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Parts 1&2:

Code

```
# Loading work.behavioralDecoder
# 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
# vsim
# Start time: 03:56:52 on Sep 25,2015
# Loading work.testFullAdder
# Loading work.behavioralFullAdder
# A B Ci | COut Sum | Expected Output
# 0 0  0 |  0 0 | Both False
# 0 1  0 |  0 1 | Sum True
# 1 0  0 |  0 1 | Sum True
# 1 1  0 |  1 0 | COut True
# 0 0  1 |  0 1 | Sum True
# 0 1  1 |  1 0 | COut True
# 1 0  1 |  1 0 | COut True
```

```
# 1 1  1 |  1 1 | Both True
# vsim
# Start time: 03:56:55 on Sep 25,2015
# Loading work.testMultiplexer
# Loading work.behavioralMultiplexer
# a1 a0 | in0 in1 in2 in3 | out | Expected Output
#  0  0 |  0  0  0  0 |   0      0
#  0  0 |  0  0  0  1 |   0      0
#  0  0 |  0  0  1  0 |   0      0
#  0  0 |  0  0  1  1 |   0      0
#  0  0 |  0  1  0  0 |   0      0
#  0  0 |  0  1  0  1 |   0      0
#  0  0 |  0  1  1  0 |   0      0
#  0  0 |  0  1  1  1 |   0      0
#  0  0 |  1  0  0  0 |   1      0
#  0  0 |  1  0  0  1 |   1      0
#  0  0 |  1  0  1  0 |   1      0
#  0  0 |  1  0  1  1 |   1      0
#  0  0 |  1  1  0  0 |   1      0
#  0  0 |  1  1  0  1 |   1      0
#  0  0 |  1  1  1  0 |   1      0
#  0  0 |  1  1  1  1 |   1      0
#  0  1 |  0  0  0  0 |   0      1
#  0  1 |  0  0  0  1 |   0      1
#  0  1 |  0  0  1  0 |   1      1
```

0 1 | 0 0 1 1 | 1 1

0 1 | 0 1 0 0 | 0 1

0 1 | 0 1 0 1 | 0 1

0 1 | 0 1 1 0 | 1 1

0 1 | 0 1 1 1 | 1 1

0 1 | 1 0 0 0 | 0 1

0 1 | 1 0 0 1 | 0 1

0 1 | 1 0 1 0 | 1 1

0 1 | 1 0 1 1 | 1 1

0 1 | 1 1 0 0 | 0 1

0 1 | 1 1 0 1 | 0 1

0 1 | 1 1 1 0 | 1 1

0 1 | 1 1 1 1 | 1 1

1 0 | 0 0 0 0 | 0 2

1 0 | 0 0 0 1 | 0 2

1 0 | 0 0 1 0 | 0 2

1 0 | 0 0 1 1 | 0 2

1 0 | 0 1 0 0 | 1 2

1 0 | 0 1 0 1 | 1 2

1 0 | 0 1 1 0 | 1 2

1 0 | 0 1 1 1 | 1 2

1 0 | 1 0 0 0 | 0 2

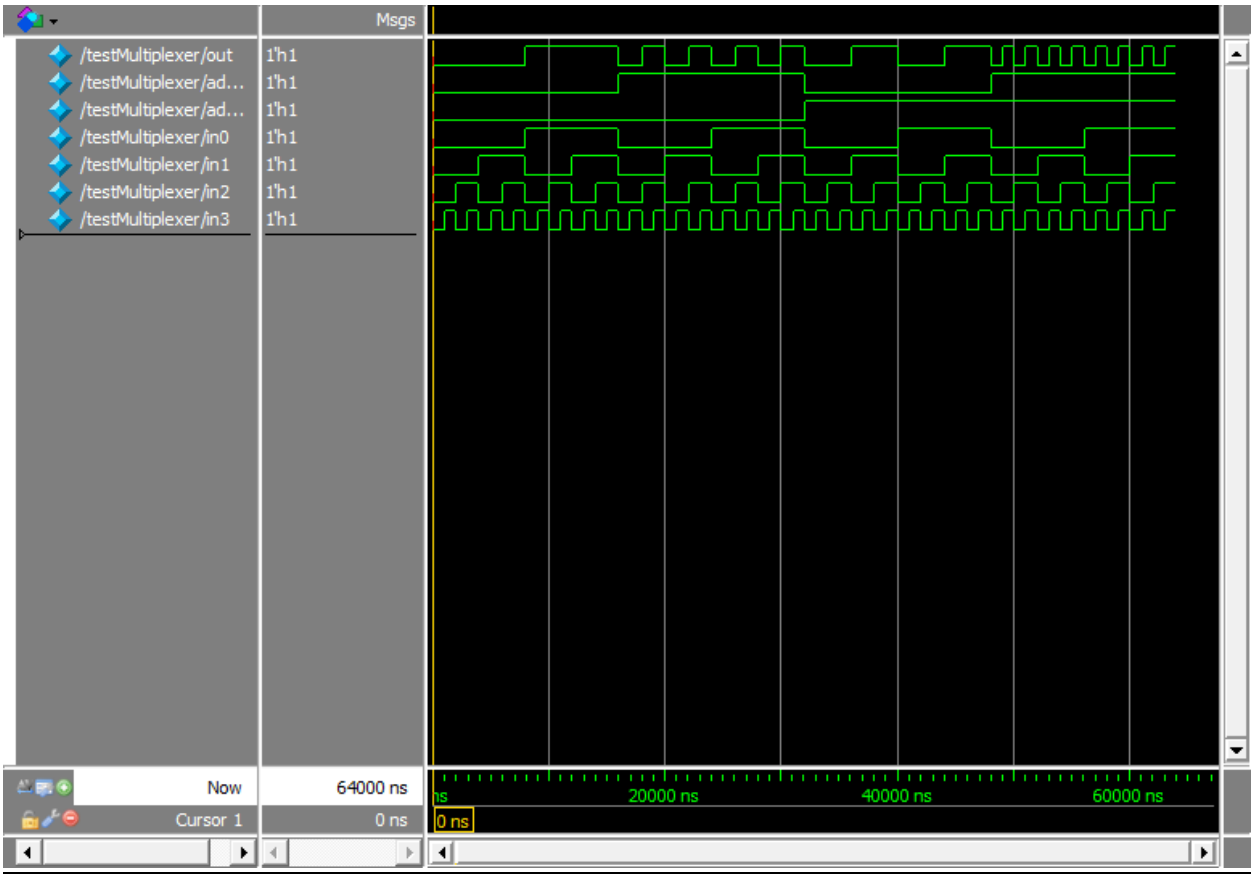
1 0 | 1 0 0 1 | 0 2

1 0 | 1 0 1 0 | 0 2

1 0 | 1 0 1 1 | 0 2

```
# 1 0 | 1 1 0 0 |  1    2
# 1 0 | 1 1 0 1 |  1    2
# 1 0 | 1 1 1 0 |  1    2
# 1 0 | 1 1 1 1 |  1    2
# 1 1 | 0 0 0 0 |  0    3
# 1 1 | 0 0 0 1 |  1    3
# 1 1 | 0 0 1 0 |  0    3
# 1 1 | 0 0 1 1 |  1    3
# 1 1 | 0 1 0 0 |  0    3
# 1 1 | 0 1 0 1 |  1    3
# 1 1 | 0 1 1 0 |  0    3
# 1 1 | 0 1 1 1 |  1    3
# 1 1 | 1 0 0 0 |  0    3
# 1 1 | 1 0 0 1 |  1    3
# 1 1 | 1 0 1 0 |  0    3
# 1 1 | 1 0 1 1 |  1    3
# 1 1 | 1 1 0 0 |  0    3
# 1 1 | 1 1 0 1 |  1    3
# 1 1 | 1 1 1 0 |  0    3
# 1 1 | 1 1 1 1 |  1    3
```

Waveform



Parts 2&3

Code

Loading work.structuralDecoder

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

# vsim

# Start time: 03:43:59 on Sep 25,2015

# Loading work.testFullAdder

# Loading work.structuralFullAdder

# A B Ci | COut Sum | Expected Output

# 0 0  0 |  0       0 | Both False

# 0 1  0 |  0       1 | Sum True

# 1 0  0 |  0       1 | Sum True

# 1 1  0 |  1       0 | COut True

# 0 0  1 |  0       1 | Sum True

# 0 1  1 |  1       0 | COut True

# 1 0  1 |  1       0 | COut True

# 1 1  1 |  1      1 | Both True

# vsim

# Start time: 03:44:03 on Sep 25,2015

# Loading work.testMultiplexer

# Loading work.structuralMultiplexer

# a1 a0 | in0 in1 in2 in3 | out | Expected Output

#  0  0 |  0  0  0  0  |   0                0

#  0  0 |  0  0  0  1  |   0                0

#  0  0 |  0  0  1  0  |   0                0

#  0  0 |  0  0  1  1  |   0                0
```

0 0 | 0 1 0 0 | 0 0

0 0 | 0 1 0 1 | 0 0

0 0 | 0 1 1 0 | 0 0

0 0 | 0 1 1 1 | 0 0

0 0 | 1 0 0 0 | 0 0

0 0 | 1 0 0 1 | 0 0

0 0 | 1 0 1 0 | 0 0

0 0 | 1 0 1 1 | 0 0

0 0 | 1 1 0 0 | 0 0

0 0 | 1 1 0 1 | 0 0

0 0 | 1 1 1 0 | 0 0

0 0 | 1 1 1 1 | 0 0

0 1 | 0 0 0 0 | 0 1

0 1 | 0 0 0 1 | 0 1

0 1 | 0 0 1 0 | 0 1

0 1 | 0 0 1 1 | 0 1

0 1 | 0 1 0 0 | 0 1

0 1 | 0 1 0 1 | 0 1

0 1 | 0 1 1 0 | 0 1

0 1 | 0 1 1 1 | 0 1

0 1 | 1 0 0 0 | 0 1

0 1 | 1 0 0 1 | 0 1

0 1 | 1 0 1 0 | 0 1

0 1 | 1 0 1 1 | 0 1

0 1 | 1 1 0 0 | 0 1

0 1 | 1 1 0 1 | 0 1

0 1 | 1 1 1 0 | 0 1

0 1 | 1 1 1 1 | 0 1

1 0 | 0 0 0 0 | 0 2

1 0 | 0 0 0 1 | 0 2

1 0 | 0 0 1 0 | 0 2

1 0 | 0 0 1 1 | 0 2

1 0 | 0 1 0 0 | 0 2

1 0 | 0 1 0 1 | 0 2

1 0 | 0 1 1 0 | 0 2

1 0 | 0 1 1 1 | 0 2

1 0 | 1 0 0 0 | 0 2

1 0 | 1 0 0 1 | 0 2

1 0 | 1 0 1 0 | 0 2

1 0 | 1 0 1 1 | 0 2

1 0 | 1 1 0 0 | 0 2

1 0 | 1 1 0 1 | 0 2

1 0 | 1 1 1 0 | 0 2

1 0 | 1 1 1 1 | 0 2

1 1 | 0 0 0 0 | 0 3

1 1 | 0 0 0 1 | 1 3

1 1 | 0 0 1 0 | 0 3

1 1 | 0 0 1 1 | 1 3

1 1 | 0 1 0 0 | 0 3

1 1 | 0 1 0 1 | 1 3

1 1 | 0 1 1 0 | 0 3

1 1 | 0 1 1 1 | 1 3

1 1 | 1 0 0 0 | 0 3

1 1 | 1 0 0 1 | 1 3

1 1 | 1 0 1 0 | 0 3

1 1 | 1 0 1 1 | 1 3

1 1 | 1 1 0 0 | 0 3

1 1 | 1 1 0 1 | 1 3

1 1 | 1 1 1 0 | 0 3

1 1 | 1 1 1 1 | 1 3

Waveform