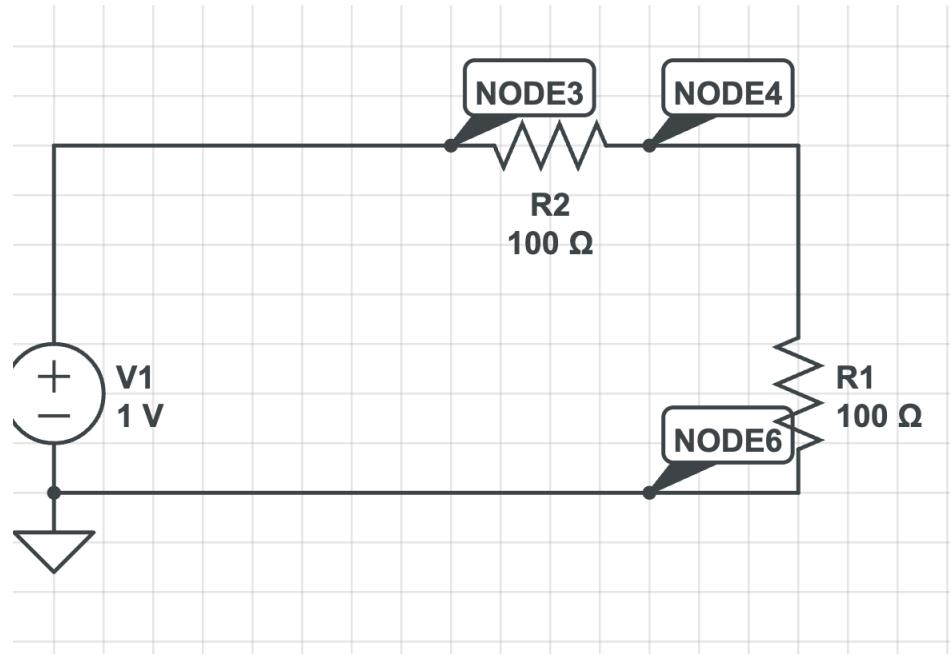
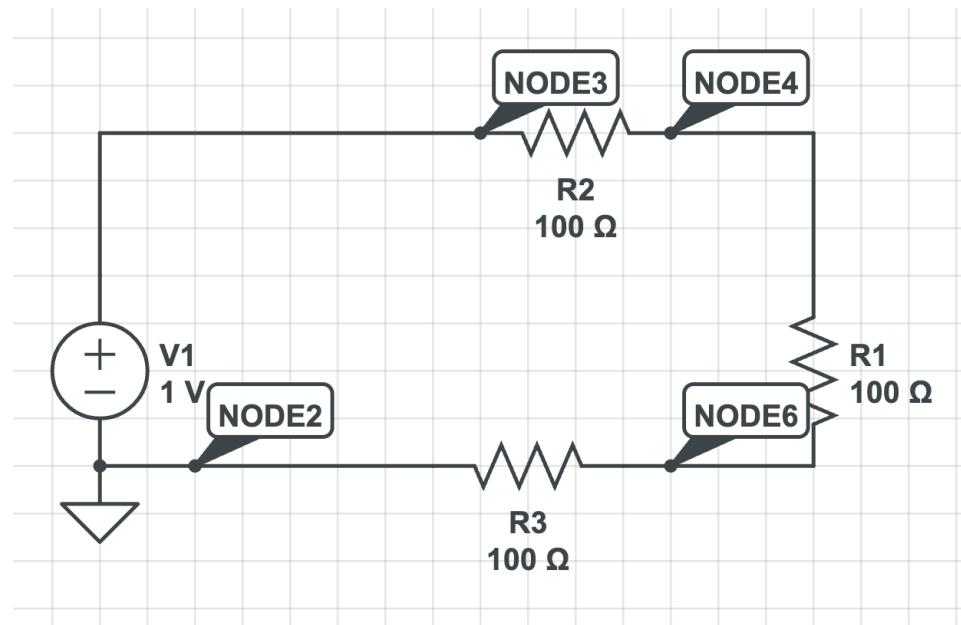


## 1. Question

### a. Circuit #1

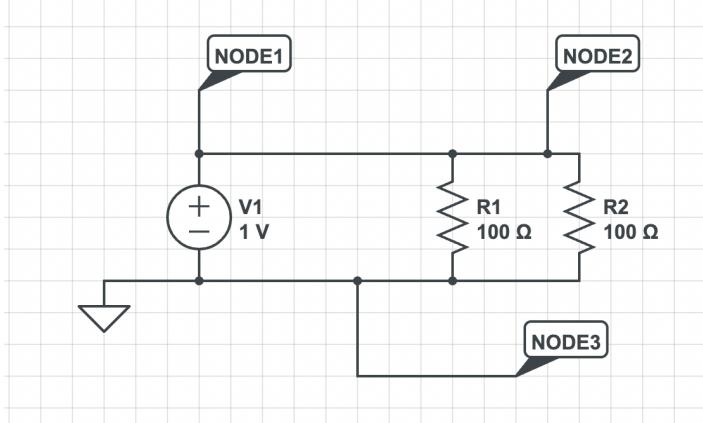


### b. Circuit #2



- c. Observation: the nodes (2,3,4) in circuit 1 were 0 Volt, 1 Volt, and 500 Volt respectively. While in the second circuit the nodes (2,3,4,6) were 0 V, 1 V, 666 mV, and 333 mV. So it is clear that as you go through the circuit the voltage decreases in both circuits. While in the second circuit the voltage was distributed more evenly.

2.

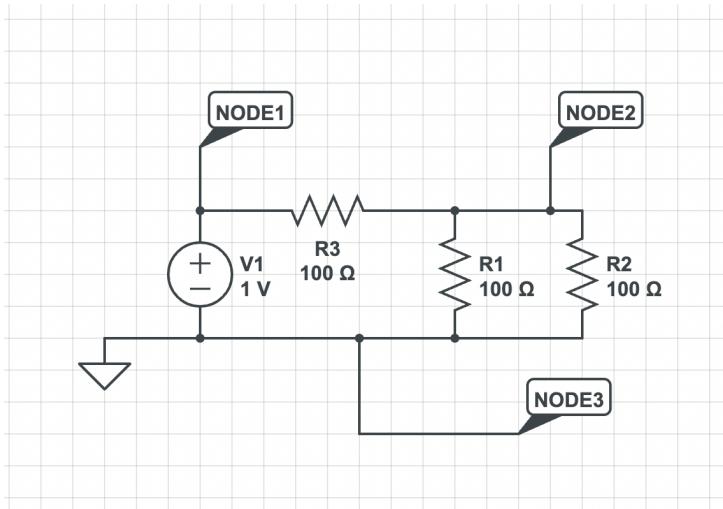


Observations:

V(NODE1)	1.000 V		
V(NODE2)	1.000 V		
V(NODE3)	0.000 V		
P(R1)	10.00 mW		
P(R2)	10.00 mW		

Current across each resistor = 10mA

3.

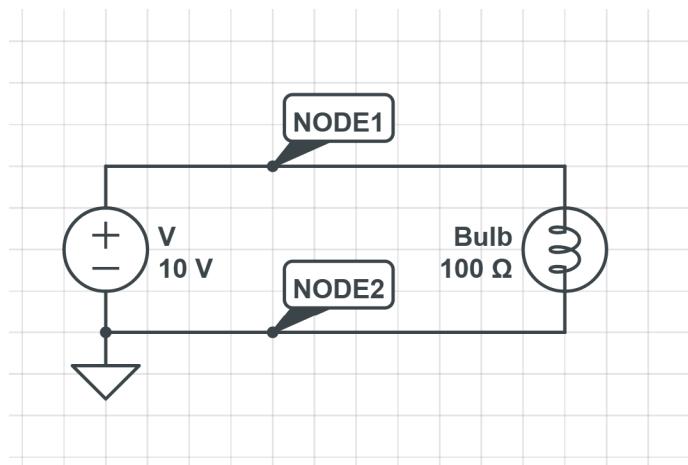


Observations:

$V(NODE1)$	1.000 V	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$V(NODE2)$	333.3 mV	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$V(NODE3)$	0.000 V	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$P(R1)$	1.111 mW	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$P(R2)$	1.111 mW	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$P(R3)$	4.444 mW	<input type="checkbox"/>	<input checked="" type="checkbox"/>

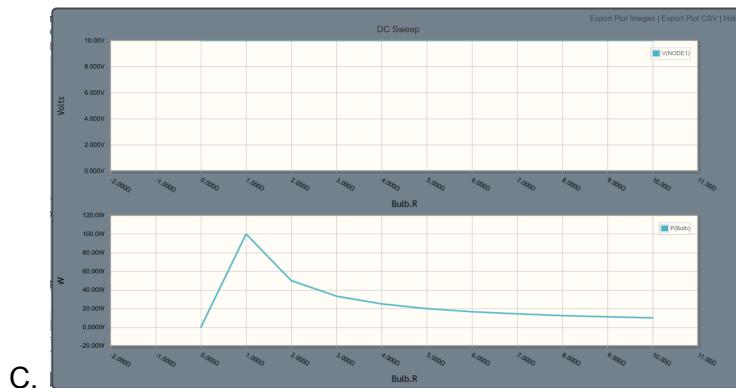
Current across resistors in parallel: 3.333mA

Currents across resistor in series: 6.667mA

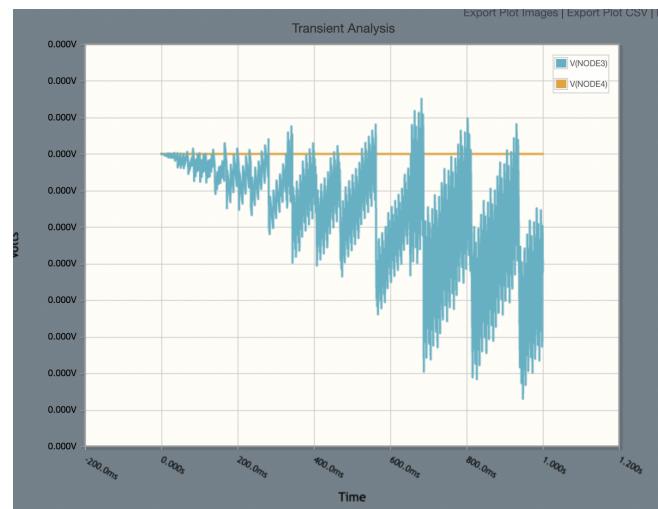


4.

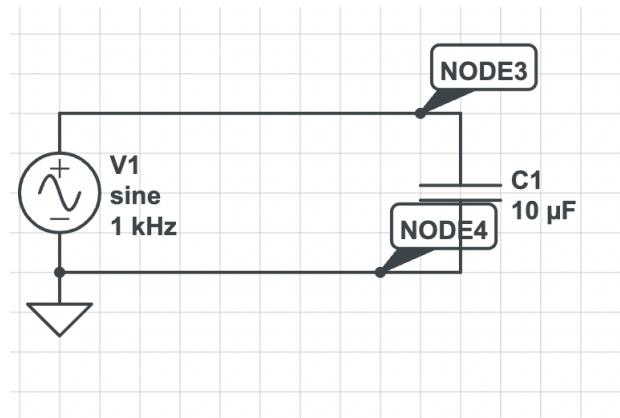
B. Using the simulation DC solver to evaluate the lightbulb power, the power of the lightbulb was 10mW.



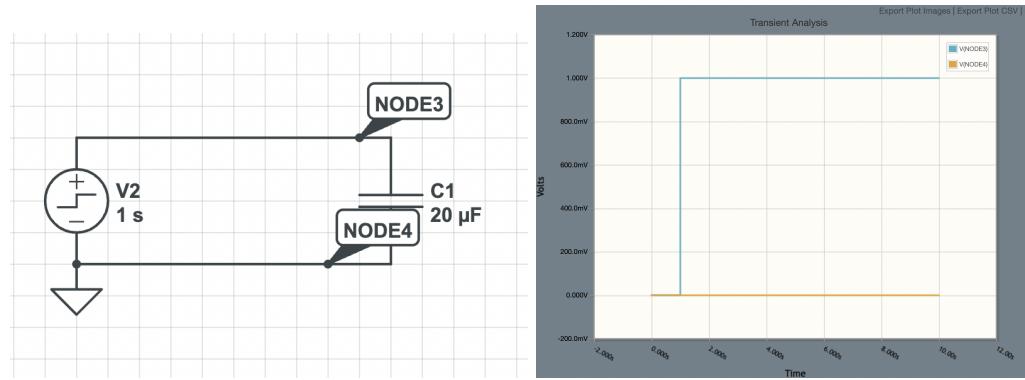
## 5. Analyzing capacitors



a. This is the sine current signal:

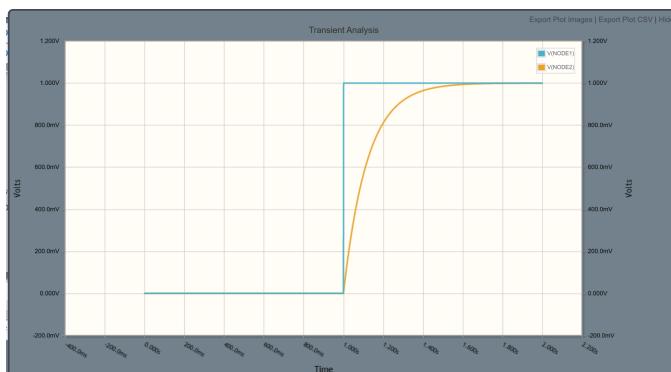
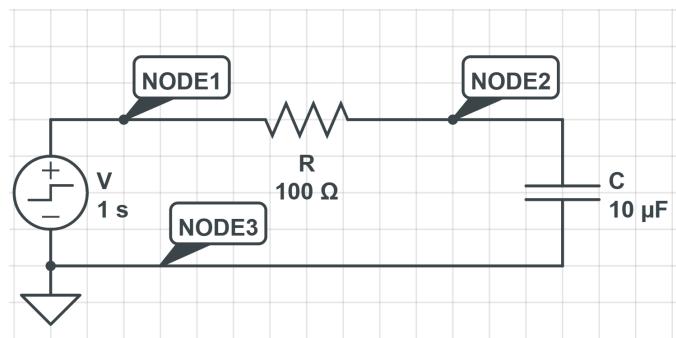


- b. This is the voltage with step size (1 second). The graph is in 0.001 increments over 10 seconds.



c.

6.

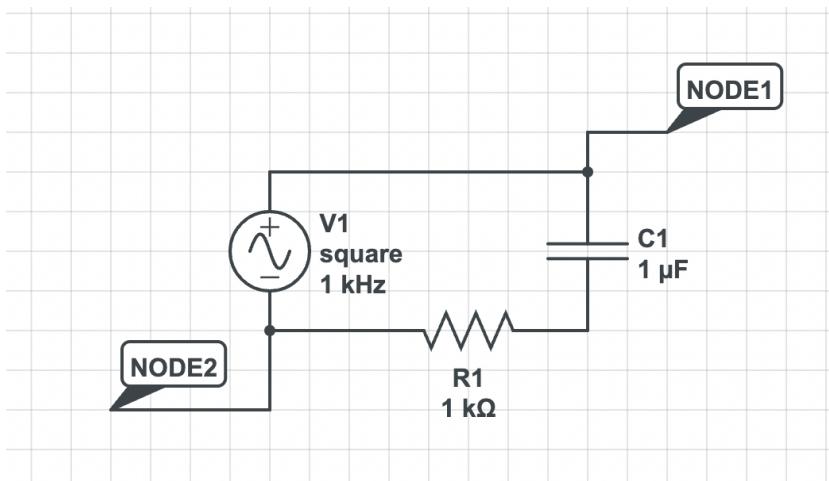


\*When the resistor is at 1000kOhm, and the capacitor is at 120uF

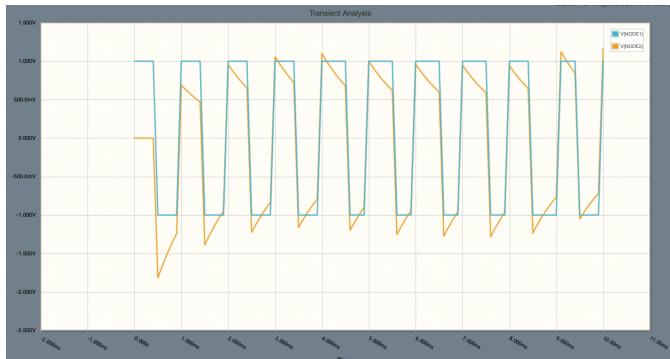


\*When the resistor is at 1.5kOhm, and the capacitor is at 10uF

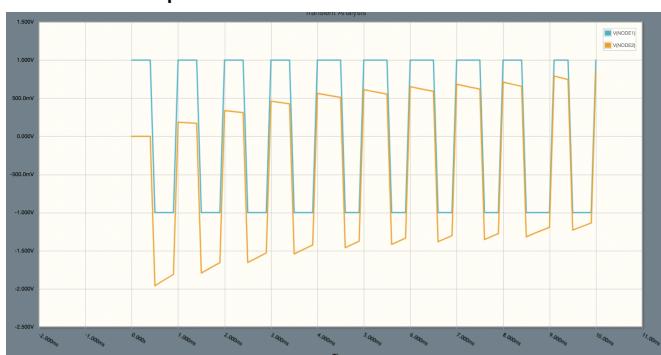
7.



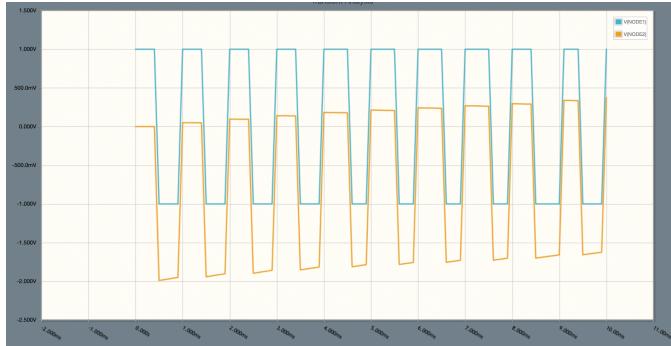
With the basic settings listed above this is the graph, time step .0001s, interval 0.01s:



When the capacitance is increased to 5uf:

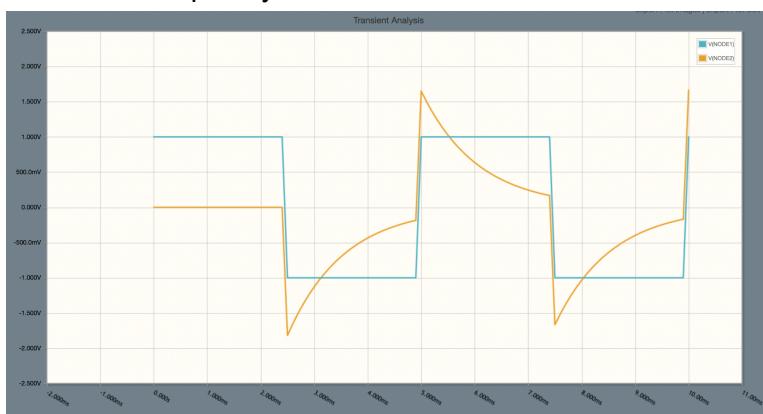


Capacitance of 20uf:

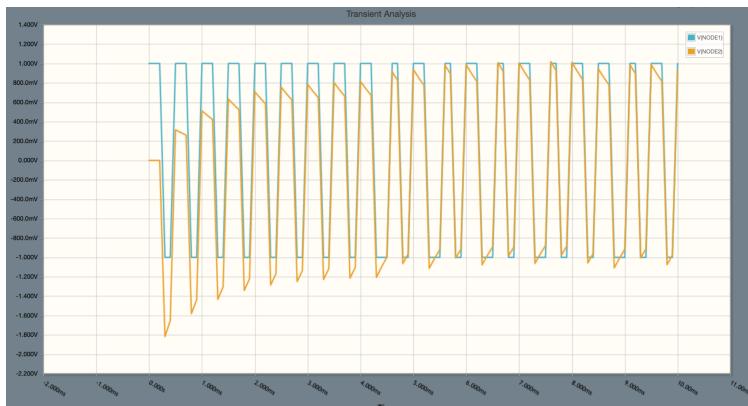


The capacitance in the filter seems to offset how quickly the average voltage returns to that of the square wave itself. The larger the capacitance the slower this change.

1uf, 200hz frequency:



1uf, 2000hz frequency:



1uf, 1000hz freq, 100ohm resistance, not 1k ohm:

