sum only
# 0 1 1 ||  0  1 | Carryout only
# 1 0 0 ||  1  0 | Sum only
# 1 0 1 ||  0  1 | CarryOut only
# 1 1 0 ||  0  1 | CarryOut only
# 1 1 1 ||  1  1 | All true
```