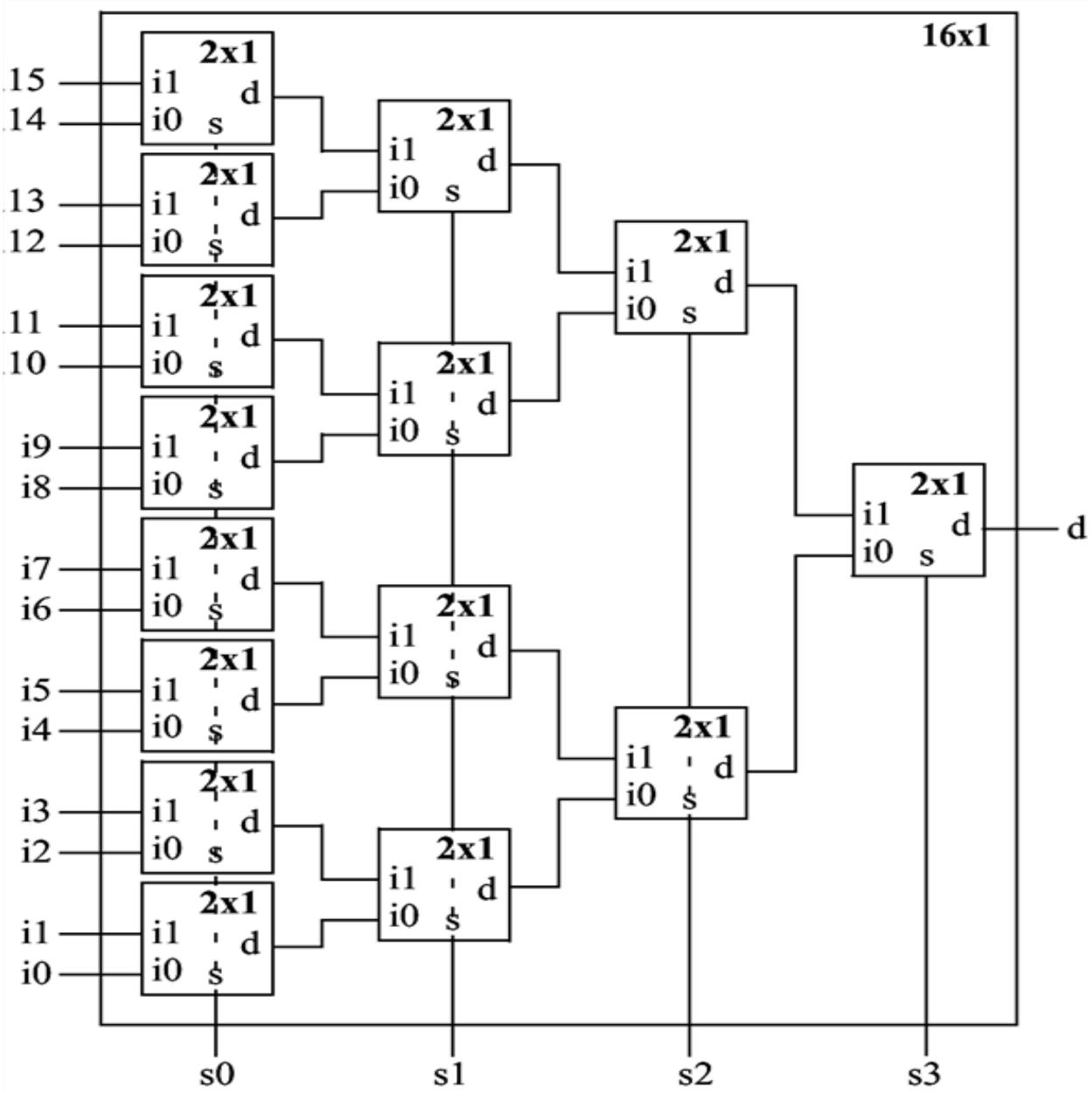
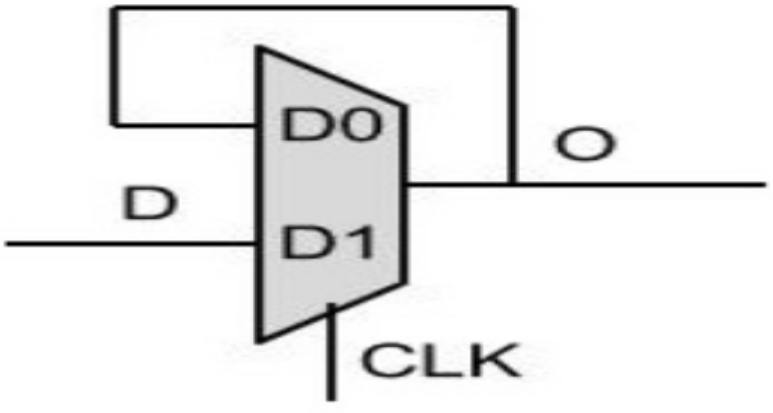
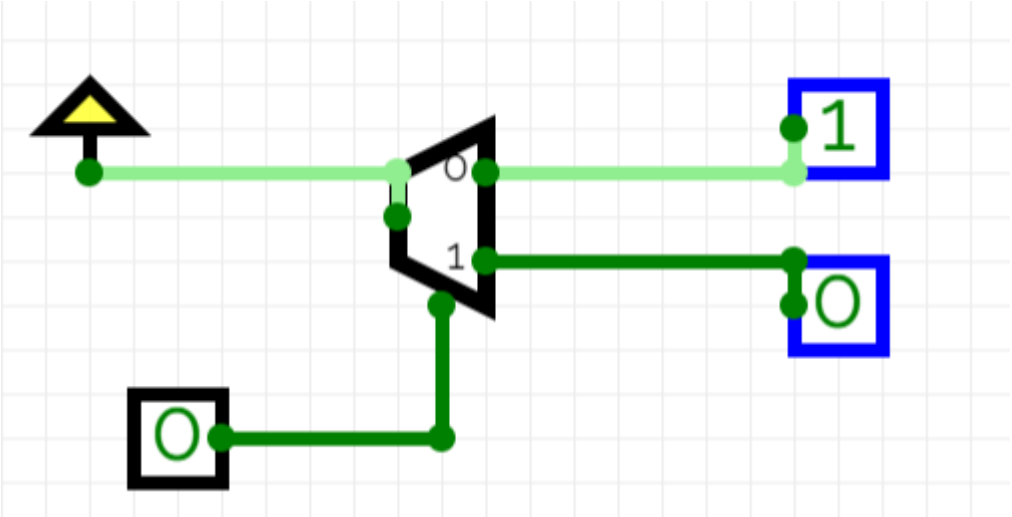
1. Design a 16:1 MUX using 2:1 MUX



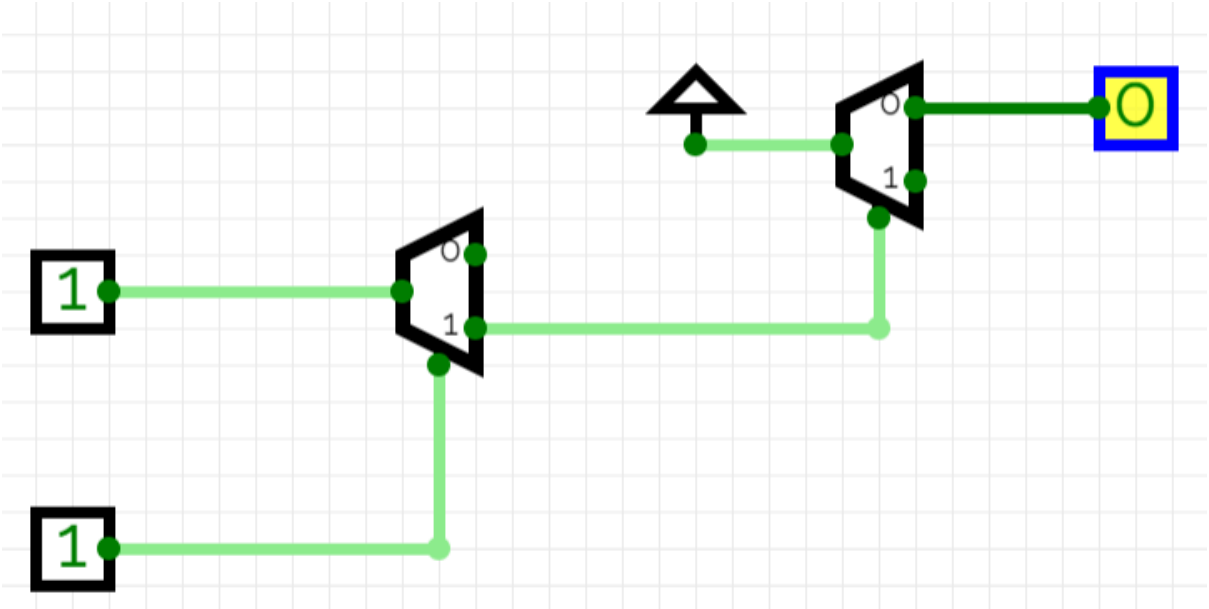
2. Design a D flip-flop using MUX



3. Design a 1:2 DEMUX that can act as an inverter and buffer.



4. Design a NAND gate using DEMUX



5. What is the difference between Decoder and DEMUX?

   Decoder

   - A decoder is a logic circuit that changes the format of an encrypted input stream.
   - It contains n input lines and 2n output lines.
   - decoding is utilized in data-intensive applications where data must be changed into another format.

   Demux

   - a demultiplexer (DEMUX) is a combination circuit that is utilized to build general-purpose logic. It routes the single input signal into one of the various output signals.
   - It contains one input and 2n output of selected lines.
   - Demultiplexing is widely utilized in networking applications.

6. When one of the inputs to a 2:1 MUX is zero, what is the output?

When the other input is 0 the output is zero but when the other input is 1 the output is equal to the value in the select line.

7. When one input of a 2:1 MUX is one. What is the output?
   When the other input is zero the output is the not of the select line. When the other input is one the output is one.

8. Applications of
   MUX
   - It can be used to implement different logic circuits.
   - It is used to convert data parallel to serial.
   - Used to access memory.

   DeMUX
   - Used to transmit data to multiple devices.
   - Used to convert data from parallel to serial.
   - Used to read from memory.