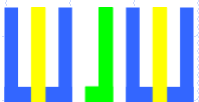


회로 이론/실습

5. 중첩의 원리



5. 중첩의 원리

5-1. 목적 및 배경

5-2. 소요 부품 및 장비

5-3. 유용한 공식

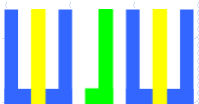
5-4. 각 단의 전압과 전류 (정상 회로)

5-5. 각 단의 전압과 전류 (V_{s1})

5-6. 각 단의 전압과 전류 (V_{s2})

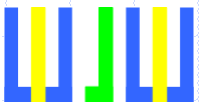
5-7. 각각의 전압과 전류 합치기

5-8. 중첩의 원리 예제



5-1. 목적 및 배경

- ✓ 중첩의 원리를 이용하여 전원이 2개 이상인 회로를 해석한다.
- ✓ 중첩의 원리를 이용하여 회로를 해석하고, 실험을 통하여 결과를 확인한다.



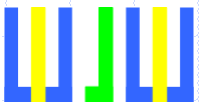
5-2. 소요 부품 및 장비

✓ 부품

- ✓ 저항 (1/4W) : 4.7k Ω , 6.8k Ω , 10k Ω
- ✓ 저항 (1/2W) : 200 Ω , 300 Ω

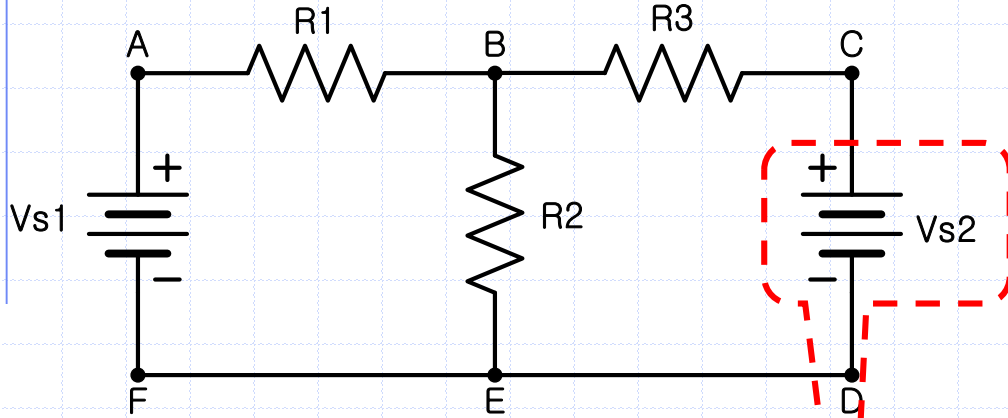
✓ 장비

- ✓ 브레드 보드
- ✓ 디지털 멀티미터 (Digital Multi-Meter)
- ✓ 직류전원장치 (DC Power Supply)



5-3. 유용한 공식

중첩의 원리



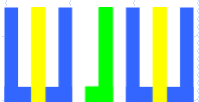
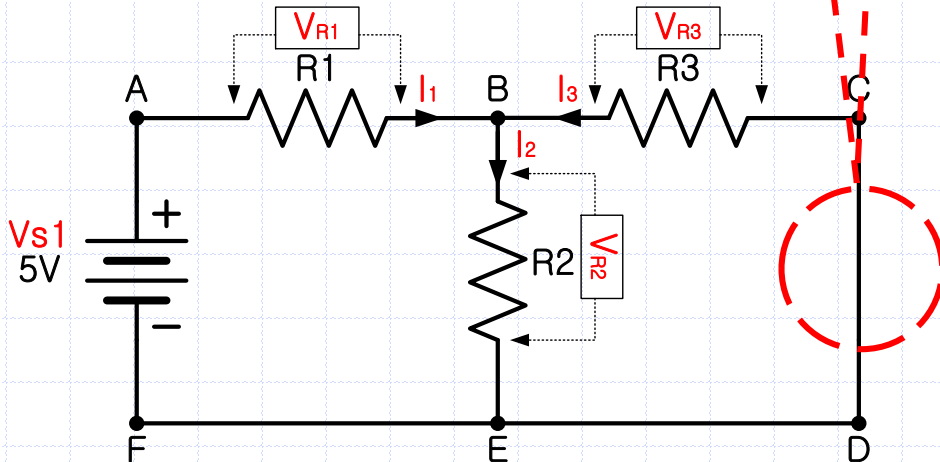
✓ 전원 V_{s1} 에 대한 해석을 위하여 전원 V_{s2} 를 제거한다.

✓ 전원의 제거 방법

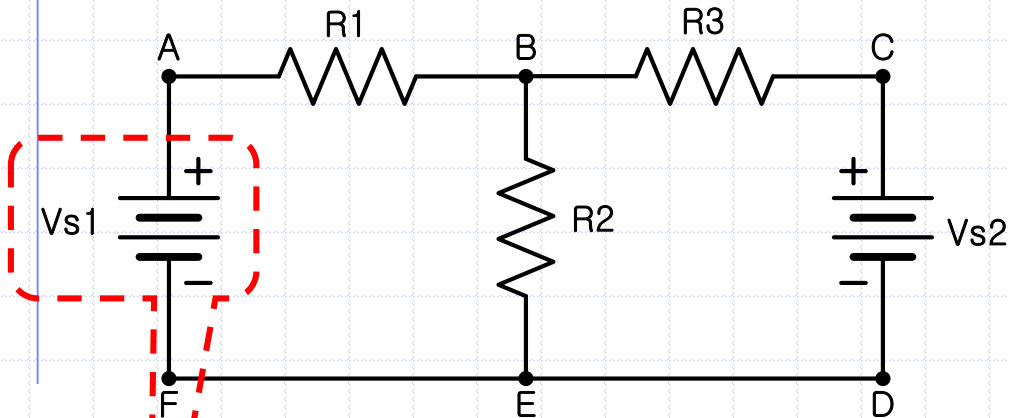
전압원 : 단락

전류원 : 개방

✓ 각 단의 전압과 전류를 해석(측정)한다.



5-3. 유용한 공식

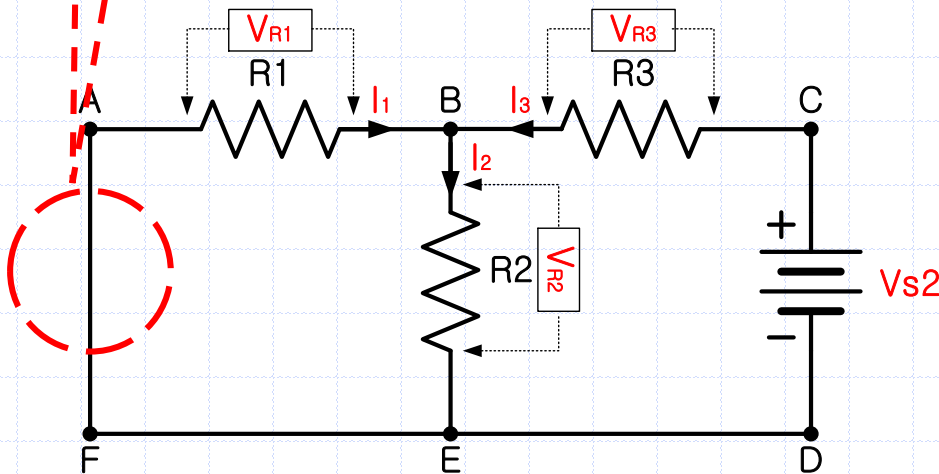


✓ 전원 V_{s2} 에 대한 해석을 위하여 전원 V_{s1} 를 제거한다.

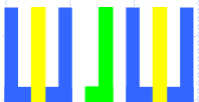
✓ 전원의 제거 방법

전압원 : 단락

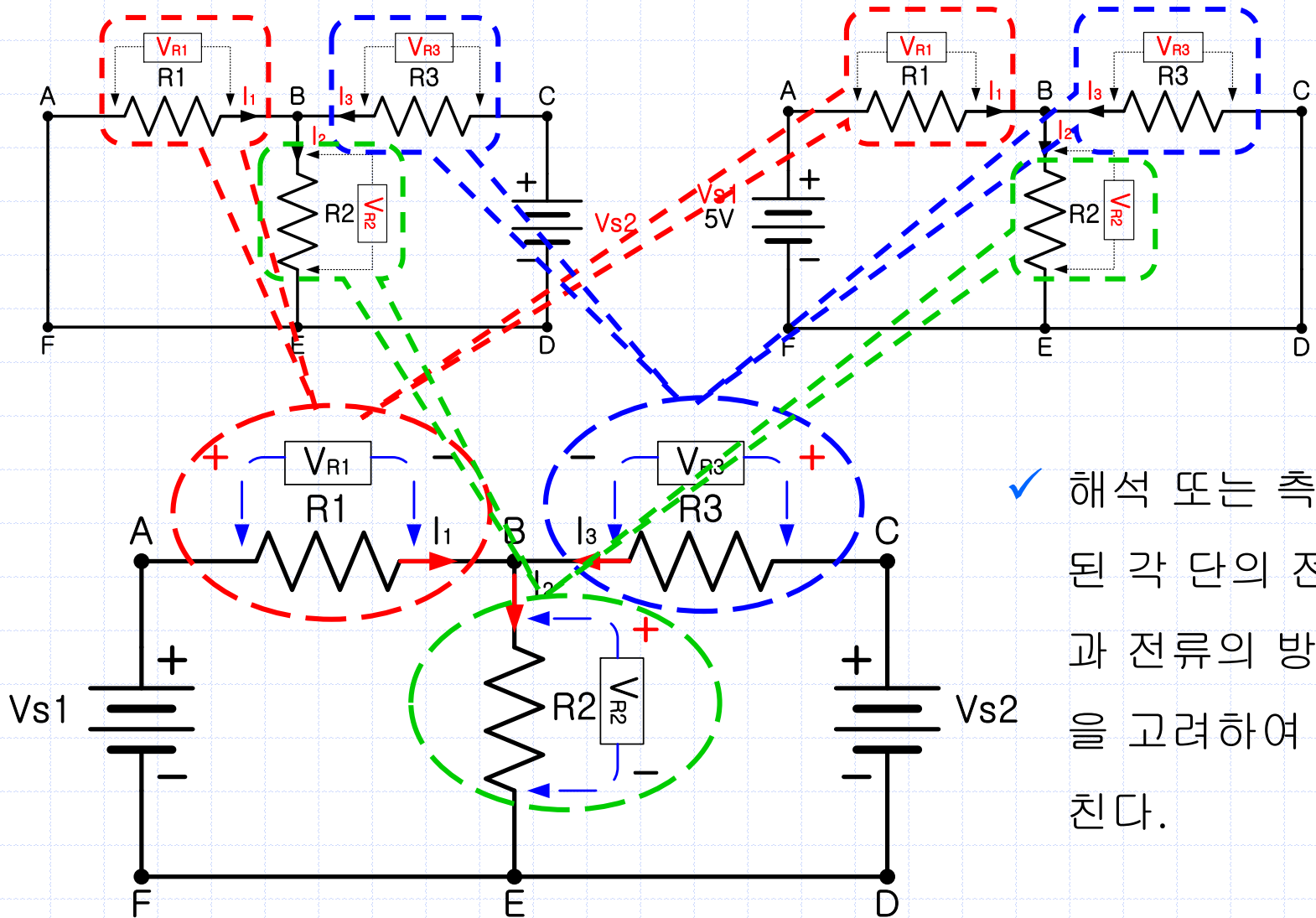
전류원 : 개방



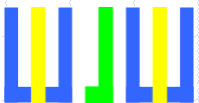
✓ 각 단의 전압과 전류를 해석(측정)한다.



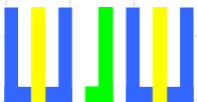
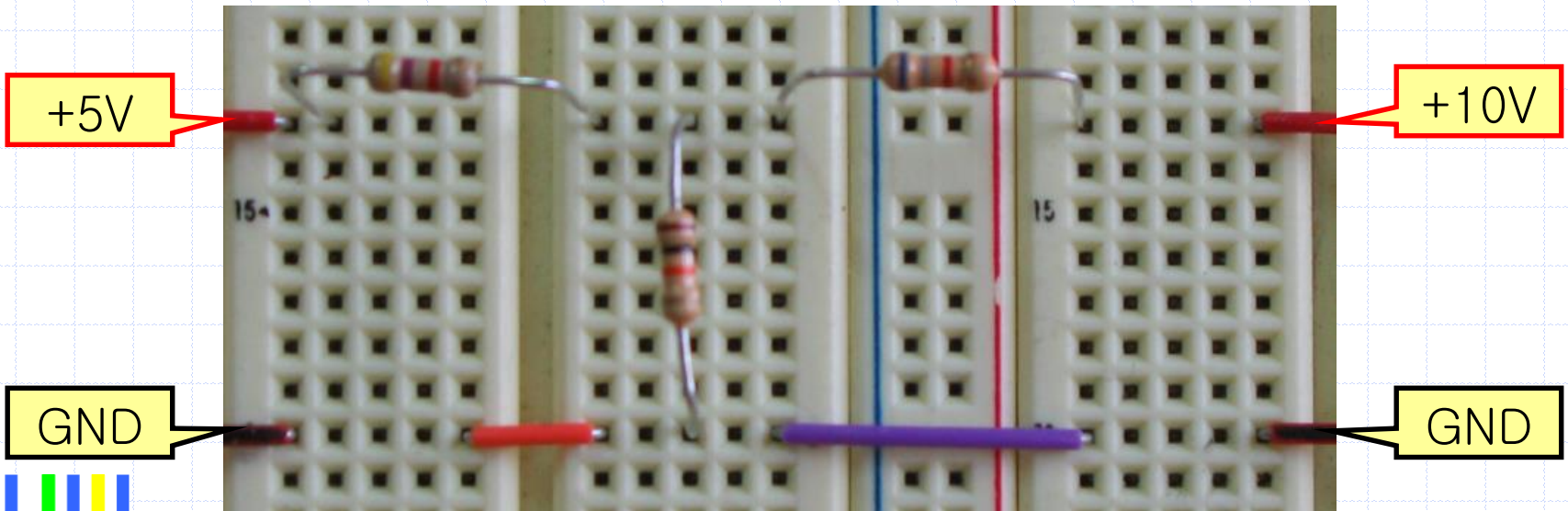
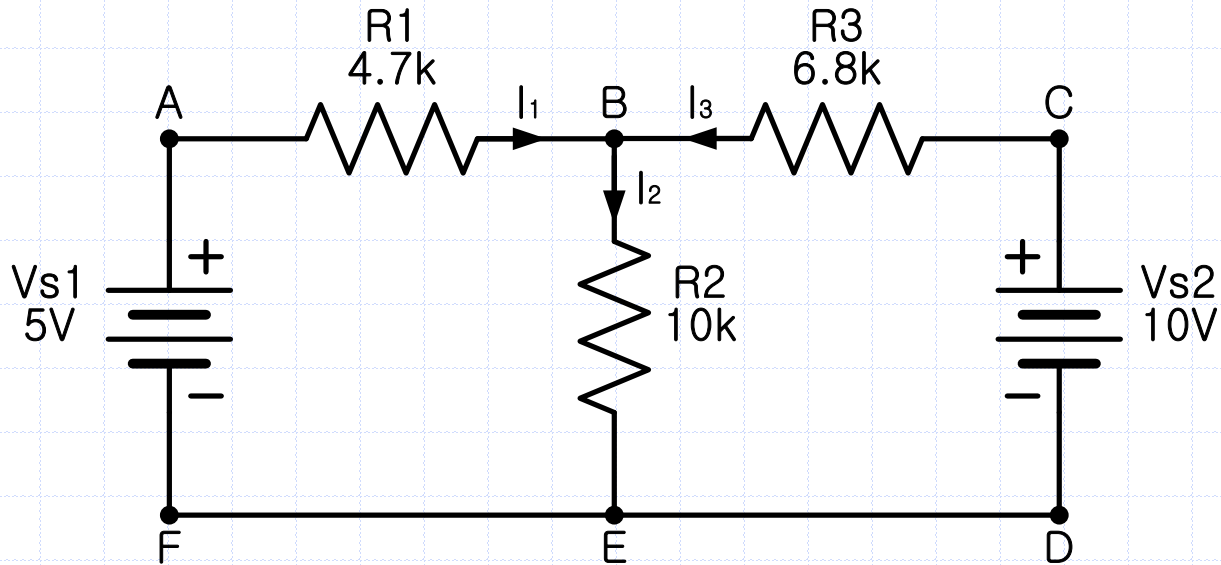
5-3. 유용한 공식



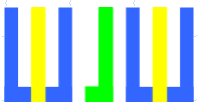
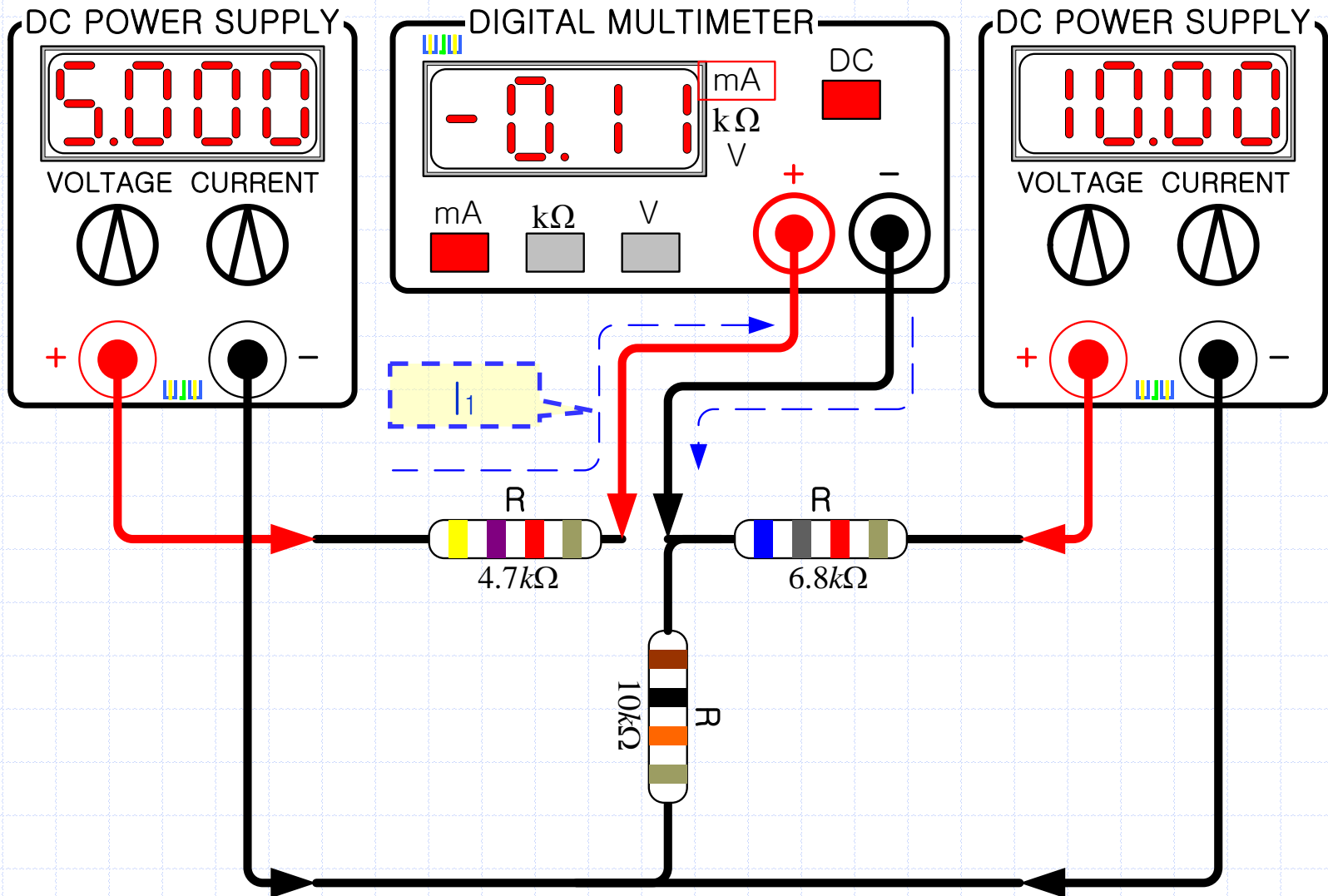
✓ 해석 또는 측정된 각 단의 전압과 전류의 방향을 고려하여 합친다.



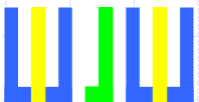
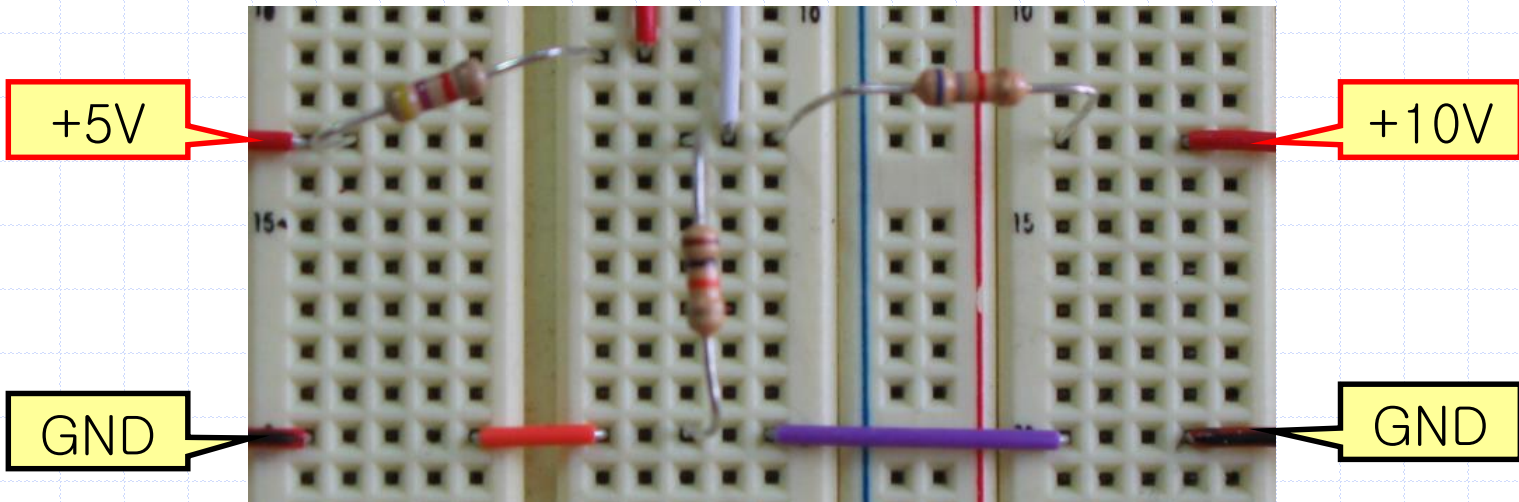
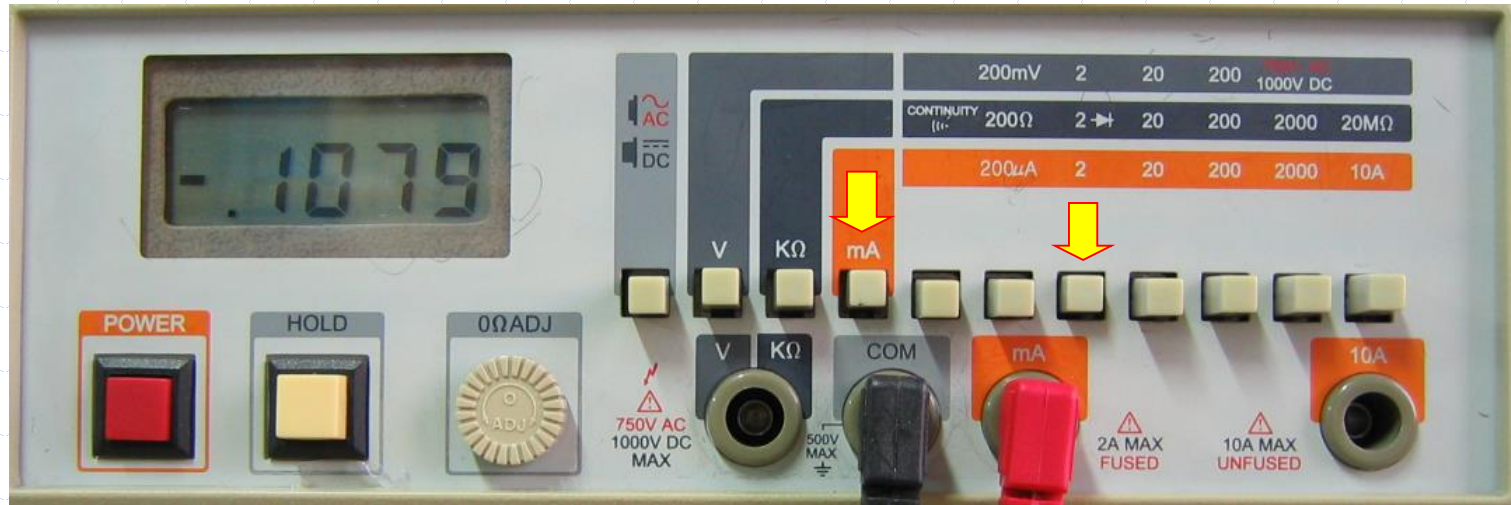
5-4. 각 단의 전압과 전류-정상 회로



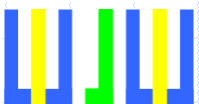
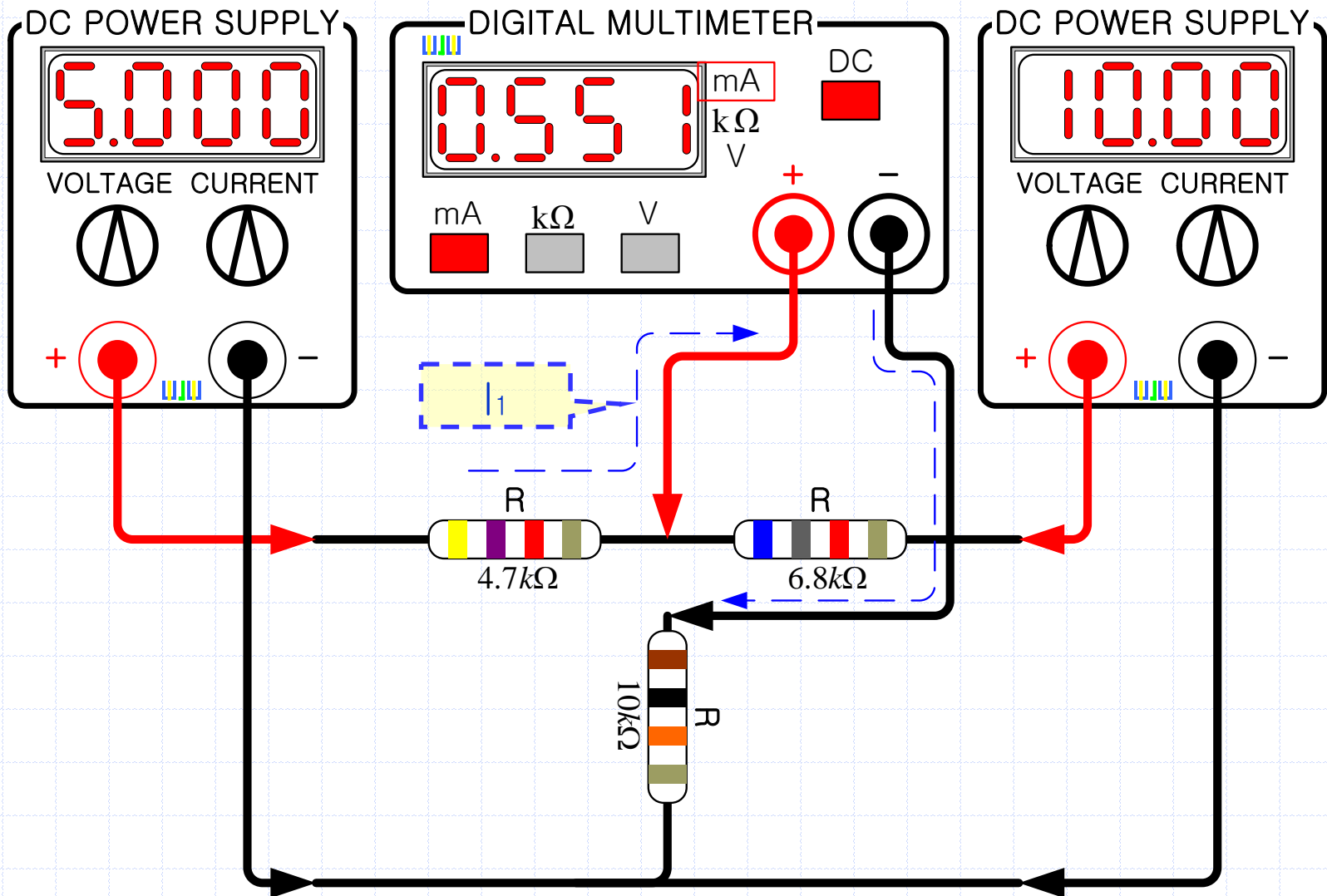
5-4. 각 단의 전압과 전류-정상 회로



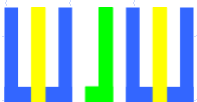
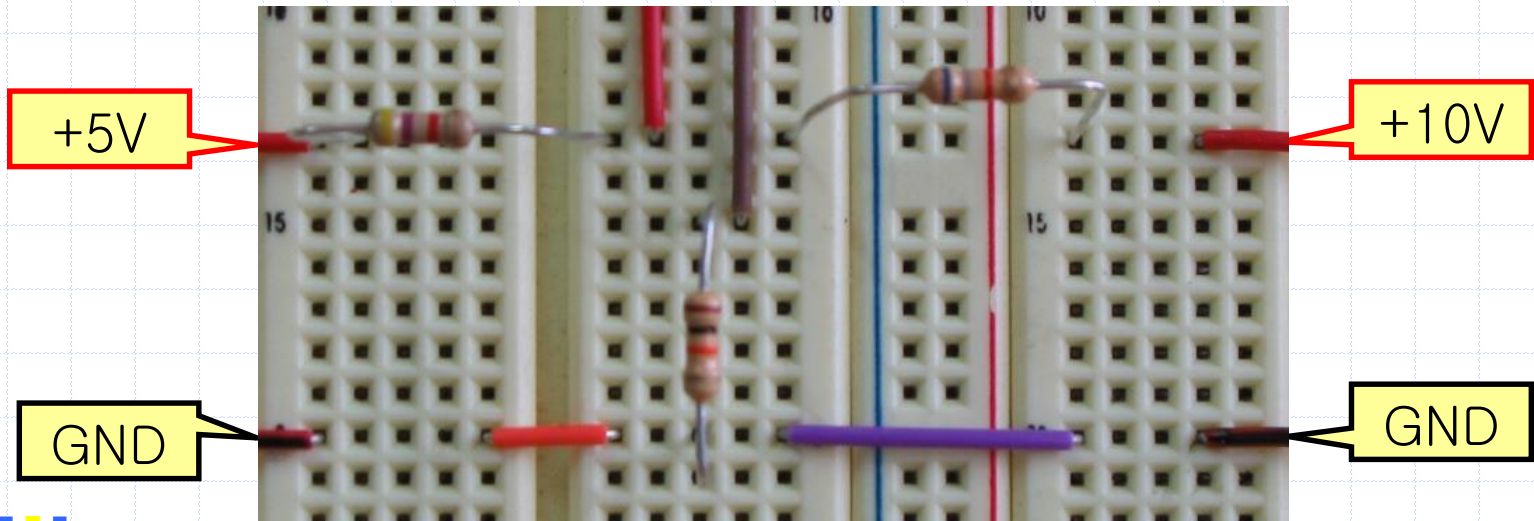
5-4. 각 단의 전압과 전류-정상 회로



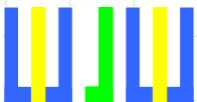
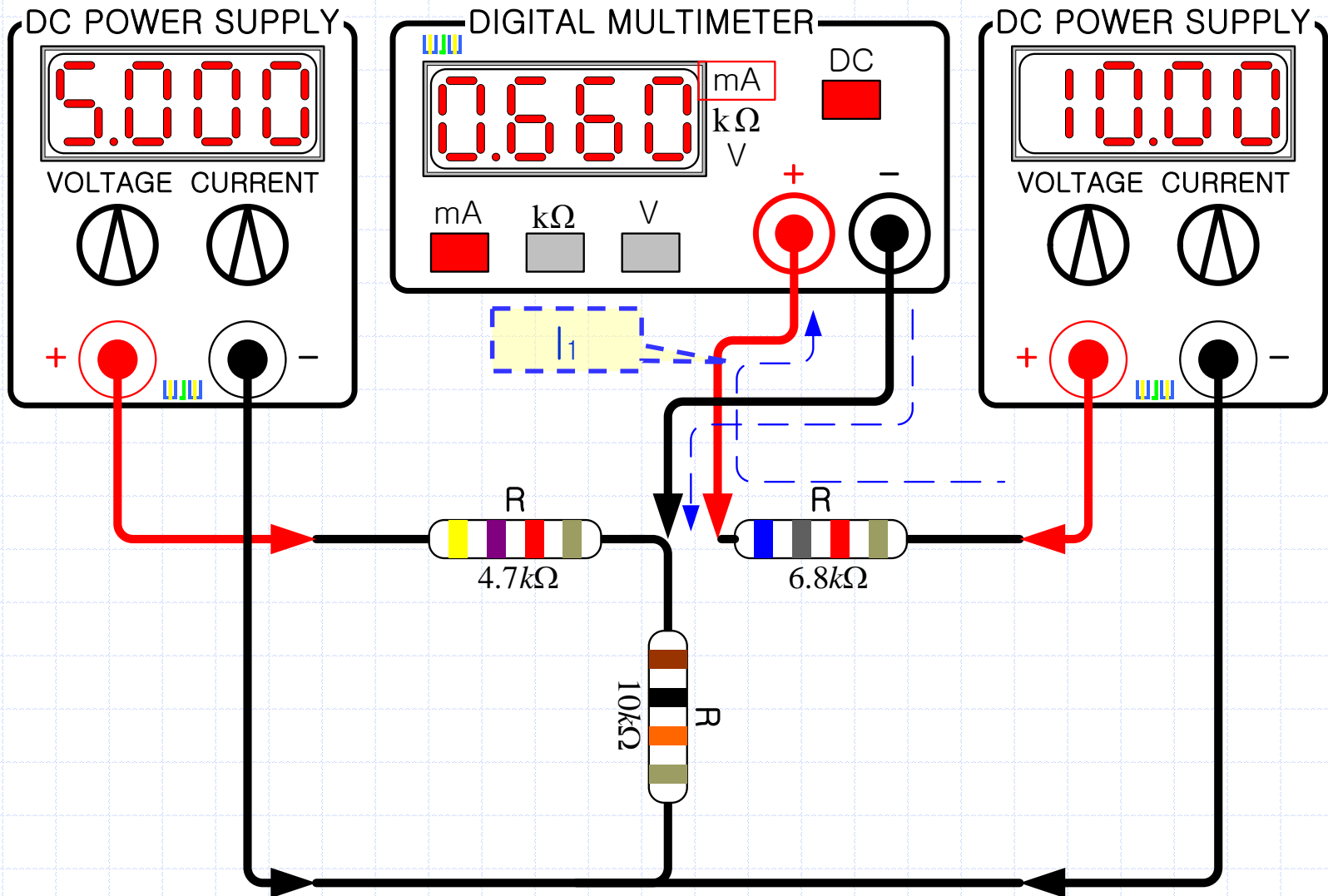
5-4. 각 단의 전압과 전류-정상 회로



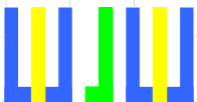
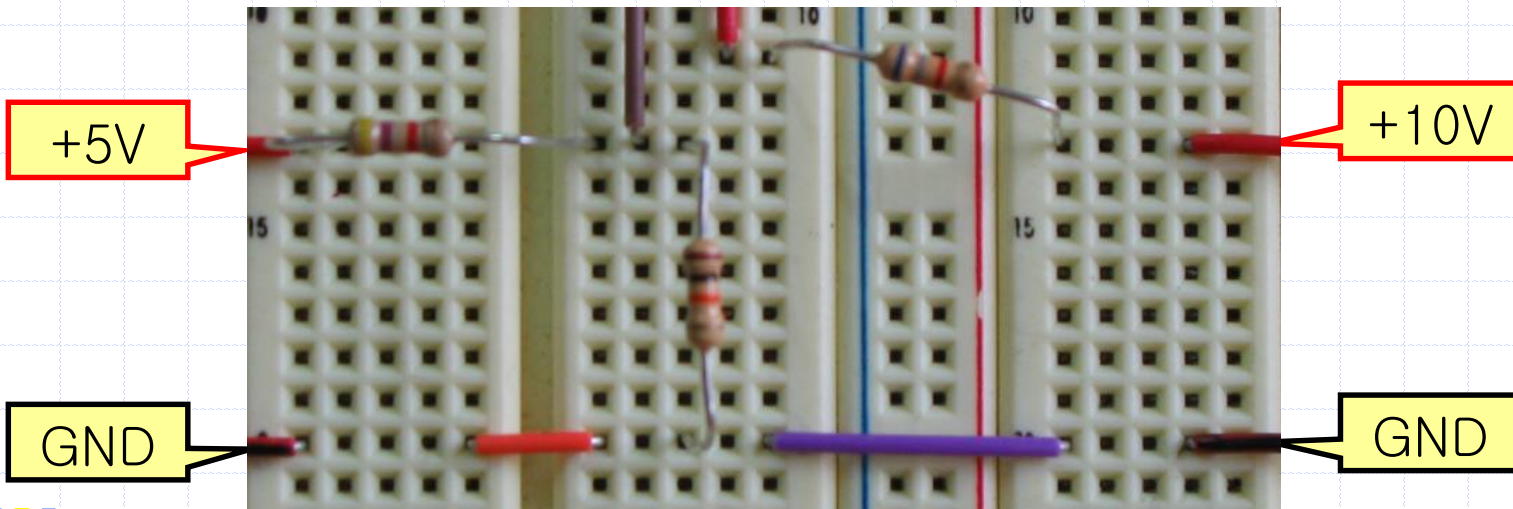
5-4. 각 단의 전압과 전류-정상 회로



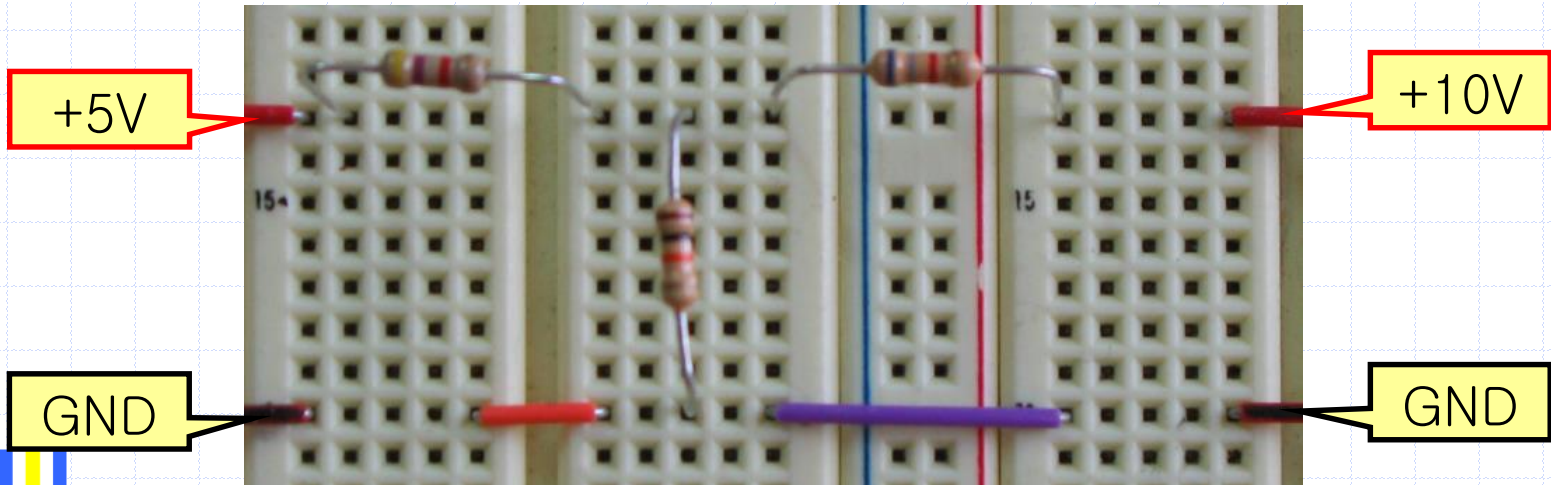
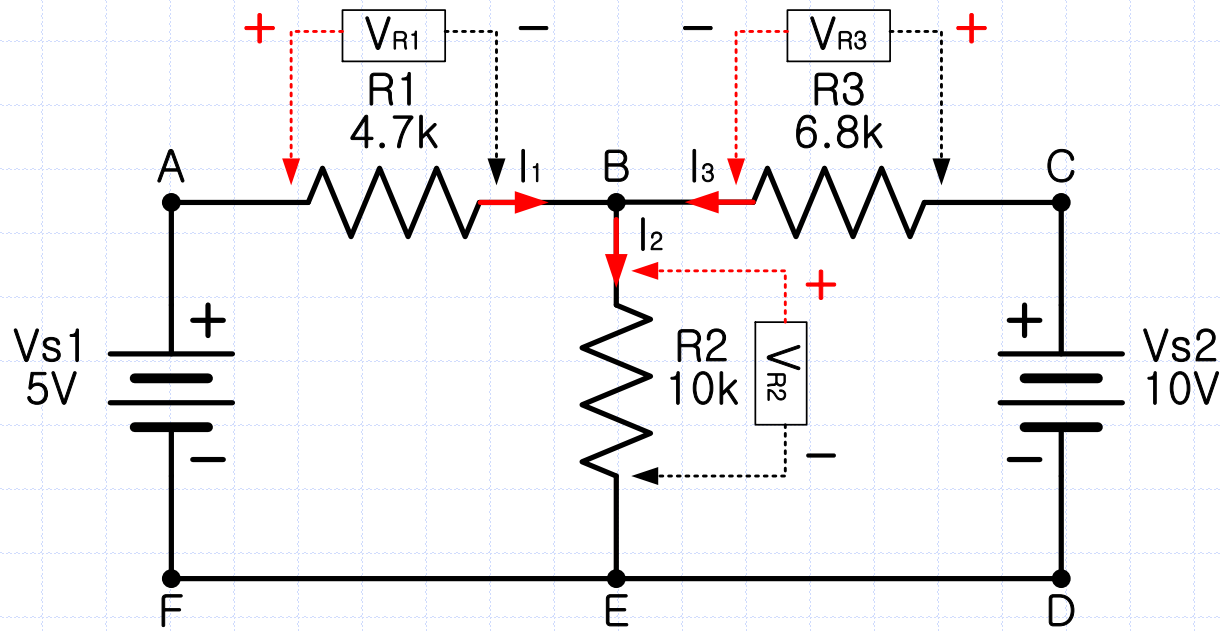
5-4. 각 단의 전압과 전류-정상 회로



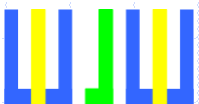
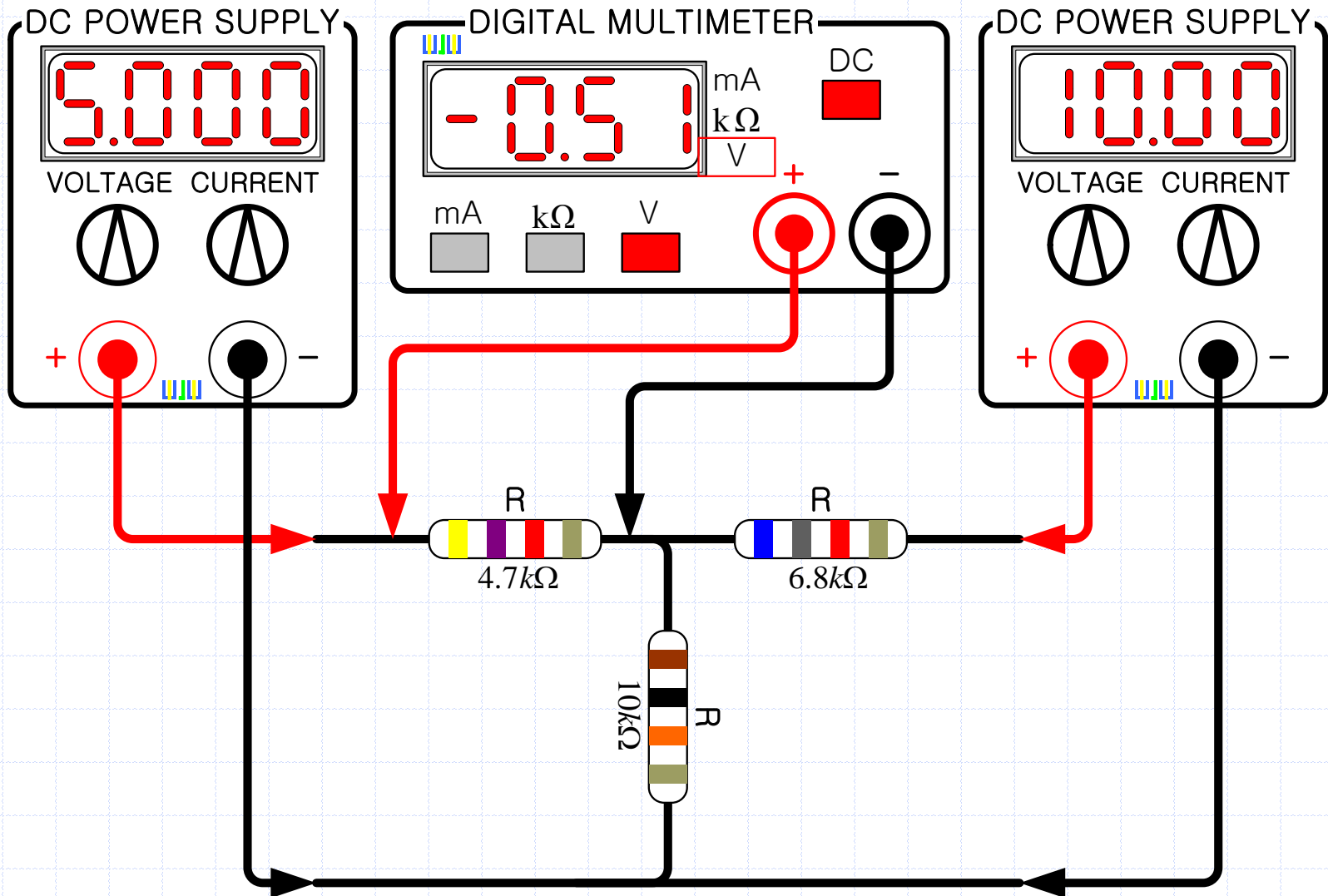
5-4. 각 단의 전압과 전류-정상 회로



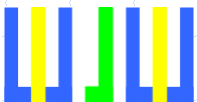
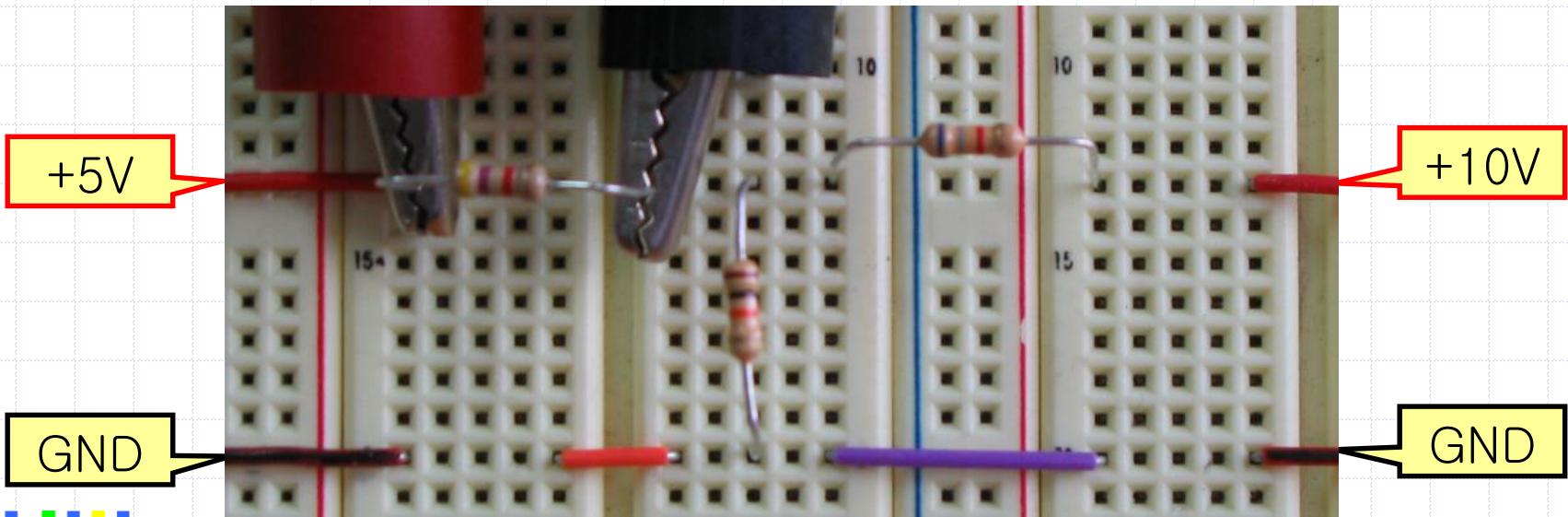
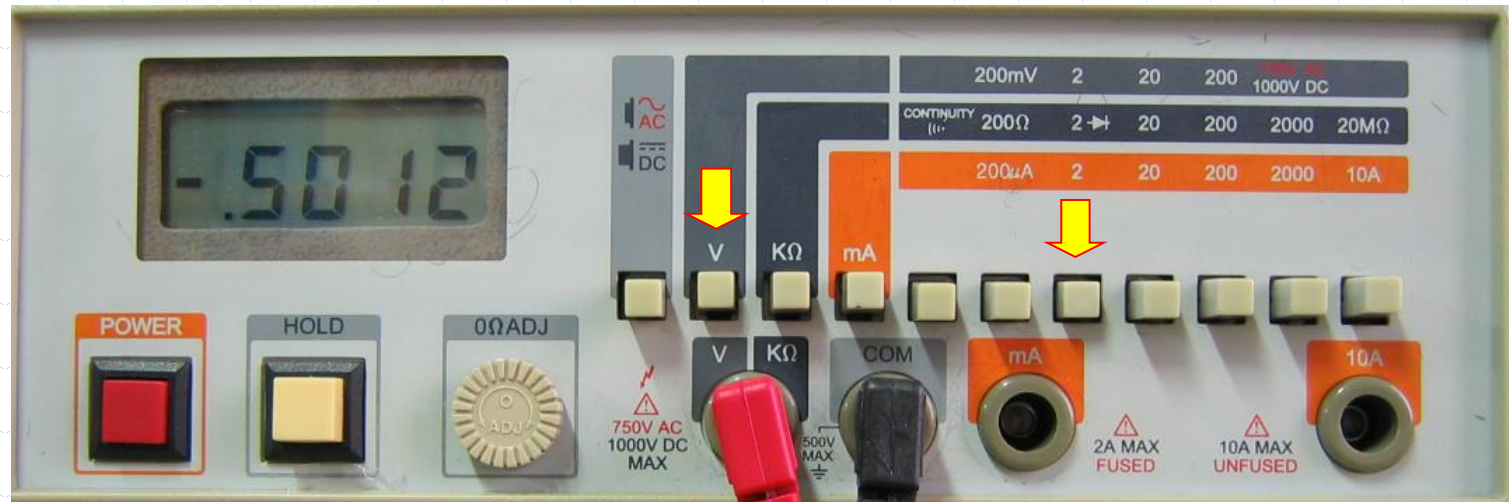
5-4. 각 단의 전압과 전류-정상 회로



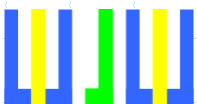
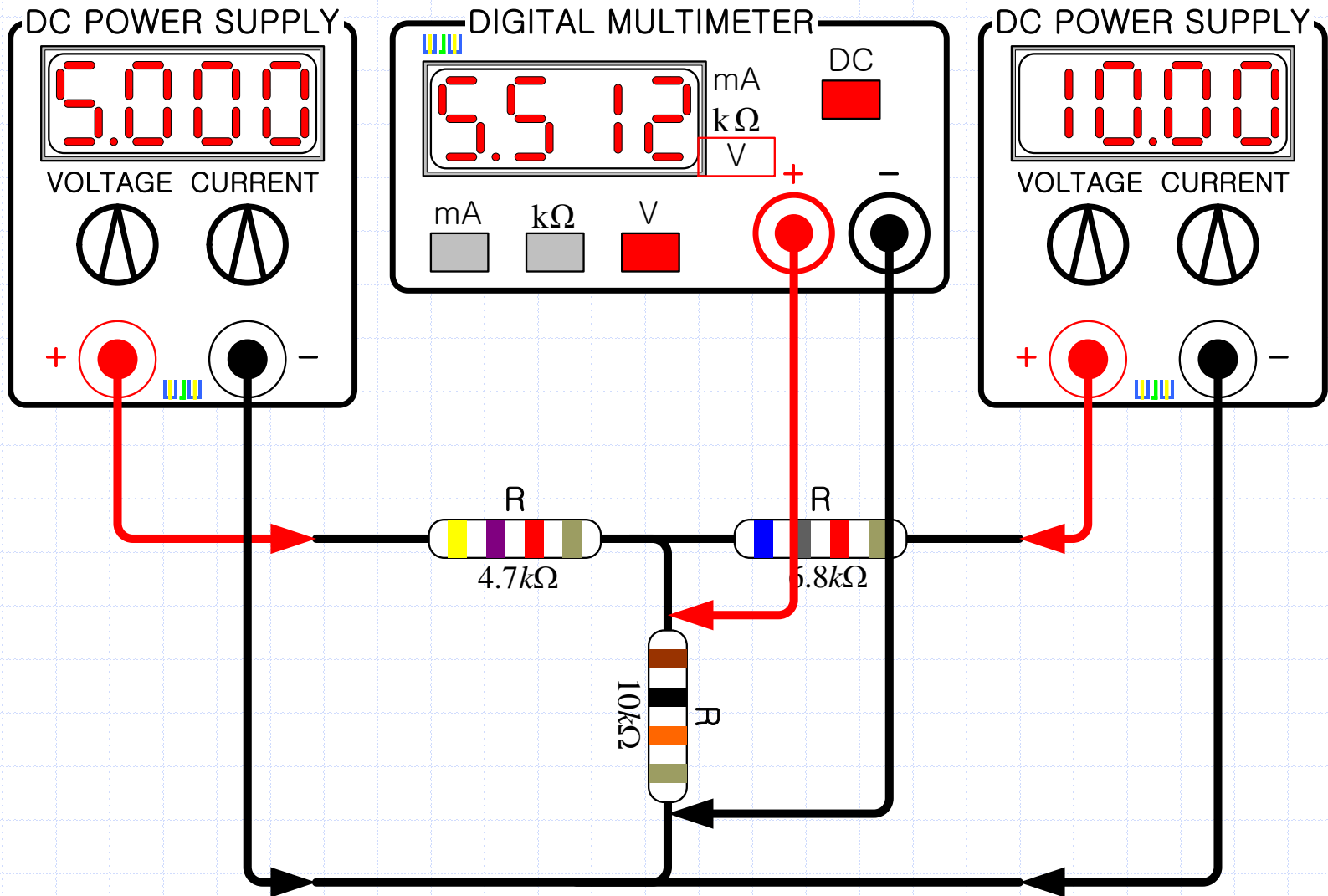
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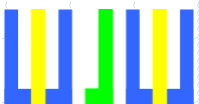
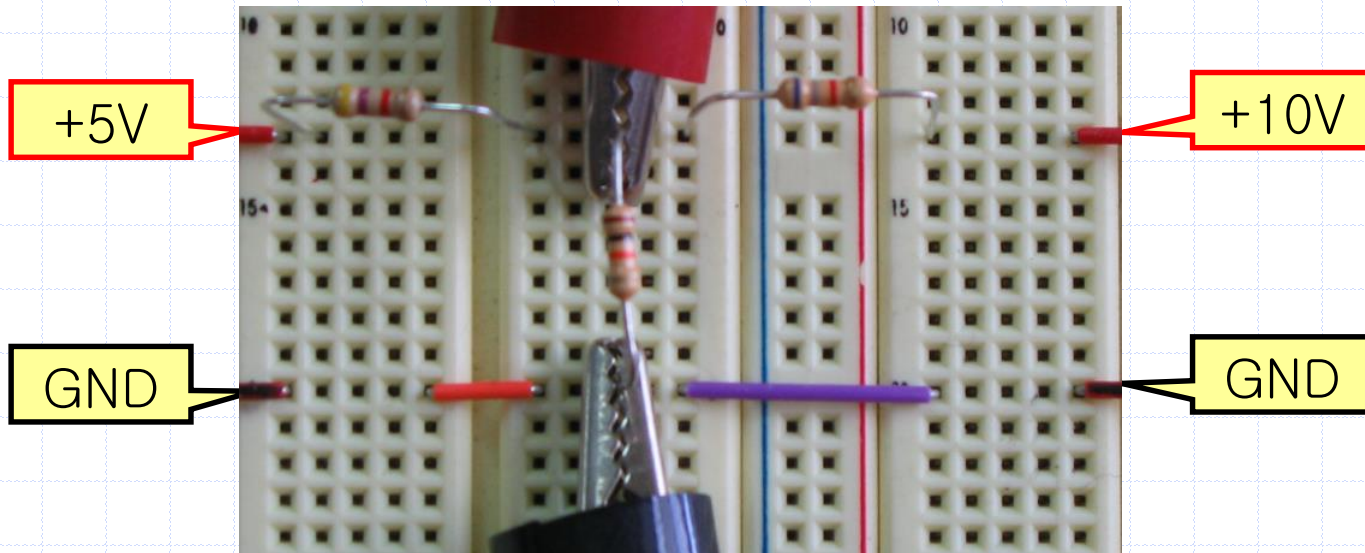
5-4. 각 단의 전압과 전류-정상 회로



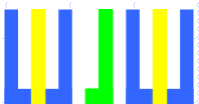
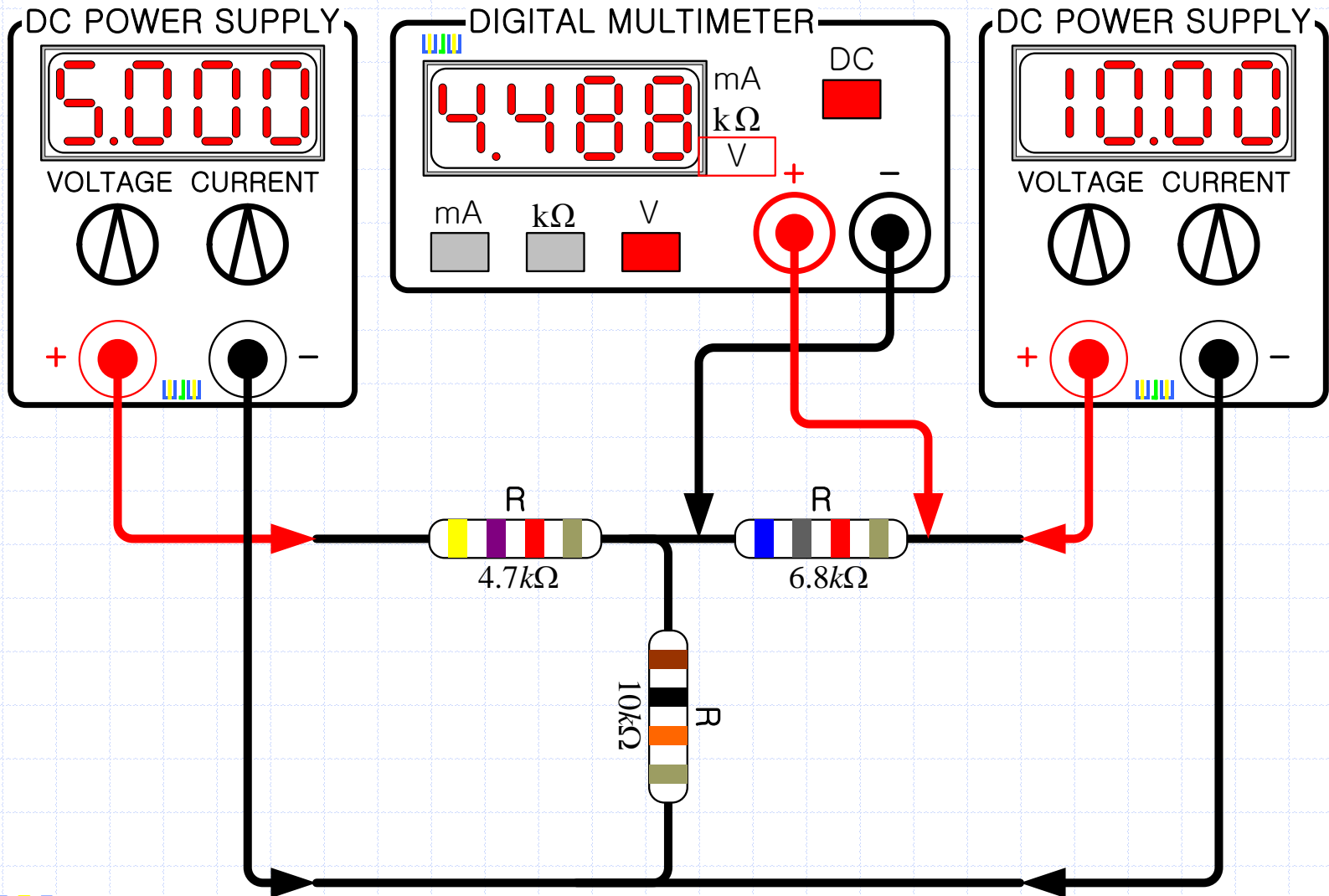
5-4. 각 단의 전압과 전류-정상 회로



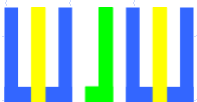
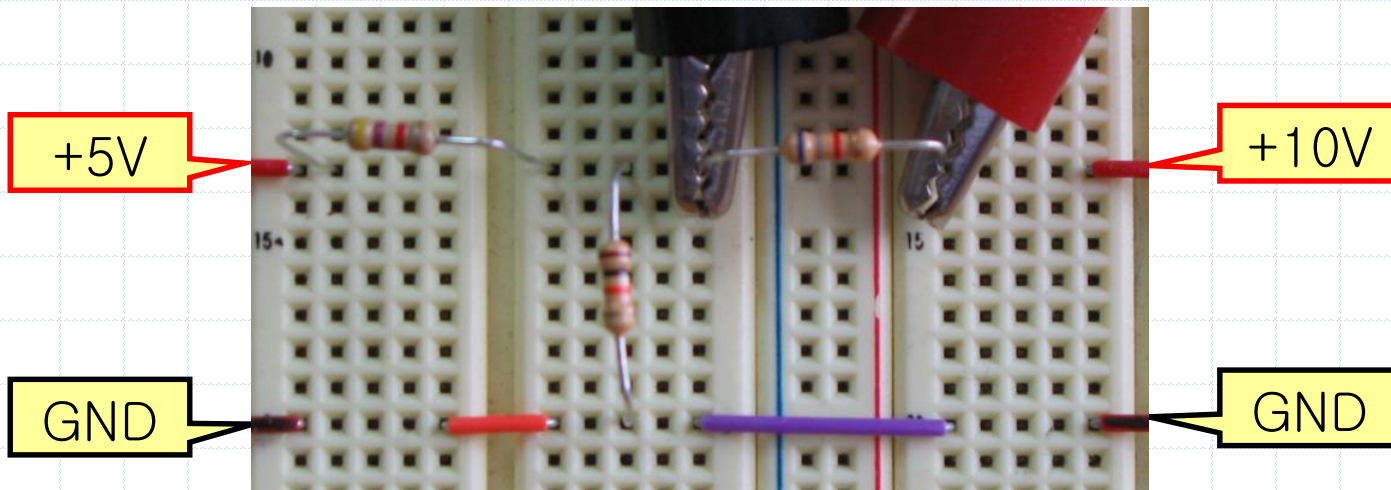
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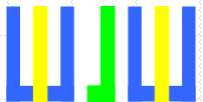
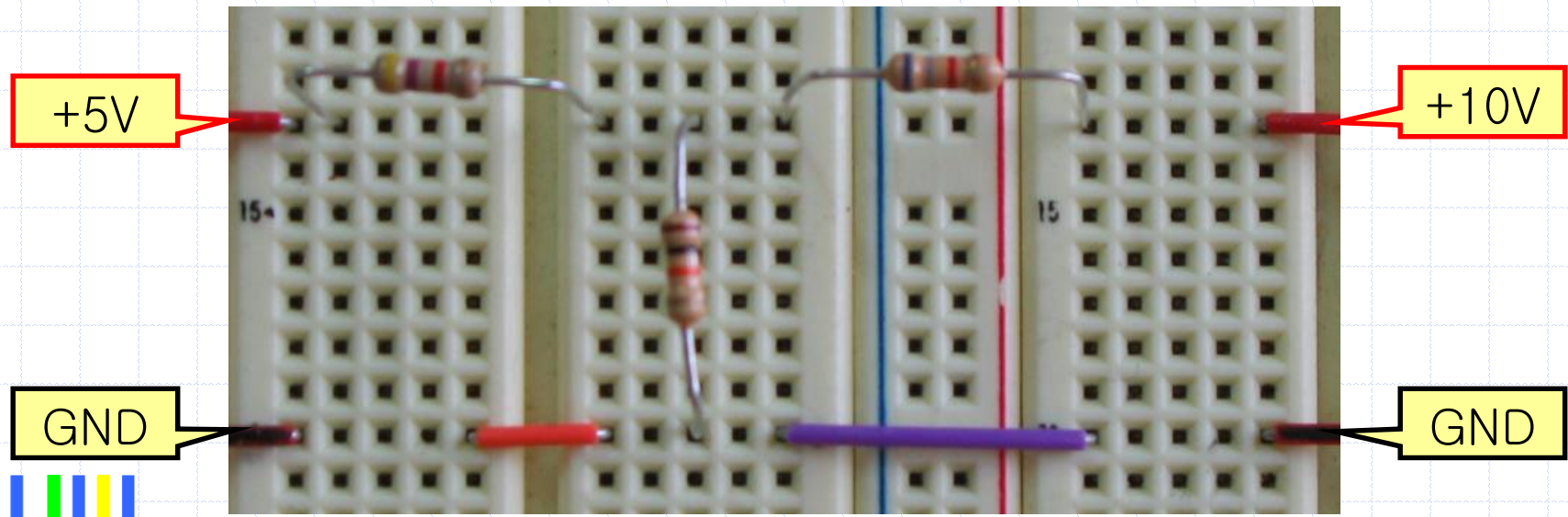
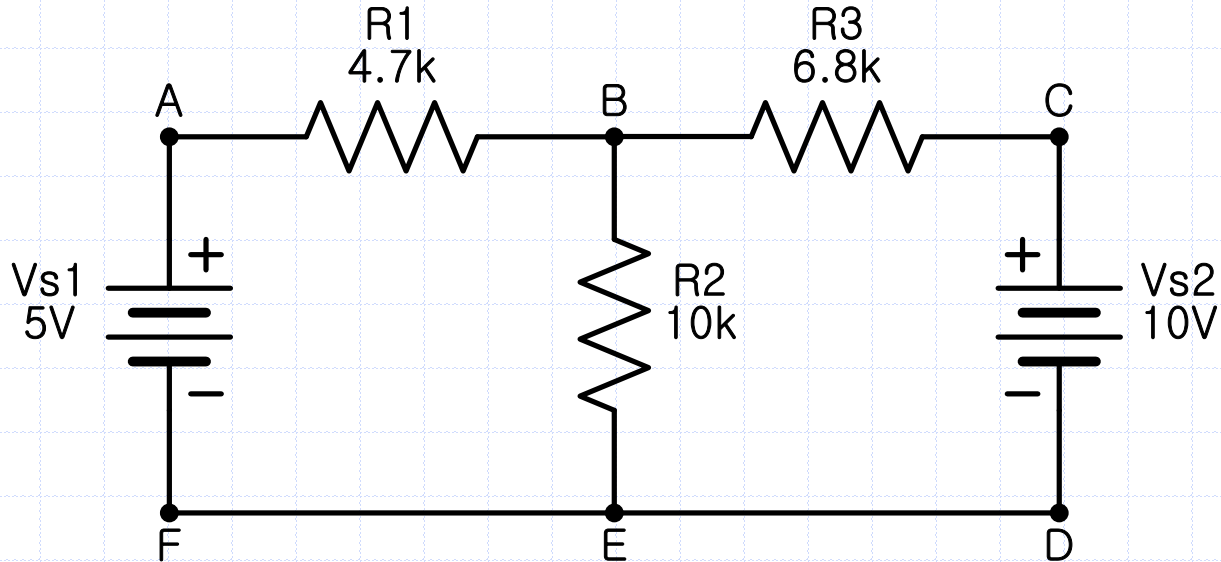
5-4. 각 단의 전압과 전류-정상 회로



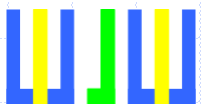
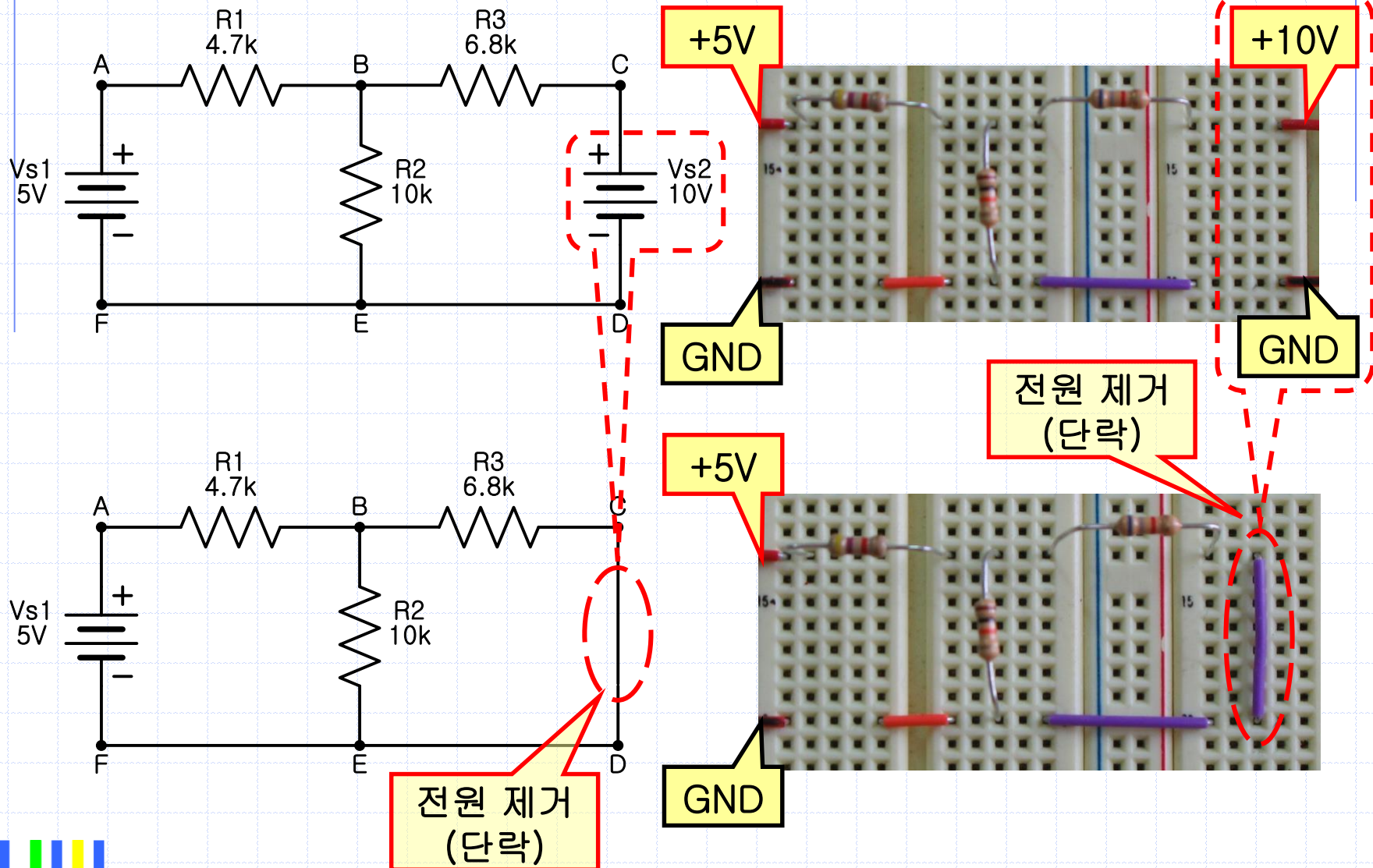
5-4. 각 단의 전압과 전류-정상 회로



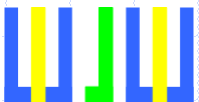
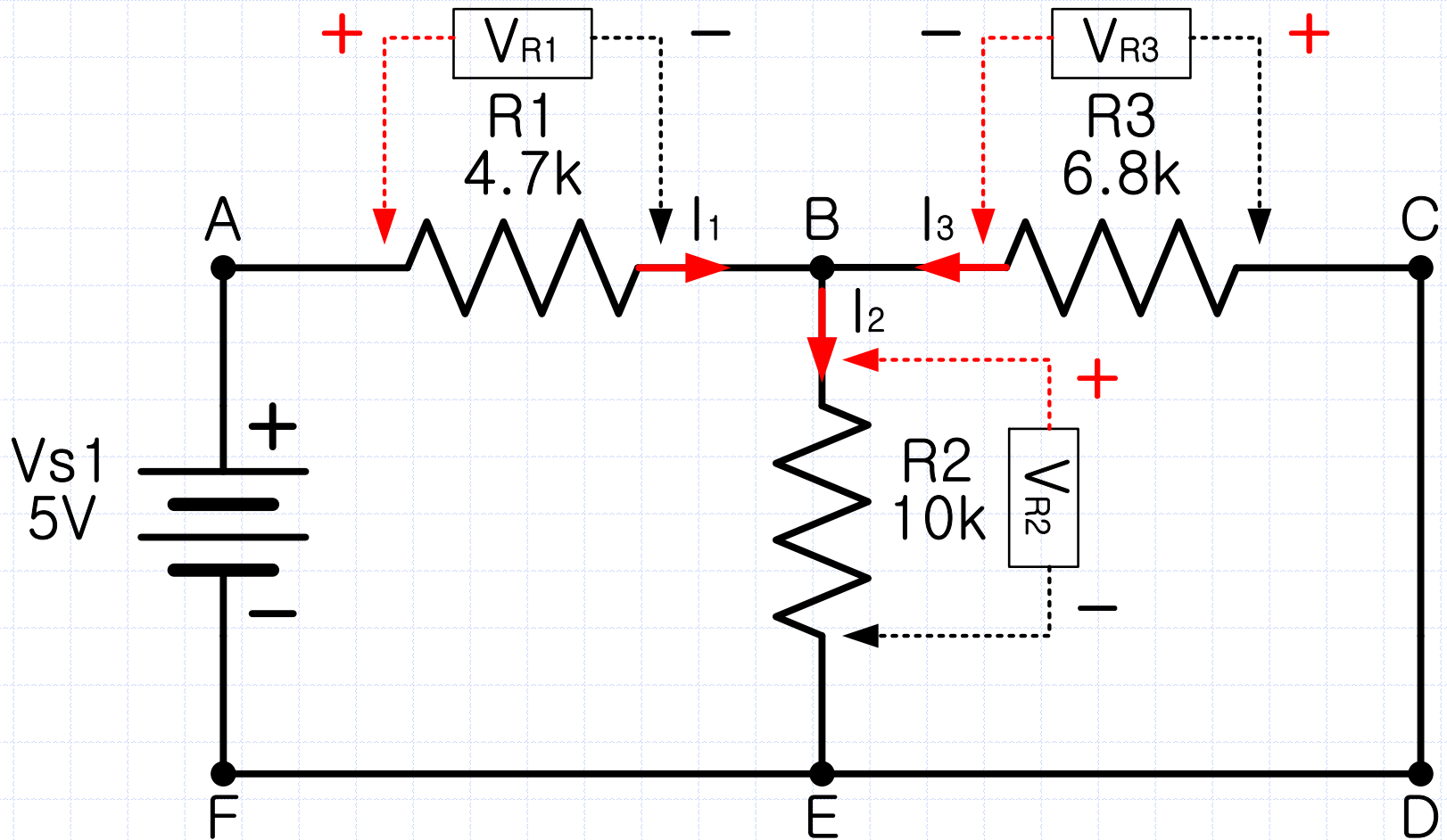
5-5. 각 단의 전압과 전류-전원 Vs1



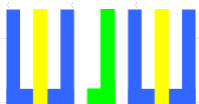
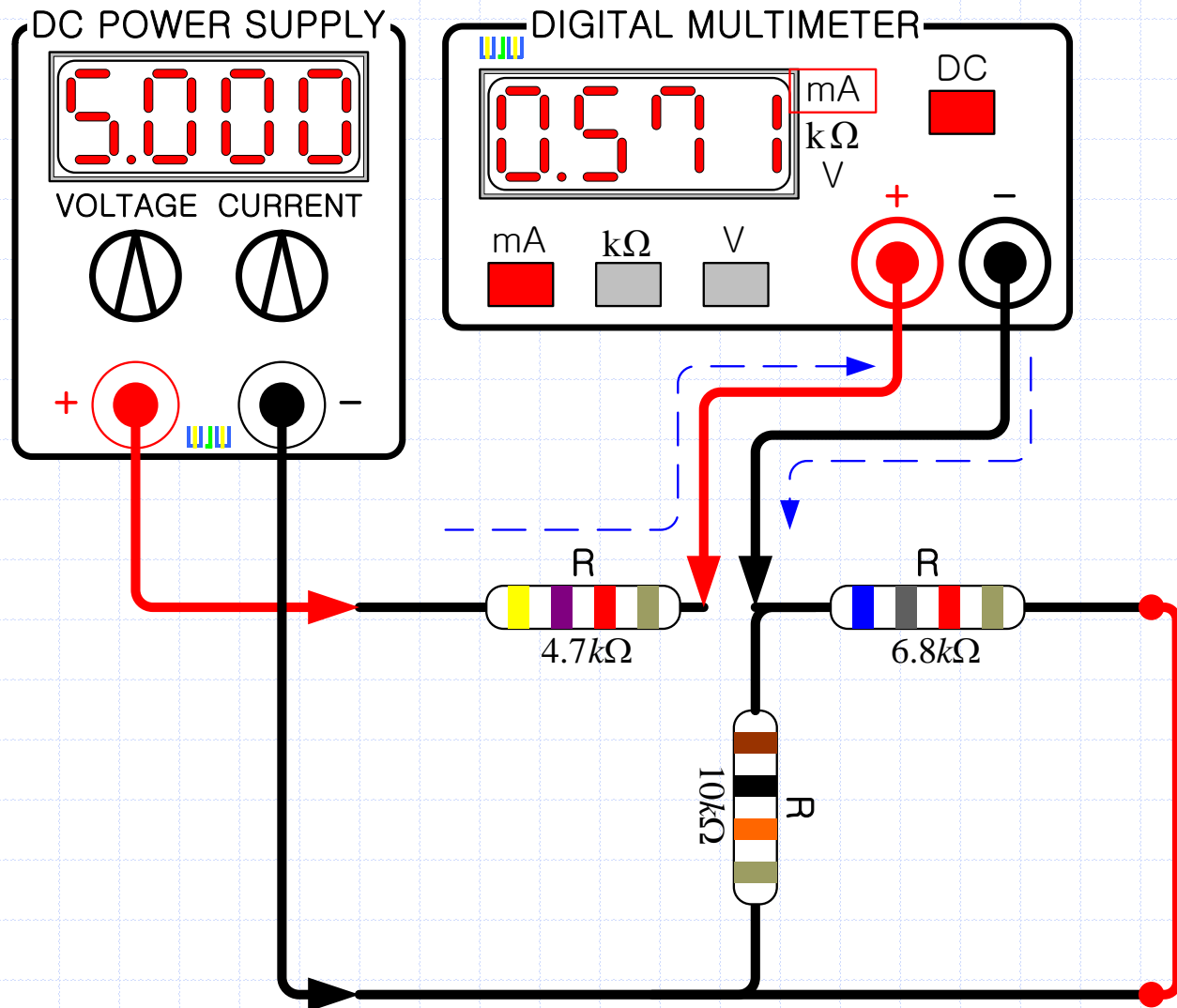
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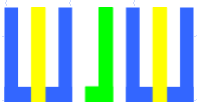
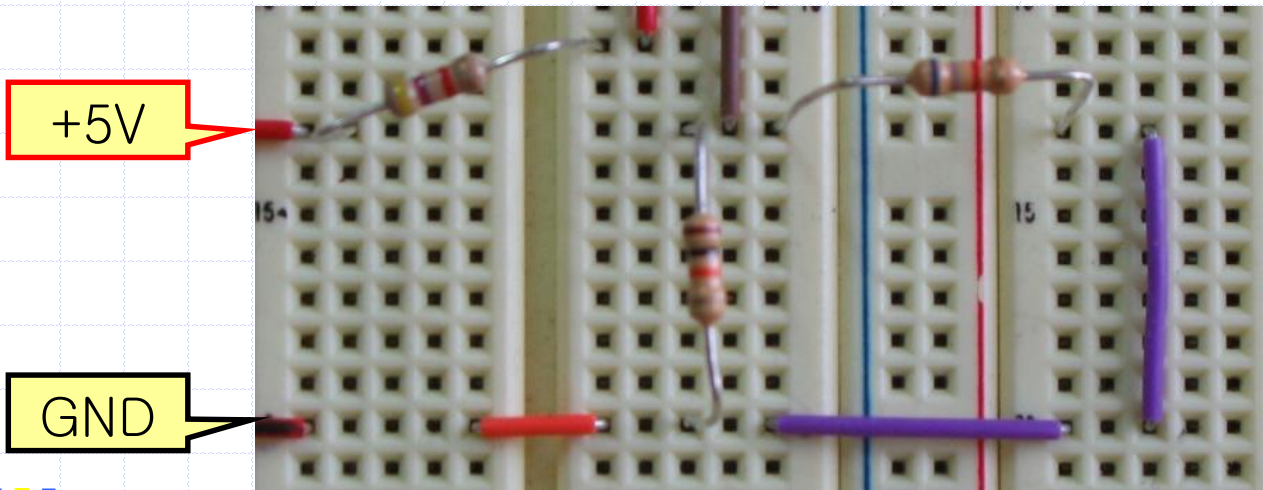
5-5. 각 단의 전압과 전류-전원 V_{s1}



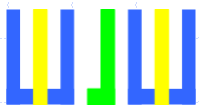
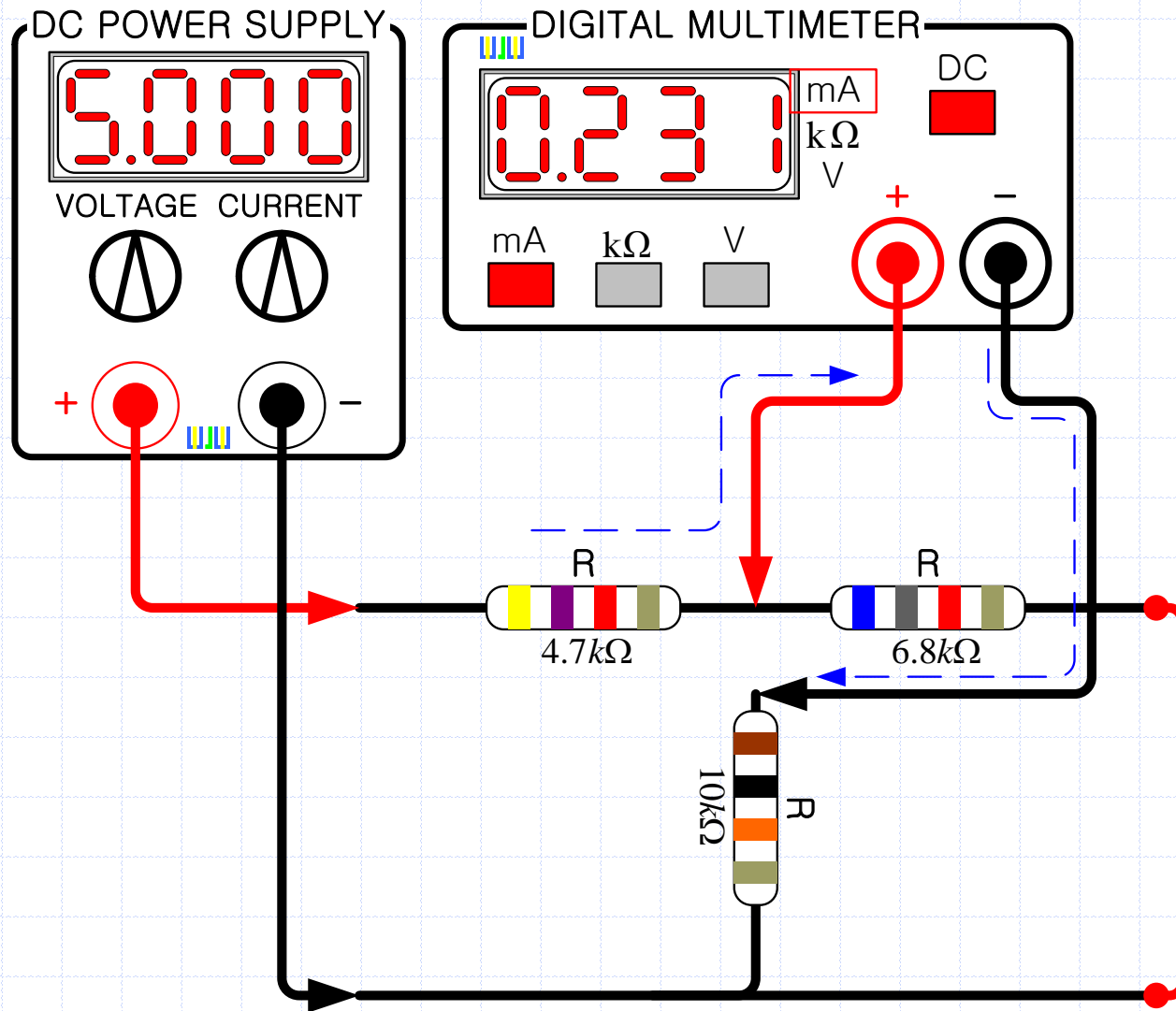
5-5. 각 단의 전압과 전류-전원 Vs1



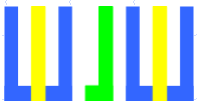
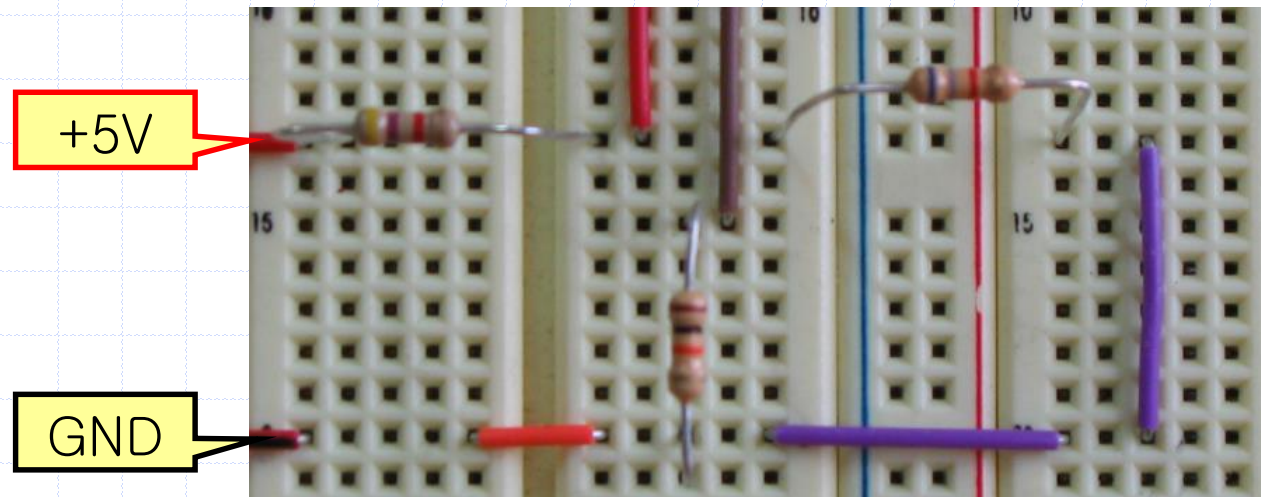
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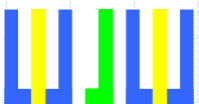
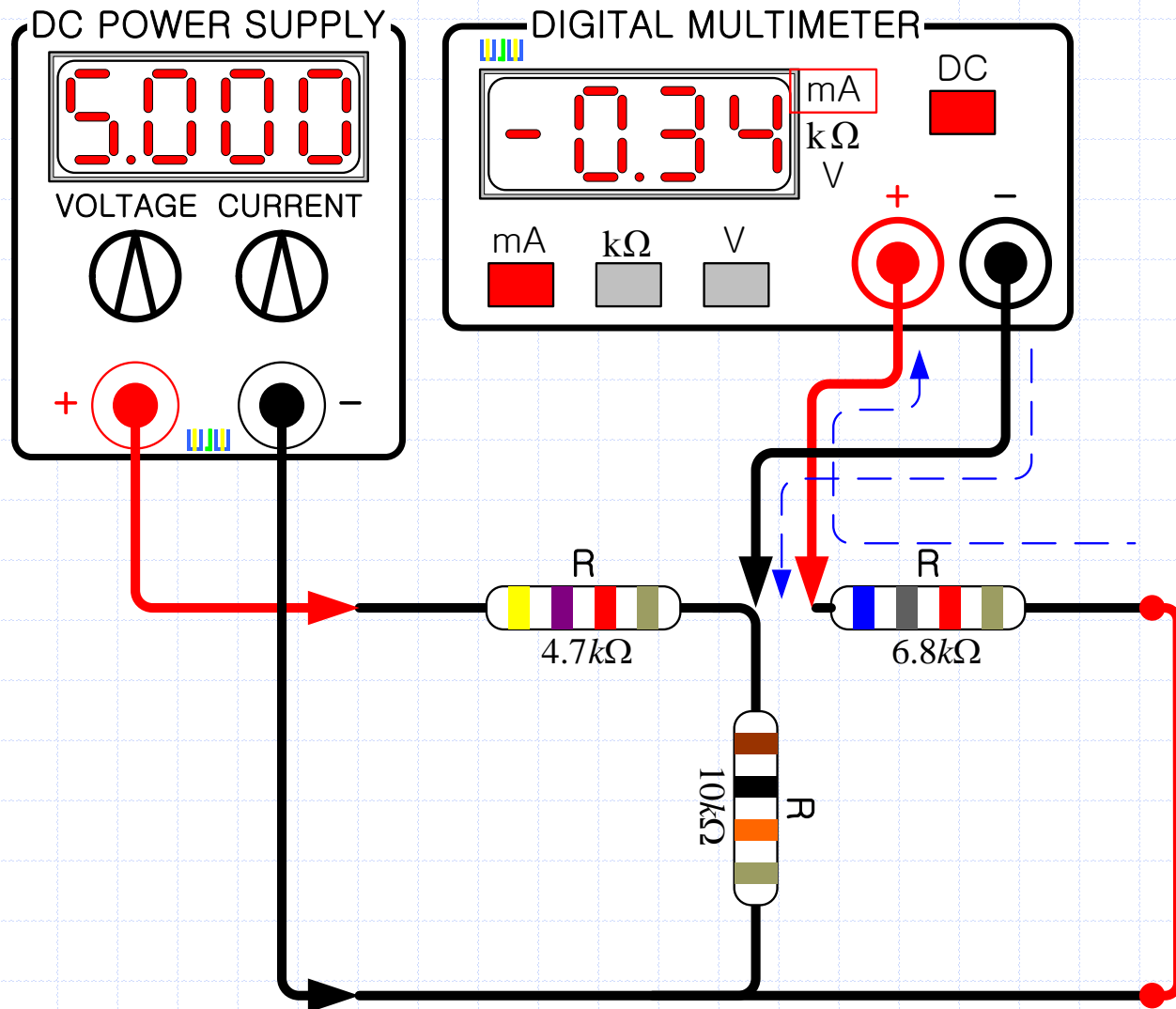
5-5. 각 단의 전압과 전류-전원 Vs1



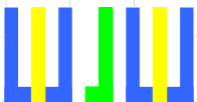
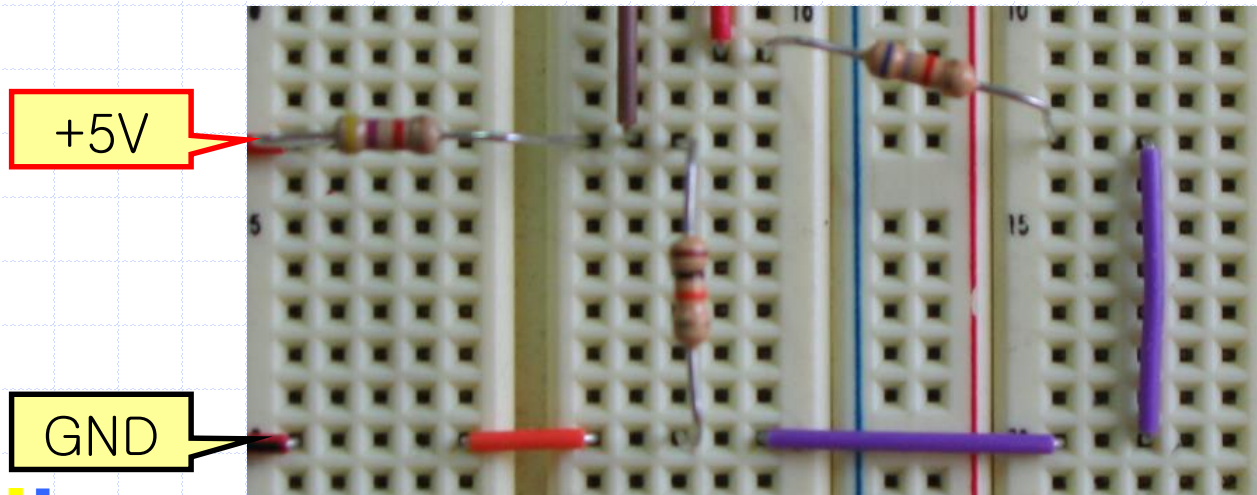
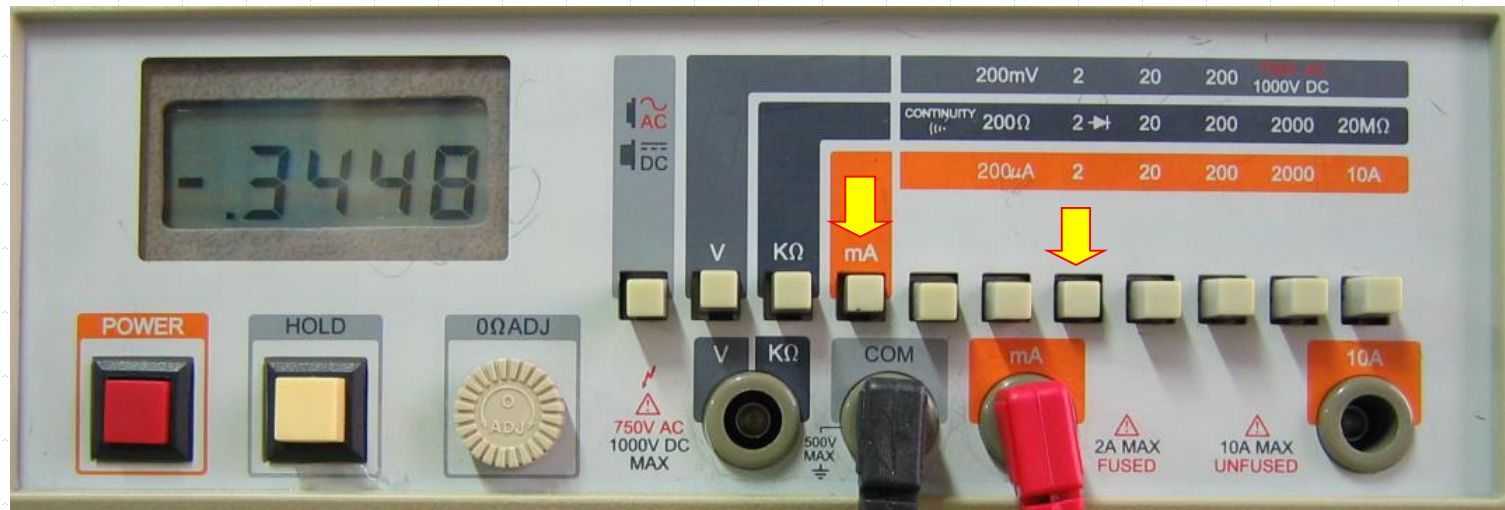
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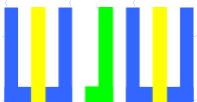
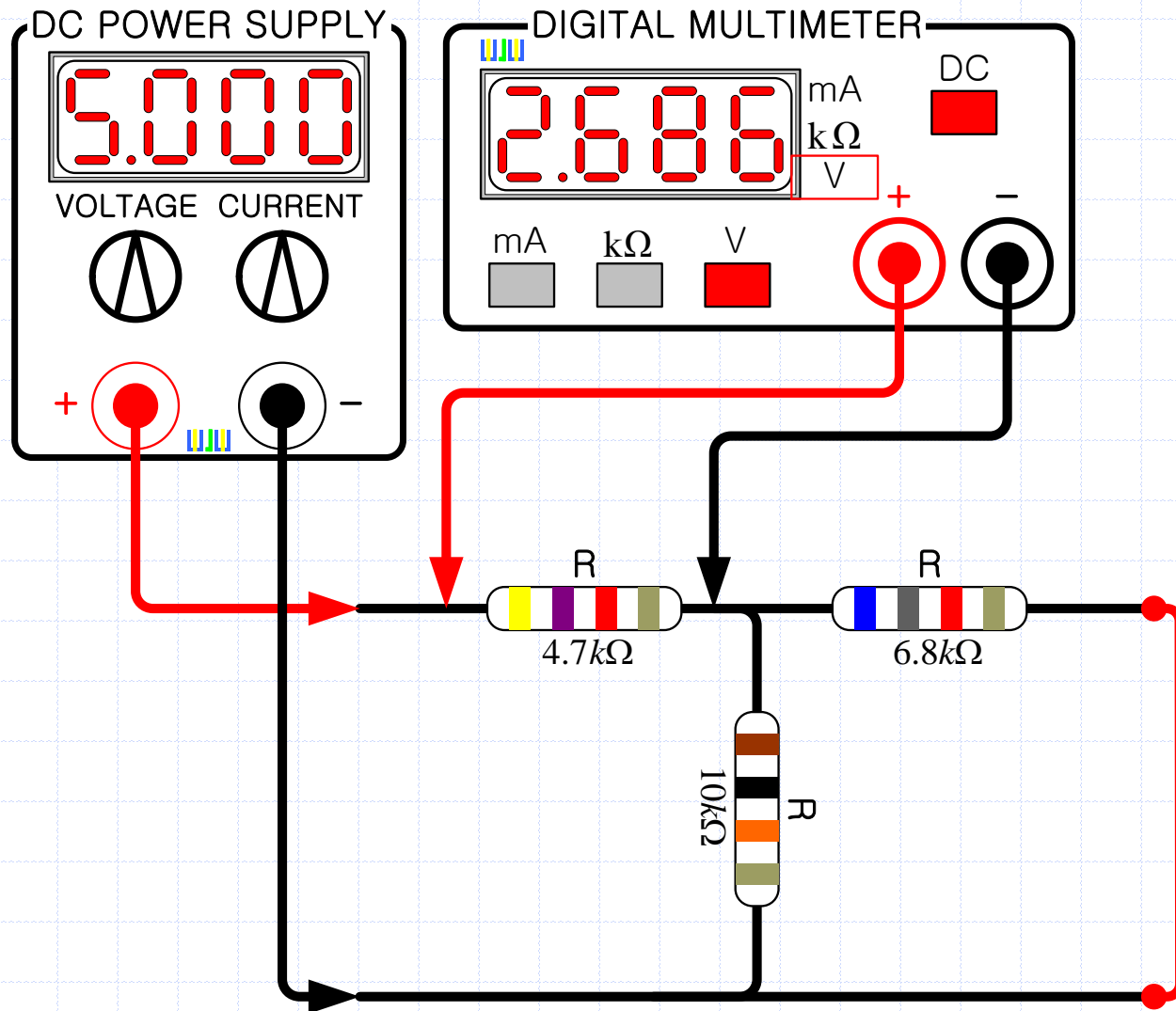
5-5. 각 단의 전압과 전류-전원 Vs1



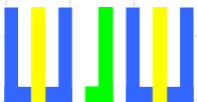
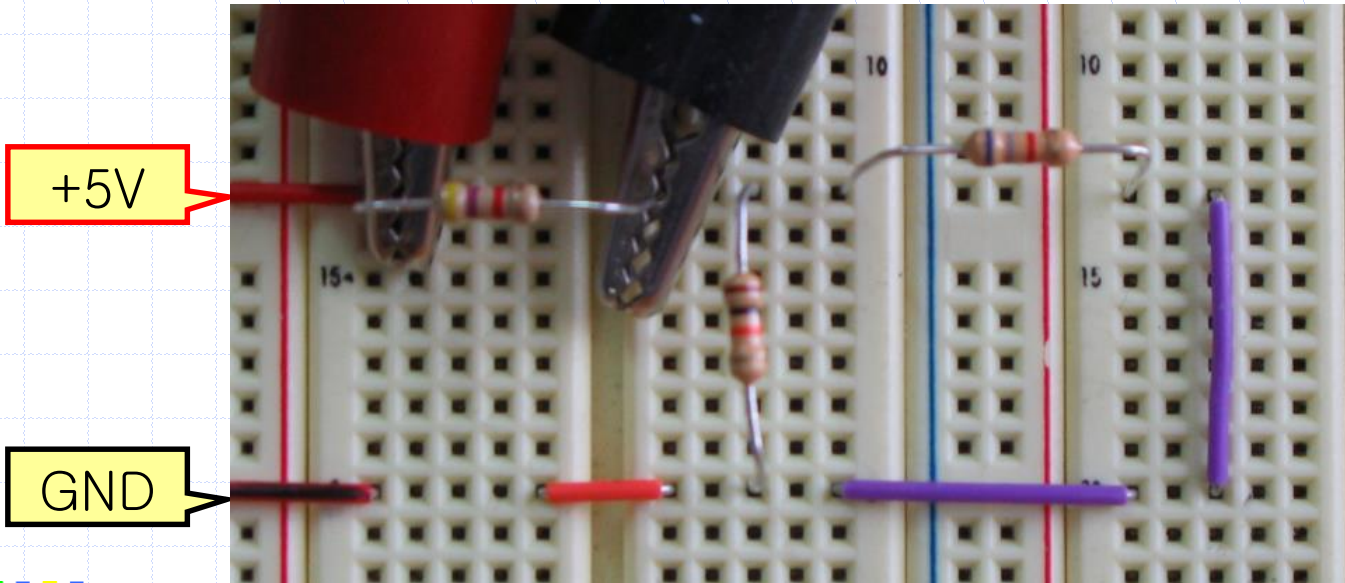
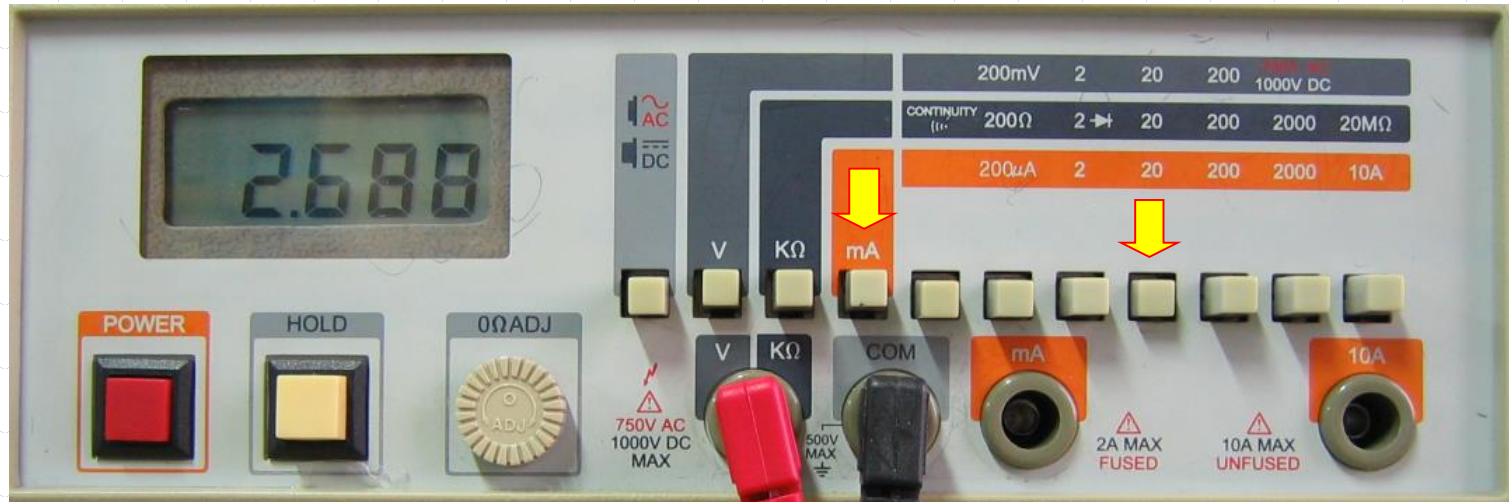
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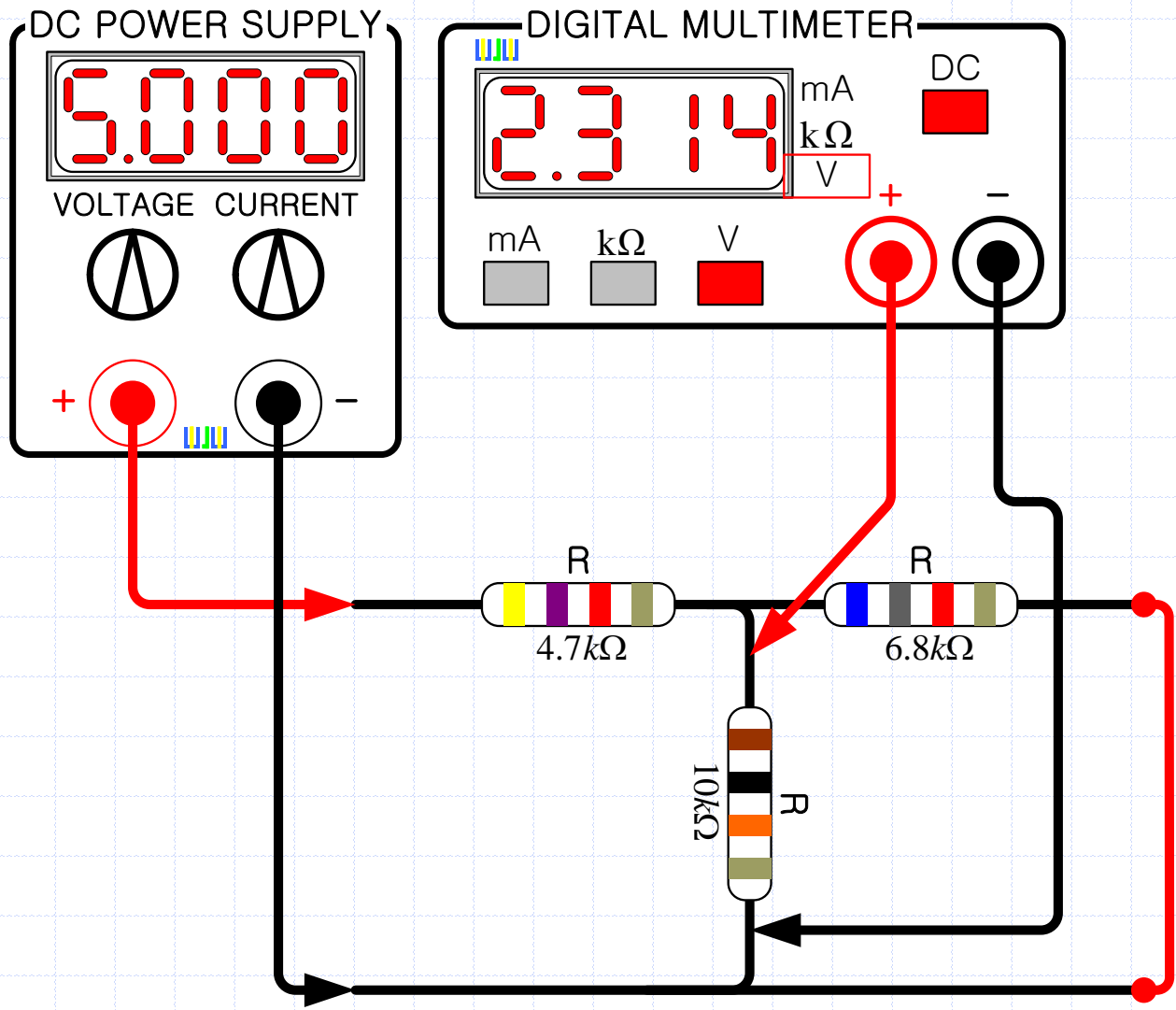
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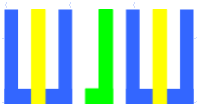
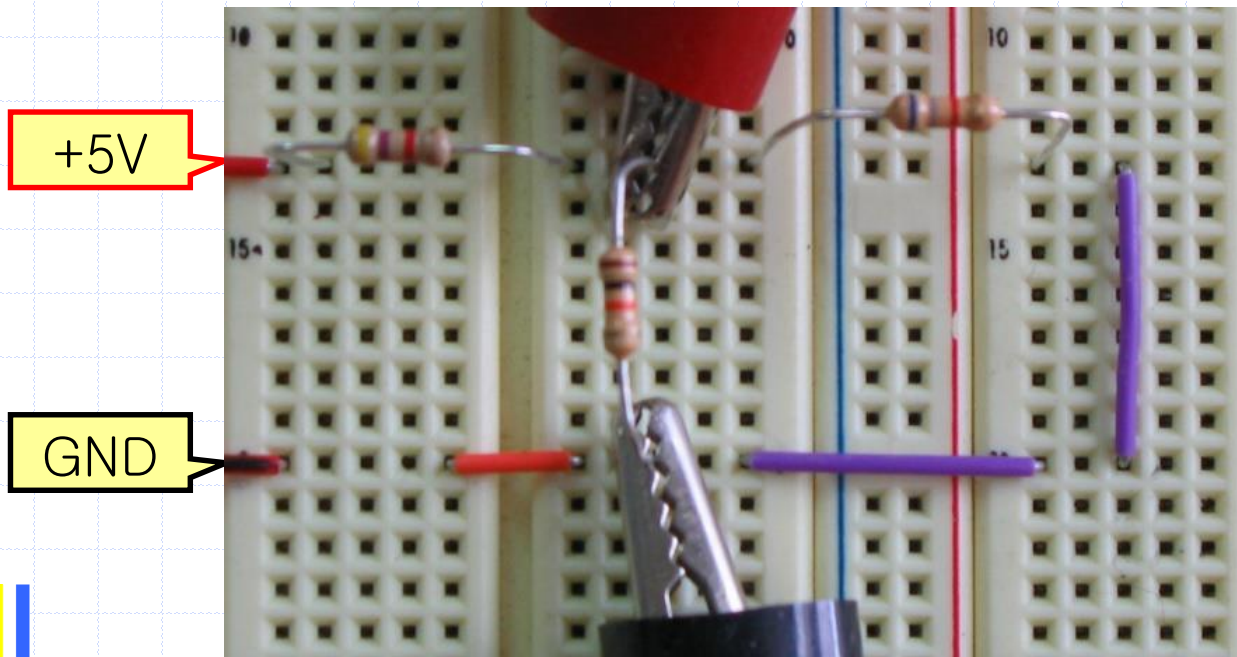
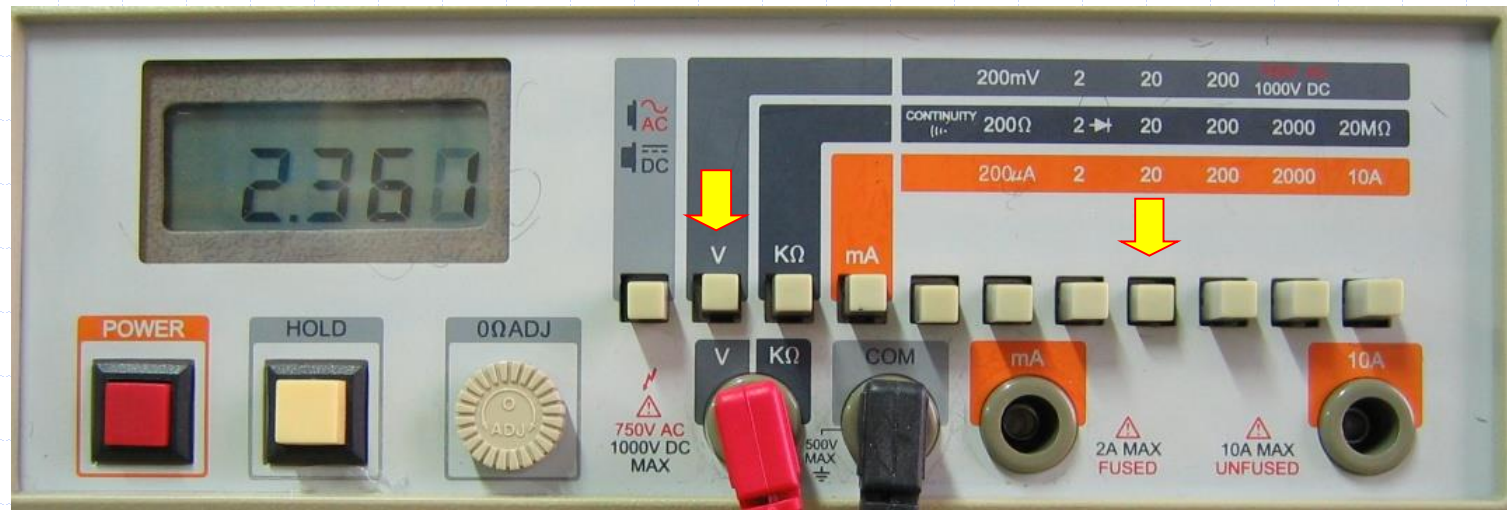
5-5. 각 단의 전압과 전류-전원 Vs1



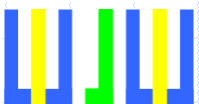
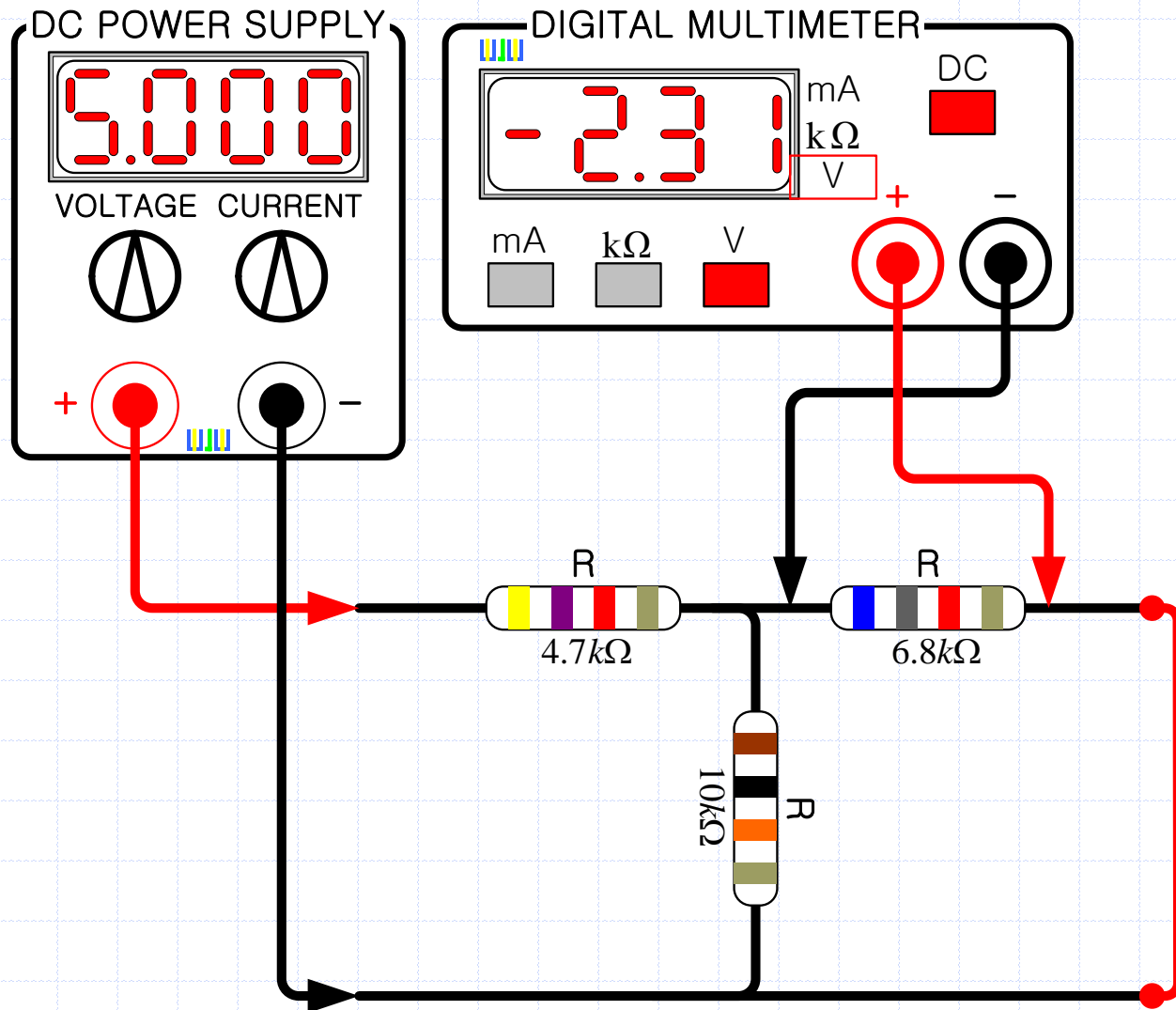
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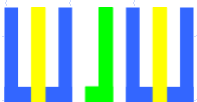
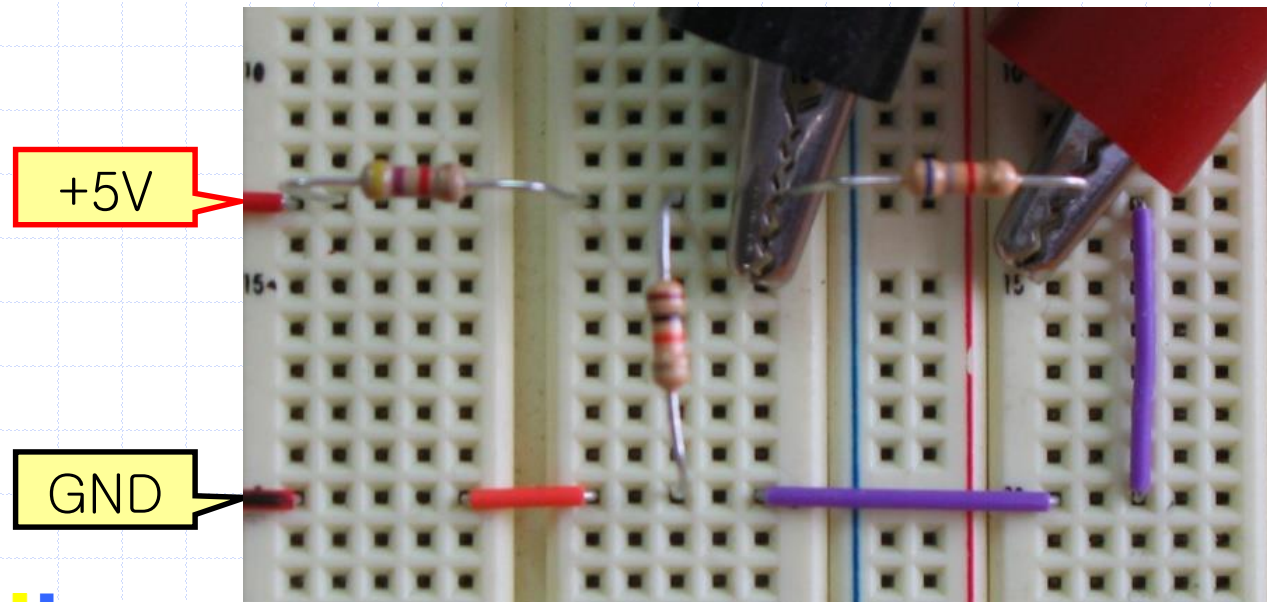
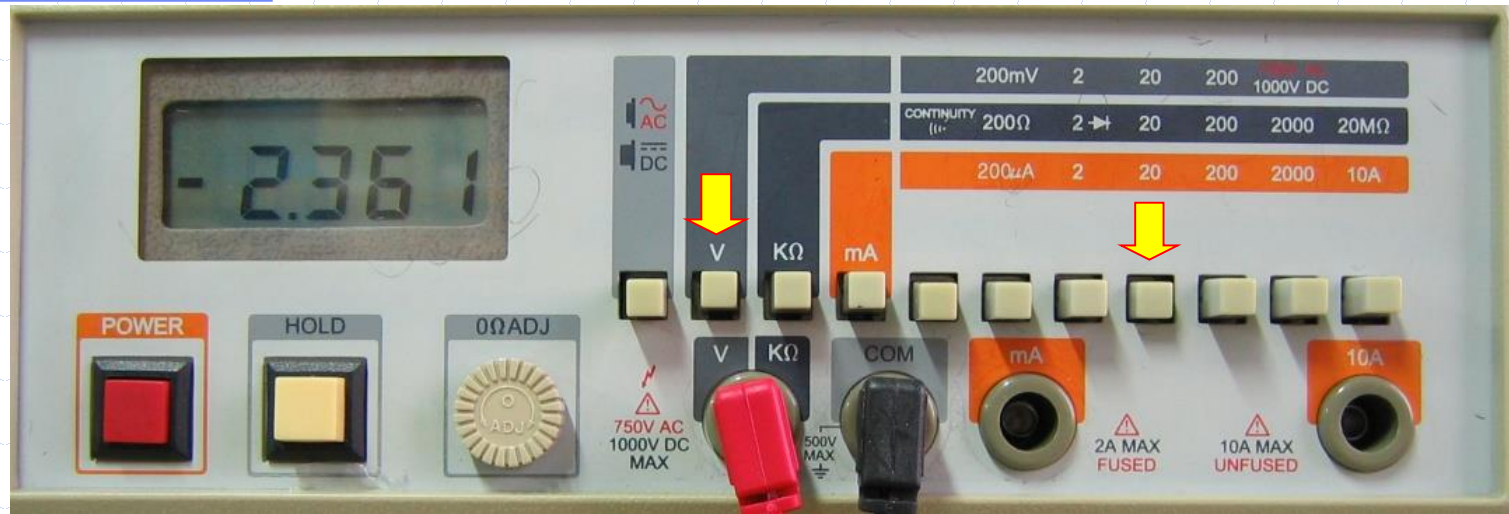
5-5. 각 단의 전압과 전류-전원 Vs1



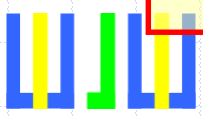
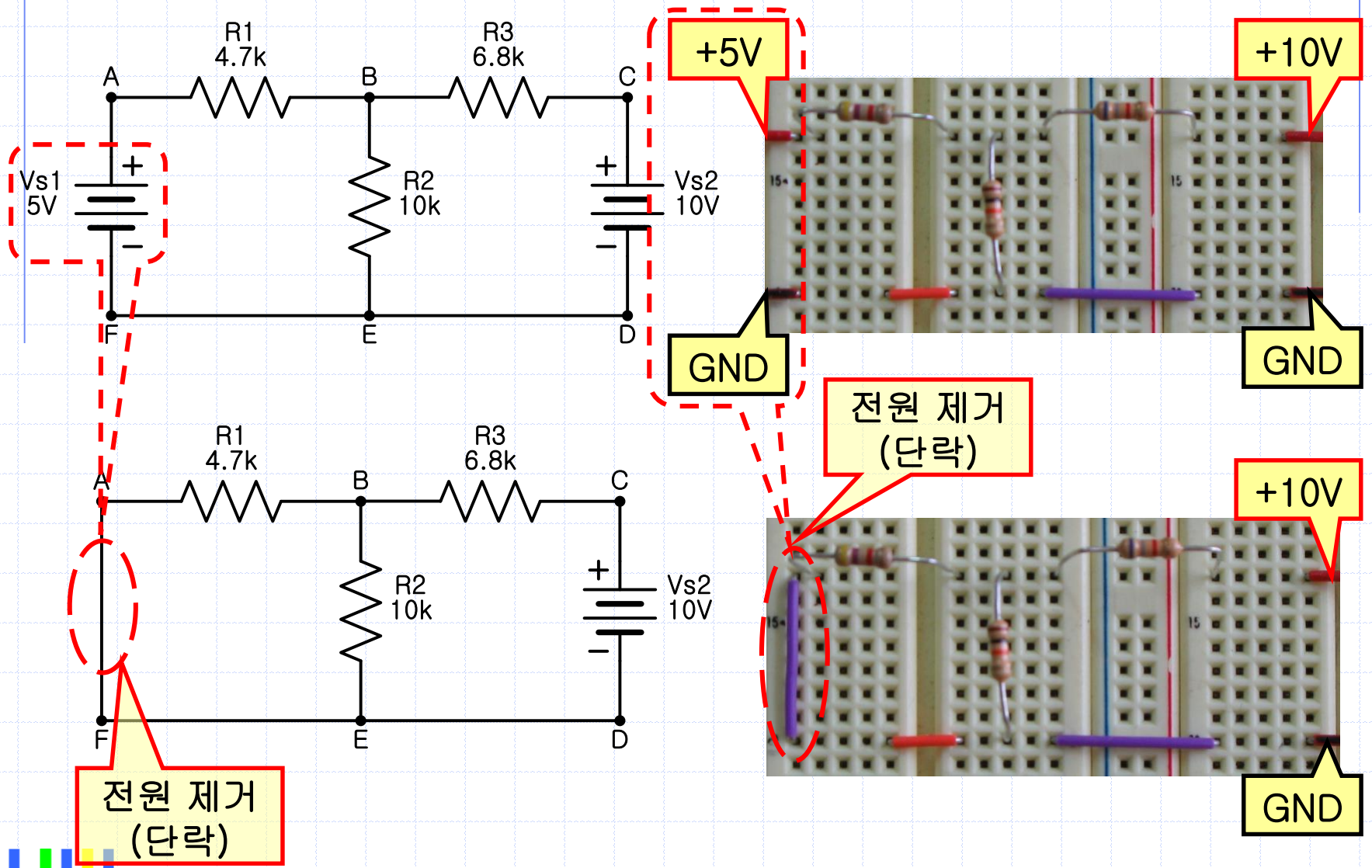
5-5. 각 단의 전압과 전류-전원 Vs1



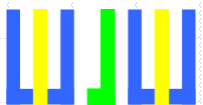
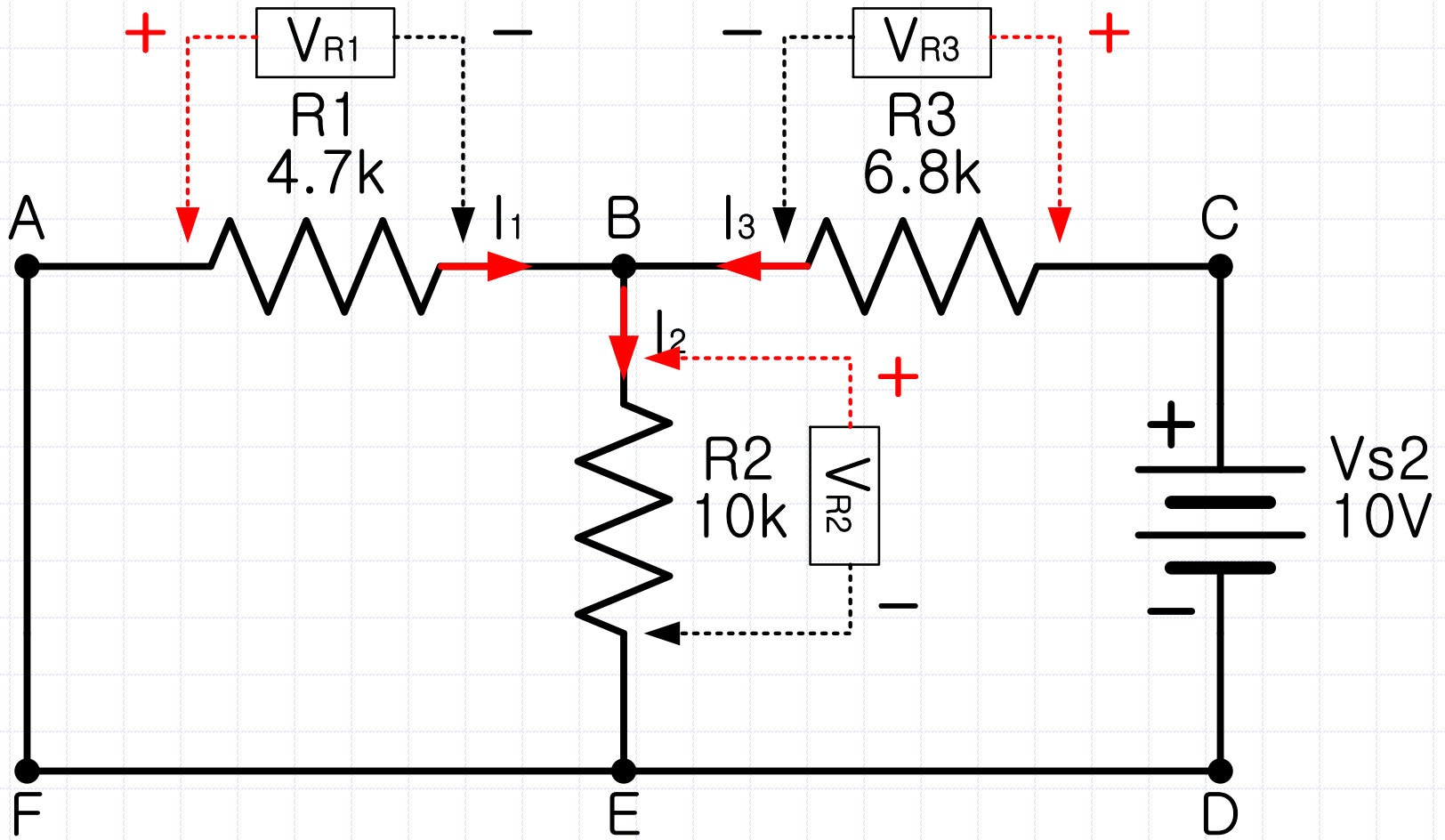
5-5. 각 단의 전압과 전류-전원 Vs1



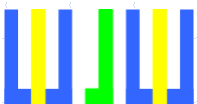
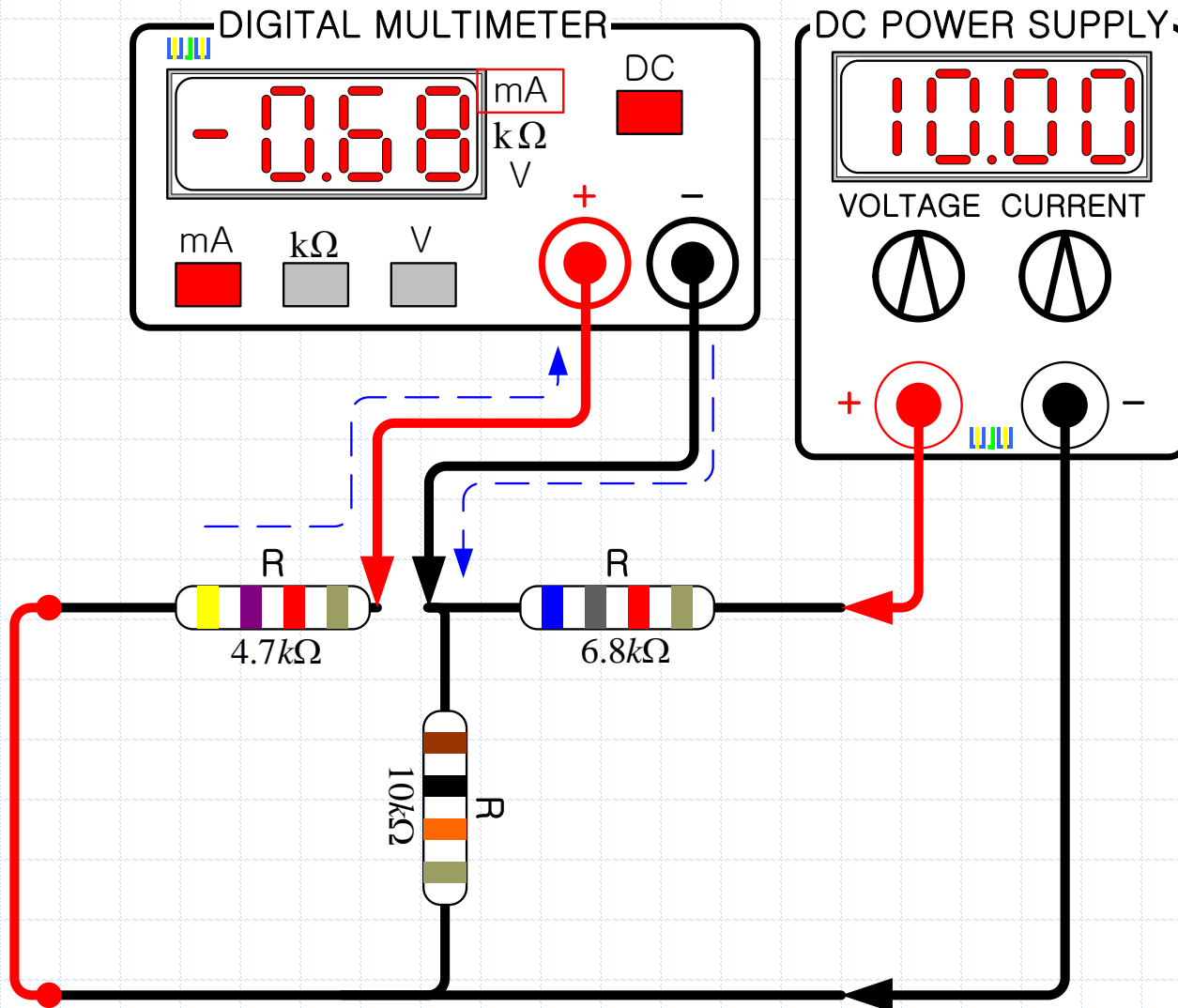
5-6. 각 단의 전압과 전류-전원 Vs2



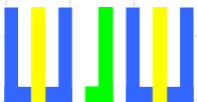
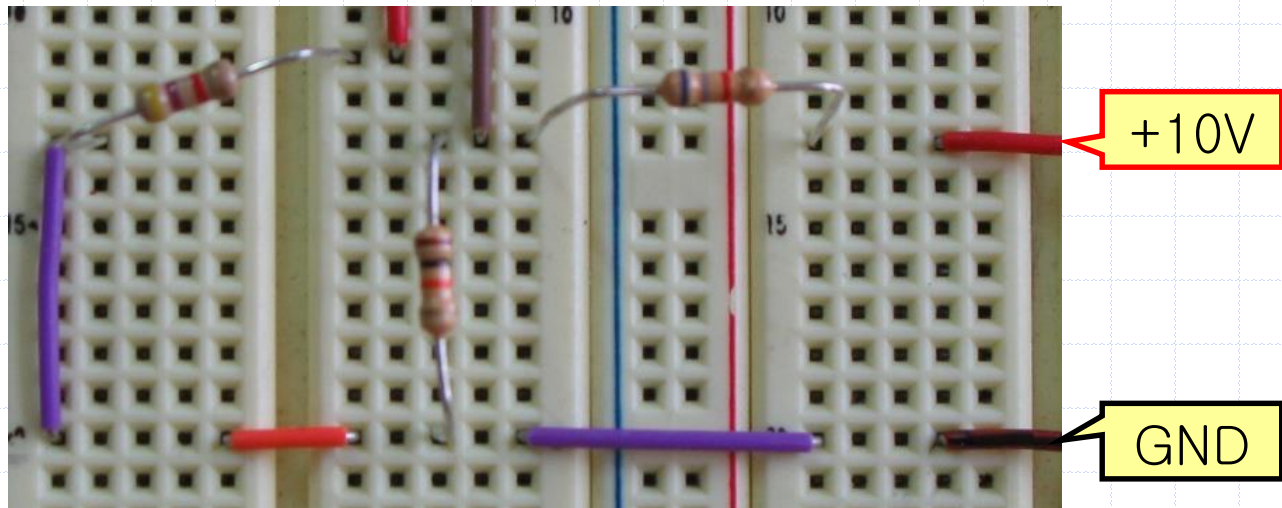
5-6. 각 단의 전압과 전류-전원 V_{s2}



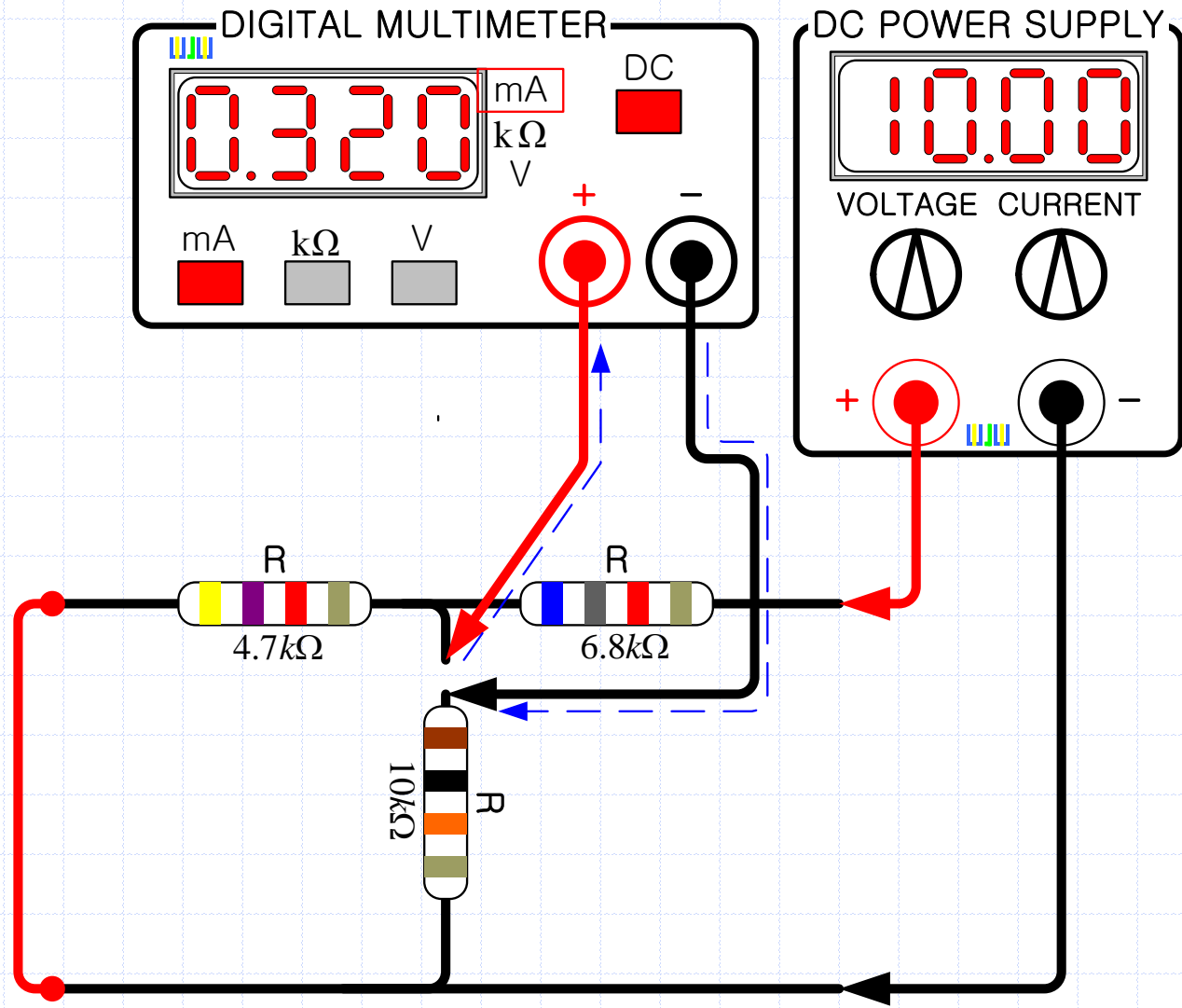
5-6. 각 단의 전압과 전류-전원 V_{s2}



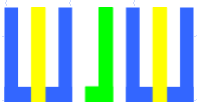
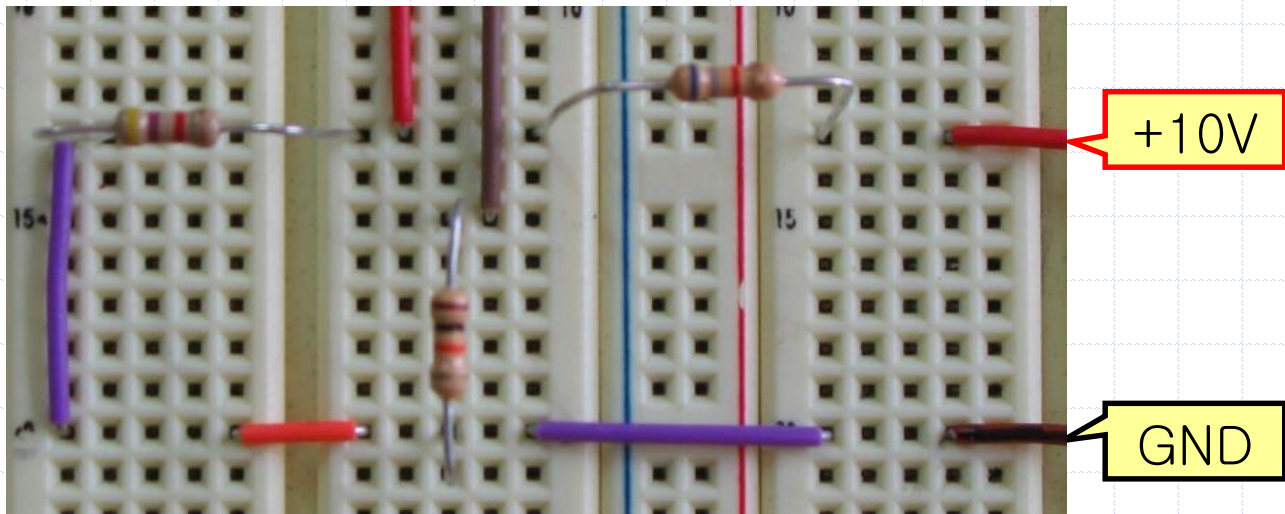
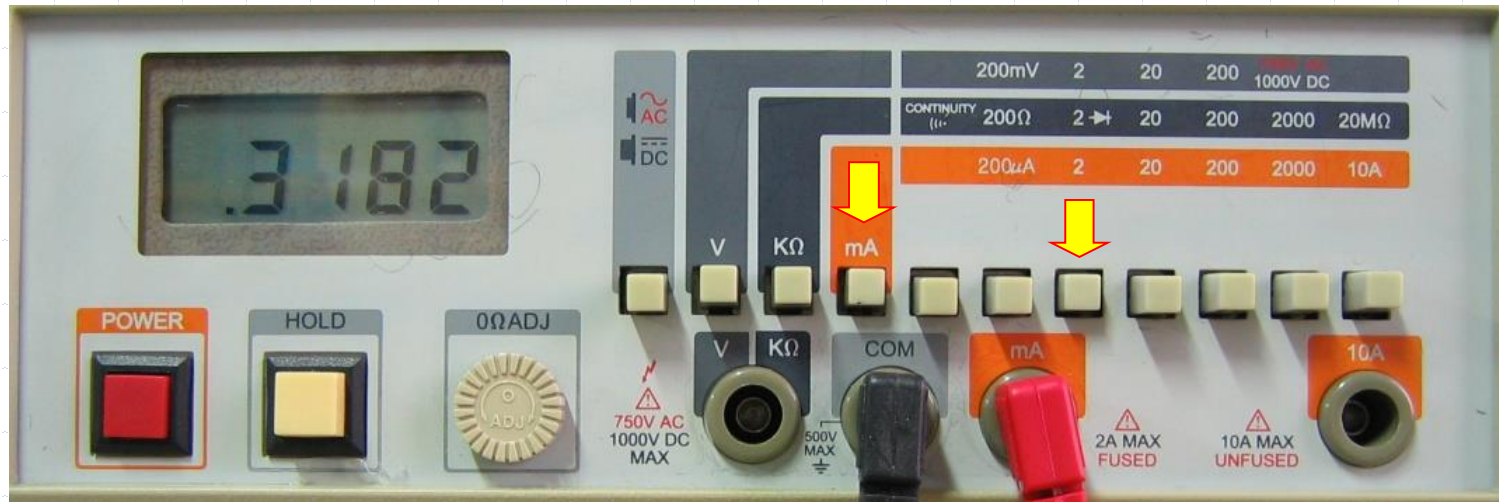
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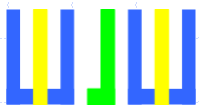
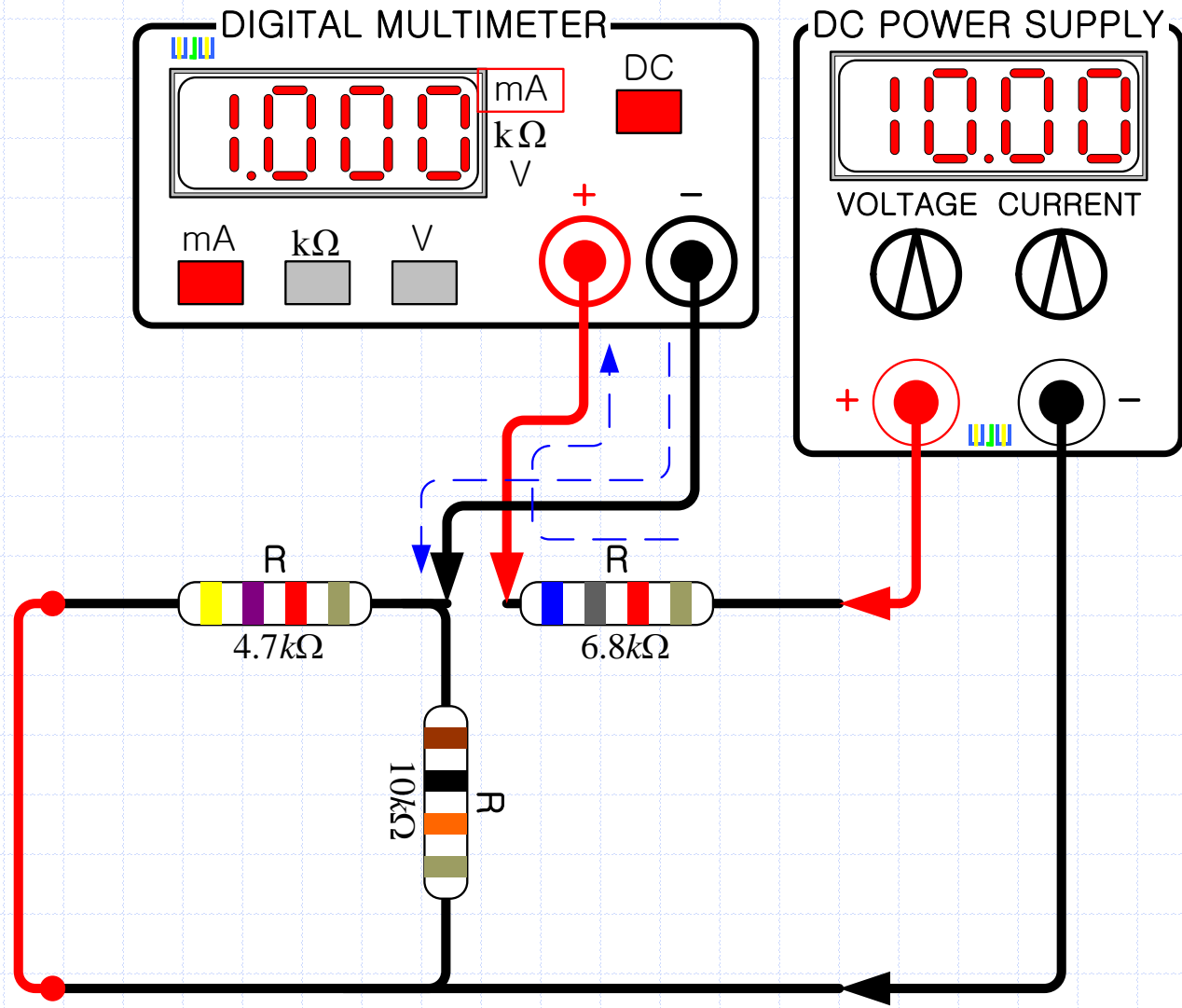
5-6. 각 단의 전압과 전류-전원 V_{s2}



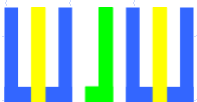
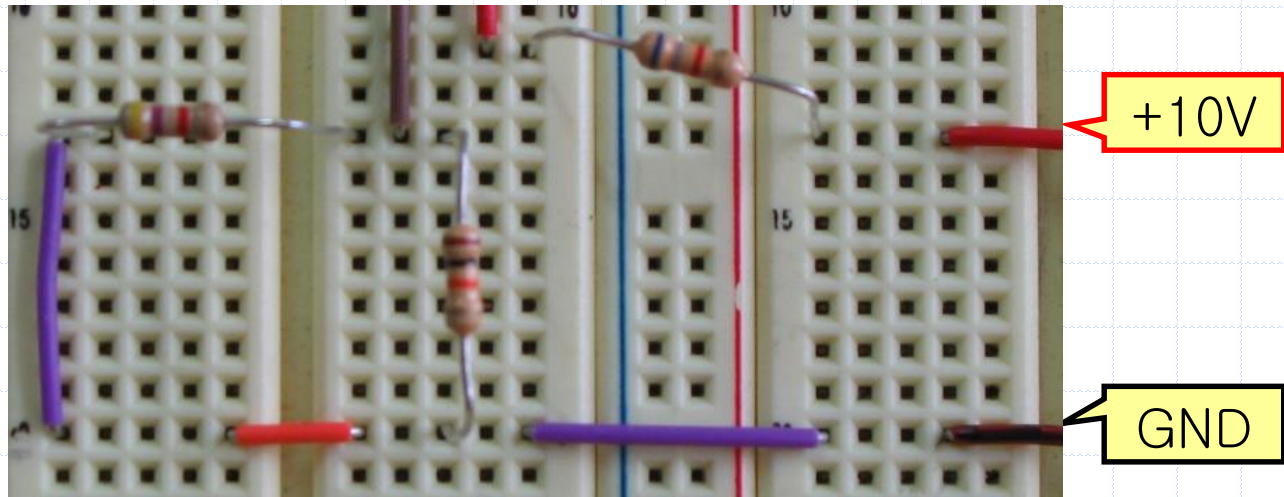
5-6. 각 단의 전압과 전류-전원 Vs2



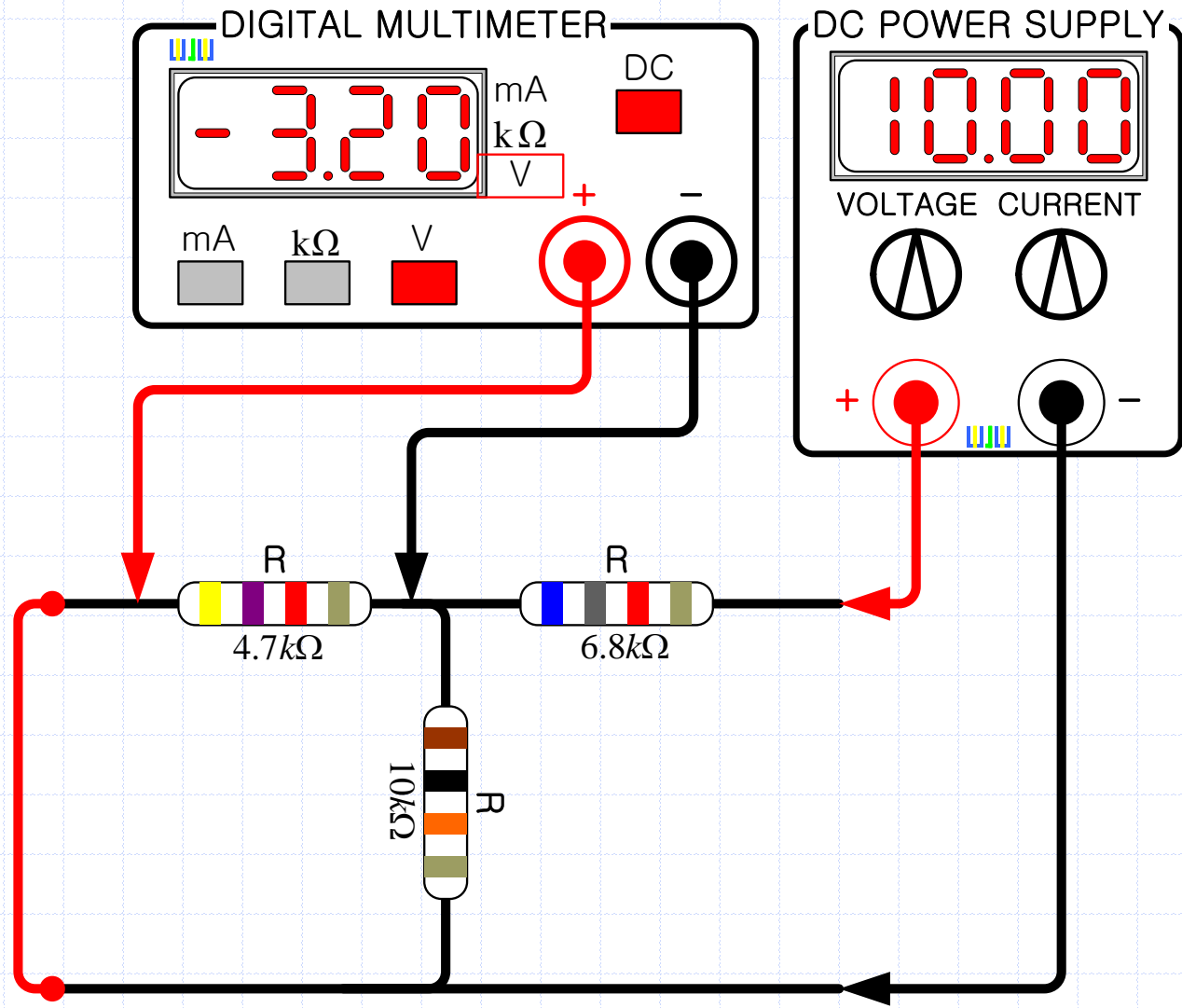
5-6. 각 단의 전압과 전류-전원 V_s2



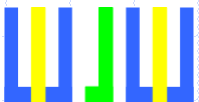
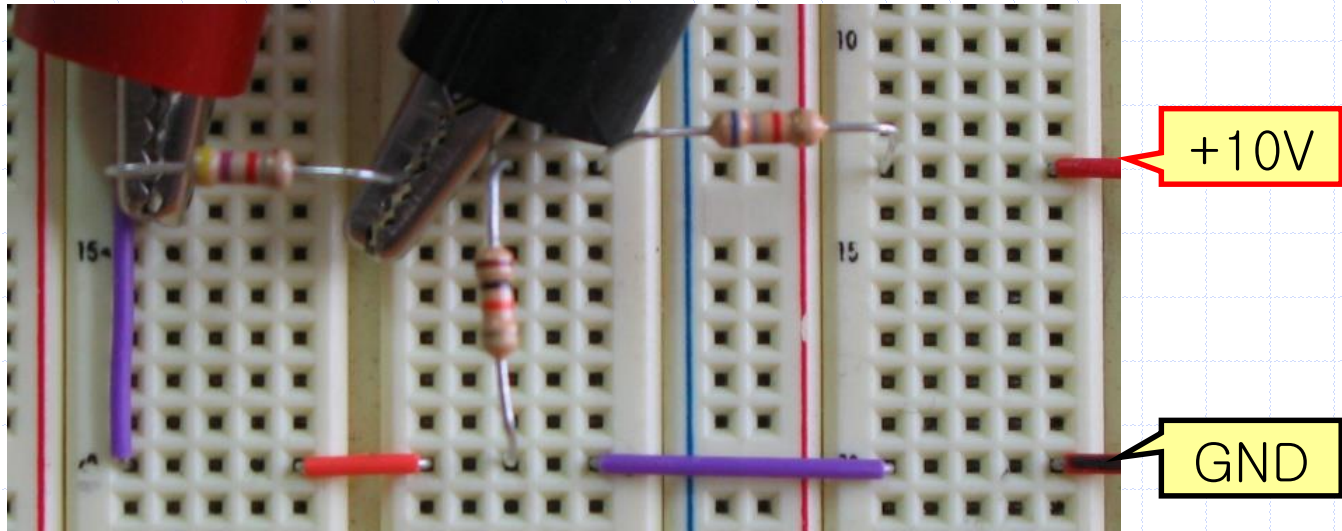
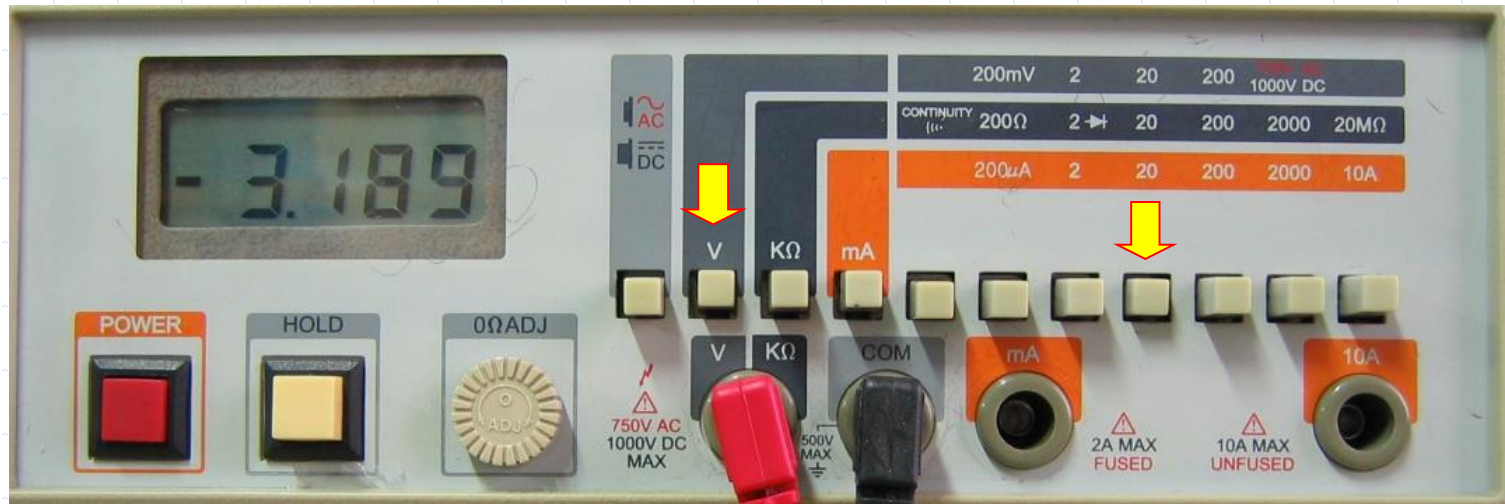
5-6. 각 단의 전압과 전류-전원 Vs2



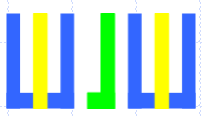
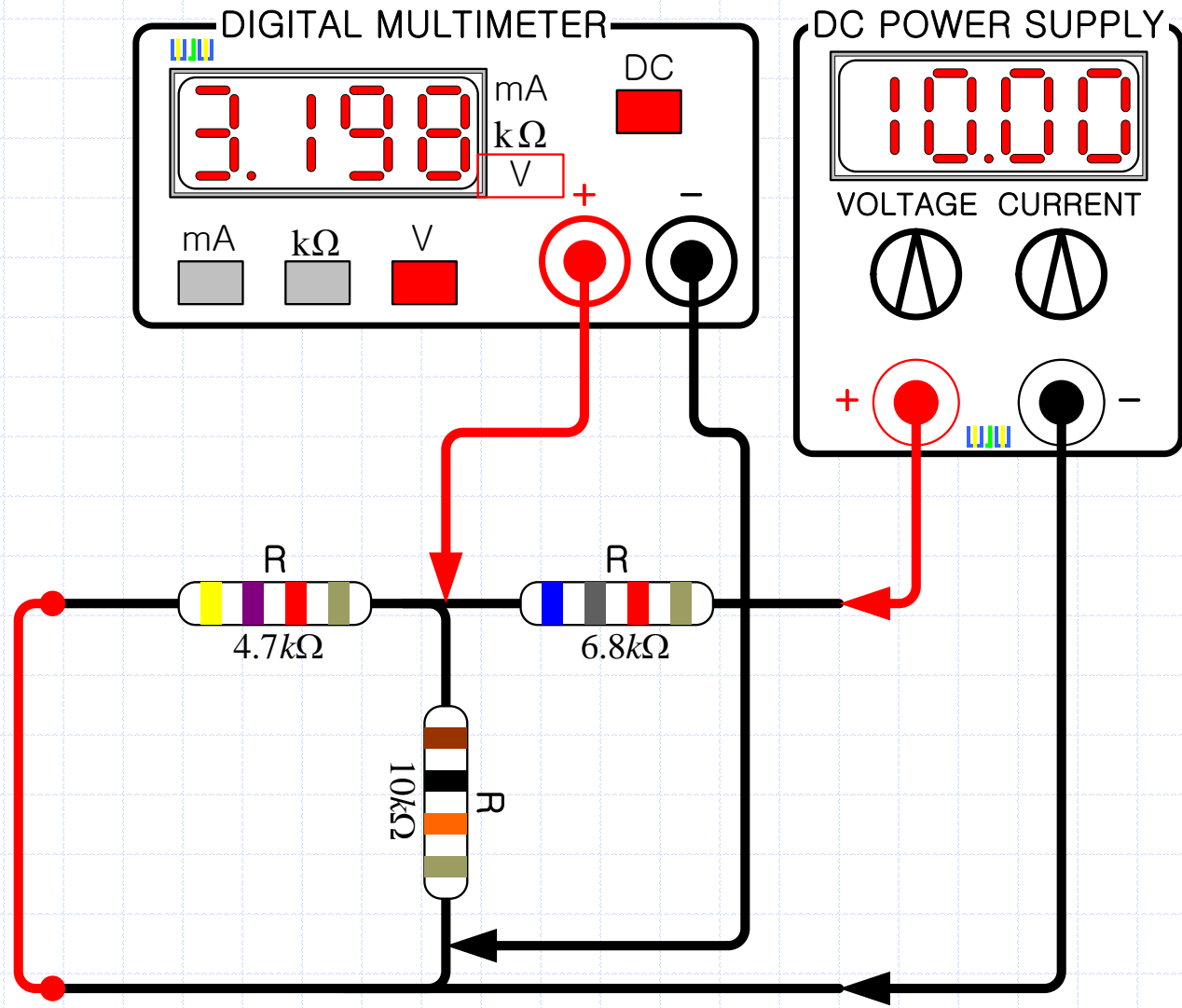
5-6. 각 단의 전압과 전류-전원 V_{s2}



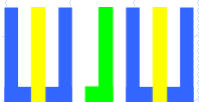
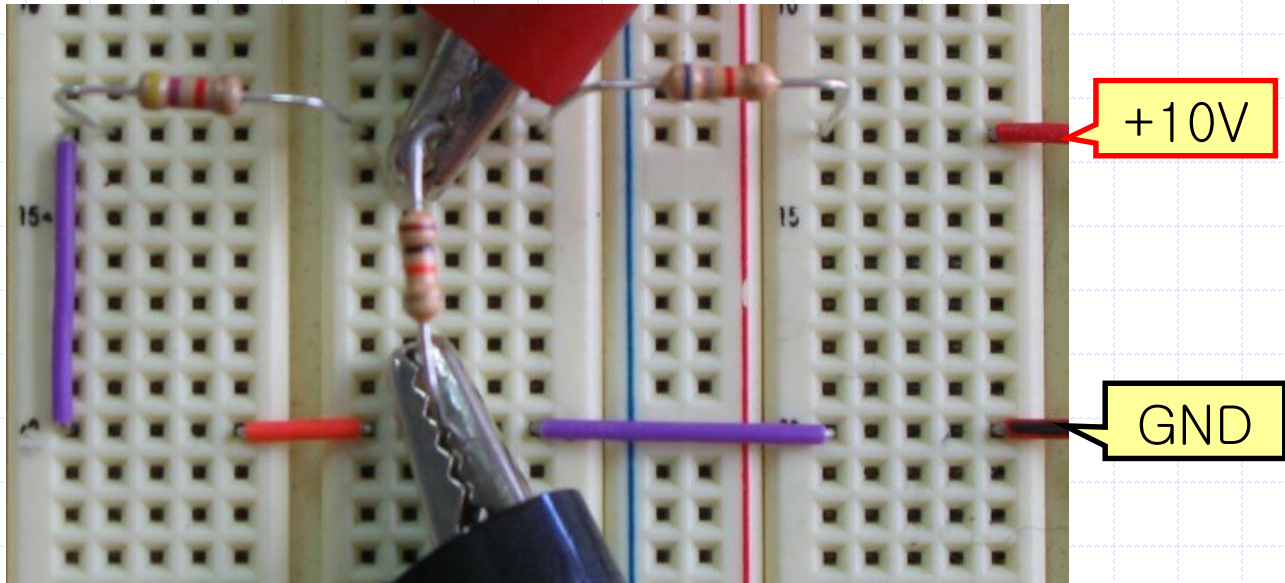
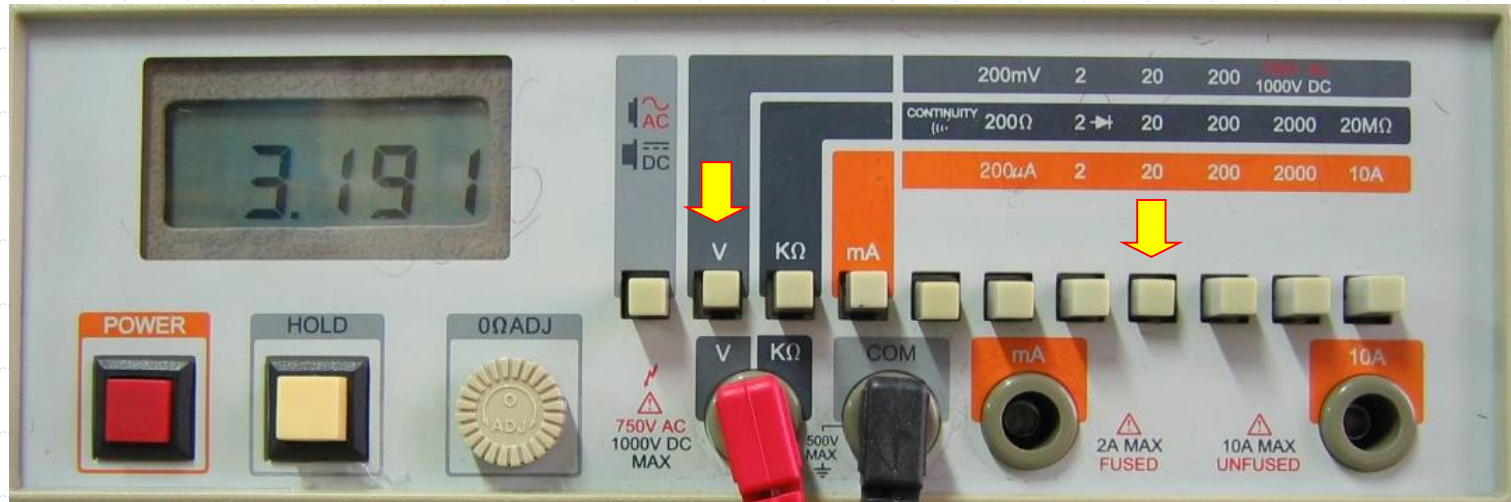
5-6. 각 단의 전압과 전류-전원 Vs2



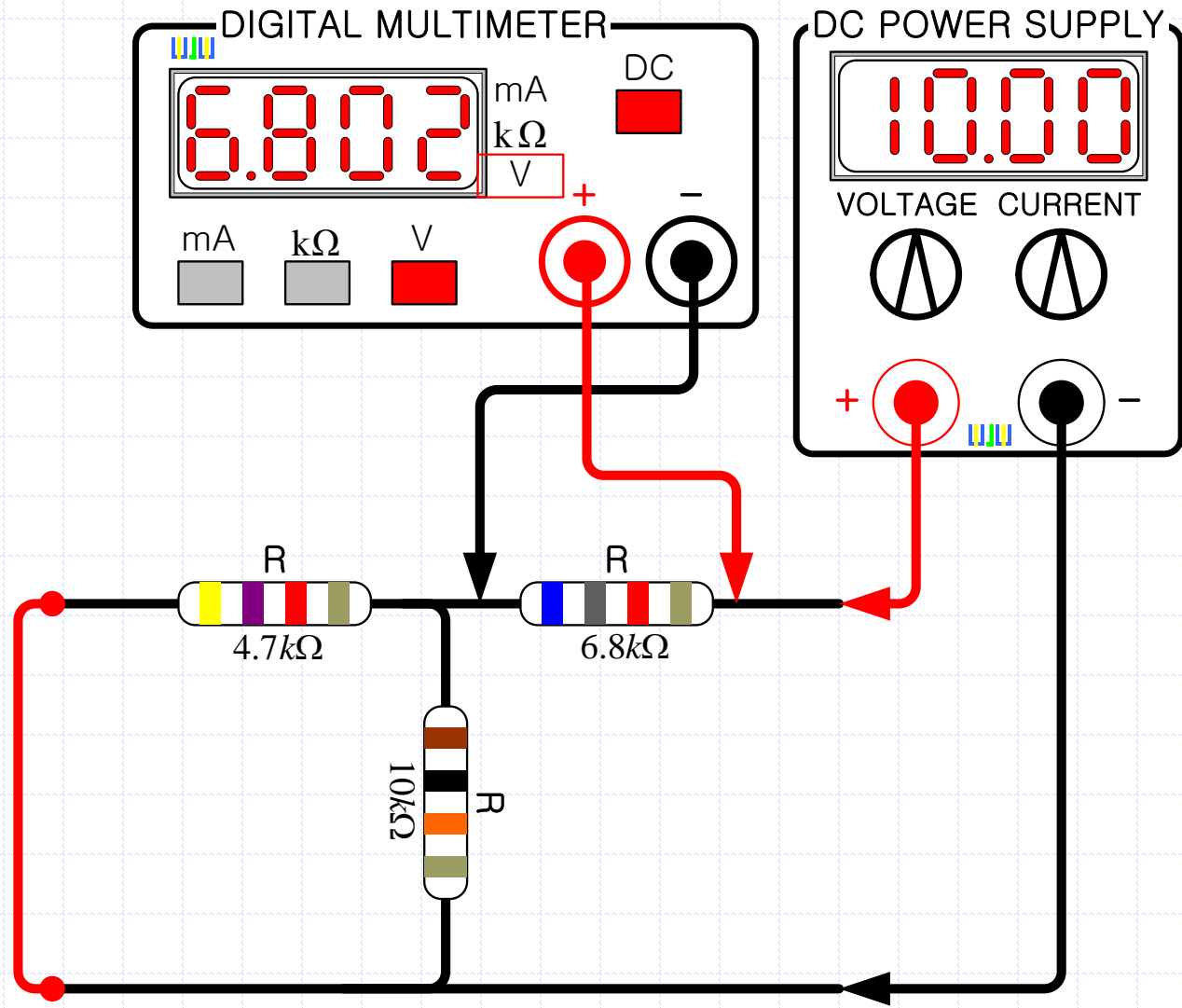
5-6. 각 단의 전압과 전류-전원 V_{s2}



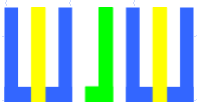
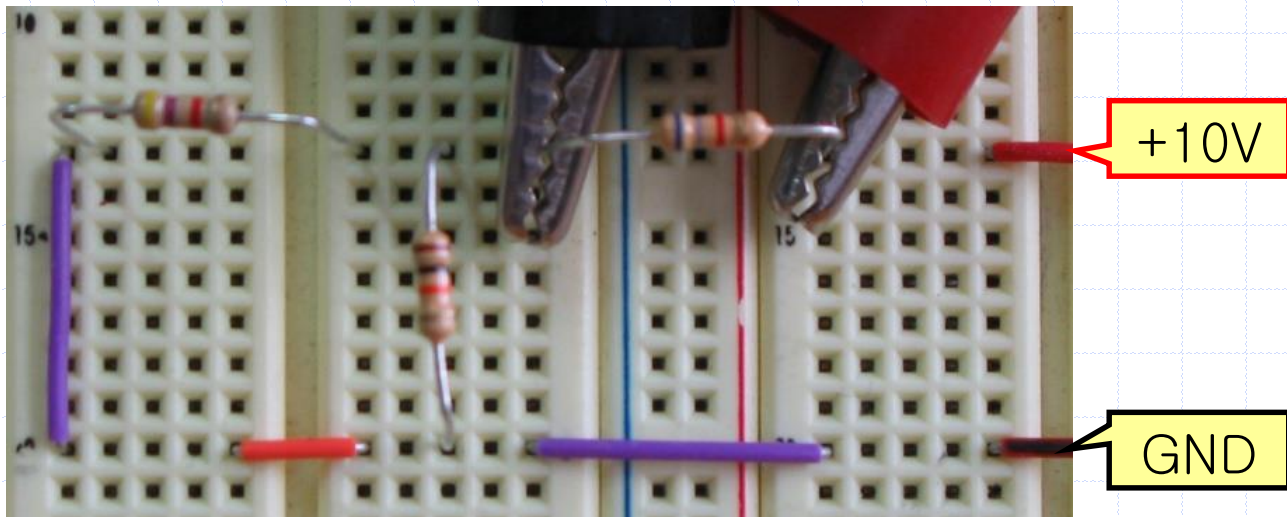
5-6. 각 단의 전압과 전류-전원 Vs2



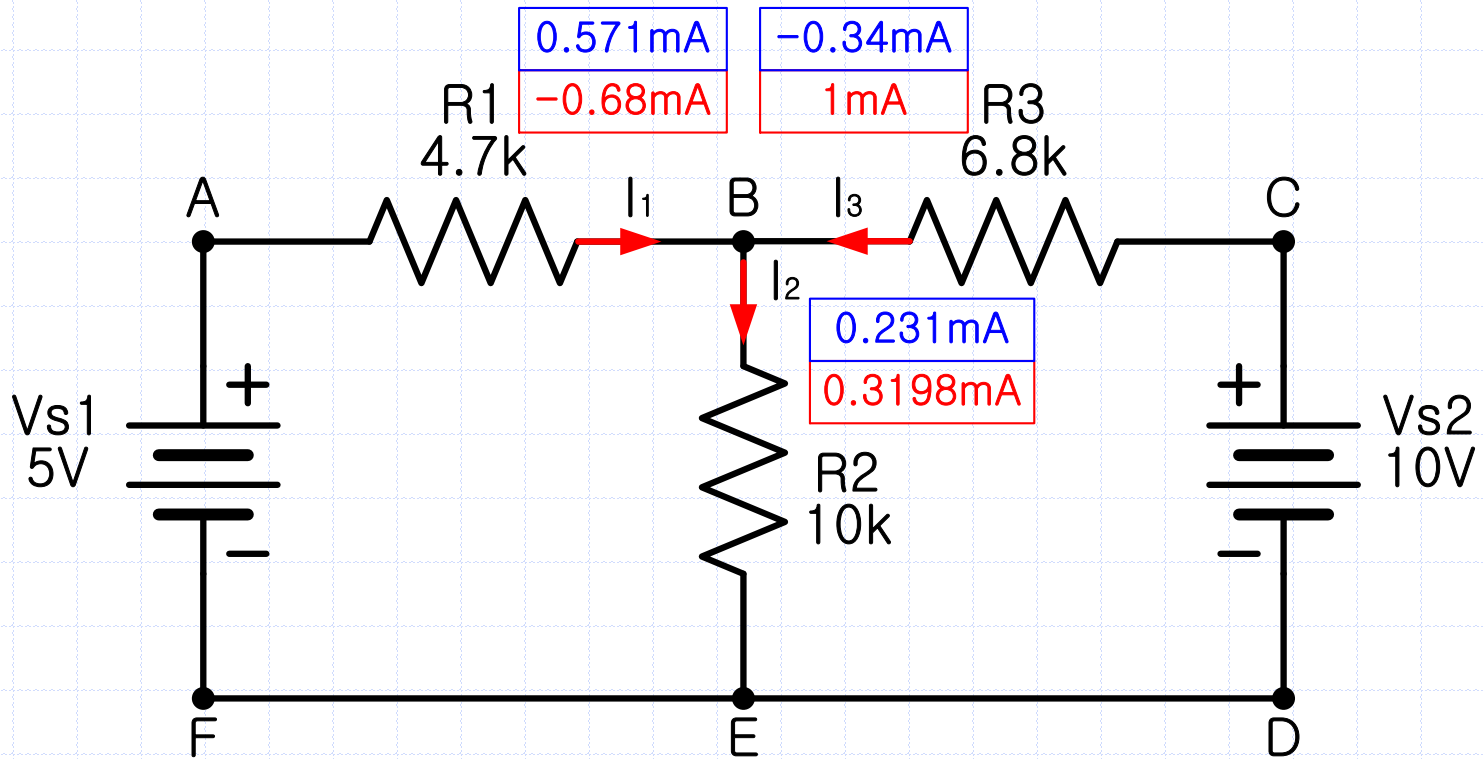
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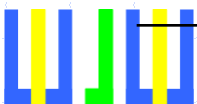
5-6. 각 단의 전압과 전류-전원 Vs2



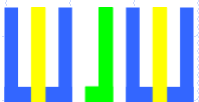
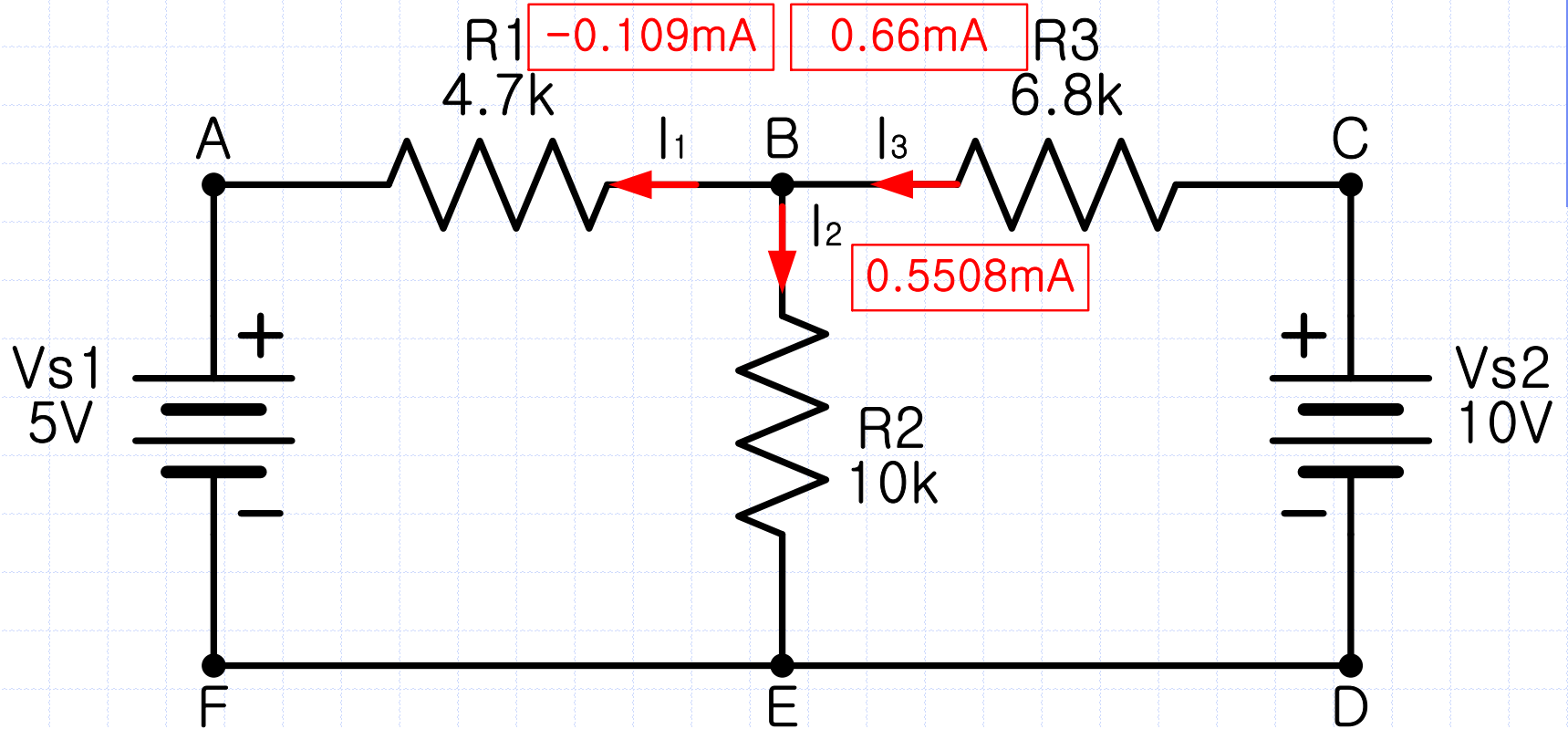
5-7. 각각의 전압과 전류 합치기



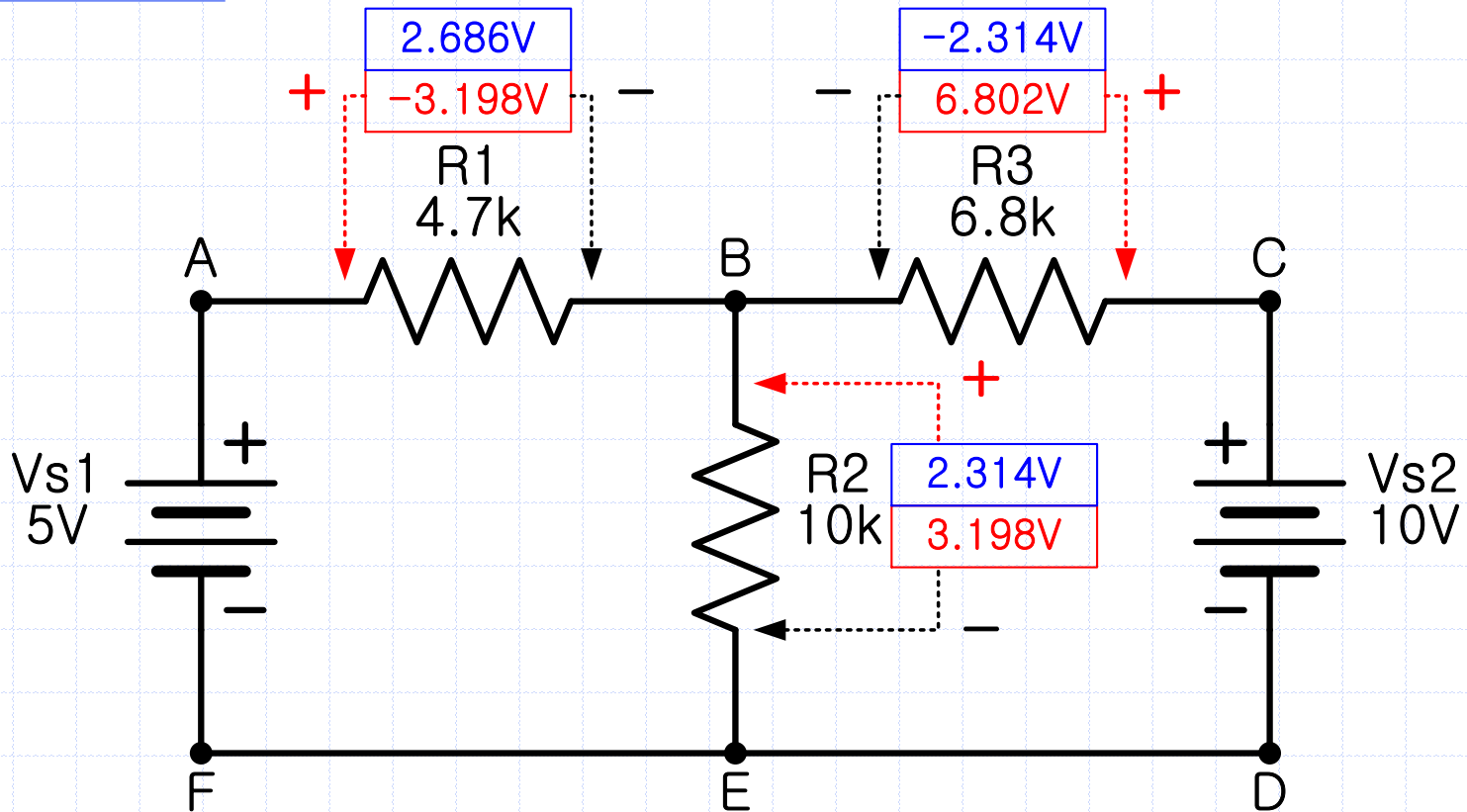
	Vs1 만 고려		Vs2 만 고려		합성결과	
I ₁	0.571 mA	+	-0.68 mA	=	-0.109 mA	기준 방향과 반대 방향
I ₂	0.231 mA	+	0.3198 mA	=	0.5508 mA	
I ₃	-0.34 mA	+	1 mA	=	0.66 mA	



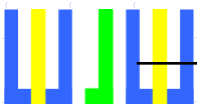
5-7. 각각의 전압과 전류 합치기



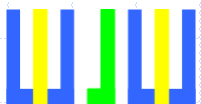
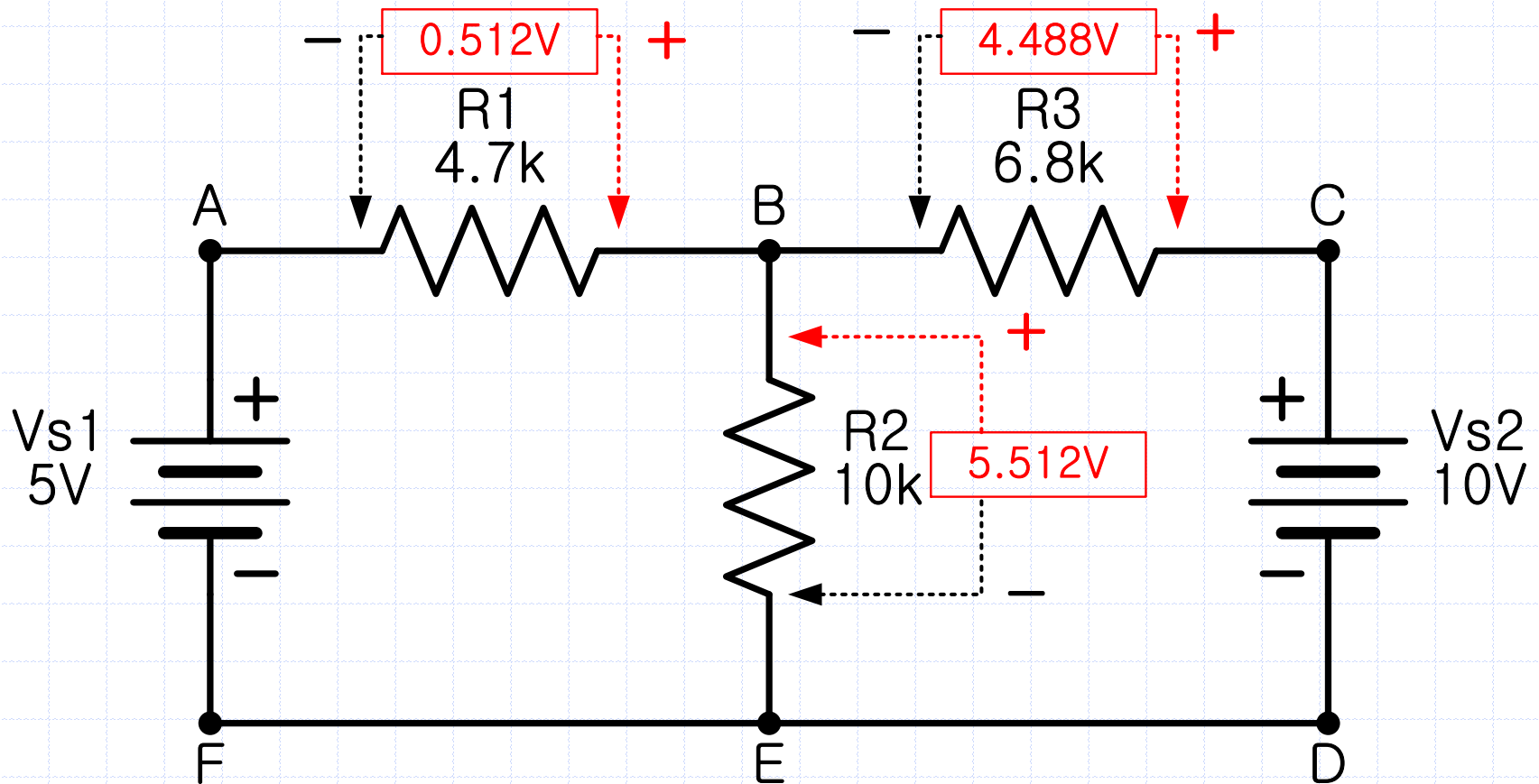
5-7. 각각의 전압과 전류 합치기



	Vs1 만 고려		Vs2 만 고려		합성결과	
VR1	2.686 V	+	-3.198 V	=	-0.512 V	기준 방향과 반대 방향
VR2	2.314 V	+	3.198 V	=	5.512 V	
VR3	-2.314 V	+	6.802 V	=	4.488 V	



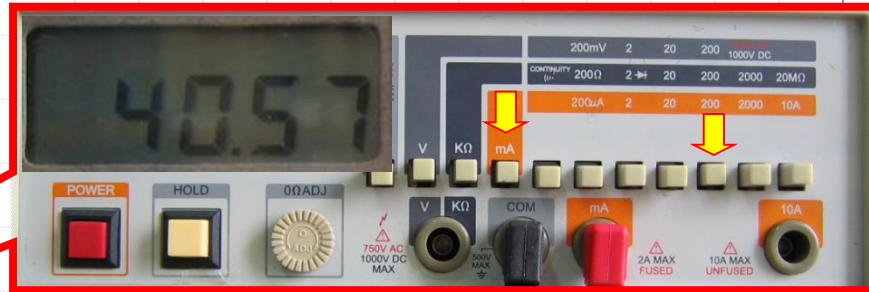
5-7. 각각의 전압과 전류 합치기



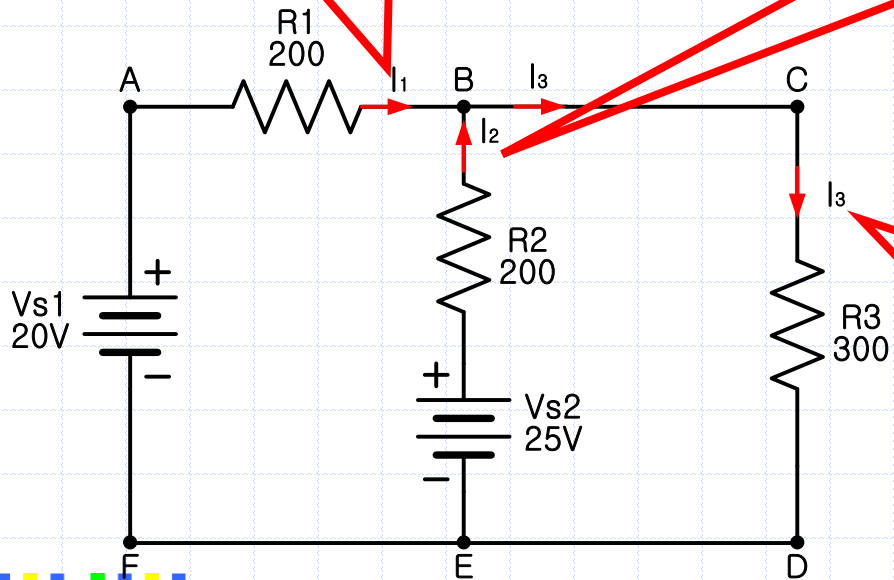
5-8. 중첩의 원리 예제



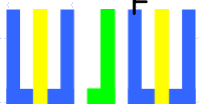
I₁



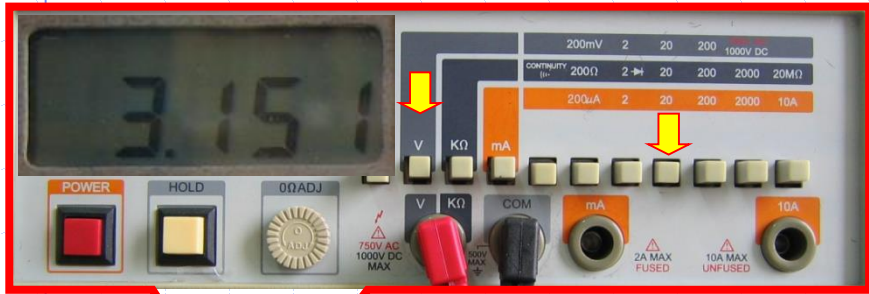
I₂



I₃



5-8. 중첩의 원리 예제



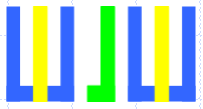
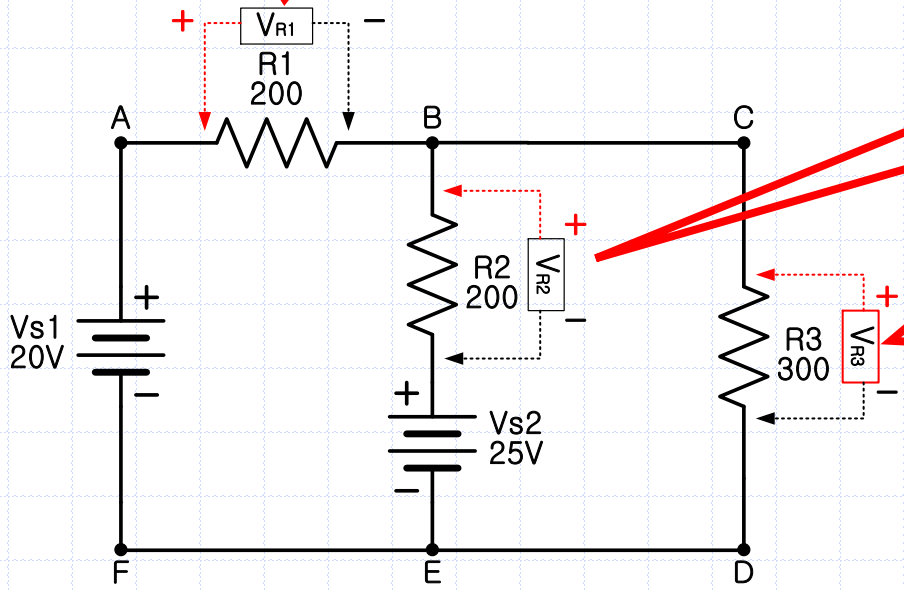
V_{R1}



V_{R2}



V_{R3}



5-8. 중첩의 원리 예제

