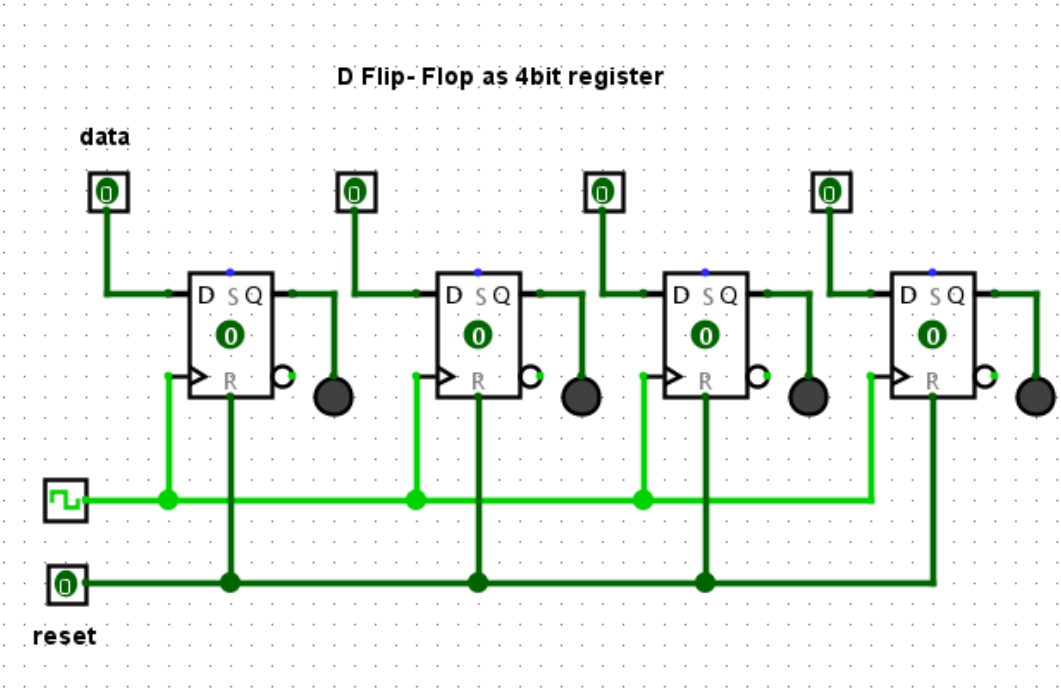
Mohamed Shafi Uzman Fassy (102608927)

Q1 to Q5



Q6.

Ox	Input Binary	Output Binary
0	0000	0000
1	0001	0001
2	0010	0010
3	0011	0011
5	0101	0101
A	1010	1010
B	1011	1011
C	1100	1100
D	1101	1101
E	1110	1110
F	1111	1111

Q7. Counters

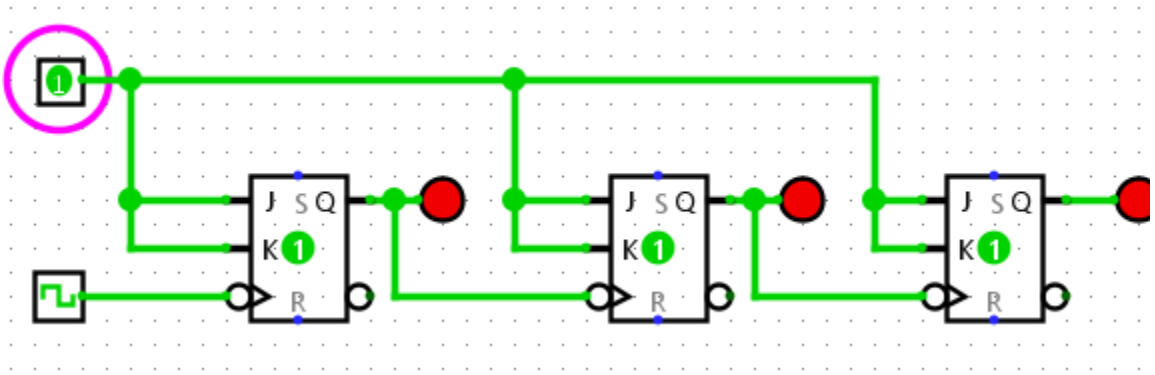
7.1 –

counters are important as they are needed to increment each time an execution of an instruction takes place as a register needs to keep track of where the next instruction will be taken place.

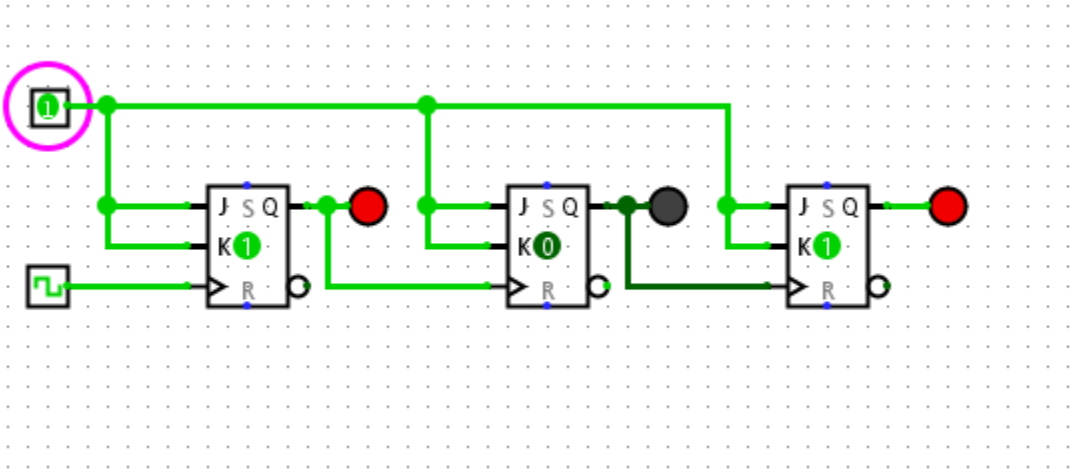
7.2 –

Ripple counter also known as an Asynchronous counter uses the toggle setting in a J-K flip flop to make the clock to pulse ripples through the circuit where it causes a ripple effect of the flip flop toggles where each oscillation is half the frequency of the previous flip flop and the bits stored in the flip flops represent incrementing binary values.

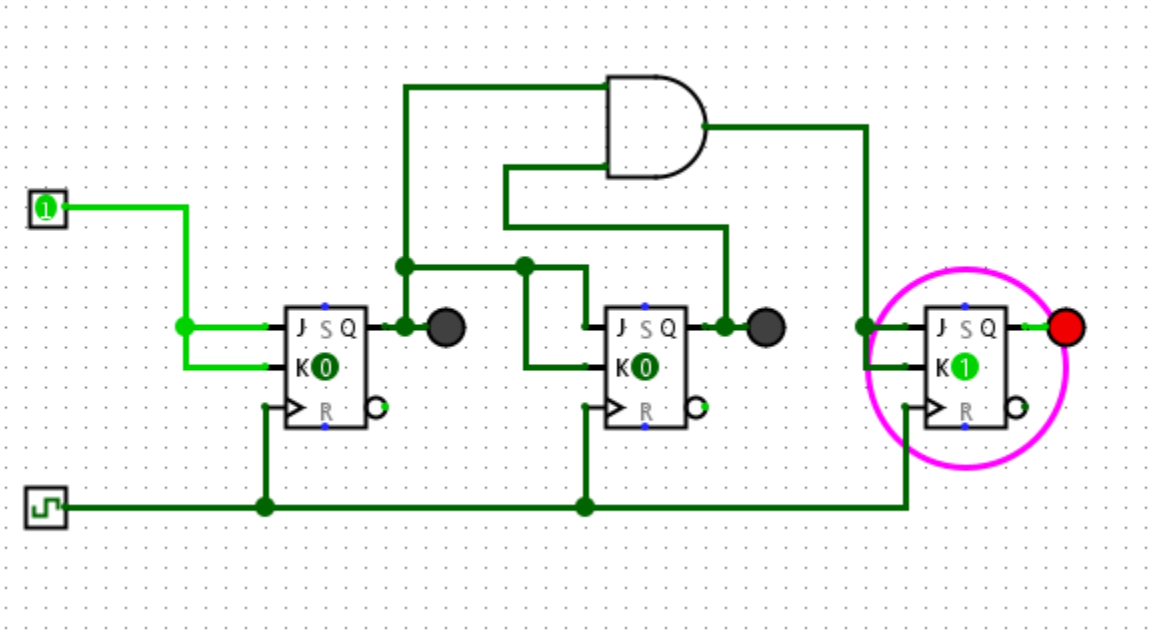
8. 3-bit ripple counter counting up using JK flip flops



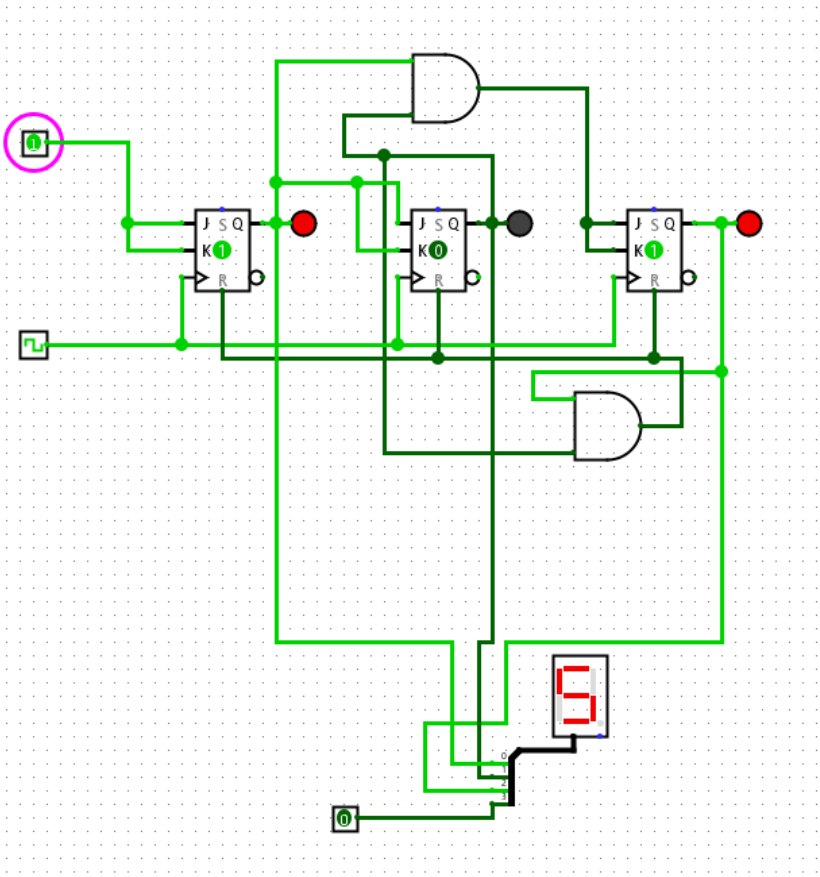
9. 3-bit ripple counter counting down using JK flip flops



14. Common Clock Counter



17. Common Counter with illegal state



17.2

If illegal state is not properly fixed, it will cause the display to be false in a real circuit.

18. Common Counter with no illegal state