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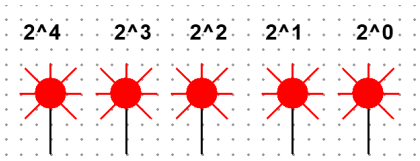
W10: DE 1.2.4 D Counting up to 15 in Binary

Make copies of the probes and show which indicators would be “ON” for each of the following numbers. What would be the pattern for the probes for each of the cases below?



Binary Counter	2^3	2^2	2^1	2^0

Create this model on Multisim. Where A=2^1 and B=2^0. If you have three probes then A=2^2, B=2^1, and C=2^0. If you have four probes then the pattern continues and now is D=2^0.

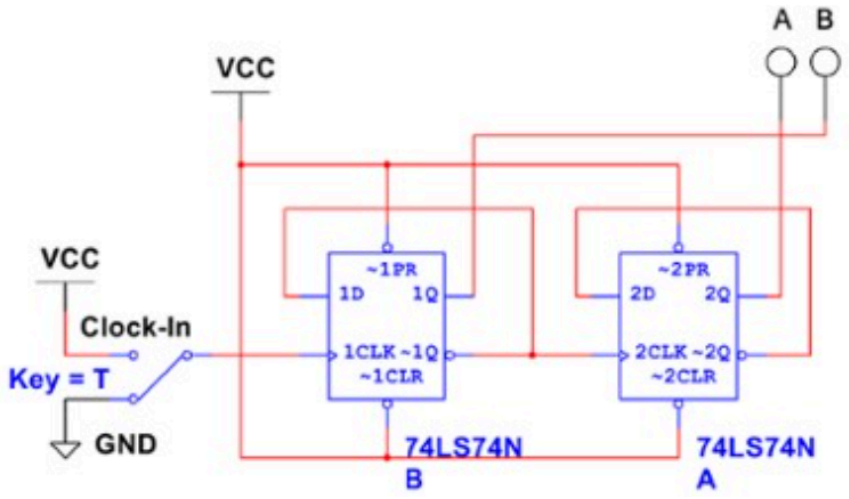


Figure 2. Binary Counter Example Circuit

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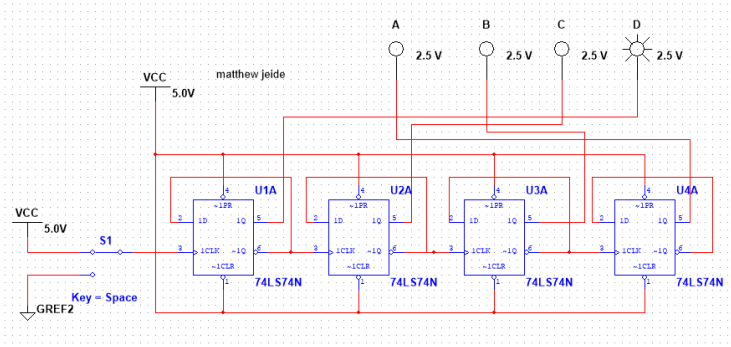
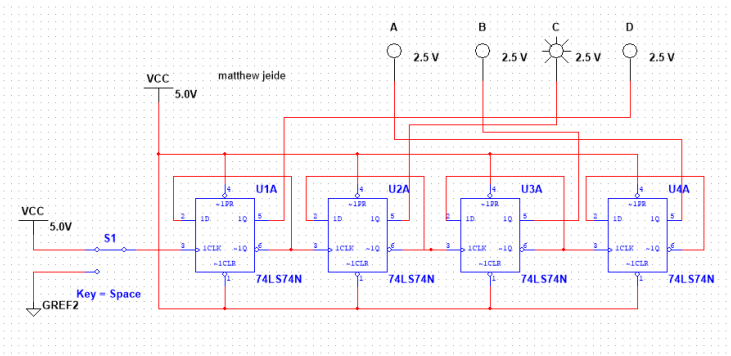
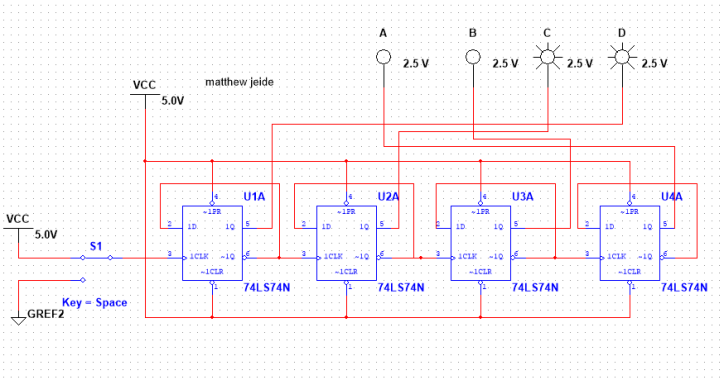
Decimal Number	Probes counting in binary (screenshot of multisim design)
1	
2	
3	

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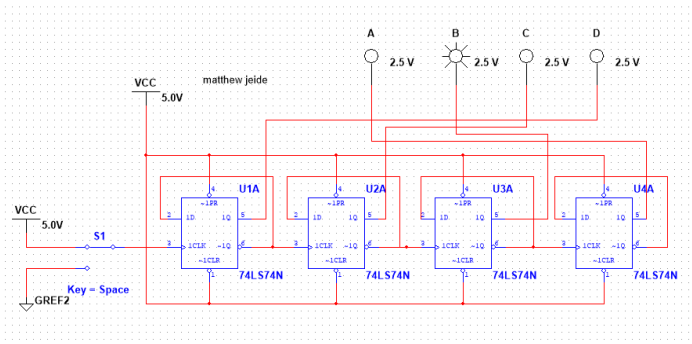
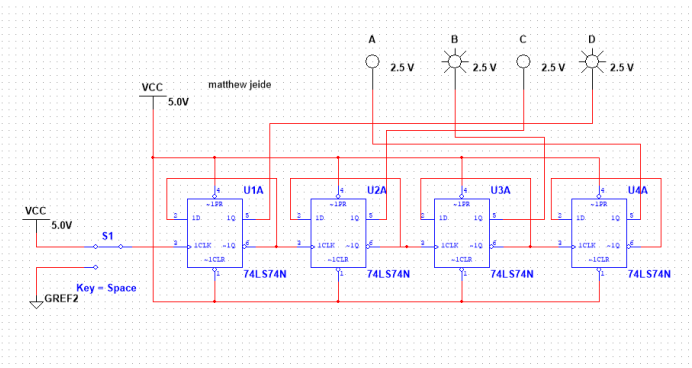
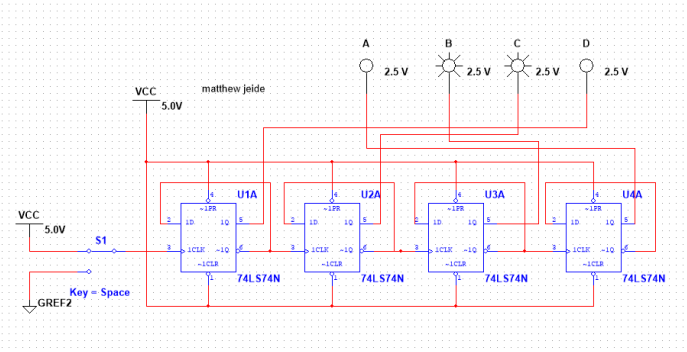
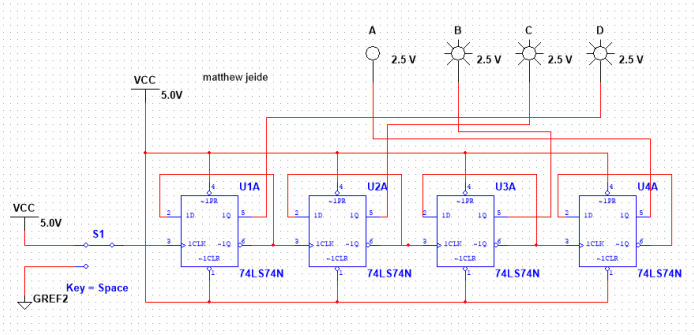
4	
5	
6	
7	

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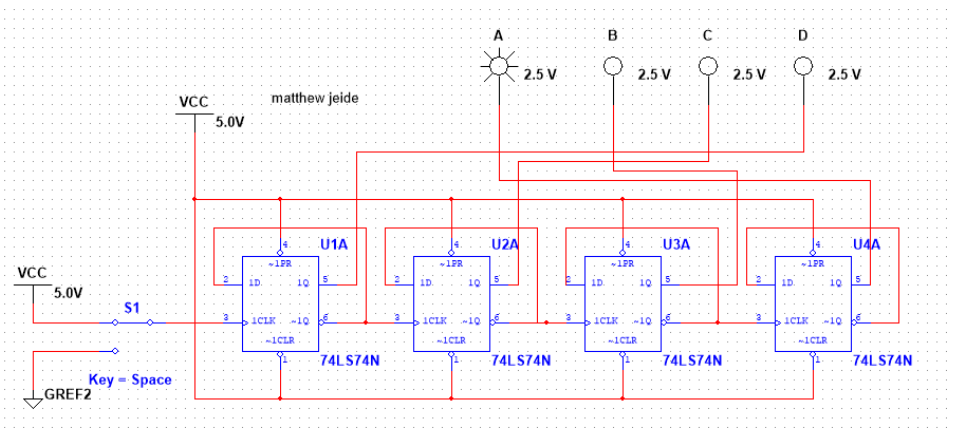
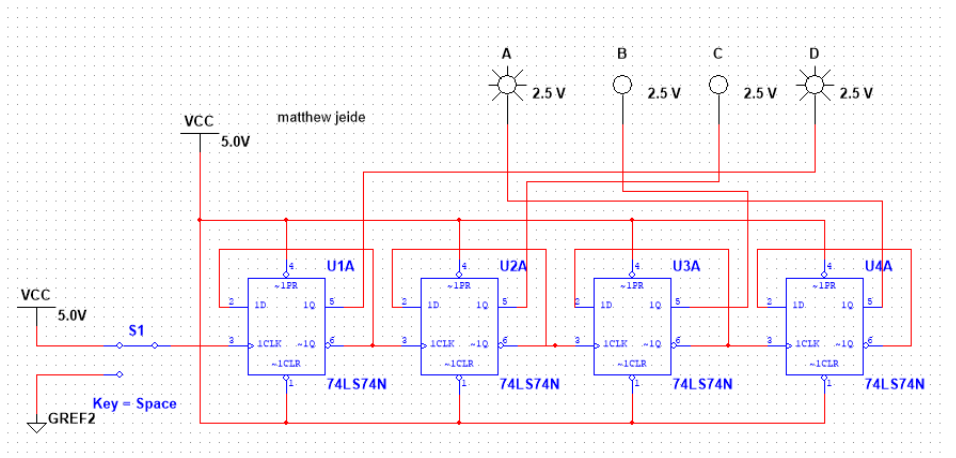
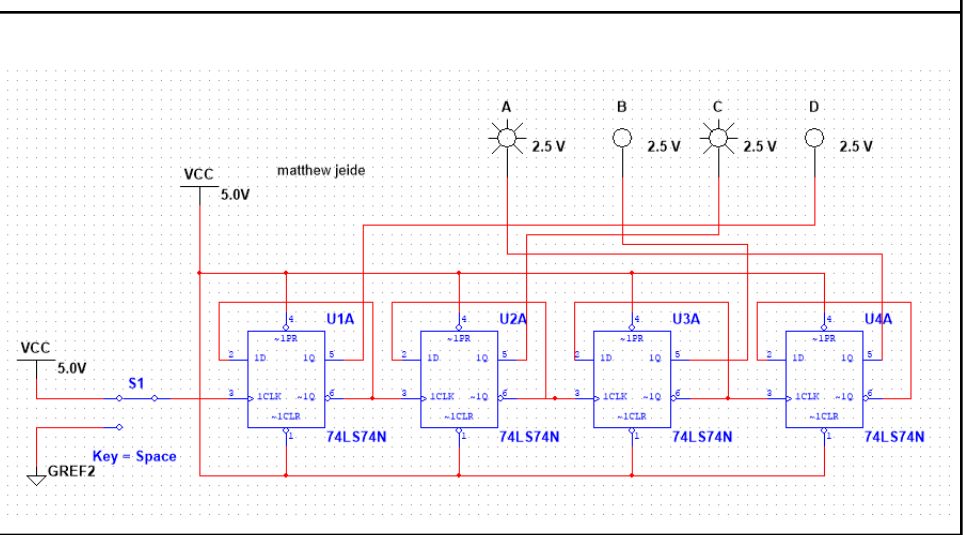
8	
9	
10	

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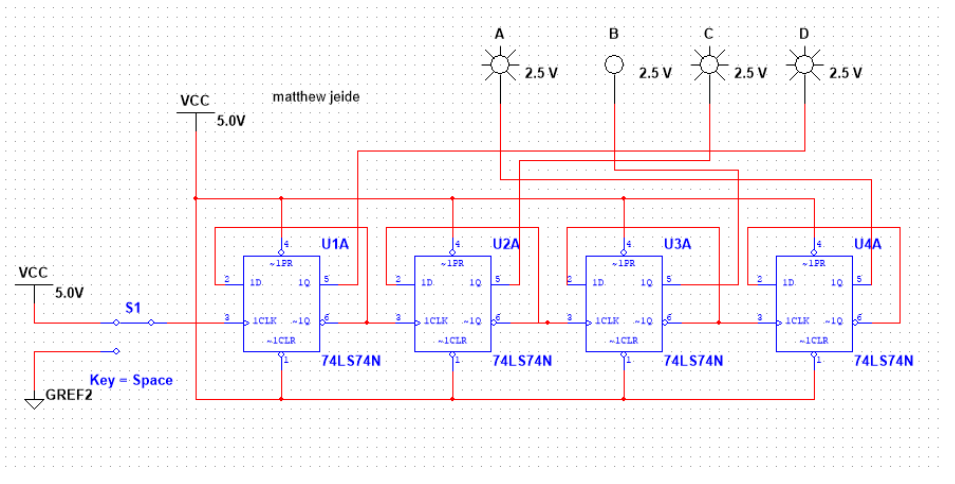
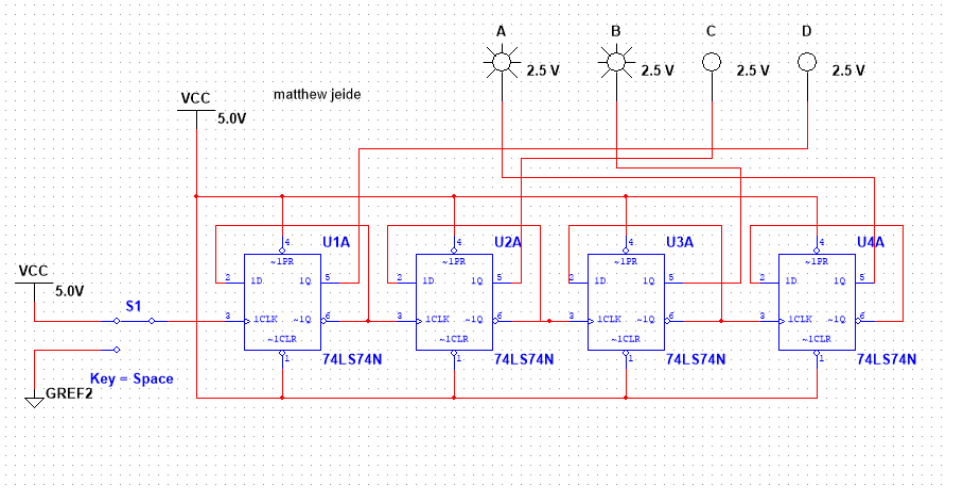
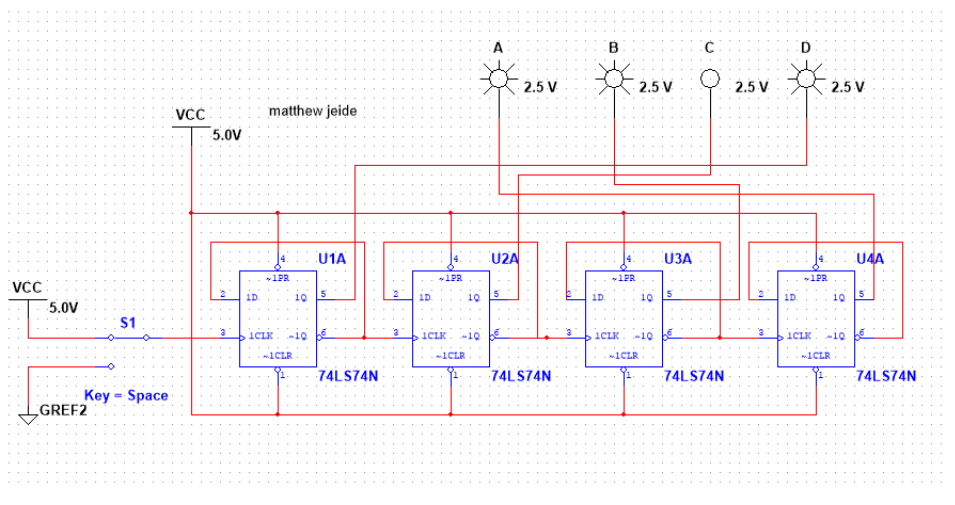
11	
12	
13	

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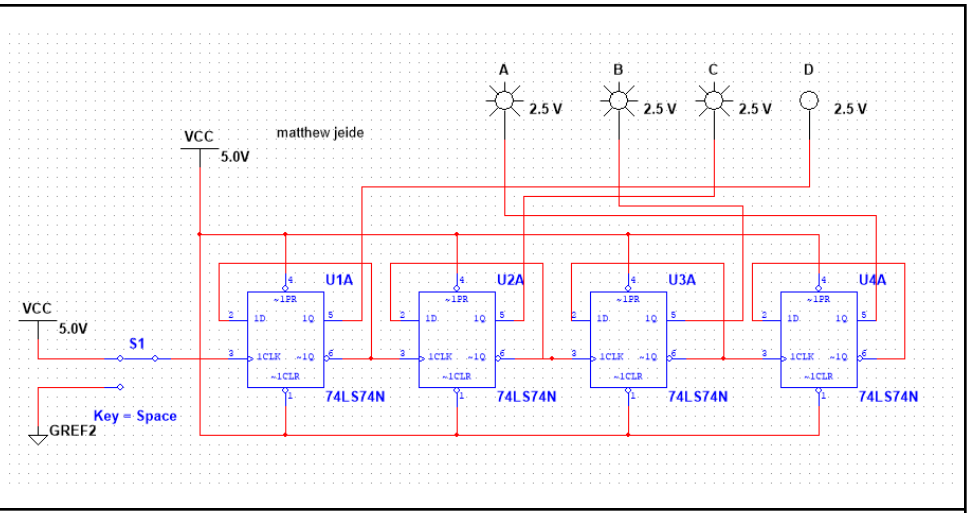
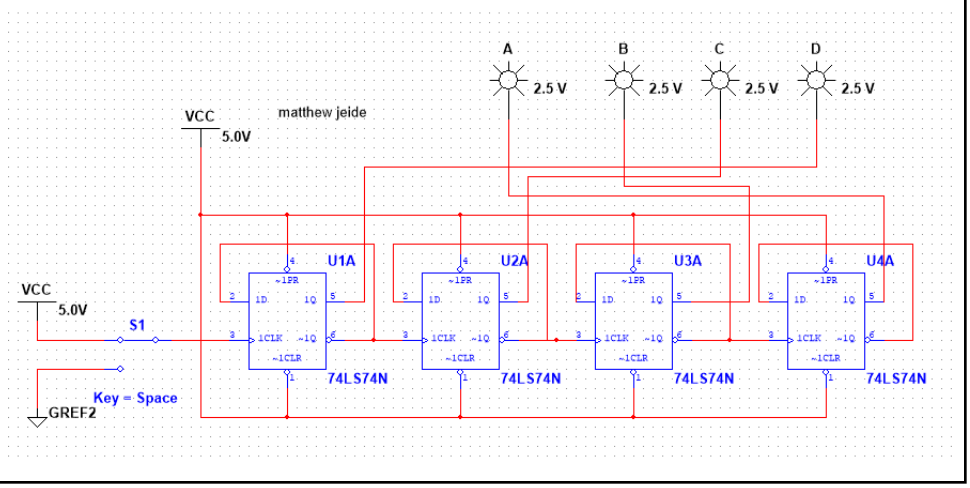
14	
15	

Build the following FIGURE 2:Binary Counter Example Circuit on Multisim.

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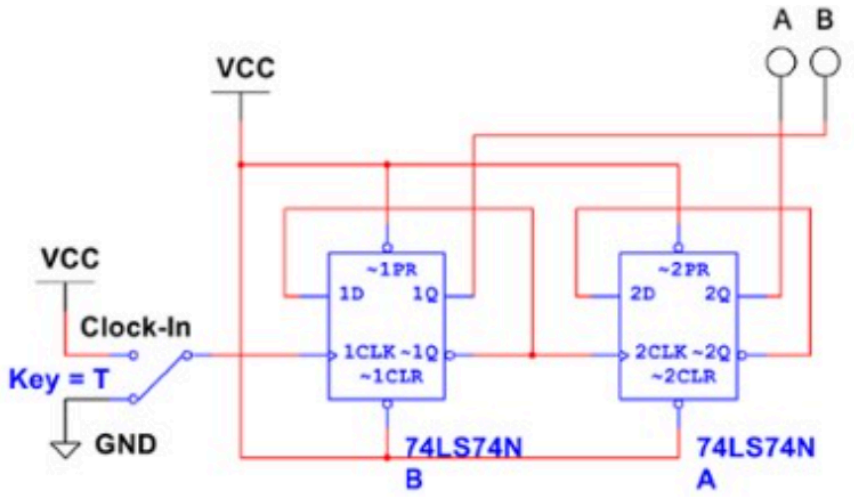
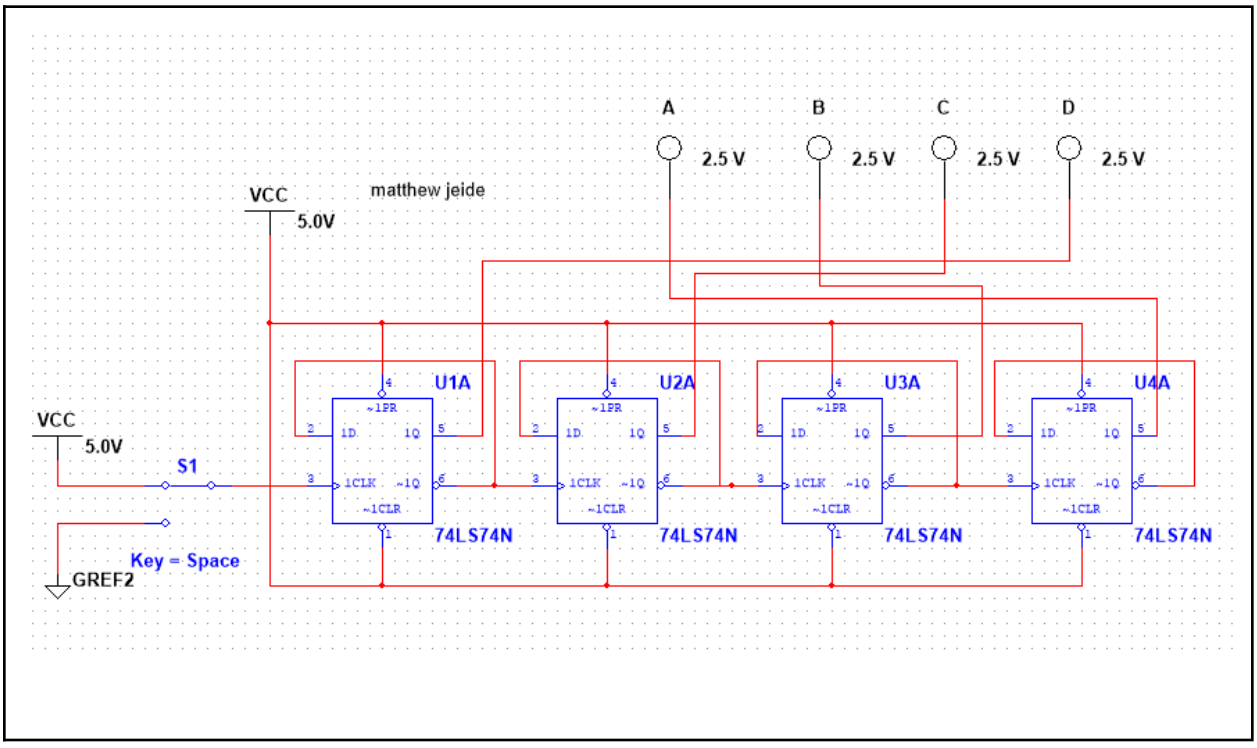


Figure 2. Binary Counter Example Circuit



How many numbers does this counter count up to? How many 74LS74N chips will I need for it to count until 15?

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How would you design a circuit to count up to the number 7? Design it on MultiSim.

Integrate another 74LS74N chip into the original 2-74LS74N chip design. This will allow the circuit to count up to 7. This design incorporates an additional 74LS74N chip, allowing it to count to 15.