Applying Kirchhoff's Rules

Consider the circuit shown below.

- Junction a: I_1, I_2 (in); $\quad I_1 + I_2$ (out)
- Junction b: $I_1 + I_2$ (in); $\quad I_1, I_2$ (out)
- Two independent currents require the use of two loops.
- Loop A (ccw): $6\text{V} - (2\Omega)I_1 - 2\text{V} - (2\Omega)I_1 = 0$
- Loop B (ccw): $(3\Omega)I_2 + 1\text{V} + (2\Omega)I_2 - 6\text{V} = 0$
- Solution: $I_1 = 1\text{A}, \quad I_2 = 1\text{A}$