

CS 2110

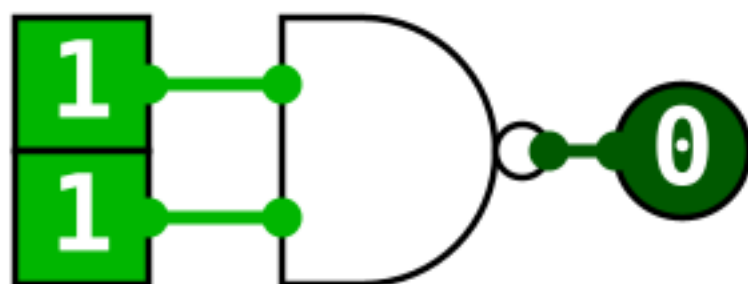
Starring:

Austin as Tom Conte

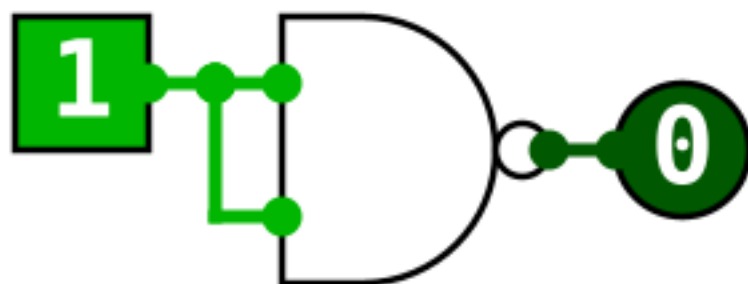
Jason as Jason

September 13th, 2022

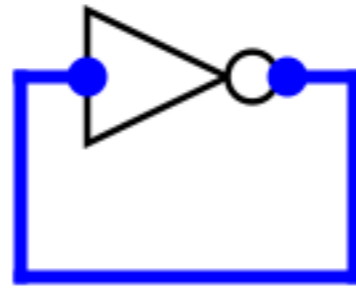
A NAND gate outputs a 0 if and only if both inputs are 1:



Thus, we can build an inverter (NOT gate) with a NAND gate:

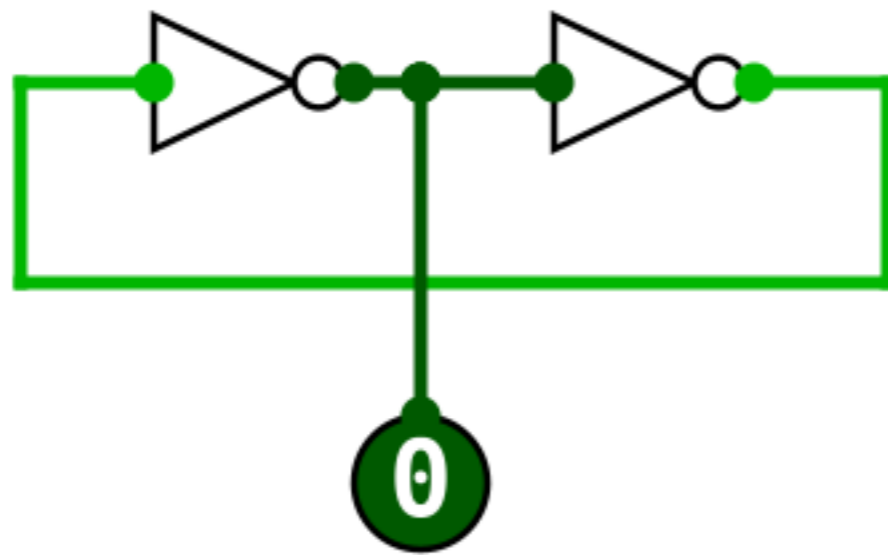


If we hook up an inverter to itself, we get an oscillating mess:

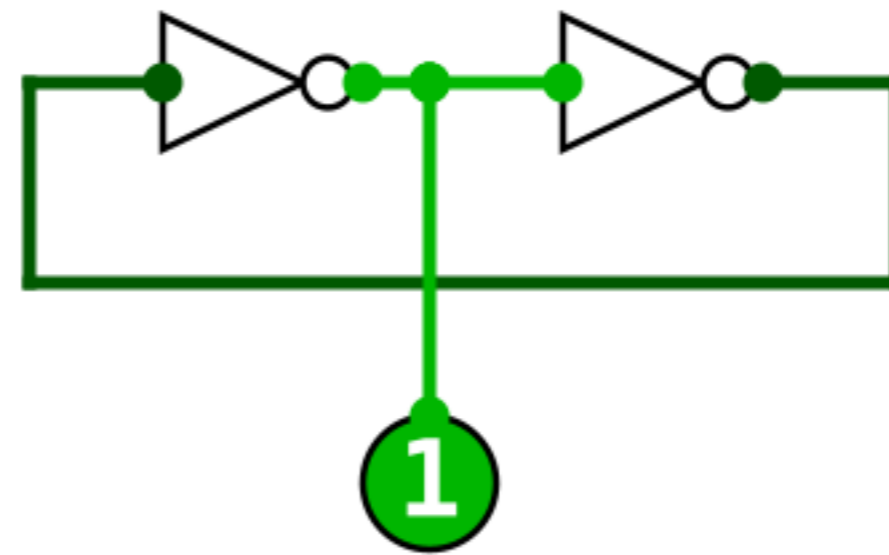


But if we use two inverters, we get two stable states:

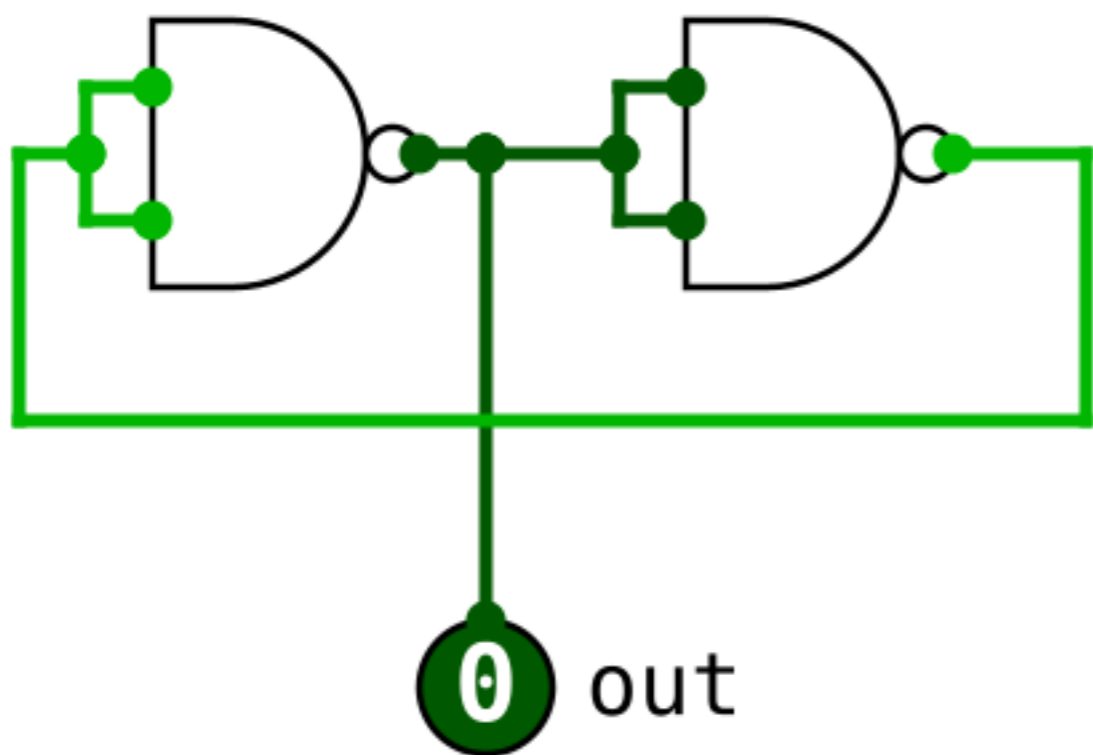
Stable state 0



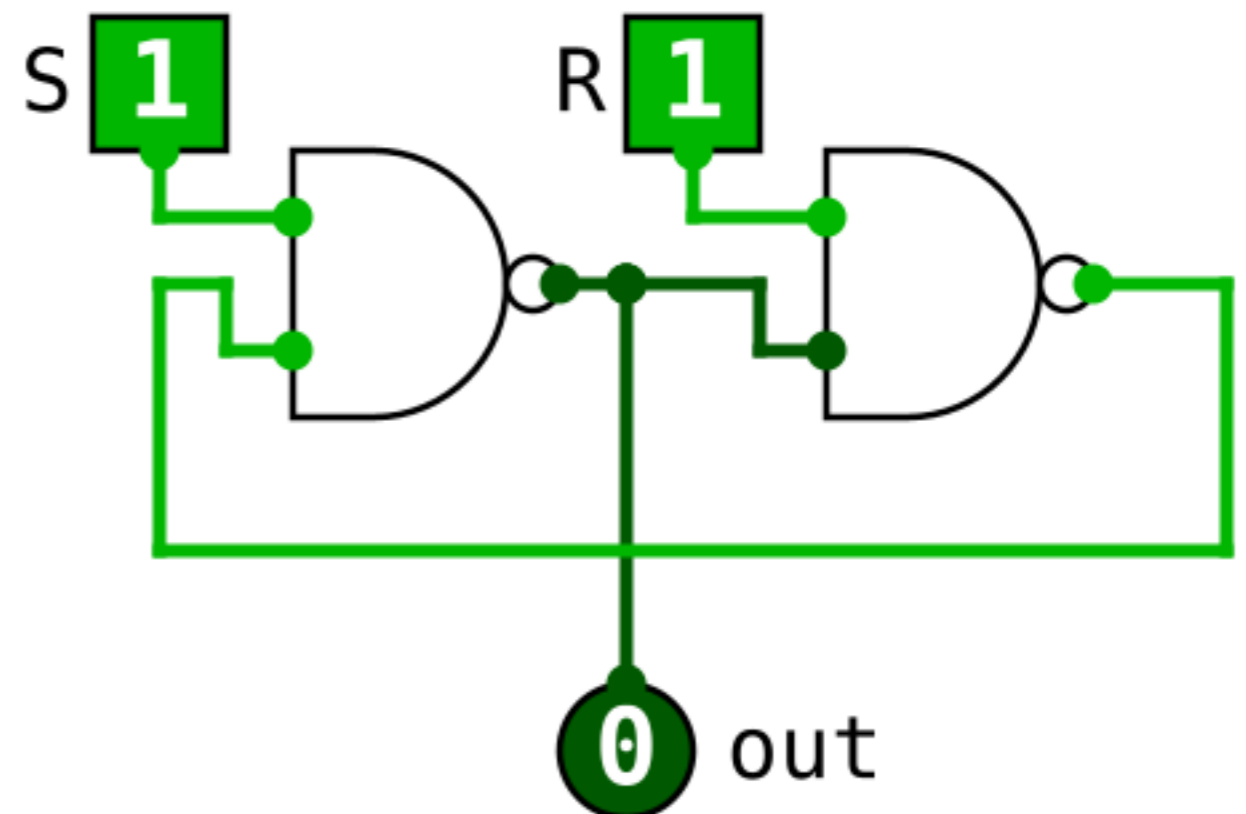
Stable state 1



Let's try NAND gates...

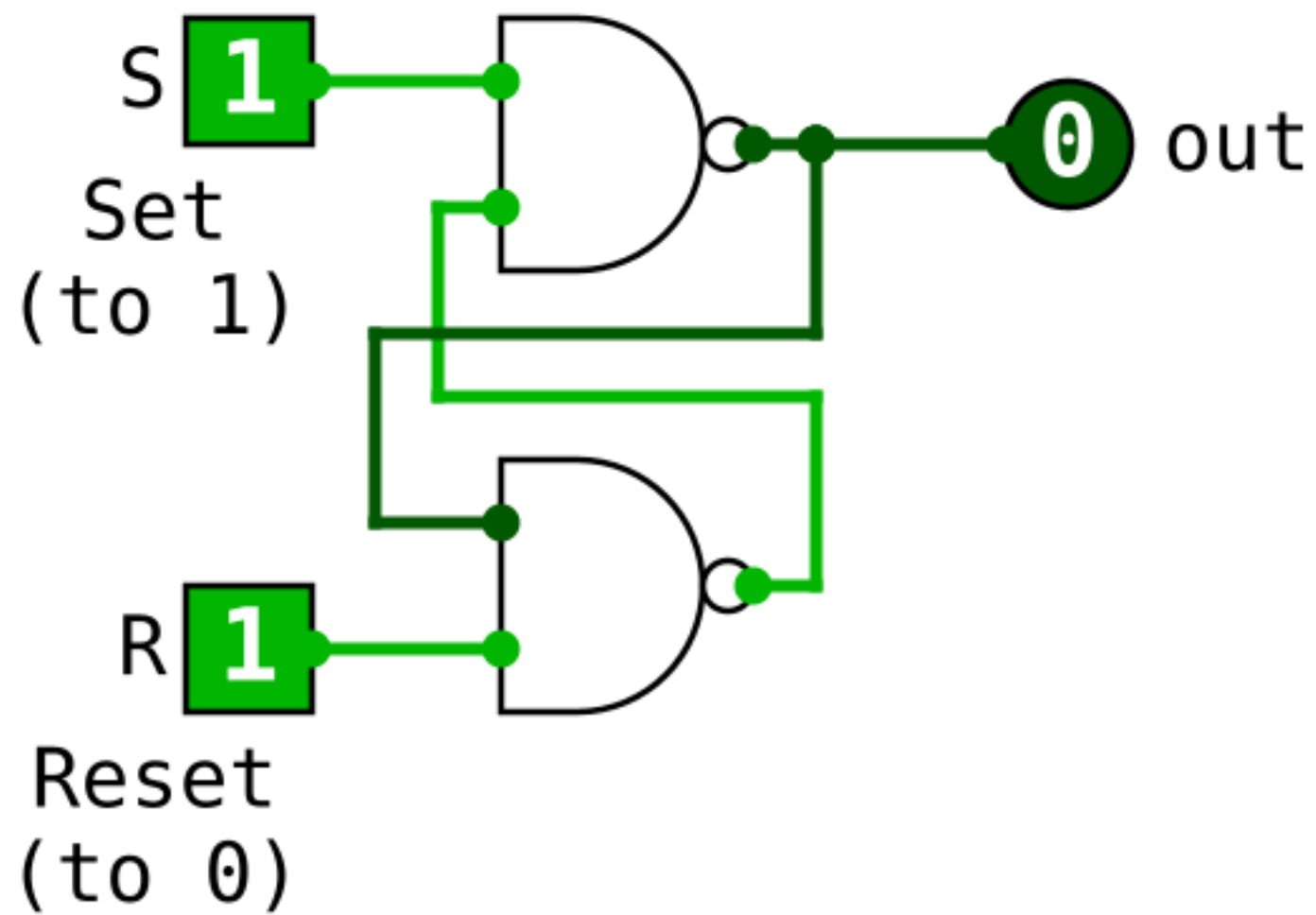


Now what we hook up some input pins?



We rearrange this into...

RS Latch



Types of inputs:

Active high:

Do something when 1
(Else 0)

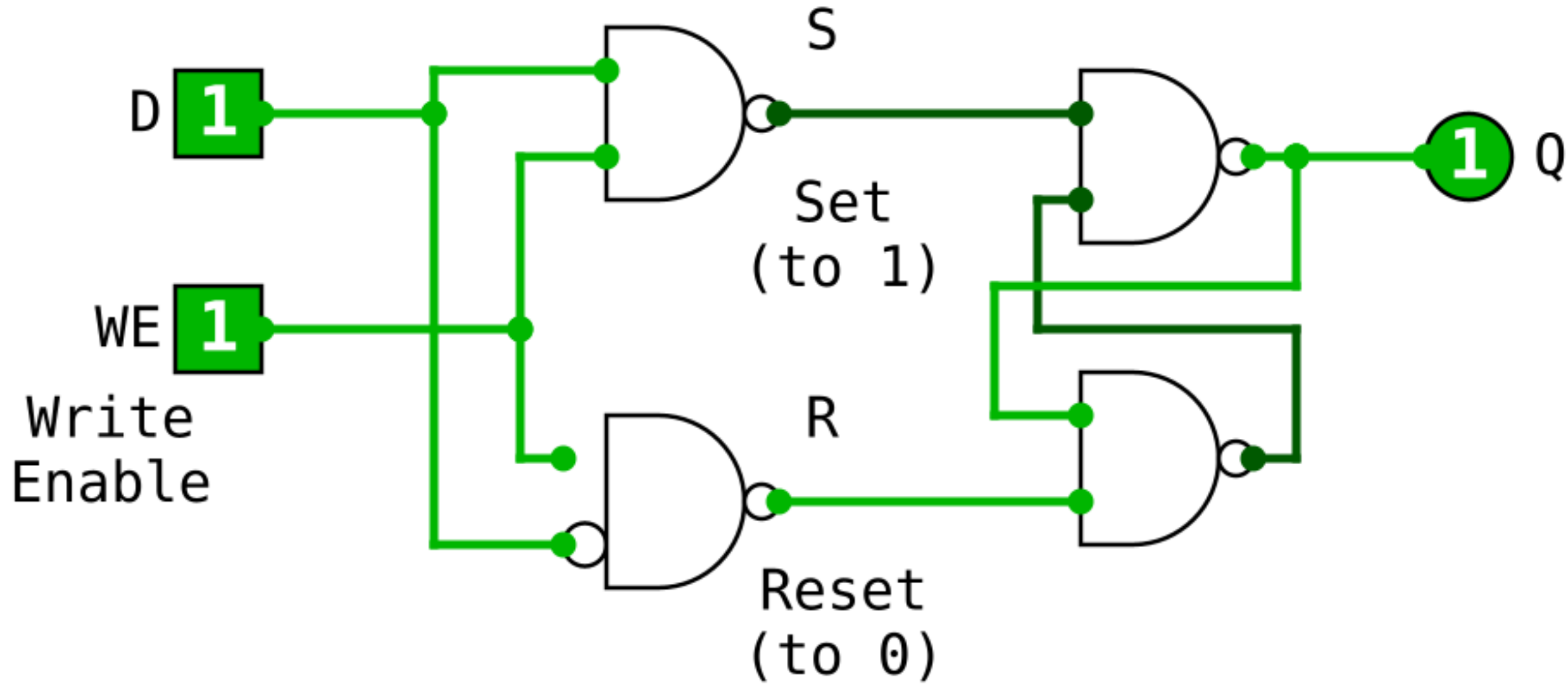
Active low:

Do something when 0
(Else 1)

R and S are active-low

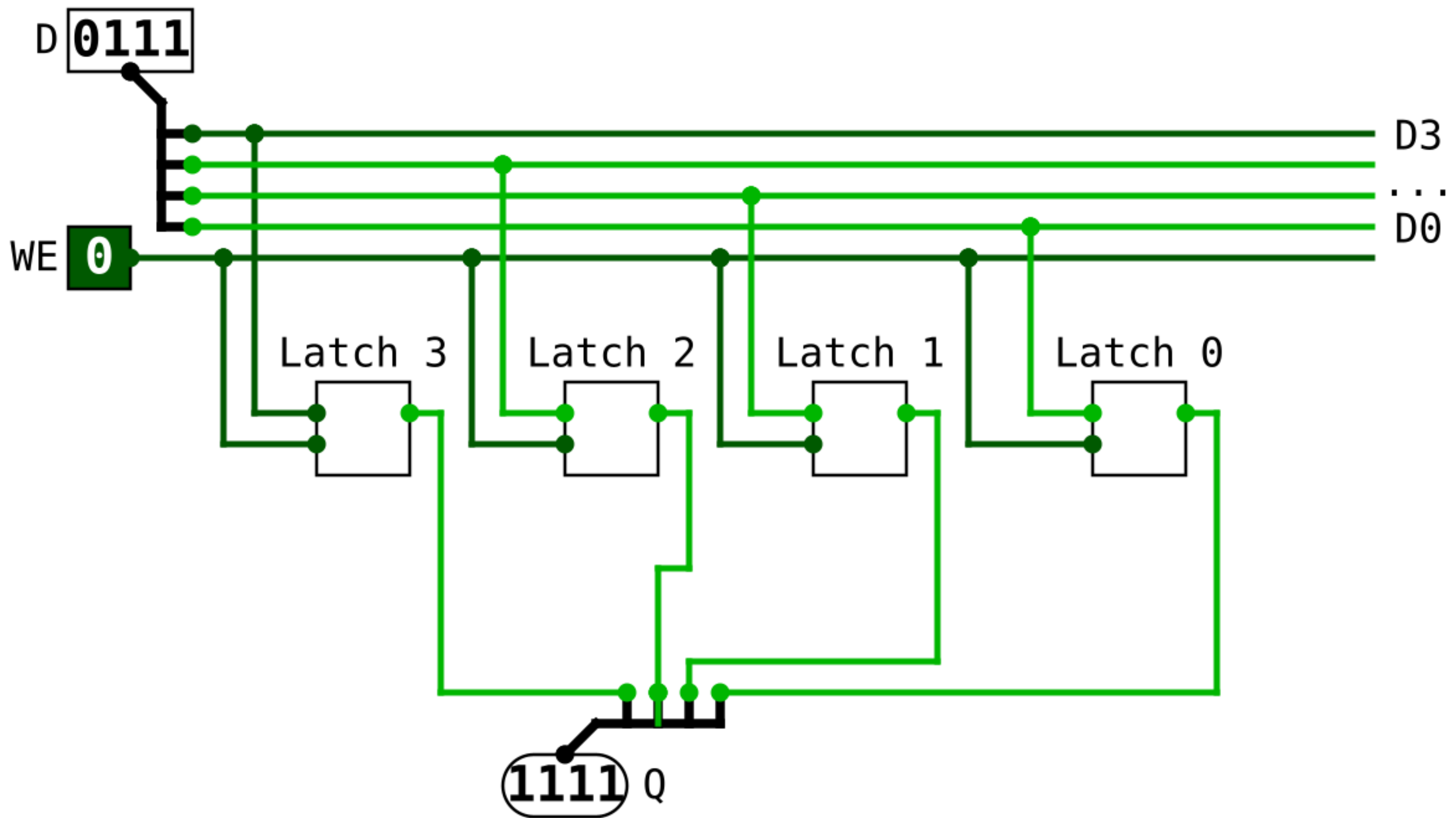
This is kind of a low-level interface.
Can we build a higher-level interface
for storing a bit? Let's see...

Gated D Latch

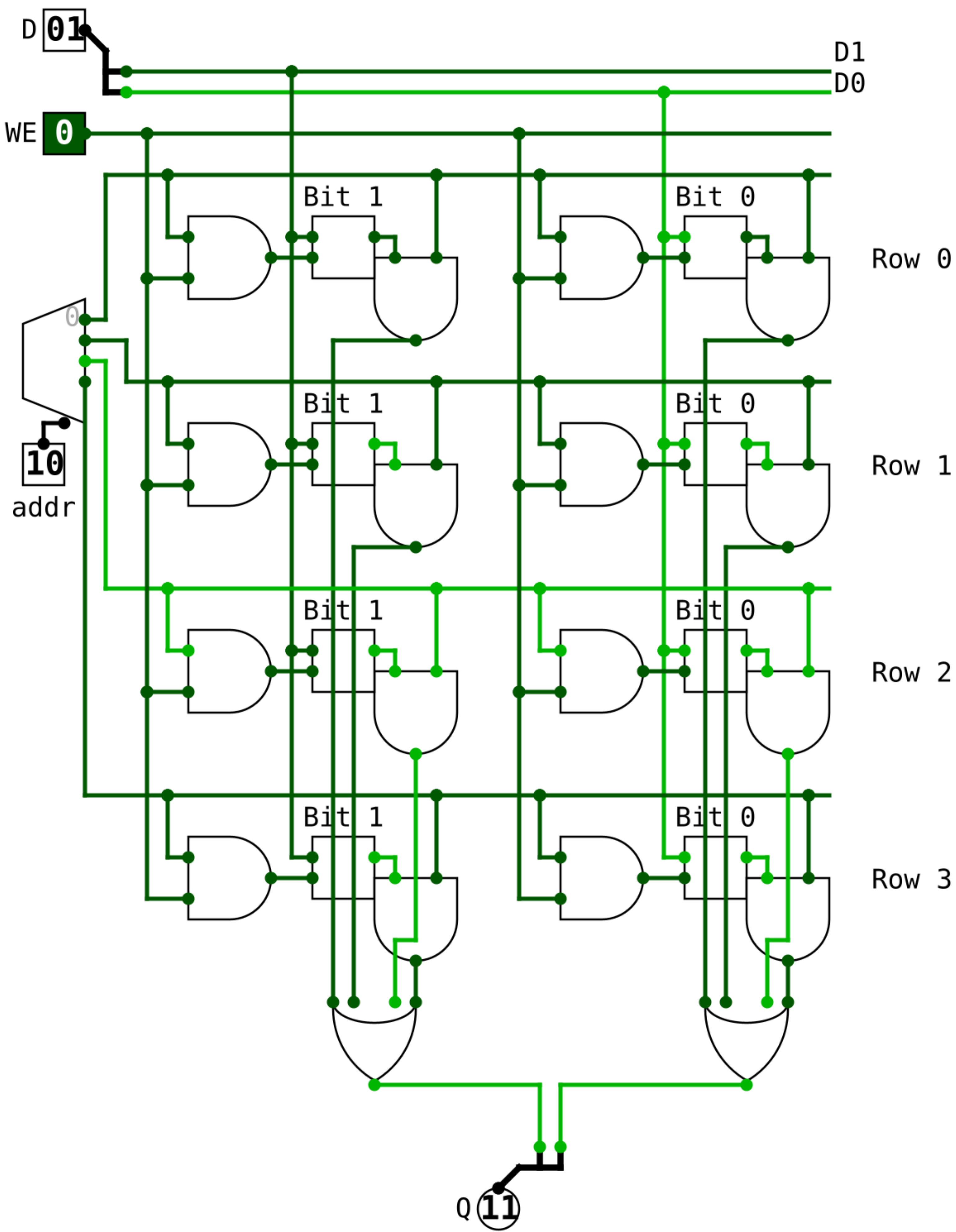


But this only stores 1 bit. What about, say, 4 bits? Let's look...

4-Bit Register



Cool, but how could we build a memory?
Let's look...



What is an address?

1. Addressability:
How many bits are at each
memory location?
(at each address)

In this example: 2 bits

2. Address Space
How many memory locations
are there?

(How many addresses?)

In this example: 4 rows