ECE 215 Spring 2025

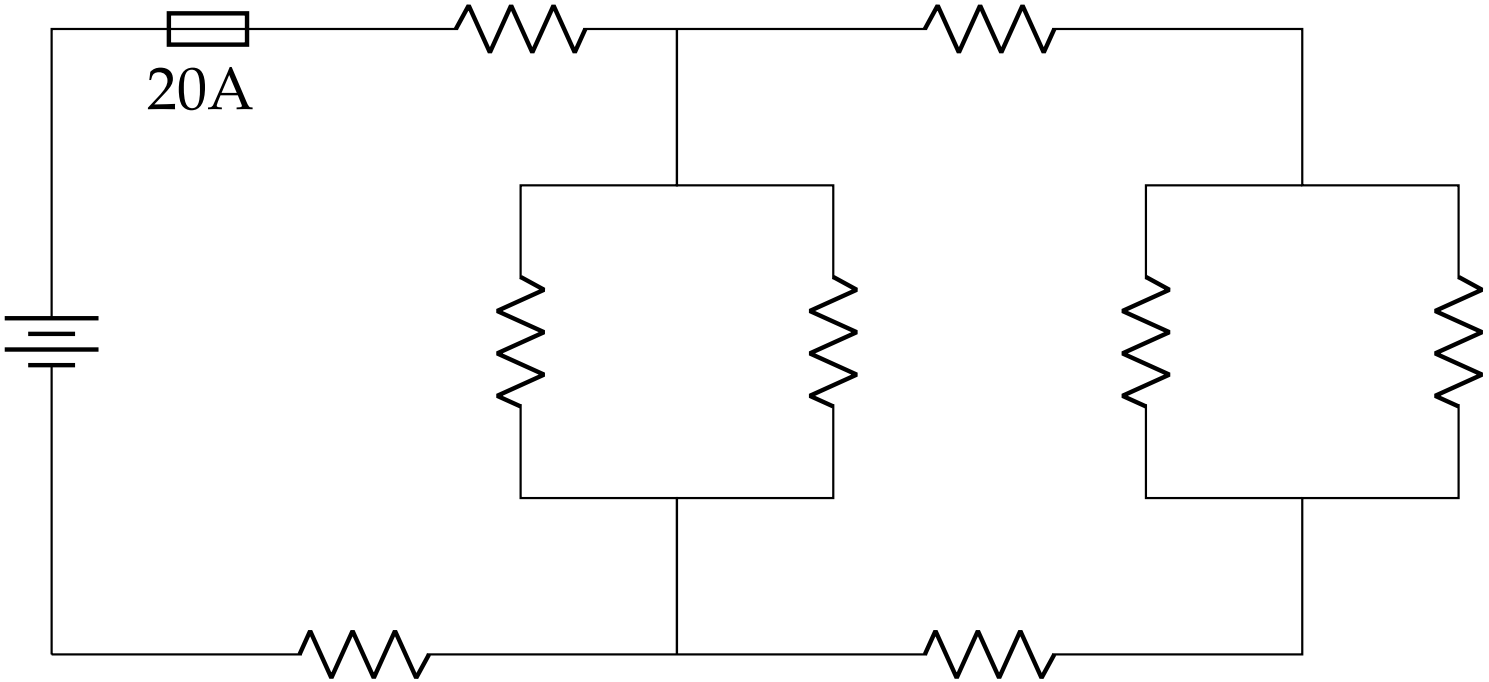
Objective 1.2: Circuit Protection

UNITED STATES AIR FORCE ACADEMY

Objective 1.2

I can determine appropriate circuit breaker values for adequate system protection.

Don't let the smoke out!



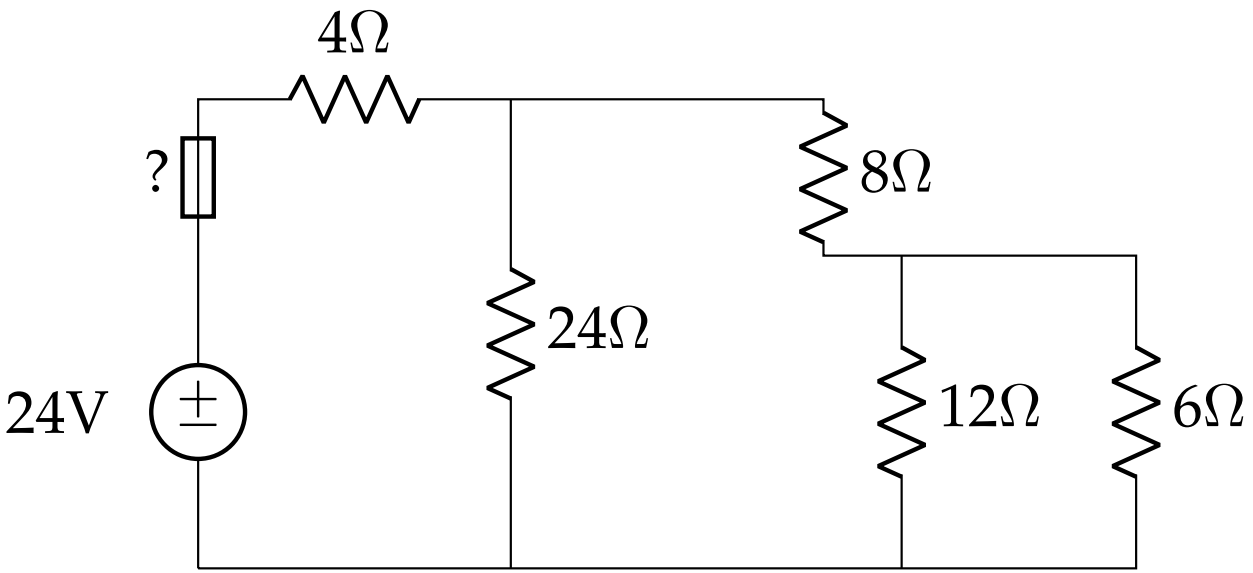
Considerations:

- Are the components protected from failures?
- Are the load voltages/currents within operational limits?
- → We need to analyze the circuit!

Method

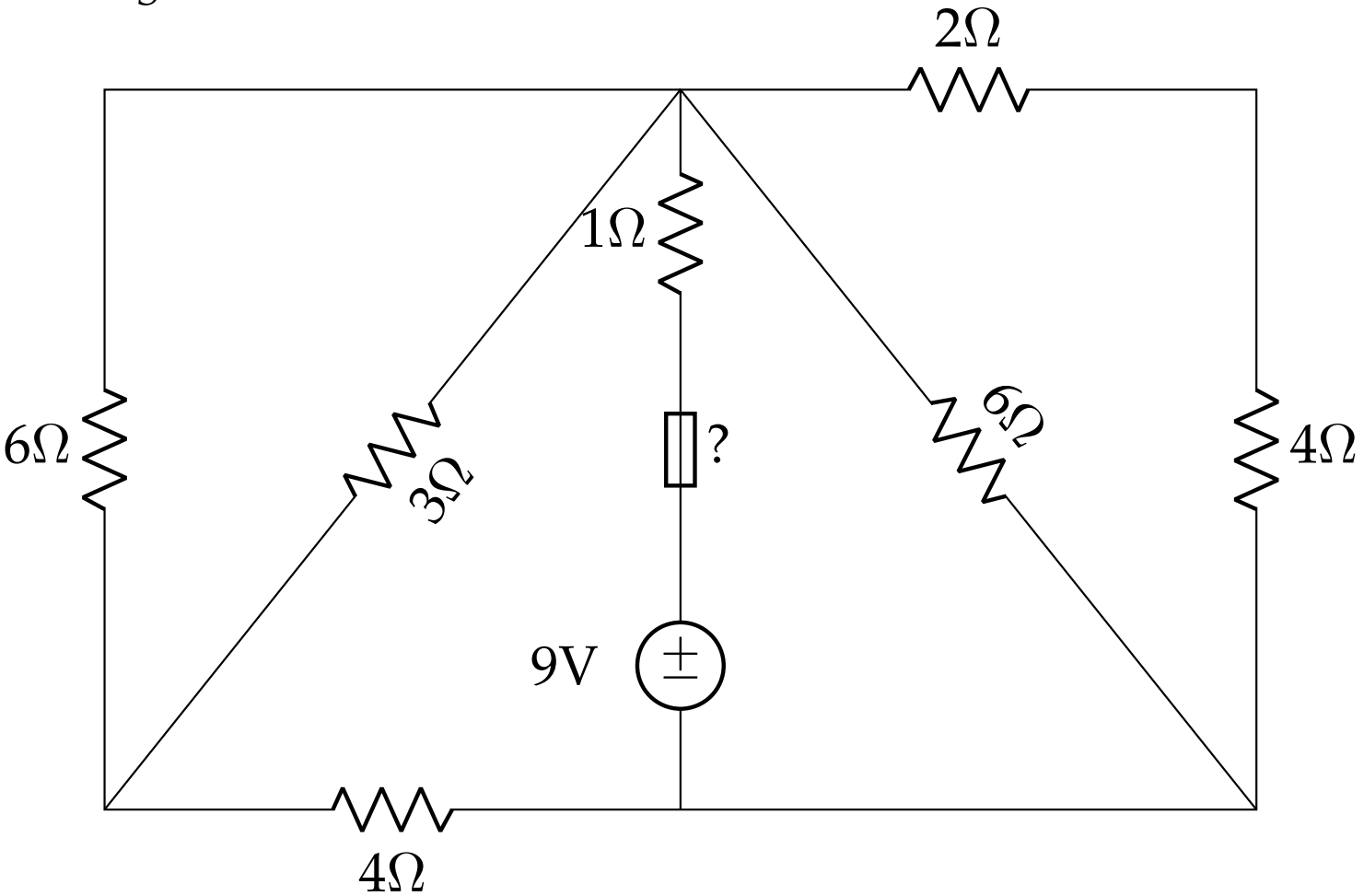
- Label nodes
- Combine resistors working towards source
- Find source current
- Choose appropriate circuit protection
  - Select circuit protection rated for current between 10% and 50% higher than source current

Example - Find I_s and Select Fuse



Rating
2A
2.5A
3A
3.5A
4A

Find I_S and Select Fuse???



Method

1. Replace fuse with a short circuit (wire), label nodes
2. Start with source, label nodes on either side, and at minor nodes (2 components) draw downward
3. At major node (more than 2 components), draw horizontal line & hang components off these. Cross off components as you've redrawn them.
4. Analyze as before!