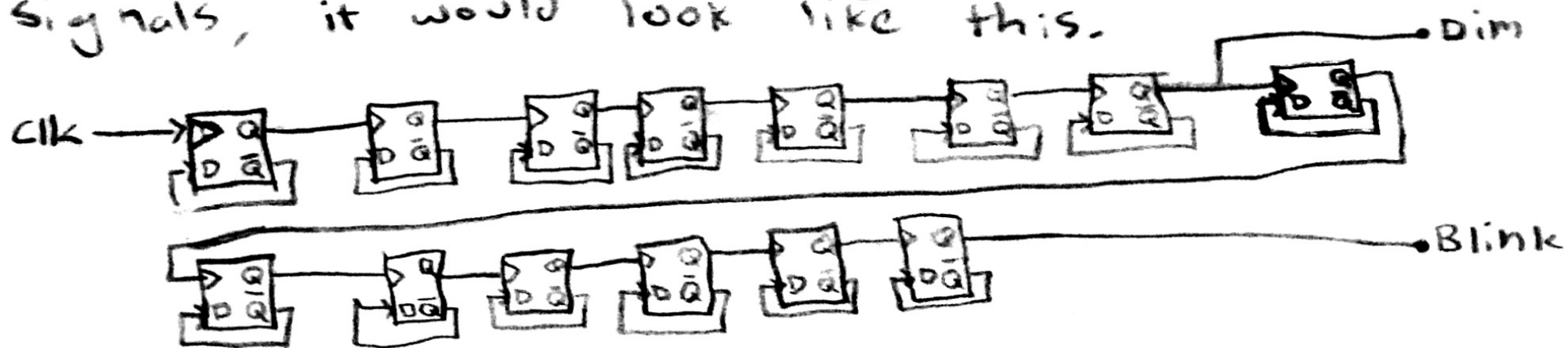
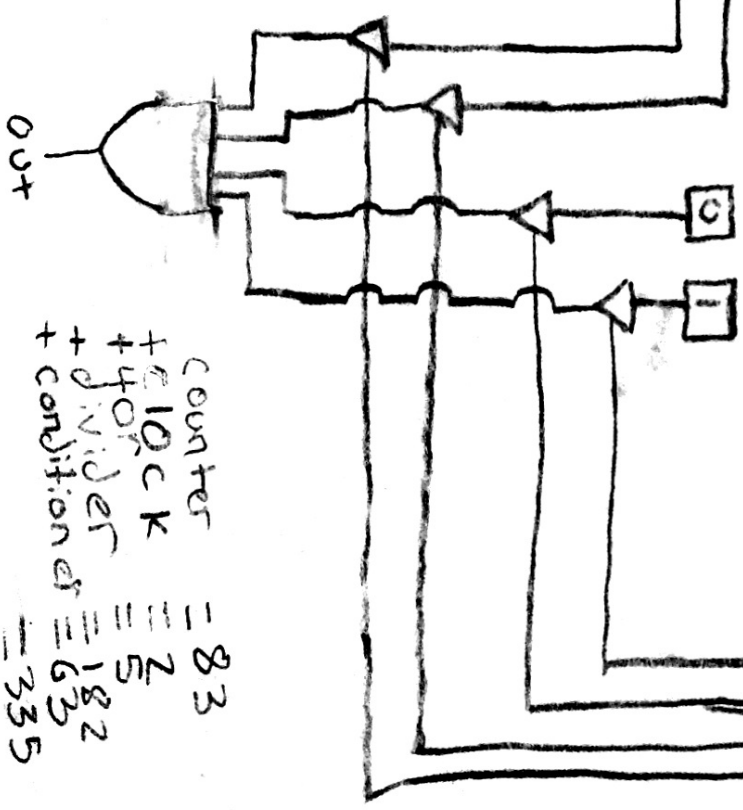
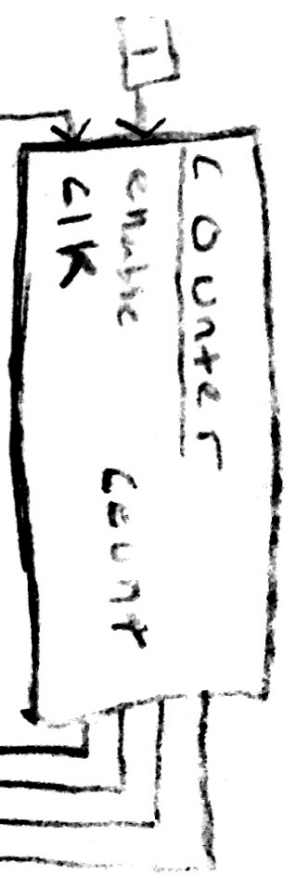
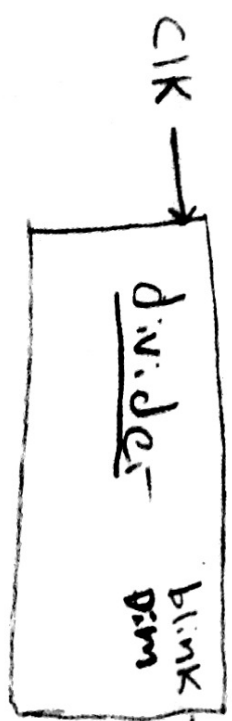


The mother of all clock dividers. Because the 2 operational modes that aren't on or off can both be thought of as square waves with duty cycles of 50% at a frequency lower than the clock they can both be generated using a series of clock dividers. Taking clock as an input and outputting the dim and blink signals, it would look like this.

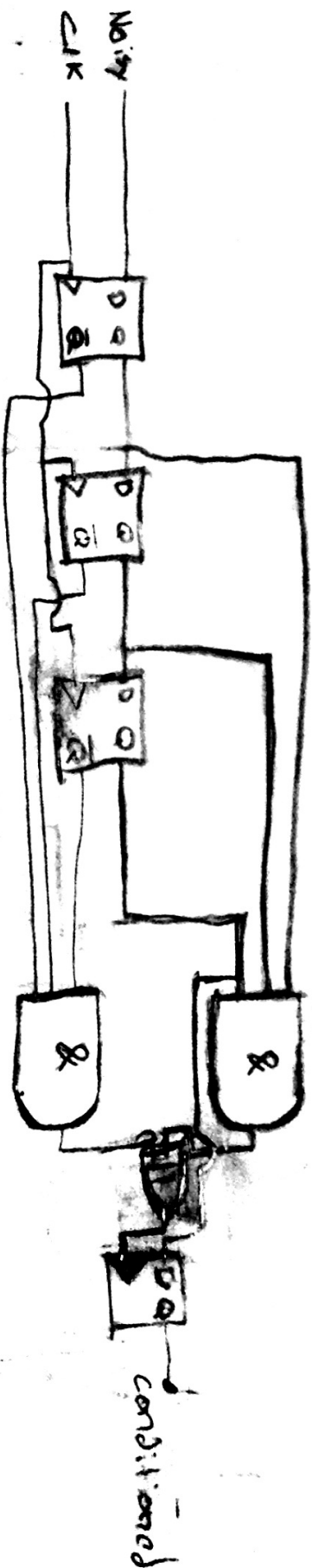


$$14 \times 13 \text{ gates} = 182 \text{ gates}$$



counter = 83
 + CLK = 2
 + divider = 5
 + condition = 182
 = 335

Input conditioner. To avoid debounce related issues a signal conditioner is necessary. Taking in a clock signal and an unconditioned input and outputting the conditioned signal. Sustained depression is detected by sampling the signal at 3 times and checking their equality. If they're equal the signal is shared out.



$$\begin{aligned}
 &4 \times \text{Flip Flop} = 52 \text{ gates} \\
 &+ 2 \times 3 \text{ And} = 8 \text{ gates} \\
 &+ 2 \text{ Or} = 3 \text{ gates} \\
 &= 63 \text{ gates}
 \end{aligned}$$