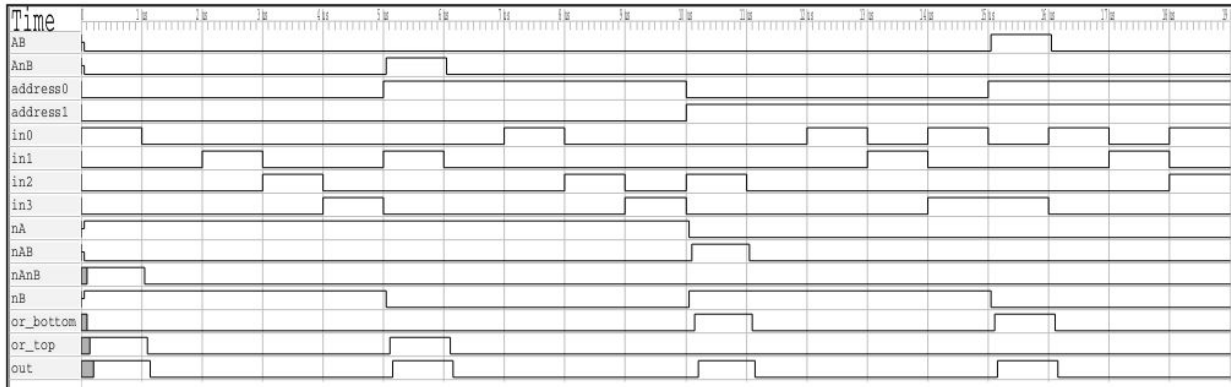


Homework 2: LHachmann

Multiplexer waveform:



Multiplexer - test bench output to given device

A1 A0 | 00 01 02 03 | Out | Expected outcome

0	0	1	0	0	0	1	1
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0
0	0	0	0	1	0	0	0
0	0	1	0	0	1	1	1
0	1	0	1	0	0	1	1
0	1	0	0	0	0	0	0
0	1	1	0	0	0	0	0
0	1	0	0	1	0	0	0
0	1	0	1	0	1	1	1
1	0	0	0	1	0	1	1
1	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0
1	0	0	1	0	0	0	0
1	0	1	0	1	1	1	1
1	1	0	0	0	1	1	1
1	1	1	0	0	0	0	0
1	1	0	1	0	0	0	0
1	1	1	0	1	1	1	1

Multiplexer - test bench output to made device

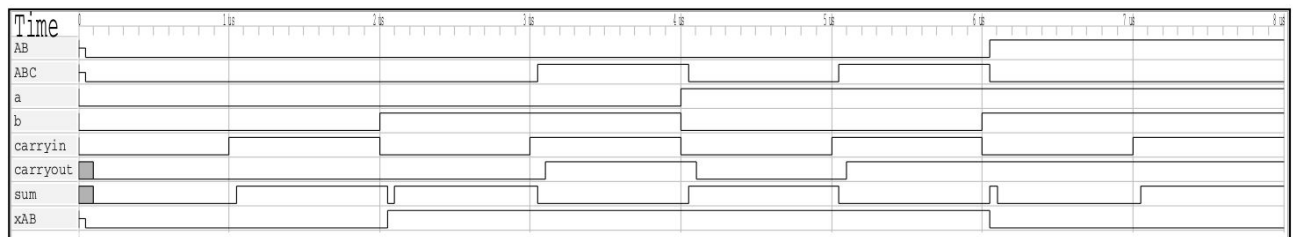
A1 A0 | 00 01 02 03 | Out | Expected outcome

0	0	1	0	0	0	1	1
0	0	0	0	0	0	0	0

0	0	0	1	0	0	0	0
0	0	0	0	1	0	0	0
0	0	1	0	0	1	1	1
0	1	0	1	0	0	1	1
0	1	0	0	0	0	0	0
0	1	1	0	0	0	0	0
0	1	0	0	1	0	0	0
0	1	0	1	0	1	1	1
1	0	0	0	1	0	1	1
1	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0
1	0	0	1	0	0	0	0
1	0	1	0	1	1	1	1
1	1	0	0	0	1	1	1
1	1	1	0	0	0	0	0
1	1	0	1	0	0	0	0
1	1	1	0	1	1	1	1

Truth table shows that the output is the input that is selected by the address. While other inputs may be high, only the input that the address selects can choose the output.

Adder waveform:



Adder - test bench output to given device

A B Cin | Cout Sum | Expected Output

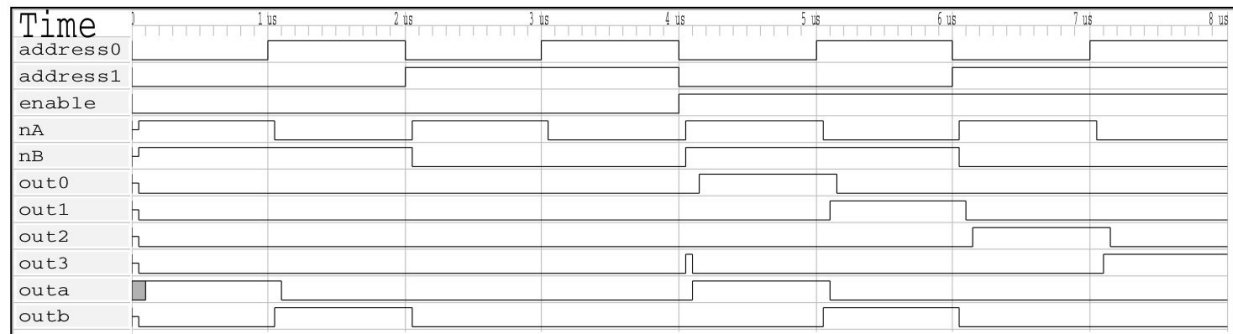
0	0	0	0	0	Remainder 0 Sum 0
0	0	1	0	1	Remainder 0 Sum 1
0	1	0	0	1	Remainder 0 Sum 1
0	1	1	1	0	Remainder 1 Sum 0
1	0	0	0	1	Remainder 0 Sum 1
1	0	1	1	0	Remainder 1 Sum 0
1	1	0	1	0	Remainder 1 Sum 0
1	1	1	1	1	Remainder 1 Sum 1

Adder - test bench output to made device

A B Cin | Cout Sum | Expected Output

0	0	0		0	0		Remainder 0	Sum 0
0	0	1		0	1		Remainder 0	Sum 1
0	1	0		0	1		Remainder 0	Sum 1
0	1	1		1	0		Remainder 1	Sum 0
1	0	0		0	1		Remainder 0	Sum 1
1	0	1		1	0		Remainder 1	Sum 0
1	1	0		1	0		Remainder 1	Sum 0
1	1	1		1	1		Remainder 1	Sum 1st

Decoder waveform:



Decoder - given test bench output

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

Decoder - test bench output to made device

En A1 A0| 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