Logic implementation using a multiplexer (DGTL_mux_1.sqproj)

$$A \longrightarrow IO$$

$$1 \longrightarrow I1$$

$$\overline{A} \longrightarrow I2$$

$$0 \longrightarrow I3$$

$$S_1 S_0$$

$$B C$$

Figure 1: Multiplexer example.

Question: For the connections shown in Fig. 1, find a logical expression for Y, and construct its truth table.

Solution:

$$Y = (B \cdot C) \cdot \mathbf{0} + (B \cdot \overline{C}) \cdot \overline{A} + (\overline{B} \cdot C) \cdot \mathbf{1} + (\overline{B} \cdot \overline{C}) \cdot A$$

= $\overline{A} B \overline{C} + \overline{B} C + A \overline{B} \overline{C}$ (1)

From the above expression, we can construct the truth table for Y as given below.

A	В	C	Y
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

SequelApp Exercises: For the connections shown in Fig. 2, find a logical expression for Y, and construct its truth table.

$$\overline{A} - I0 \\ 0 - I1 \\ A - I2 \\ 1 - I3 \\ B - C$$

$$-Y$$

Figure 2: Multiplexer example.

Verify your answers using SequelApp.