Assignment B-4 Exercise 3.1 Project 1 and 2

3.3.1 Decoder

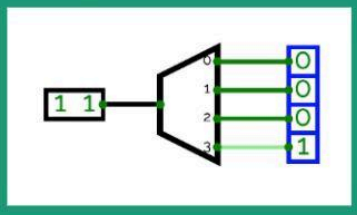
- **Exercise 3-1**: draw the circuits by using the logic simulator
  - **Project 1**
    - Draw the 2-to-4 Decoder (the full logic circuit without any sub-circuit)
      1) Use 2 inputs(A0, A1) and 1 enable(Enable), 4 outputs (D0, D1, D2, D3)
      2) Draw the full circuits without any sub-circuit
      3) Show the test results by using testBench
      4) Show the test result

Extra points
for the 3x8 Decoder

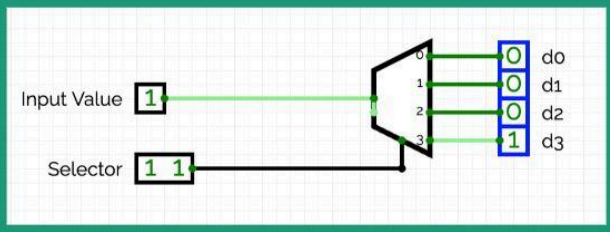
3.3.1 Decoder

- **Exercise 3-1**:

- **Project 2**
  - Use the built-in 2-to-4 Decoder (Decoder or Demultiplexer)
    - Draw the Circuit
    - Add the TestBench
    - Show the Test Result



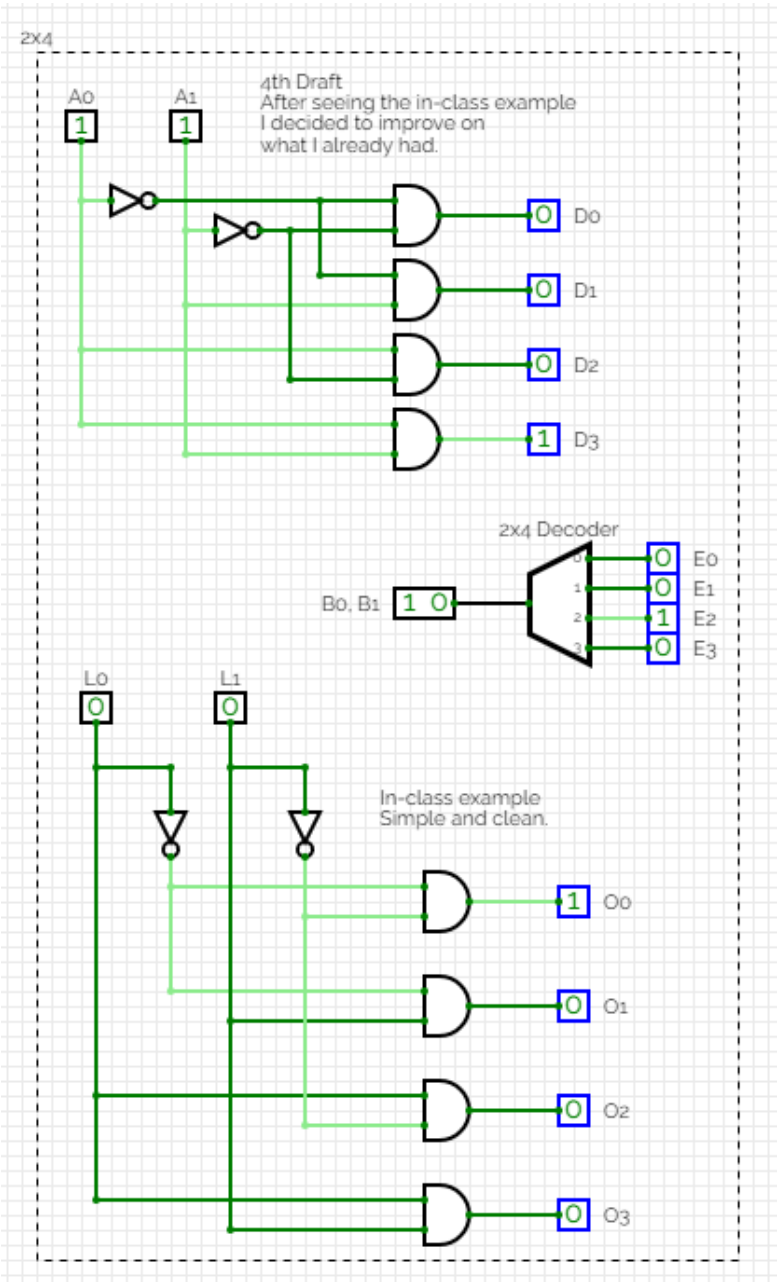
Using Decoder



Using DeMux

2x4 Decoder Circuit

1) Design Screenshot



2) Testbenches

Title: 2x4 Test

Sequential Test | Combinational Test

	INPUTS		OUTPUTS			
Label	A0	A1	D0	D1	D2	D3
Bitwidth	1	1	1	1	1	1

Group 1

Click + to add tests to the group

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

+ New Group | Import from CSV | Export as CSV | Attach

Title: 2x4 Decoder Test

Sequential Test | Combinational Test

	INPUTS	OUTPUTS			
Label	2x4 Input	E0	E1	E2	E3
Bitwidth	2	1	1	1	1

Group 1

Click + to add tests to the group

00	1	0	0	0
01	0	1	0	0
10	0	0	1	0
11	0	0	0	1

+ New Group | Import from CSV | Export as CSV | Attach

3) Test Results

TESTBENCH

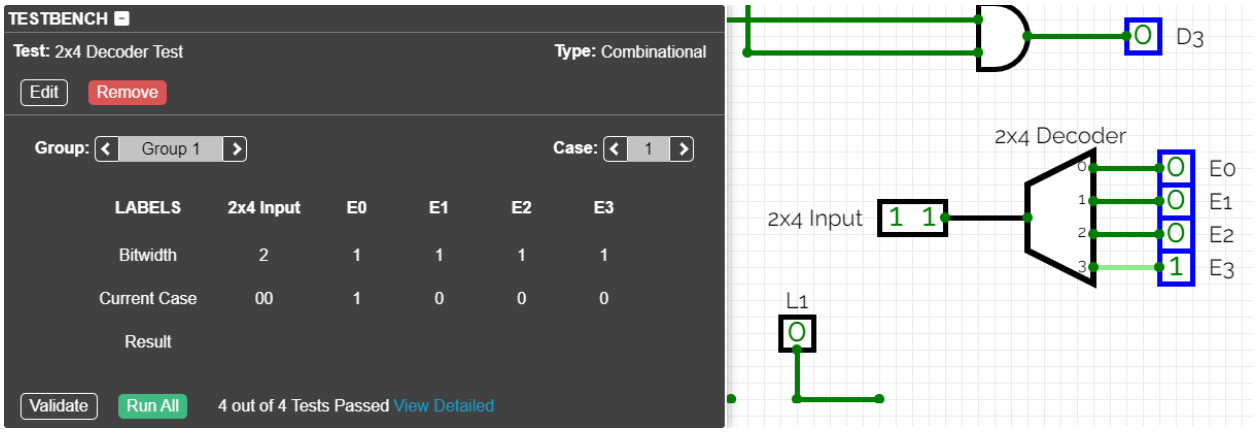
Test: 2x4 Test **Type:** Combinational

Edit Remove

Group: Group 1 **Case:** 1

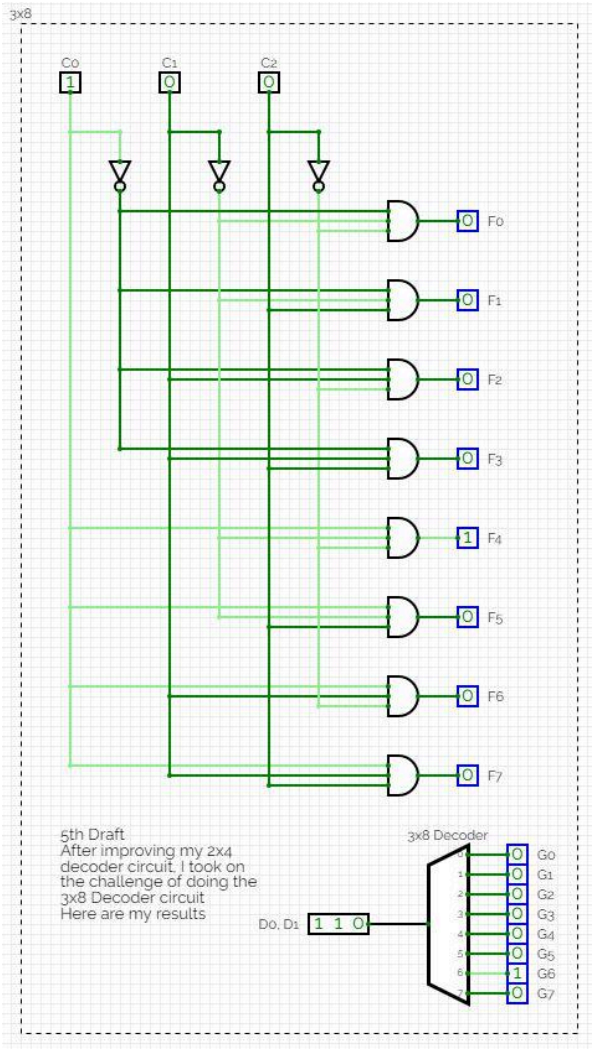
LABELS	A0	A1	D0	D1	D2	D3
Bitwidth	1	1	1	1	1	1
Current Case	0	0	1	0	0	0
Result						

Validate Run All 4 out of 4 Tests Passed View Detailed



3x8 Decoder Circuit

1) Design Screenshot



2) Testbenches

Title: 3x8 Test

Sequential Test | Combinational Test

	INPUTS +			OUTPUTS +							
Label	**C0**	**C1**	**C2**	**F0**	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**
Bitwidth	1	1	1	1	1	1	1	1	1	1	1

Group 1

Click + to add tests to the group

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

+ New Group | Import from CSV | Export as CSV | Attach

Title: 3x8 Decoder Test

Sequential Test | Combinational Test

	INPUTS +	OUTPUTS +							
Label	**3x8 Input**	**G0**	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**
Bitwidth	3	1	1	1	1	1	1	1	1

Group 1

Click + to add tests to the group

000	1	0	0	0	0	0	0	0
001	0	1	0	0	0	0	0	0
010	0	0	1	0	0	0	0	0
011	0	0	0	1	0	0	0	0
100	0	0	0	0	1	0	0	0
101	0	0	0	0	0	1	0	0
110	0	0	0	0	0	0	1	0
111	0	0	0	0	0	0	0	1

+ New Group | Import from CSV | Export as CSV | Attach

3) Test Results

TESTBENCH

Test: 3x8 Test **Type:** Combinational

Edit Remove

Group: Group 1 **Case:** 1

LABELS	C0	C1	C2	F0	F1	F2	F3
Bitwidth	1	1	1	1	1	1	1
Current Case	0	0	0	1	0	0	0
Result							

Validate Run All 8 out of 8 Tests Passed View Detailed

TESTBENCH

Test: 3x8 Decoder Test **Type:** Combinational

Edit Remove

Group: Group 1 **Case:** 1

LABELS	3x8 Input	G0	G1	G2	G3	G4
Bitwidth	3	1	1	1	1	1
Current Case	000	1	0	0	0	0
Result						

Validate Run All 8 out of 8 Tests Passed View Detailed