Electrical Circuits

See the image of a passive electrical circuit below. Write a function called **`voltage`** that computes the voltag voltage of the supply in volts and `R`, a vector of the values of the resistors in ohm. R_1 in the figure is `R(1)`, th output of the function is a three-element column vector with the voltage levels at junctions `A`, `B` and `C`, respec

To compute the voltage levels, we can use Kirchhoff's first law (https://en.wikipedia.org/wiki/Kirchoff%27s_fi junction must be zero. So, for example, here is the equation for junction `A`:

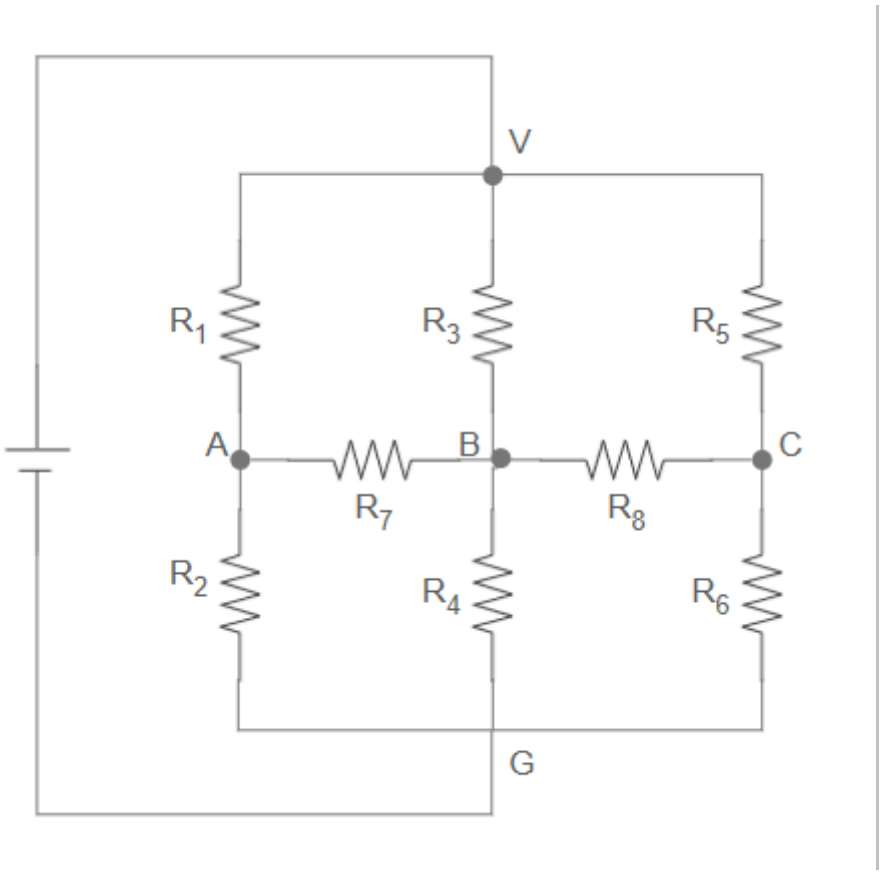
$$\frac{V-A}{R_1}-\frac{A-B}{R_7}-\frac{A}{R_2}=0$$

The current across a resistor is the voltage difference divided by the resistance, i.e, $i_N=\frac{V_{in}-V_{out}}{R_N}$. You hav the above equation, we assumed that $A>B$, so the current flows out, hence, the negative sign. But if the a negative, so overall, it will turn into a positive inflow value.

You need to write the remaining two equations for junctions `B` and `C` and rearrange the equations to get the equations.

Good values to check your function with:

- $R_1=0$ means that `A` must be at `V` level. Same for R_3 and R_5 for `B` and `C`, respectively.
- $R_2=0$ makes $A=0$. Same for R_4 and R_6 for `B` and `C`, respectively.
- If $\frac{R_1}{R_2}=\frac{R_3}{R_4}=\frac{R_5}{R_6}$ then `A`,`B` and `C` will be at the same level independent of R_7 and R_8.



Function

Save Reset MATLAB Documentation (https://www.mathworks.com/help/)

```
function y=voltage(V,R)
m11=(R(1)*R(2) + R(1)*R(7) + R(2)*R(7));
m12=-(R(1)*R(2));
m13=0;
m21=-(R(3)*R(4)*R(8));
m22=(R(4)*R(7)*R(8) + R(3)*R(4)*R(8) + R(3)*R(7)*R(8) + R(3)*R(4)*R(7));
m23=-(R(3)*R(4)*R(7));
m31=0;
m32=-(R(5)*R(6));
m33=(R(6)*R(8) + R(5)*R(6) + R(5)*R(8));
M=[m11,m12,m13;m21,m22,m23;m31,m32,m33];
b11=V.*(R(2)*R(7));
b21=V.*(R(4)*R(7)*R(8));
b31=V.*(R(6)*R(8));
b=[b11;b21;b31];
y=M\b;
end
```

Code to call your function

Reset

```
R = [1,2,4,5,13,4,8,1];
V = 10;
voltage(V,R)
```

Run Function

Assessment: All Tests Passed

Submit

- R = [1,2,4,5,13,4,8,1] and V = 10 V
- Some Special Cases
- Random input