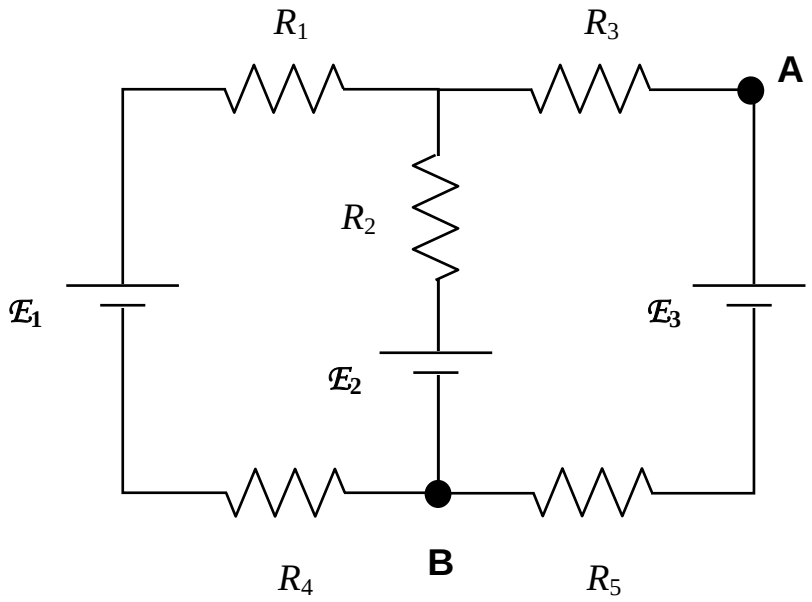
Discussion Question 6B
P212, Week 6
Kirchhoff's Law Analysis of a Resistor Network

So we now have two methods for analyzing resistor networks. Which one should we use?
(i) It depends on the particular problem, and (ii) often a *mixture* of methods is the best.

In general, method 1 (successive combination of elements) is easier, but method 2 (Kirchhoff's Laws) is more powerful ... and some circuits simply *cannot* be analyzed with method 1 alone.

The circuit shown at right is a typical example: here we have *three* batteries and they prevent us from "collapsing" *any* of the resistors in groups, as none of them are in simple series or parallel combinations.
Our only chance is to use Kirchhoff's Laws!



Let all the resistors R_i have resistance 10 Ω, and let the battery EMF's be $\mathcal{E}_1$ = 10 V, $\mathcal{E}_2$ = 20 V, $\mathcal{E}_3$ = 30 V. Your tasks are:

(a) Find the **current I_3** through resistor R3.

(b) Find the electric **potential difference, $V_A - V_B$**, for the points A and B indicated on the circuit.