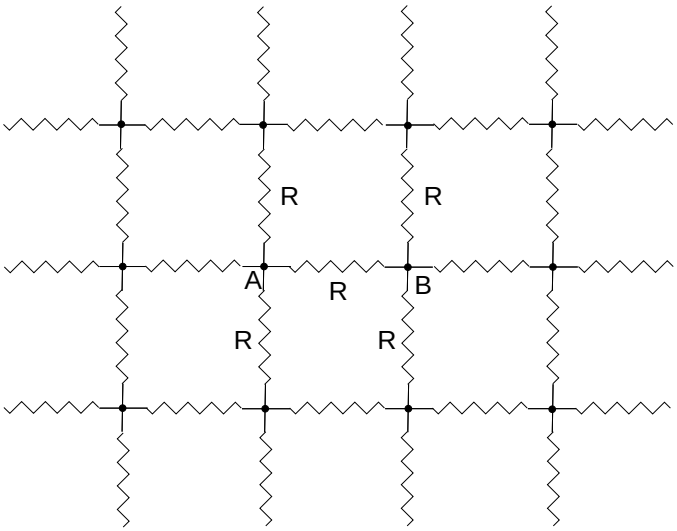
An infinite number of identical resistors are connected in a square grid as shown. What is the effective resistance between two neighboring junctions (i.e. between A and B).



If current $+I_0$ is injected at point A and allowed to flow to infinity, each of the resistors connected directly to point A will, by symmetry, carry $I_0/4$ directed away from A. Similarly, if current $-I_0$ is injected at point B, each resistor connected to B will carry current $I_0/4$ directed toward B. Superposing these two solutions yields a solution where current is injected at A and extracted at B. The net current flowing along the resistor connecting them is $I_0/2$ and so the voltage drop between A and B is $V = I_0R/2$. **The effective resistance of the network is therefore** $V/I_0 = R/2$**.**