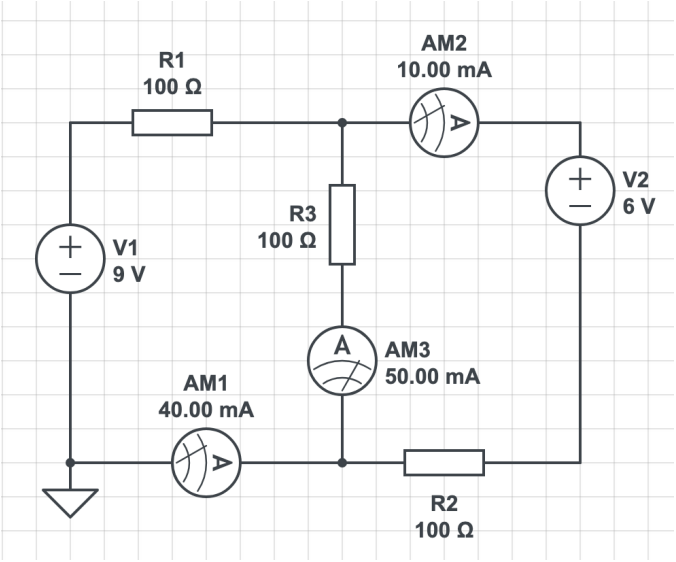
Write down a matrix-vector equation where the unknown is a vector of currents, I_1, I_2 and I_3. Verify that the ammeter values shown in this diagram are correct.



Solving the above with Doolittle's method Write down the system matrix, A, using Kirchhoff's Laws and find its LU Decomposition using Doolittle's method. What is the right-hand side?

$$\begin{bmatrix} A_{11} & A_{12} & A_{13} \\ A_{21} & A_{22} & A_{23} \\ A_{31} & A_{32} & A_{33} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix}$$

In the following decompsition, determine all the entries such as L_{21} and U_{12}.

$$A = \begin{bmatrix} 1 & 0 & 0 \\ L_{21} & 1 & 0 \\ L_{31} & L_{32} & 1 \end{bmatrix} \begin{bmatrix} U_{11} & U_{12} & U_{13} \\ 0 & U_{22} & U_{23} \\ 0 & 0 & U_{33} \end{bmatrix}$$

Use L and U to calculate the value of the currents in the circuit.

Calculate the currents when (a) $V_1 = 5$ and $V_2 = 4$ Volts, and (b) $V_1 = 100$ and $V_2 = 1$ Volts. Use the LU decomposition each time.