Assignment B-5 Exercise 3.2 Project 1 and 2

3.3.2 Multiplexer

- Exercise 3-2:
- Project 1
  1) Draw the 4x1 multiplexer using the circuit simulator(Circuitverse, Digital)
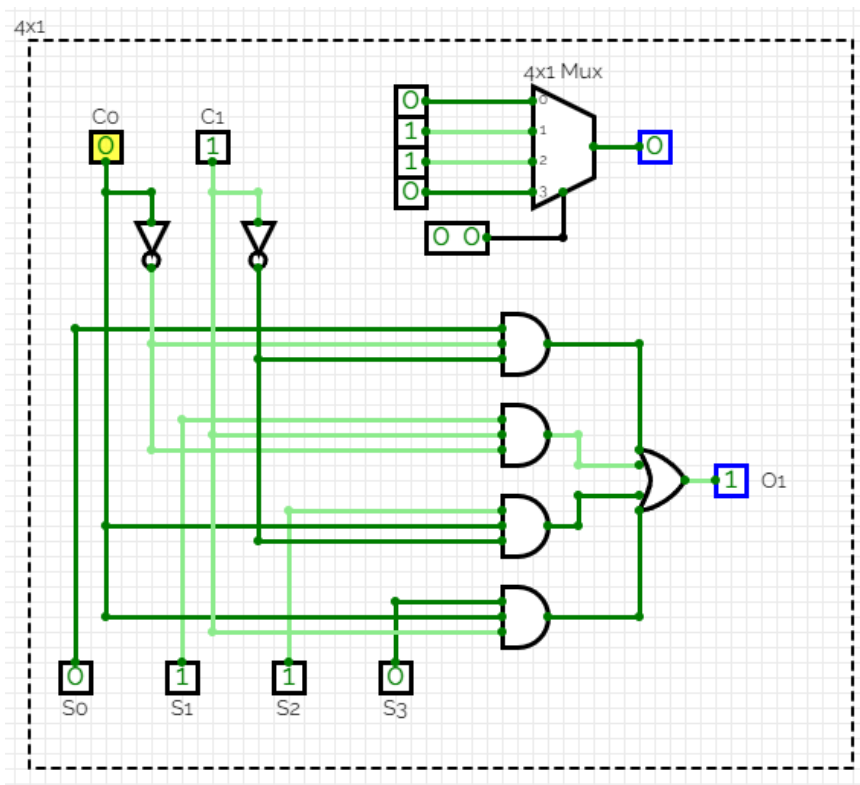 2) Show the truth tables and test results by using the simulation tool

- Project 2
  1) Draw 8x1 multiplexer by using your sub-circuit 2x1 mux
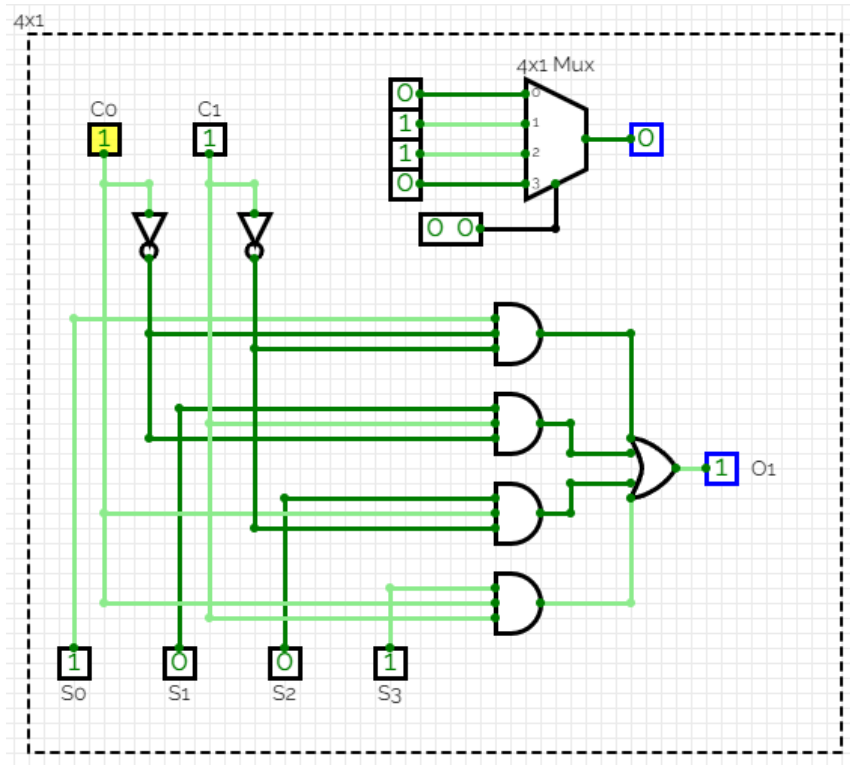   - 4 2x1 Mux + 1 4x1 Mux
  2) Show the test results and truth table

2 tries with different combos to show that it works just like a multiplexer

Project 1

1) Design Screenshot

Part 1

Part 2

2) Testbench

Title: 4x1 Test pt.1

Sequential Test	Combinational Test

	INPUTS ⊞		OUTPUTS ⊞
Label	**C0**	**C1**	**O1**
Bitwidth	1	1	1

Group 1

Click + to add tests to the group

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

+ New Group   Import from CSV   Export as CSV   Attach

Title: 4x1 Test pt.2

Sequential Test	Combinational Test

	INPUTS ⊞		OUTPUTS ⊞
Label	C0	C1	O1
Bitwidth	1	1	1

Group 1

Click + to add tests to the group

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

+	New Group		Import from CSV	Export as CSV	Attach

3) Test Result

TESTBENCH ▬

Test: 4x1 Test pt.1   **Type:** Combinational

Edit	Remove

Group: ◄ Group 1 ►   Case: ◄ 1 ►

LABELS	C0	C1	O1
Bitwidth	1	1	1
Current Case	0	0	0
Result			

Validate	Run All	4 out of 4 Tests Passed View Detailed

TESTBENCH ■

Test: 4x1 Test pt.2   **Type:** Combinational

[Edit]   [Remove]

Group: [<] Group 1 [>]   Case: [<] 1 [>]

LABELS	C0	C1	O1
Bitwidth	1	1	1
Current Case	0	0	1
Result			

[Validate]   [Run All]   4 out of 4 Tests Passed View Detailed

Project 2

1) Design Screenshot

2x1 Mux

O3

A0 | O — U0
A1 | O — U1

C0 | O — E0

2x1 Mux

O3

A2 | O — U0
A3 | 1 — U1

C1 | O — E0

4x1 Mux

O1 — 1 O4

S0
S1
S2
S3
B0 | 1 — C0
B1 | O — C1

2x1 Mux

O3

A4 | 1 — U0
A5 | O — U1

C2 | O — E0

2x1 Mux

O3

A6 | 1 — U0
A7 | 1 — U1

C3 | O — E0

Part 1
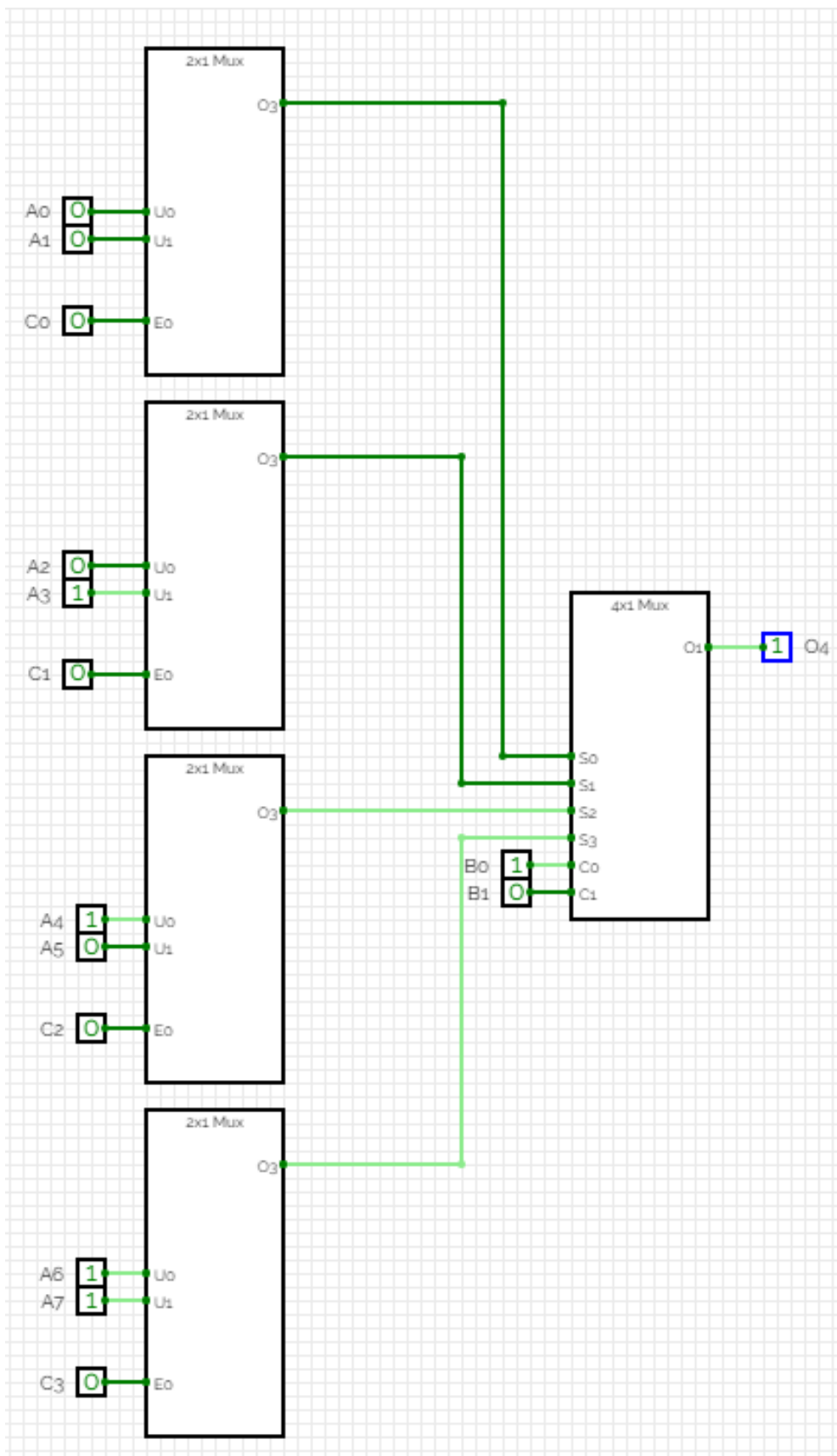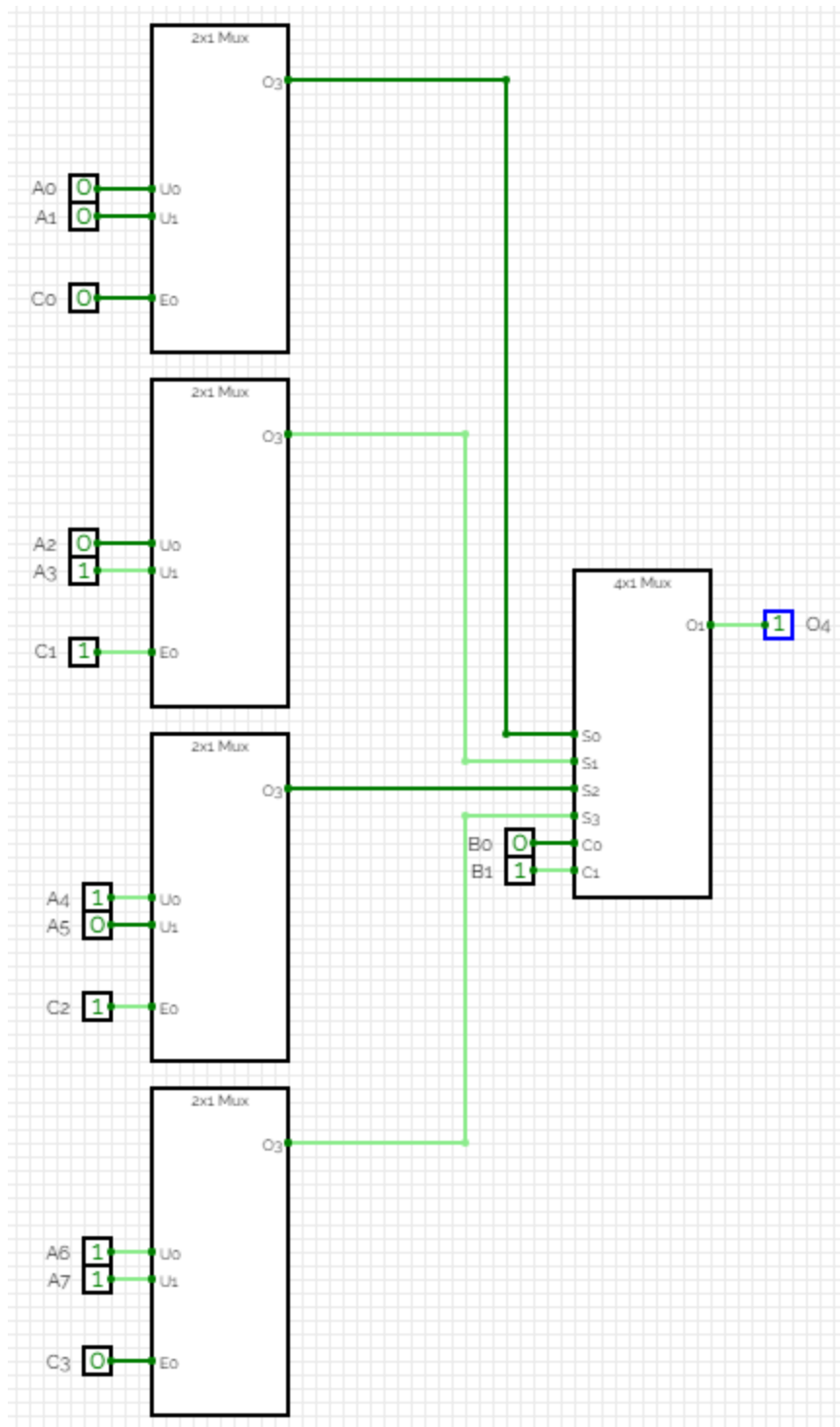
Part 2

2) Testbench

Title: 8x1 Test Pt.1

Sequential Test	Combinational Test

	INPUTS ⊞								OUTPUTS ⊞
Label	A0	A1	A2	A3	A4	A5	A6	A7	O4
Bitwidth	1	1	1	1	1	1	1	1	1

Group 1

Click + to add tests to the group

A0	A1	A2	A3	A4	A5	A6	A7	O4
0	0	0	0	0	0	0	0	0
0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1
1	1	1	1	1	1	1	1	1

+	New Group		Import from CSV	Export as CSV	Attach

Title: 8x1 Test Pt.2

Sequential Test	Combinational Test

	INPUTS ⊞								OUTPUTS ⊞
Label	A0	A1	A2	A3	A4	A5	A6	A7	O4
Bitwidth	1	1	1	1	1	1	1	1	1

Group 1

Click + to add tests to the group

A0	A1	A2	A3	A4	A5	A6	A7	O4
0	0	0	0	0	0	0	0	0
0	1	0	1	0	1	0	1	1
1	0	1	0	1	0	1	0	0
1	1	1	1	1	1	1	1	1

+	New Group		Import from CSV	Export as CSV	Attach

3) Test Result

TESTBENCH ▬

Test: 8x1 Test Pt.1   **Type:** Combinational

Edit   Remove

Group: ◀   Group 1   ▶   Case: ◀   1   ▶

LABELS	A0	A1	A2	A3	A4	A5	A(
Bitwidth	1	1	1	1	1	1	1
Current Case	0	0	0	0	0	0	0
Result							

◀ ━━━━━━━━━━━━━━━━━━━━━━━━━ ▶
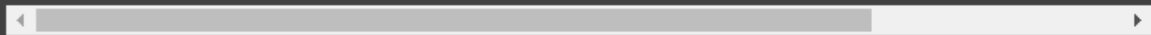
Validate   Run All   4 out of 4 Tests Passed View Detailed

TESTBENCH ▬

Test: 8x1 Test Pt.2   **Type:** Combinational

Edit   Remove

Group: ◀   Group 1   ▶   Case: ◀   1   ▶

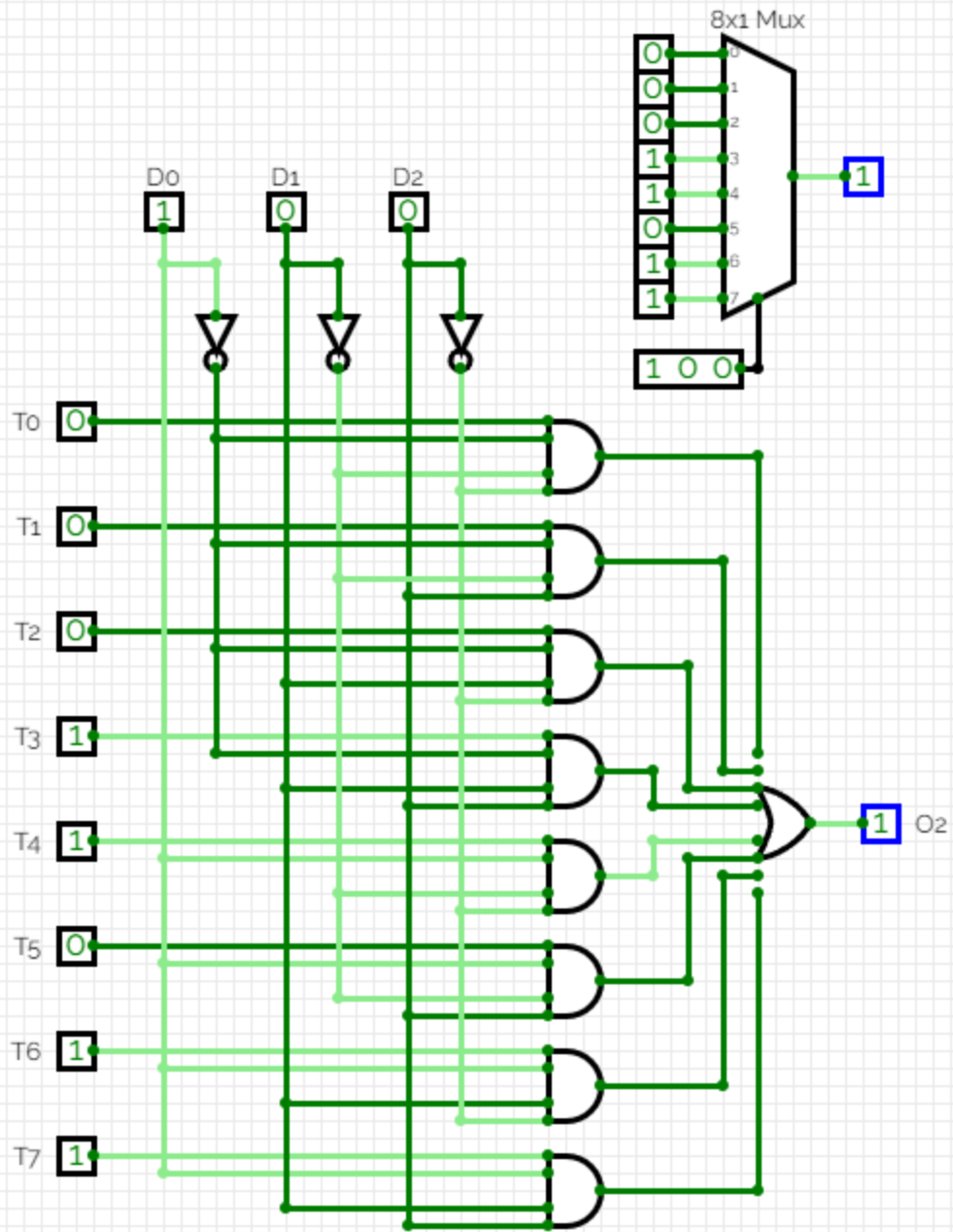| LABELS	A0	A1	A2	A3	A4	A5	A(
Bitwidth	1	1	1	1	1	1	1
Current Case	0	0	0	0	0	0	0
Result							

◀ ━━━━━━━━━━━━━━━━━━━━━━━━━ ▶
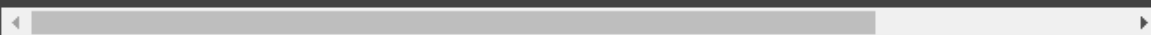
Validate   Run All   4 out of 4 Tests Passed View Detailed

Extra:

8x1

8x1 Mux

D0 D1 D2
1   0   0

O
O
O
1
1
O
1
1

1

1   O   O

T0 | O
T1 | O
T2 | O
T3 | 1
T4 | 1
T5 | O
T6 | 1
T7 | 1

1 O2