CSC 258 Lab 5

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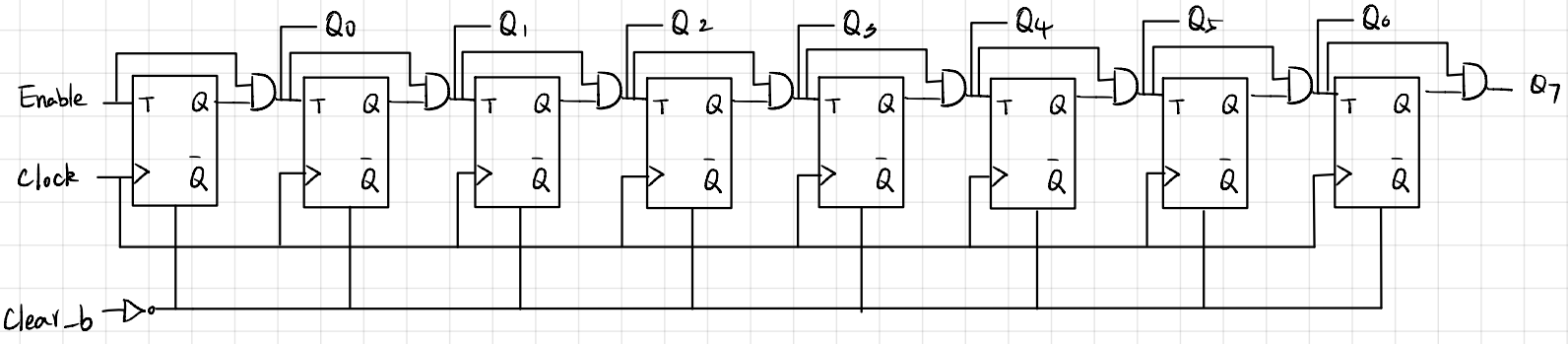
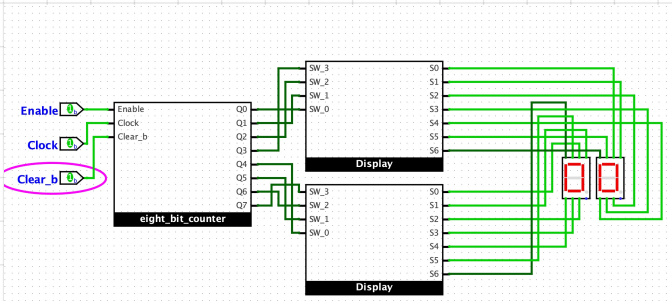
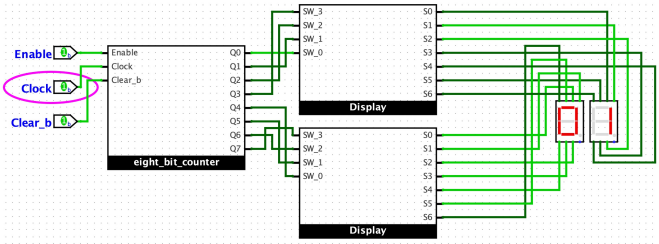
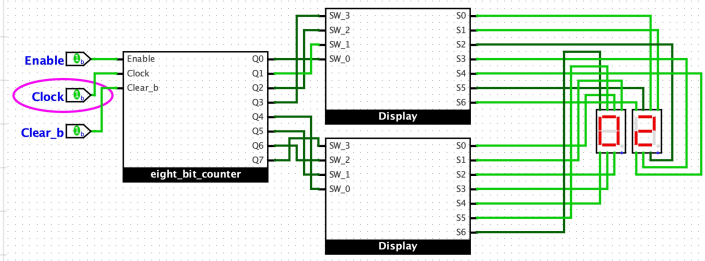
Part I 1. 2.

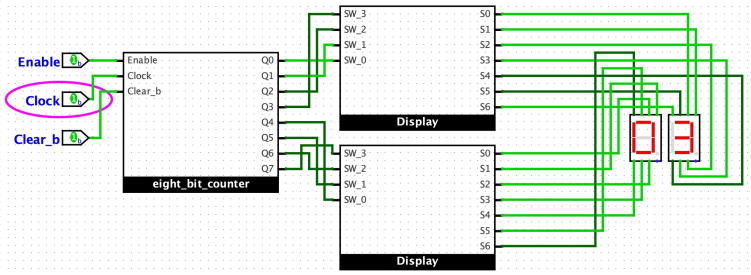


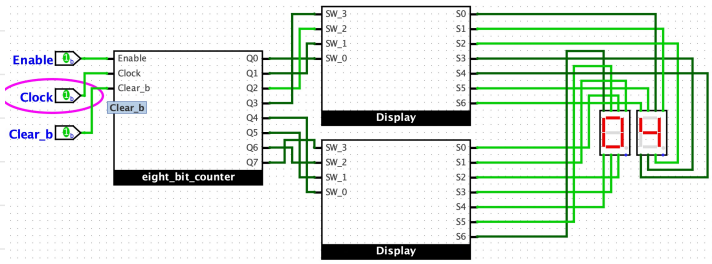
5.

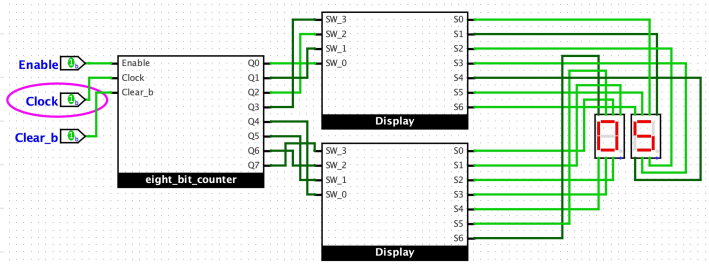












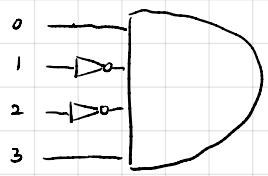
Part II

5.1

1. When the counter reaches the max "1111" the AND gate will output 1 that as the input of the OR gate on the left. That makes M_1 become high, and load a new value in the bottom left of the device.

2. If we want the maximum be 9, which is "1001". We need to add two not gate into the AND Gate.

e.g.



3. wrap around : if the counter exceeds the maximum value, it will be set back to 0

stay at value : if the counter exceeds the maximum value, it will stay at the maximum value.

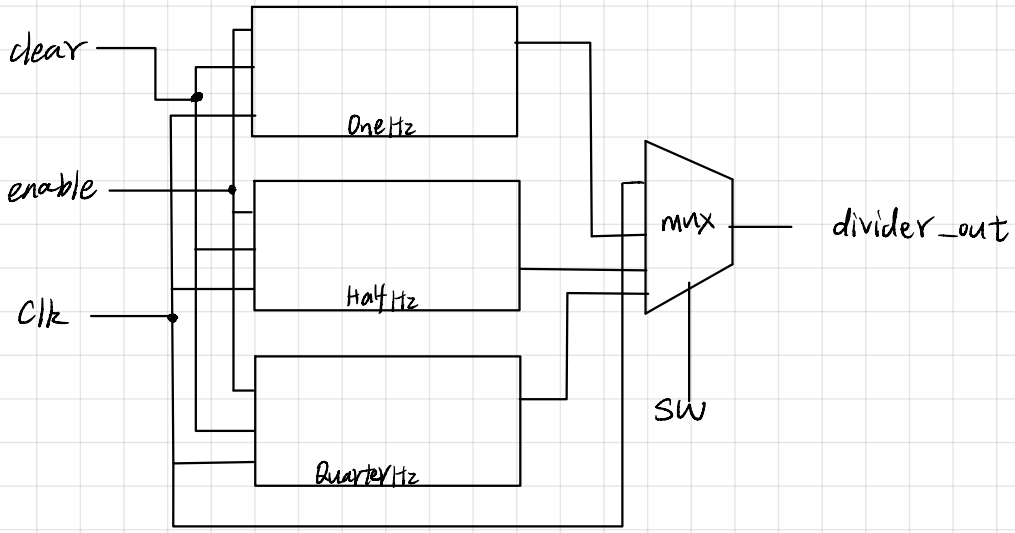
continuous counting : if the counter exceeds the maximum value, it will continue to count over the max.

load the next value : if the counter exceeds the maximum value, the next value will be load_n number.

5.2. 50 M = 500,0000

the number of binary bits = $\lceil \log_2 500{,}0000 \rceil = 26$

1. RateDivider

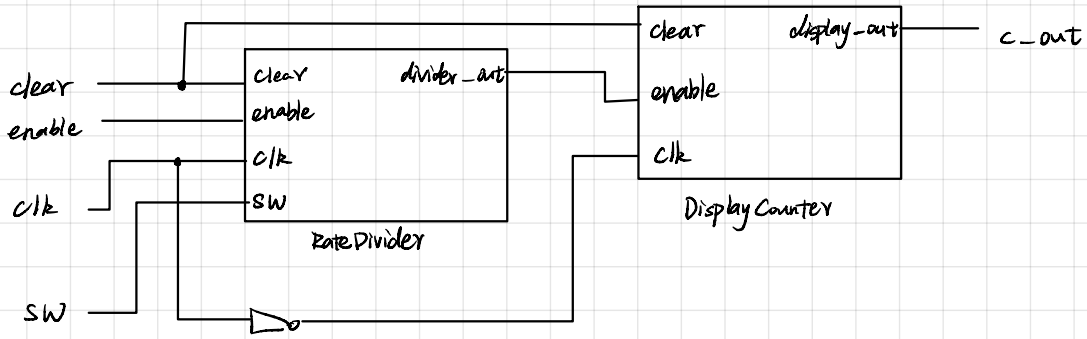


OneHz takes 4 bit counter

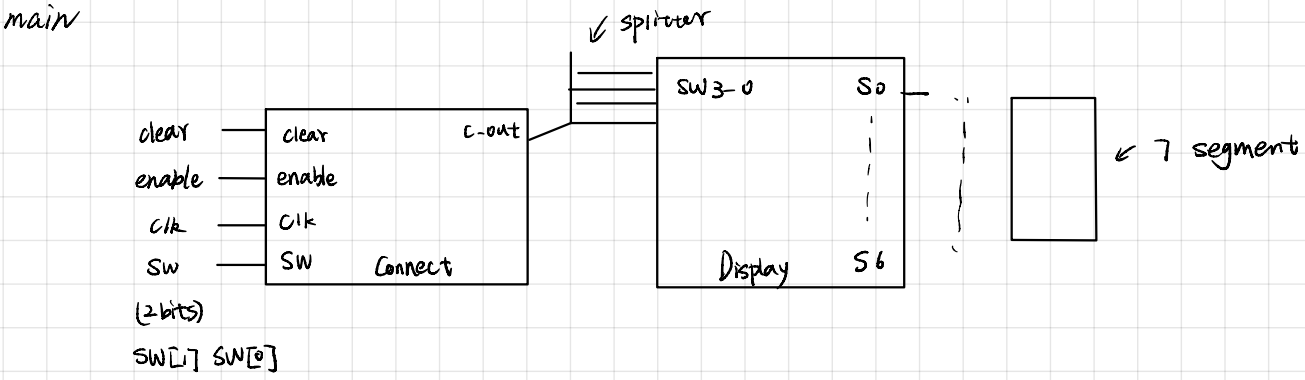
HalfHz takes 5 bit counter

QuarterHz takes 6 bit counter

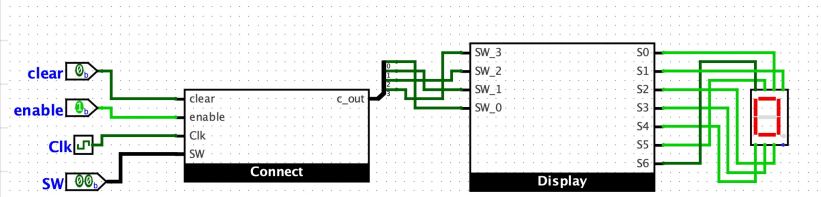
Connect



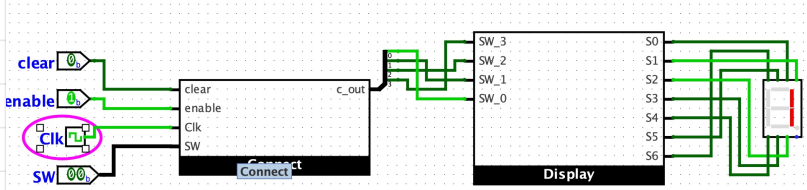
main

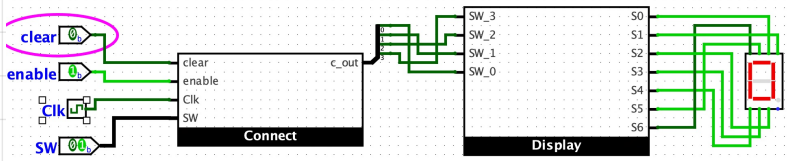


3.

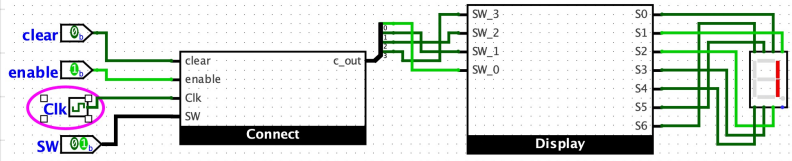


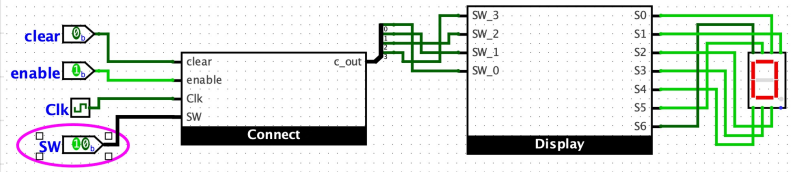
1 clock



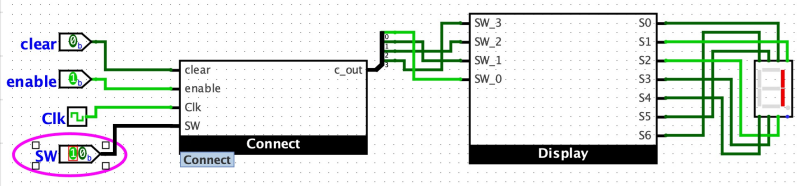


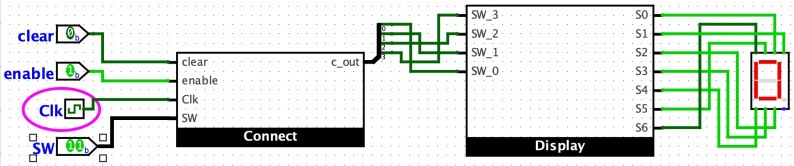
1 second



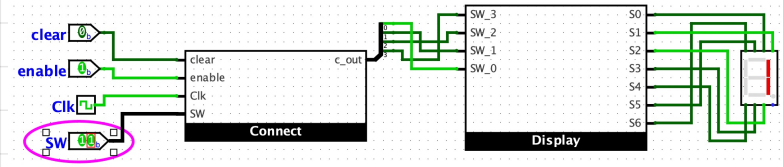


2 seconds





4 seconds

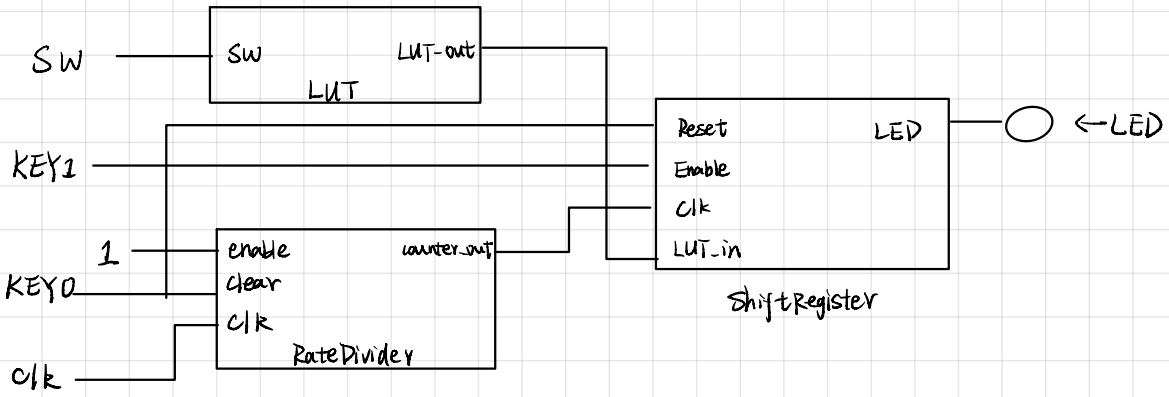


Part III

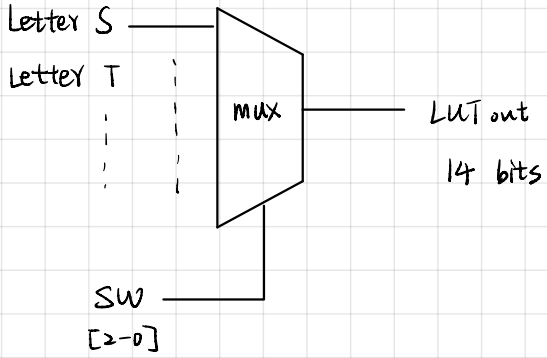
6.

Letter	Morse Code	Pattern Representation (sequence length is 14 bits)
S	• • •	10 10 10 0000 0000 — 2a00
T	—	111 0 0000 000000 — 3800
U	• • —	10 10 111 0 0000 — 2b80
V	• • • —	10 10 10 1110 0000 — 2ae0
W	• — —	10 111 0111 0 0000 — 2ee0
X	— • • —	111010101110 00 — 3ab8
Y	— • — —	1110 10 1110 1110 — 3aee
Z	— — • •	1110 1110 10 10 00 — 3ba8

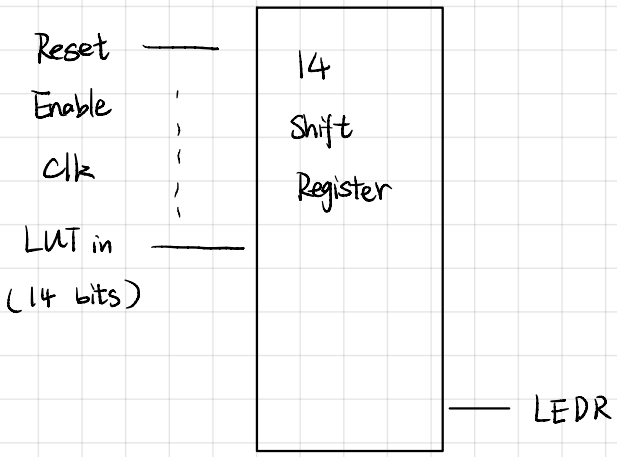
2.



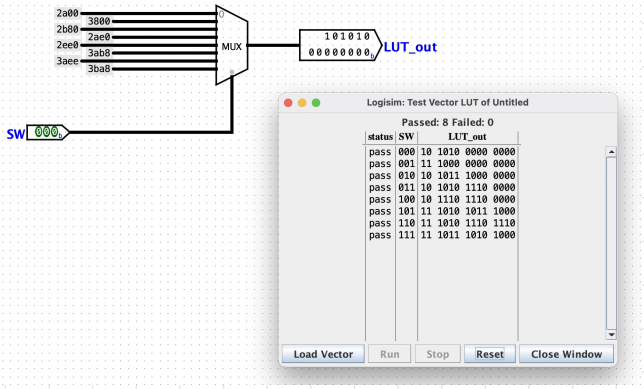
LUT



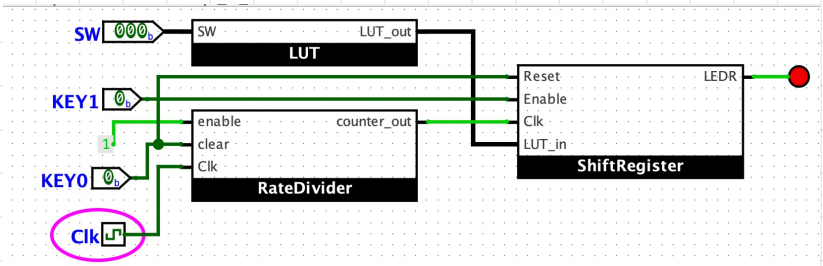
Shift Register



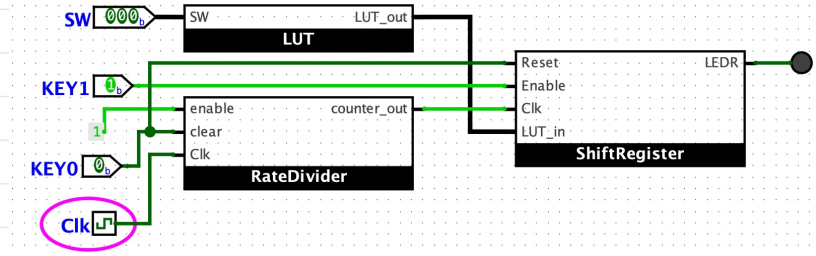
4.



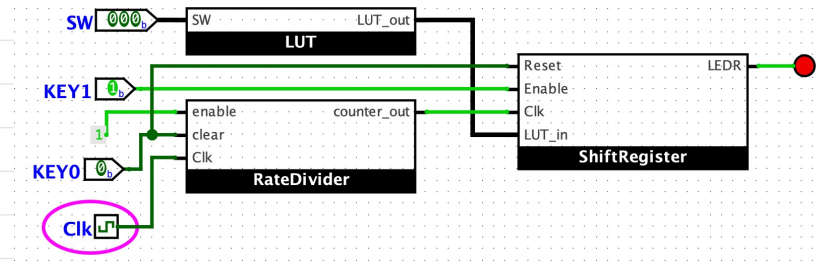
we test the S 10 10 10 0000 0000



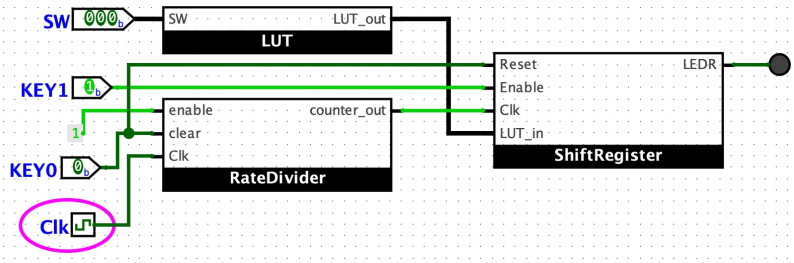
we load S
the first is "1"
the LED is on



After 0.5 seconds,
the "dot" passed
and the LED is off



After 0.5 seconds
the bit is "1"
the LED is on



Continue ....

↓ Until the rest
are all zeros
the LED is off