



## **LAB REPORT**

***Khulna University of Engineering & Technology***

### ***Computer Science and Engineering***

**Name** : Doniel Tripura

**Roll** : 1907121

**Section** : B

**Semester** : 2nd

**Experiment No** : 05





Experiment name: Multiplexer and Demultiplexer.

AIM: ① To implement  $8 \times 1$  MUX using  $4 \times 1$  MUX.

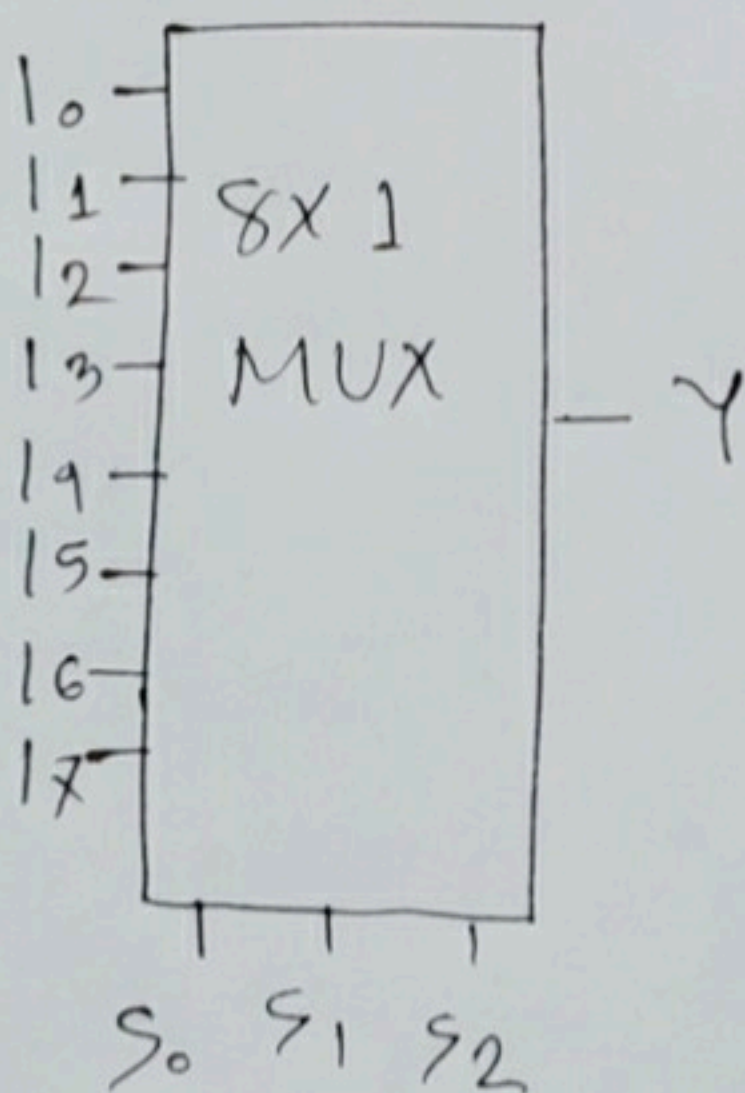
② To design  $1 \times 8$  DEMUX using NAND Gates.

③ To set up a Full subtractor using  $1 \times 8$  DEMUX

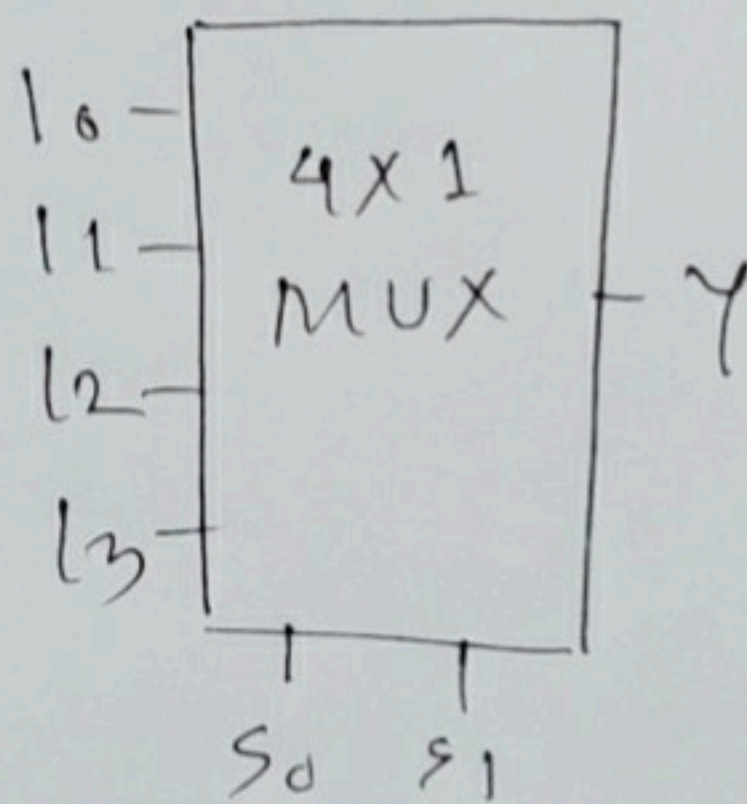
Learning Objective:

- ① Application of Multiplexer and DE-Multiplexer.
- ② Implementation of one MUX with another MUX
- ③ Designing a De-MUX from a given equation.

$8 \times 1$  MUX

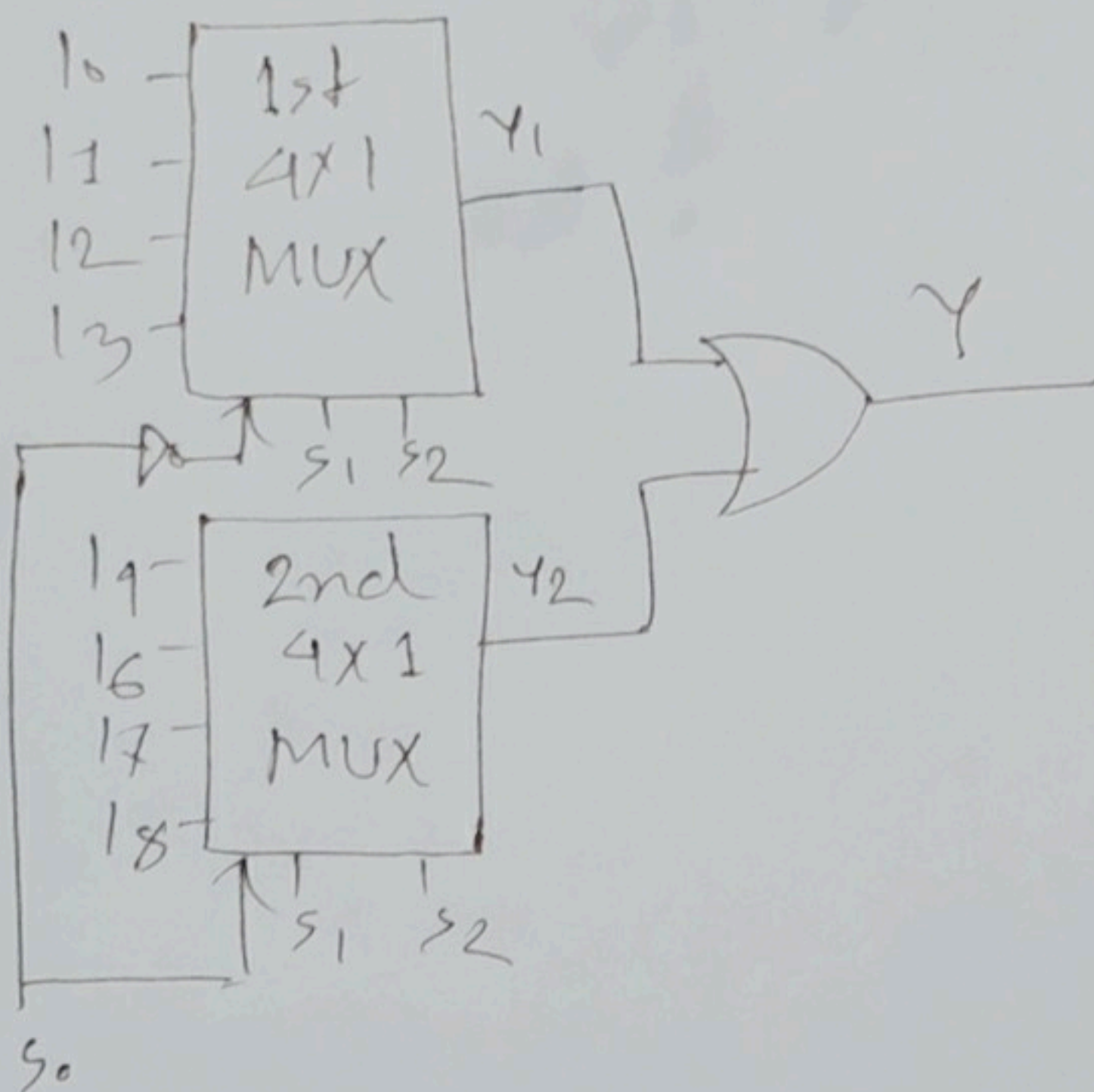


$4 \times 1$  MUX

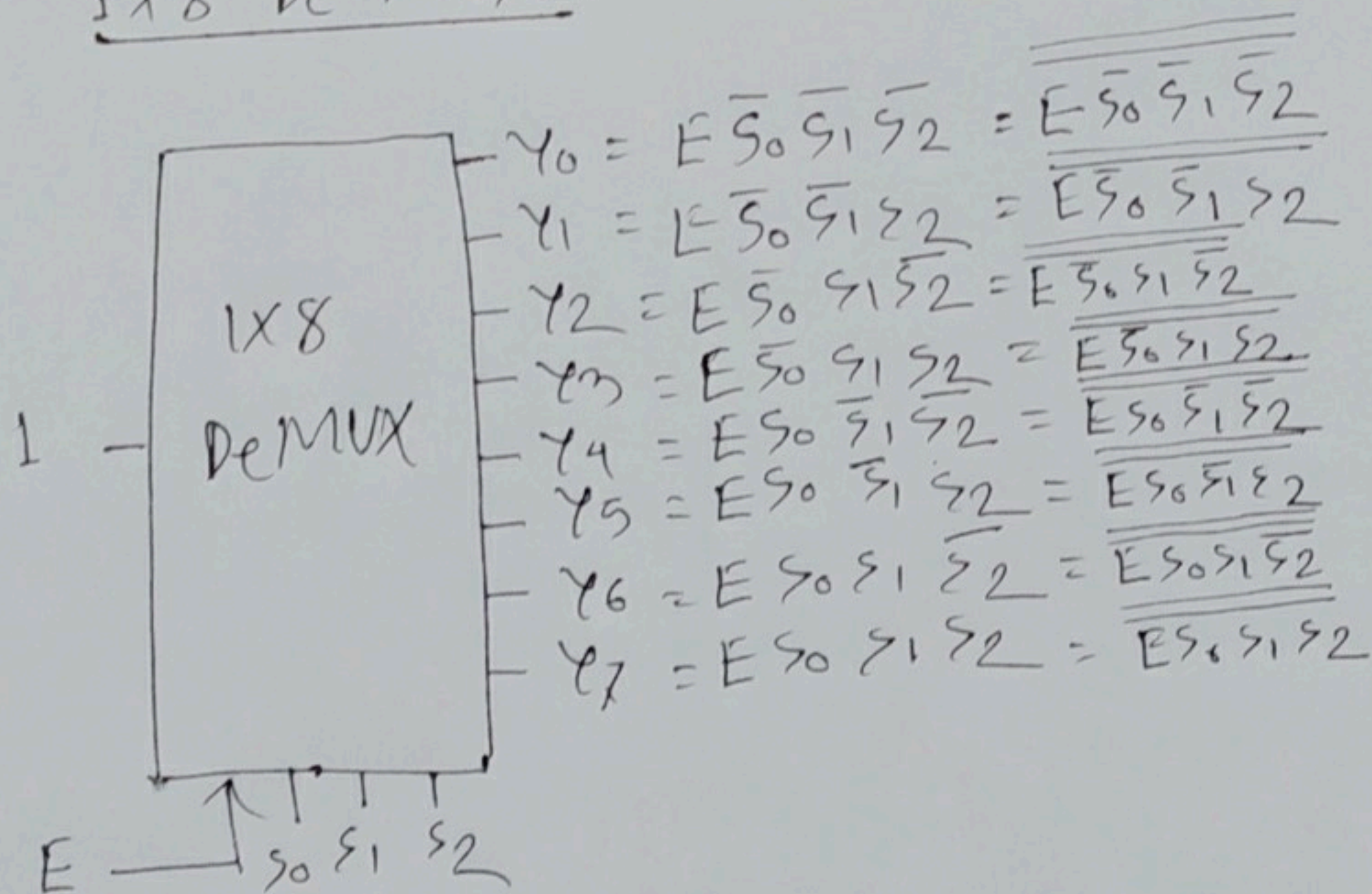




8x1 MUX using 4x1 MUX:



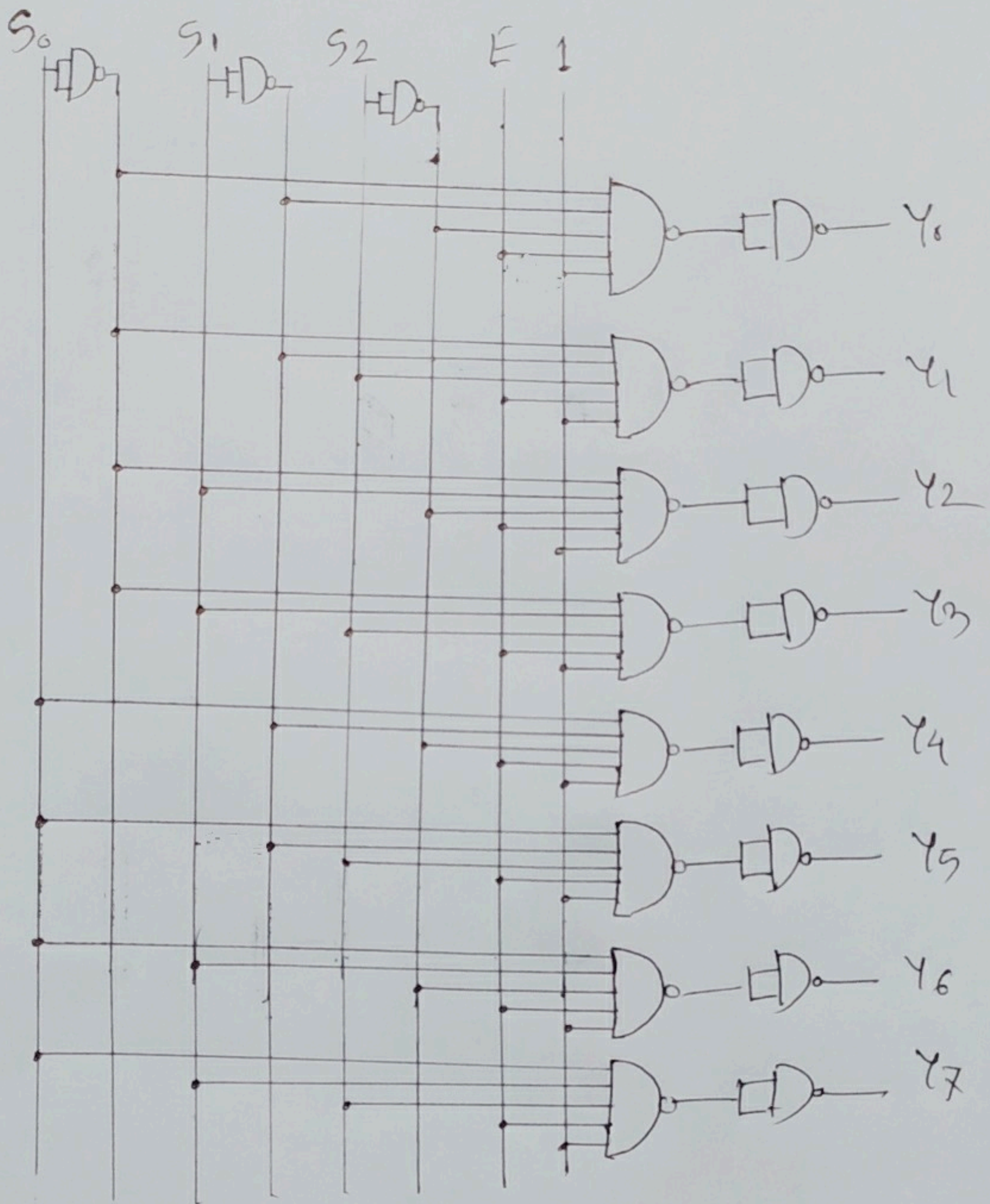
1x8 De-MUX:



[ Here,  $E=1$ , for enable the DeMUX ]



Realize 1X8 De-MUX using NAND Gate:





From the circuit of Full Subtractor

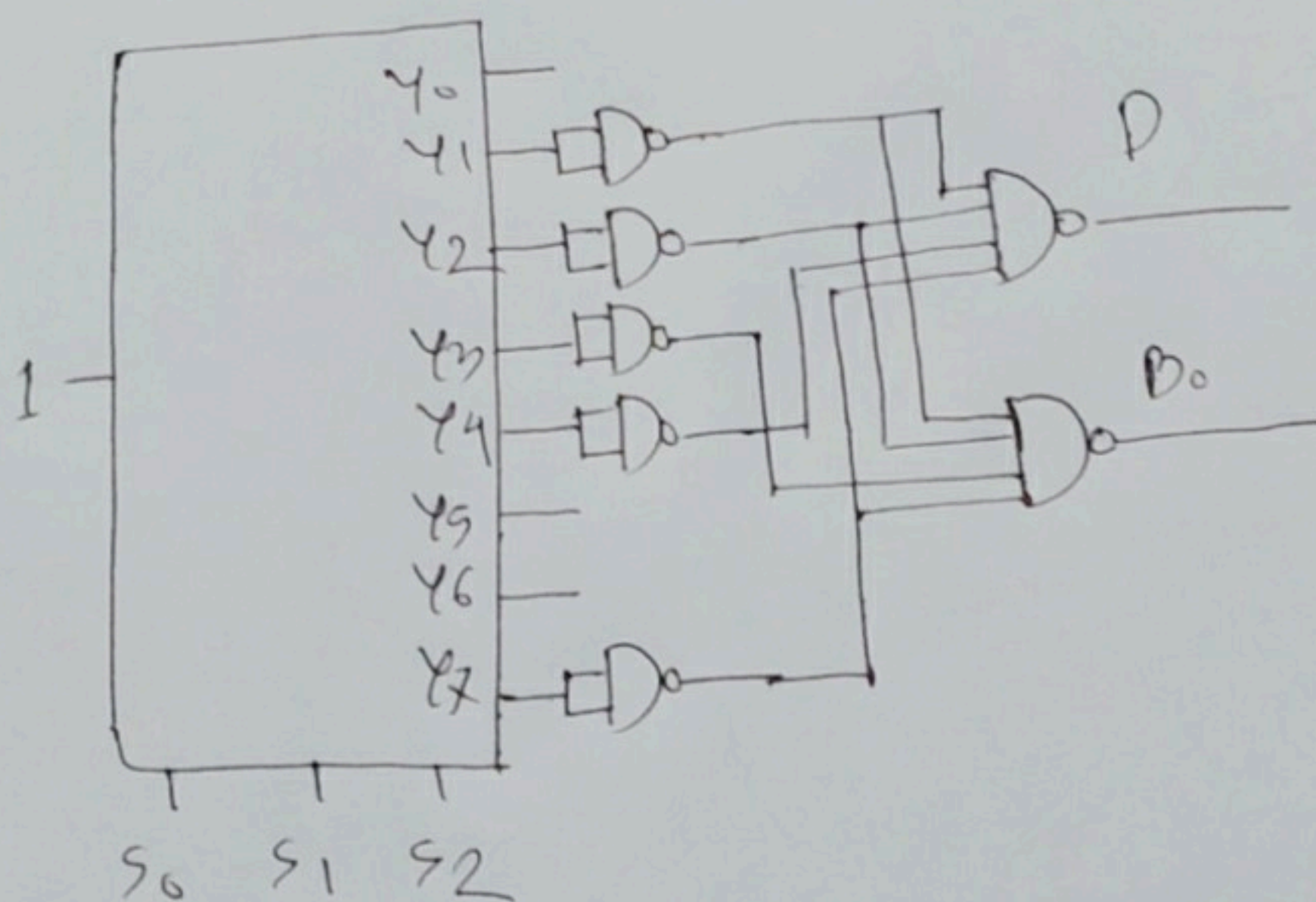
$$D = \overline{S_0} \overline{S_1} S_2 + \overline{S_0} S_1 \overline{S_2} + S_0 \overline{S_1} \overline{S_2} + S_0 S_1 S_2$$

$$= \overline{S_0} \overline{S_1} S_2 \cdot \overline{S_0} S_1 \overline{S_2} \cdot S_0 \overline{S_1} \overline{S_2} \cdot S_0 S_1 S_2$$

$$B_0 = \overline{S_0} \overline{S_1} S_2 + \overline{S_0} S_1 \overline{S_2} + \overline{S_0} S_1 S_2 + S_0 \overline{S_1} \overline{S_2}$$

$$= \overline{S_0} \overline{S_1} S_2 \cdot \overline{S_0} S_1 \overline{S_2} \cdot \overline{S_0} S_1 S_2 \cdot S_0 \overline{S_1} \overline{S_2}$$

Making Full subtractor using 1x8 deMUX



Viva Question:

① What is Multiplexer?

⇒ Multiplexer is a device that selects one of many digital or analog input signals and output it into a single output line.



✓  
(2) What is a De-Multiplexer?

→ A De-Multiplexer is a circuit designed to switch one common input line to one of several separate output lines.

(3) What are the applications of mux & Demux?

→ Communication systems use mux to carry multiple data like audio, video and other form of data using a single line for transmission.

The demux receives the output signals of the mux and converts them back to the original form of the data at the receiving end.

(4) What is the difference between mux & Demux?

→ A multiplexer is a combinational circuit that provides single output but accepts multiple data inputs.

A de-multiplexer is a combinational circuit that takes single input but input can be directed through multiple outputs.