Ohm’s Law

 No AI use

Time required: 120 minutes

Ohm's Law is a fundamental principle in electrical engineering that describes the relationship between voltage, current, and resistance in an electrical circuit. It is named after the German physicist Georg Simon Ohm, who first formulated the law.

Ohm's Law is crucial for designing and analyzing electrical circuits. It helps engineers determine the values of components needed to achieve desired electrical characteristics, such as voltage levels and current flow. Understanding Ohm's Law is essential for troubleshooting and optimizing circuit performance.

Ohm's Law Formula:

The basic formula for Ohm's Law is:

$$\boldsymbol{V = IR}$$

Where:

- **V** is the voltage (measured in volts, V).
- **I** is the current (measured in amperes, A).
- **R** is the resistance (measured in ohms, Ω).

Key Concepts:

1. **Voltage (V)**:
    - Voltage is the electrical potential difference between two points in a circuit. It is the force that pushes electric charges through the circuit.
    - Think of voltage as the pressure that drives the flow of electrons.
2. **Current (I)**:
    - Current is the flow of electric charge through a conductor. It represents the rate at which electrons pass through a point in the circuit.
    - Current is analogous to the flow of water through a pipe.

3. **Resistance (R)**:
    - Resistance is the opposition to the flow of electric current. It is determined by the material, length, and cross-sectional area of the conductor.
    - Resistance is similar to the friction that slows down the flow of water in a pipe.

Step 1: Input two of the three values (voltage, current, resistance)

- Prompt the user to enter the values for voltage (V), current (I), and resistance (R).
- Allow the user to leave one of the values empty.
  HINT: If the user presses the Enter key without a value, you get an empty string.

Step 2: Calculate the third value

- Use Ohm's Law: V=IR
    - If voltage is empty, solve for V.
    - ElseIf current is empty, solve for I.
    - ElseIf resistance is empty, solve for R.

Step 3: Display the result

- Print the calculated value in a readable format.

Example run:

```
>> Wk16OhmsLaw
Enter the voltage (V) or leave empty if unknown: 120
Enter the current (I) or leave empty if unknown: 15
Enter the resistance (R) or leave empty if unknown:
The calculated resistance is 8.00 Ω
>> Wk16OhmsLaw
Enter the voltage (V) or leave empty if unknown:
Enter the current (I) or leave empty if unknown: 15
Enter the resistance (R) or leave empty if unknown: 2
The calculated voltage is 30.00 V
>> Wk16OhmsLaw
Enter the voltage (V) or leave empty if unknown: 120
Enter the current (I) or leave empty if unknown:
Enter the resistance (R) or leave empty if unknown: 2
The calculated current is 60.00 A
```

Assignment Submission

1. Submit properly named and commented script files.
2. Attach a text file showing the successful execution of each script.
3. Attach all to the assignment in Blackboard.