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# Unit Converter with History Tracking

## **Project Description**

This Unit Converter is a Python-based tool that allows users to perform conversions across three categories: length, weight, and temperature. It also allows user to track their history conversions.

### **Build States:**

- 1. **Modular Conversion Functions:** Separate functions for length, weight, and temperature conversions. Each function uses a two-step conversion process: a. Convert input to a base unit, for example, meters for length, kilograms for weight. b. Convert from base unit to the target unit.
- Constant Based Conversions: I defined conversion factors as constants at the beginning of the code. Those conversion factors and formulas used in this project were sources from --> See the Credit and Resources Section
  - a. **Length Conversions:** Meters(m) to / from Kilometers (km), Centimeters(cm), Millimeters(mm), Inches, Feet, Miles
  - b. Weight Conversions: Kilograms(kg) to / from Grams(gm), Pounds(lb), Ounces(oz)
  - c. **Temperature Conversions:** Celsius© to / from Fahrenheit(F), Kelvin(K)
    - I use **global constants** to for conversion factors. These constants are defined at the beginning of program and used throughout the whole conversion functions.

#### 3. Loop and Error Handling:

- The main function (converter()) uses a while loop to keep the program running continuously untill they chooses to exit. It will allow user to perform multiple conversions and store them history(dictionary) without restart the program.
- The program will check if the user's input matches valid and menu options.
- I also assumed that users may enter units with inconsistent cases (uppercase or lowercase), thus, the program converts user input to a standardized and valid case to ensure the unit conversion function will work properly.

#### 4. History Tracking:

 I used a dictionary to store the conversion history. The key for each entry is a conversion counter and will increment with each new conversions. The value is a string which can describe the the input and output units of the conversion.

# **Running Instructions**

#### **Prerequisites**

Python 3.x installed on the computer.

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### Steps to Run the Program

- 1. Ensure Python is installed.
- 2. Download the MidtermProject\_Riley\_Tang.py file
- 3. Open the terminal or command prompt
- 4. Run the program following the commands
- 5. Follow the on-screen prompts to perform conversions, view history, or exit the program.

#### Sample Runs

### Sample Run 1: Length Conversion

This run will demonstrate:

- 1. A length conversion from meters to feet.
- 2. Viewing the conversion history

```
Length
Weight
Temperature
View History
Exit
                                                                                                           Welcome to Unit Converter Tool.
                                                                                                      Exit
ther your choice (1-5):1
ther the value to convert: 10
variable units: m, im, cm, mm, inch, foot, mile
ther the unit to convert from a
ther the unit to convert from to
the the unit to convert to: foot
1.0 m is equal to 22.0004 foot
                                                                                                     . Length
|. Meight
|. Temperature
|. View History
|. Exit
|mter your choice (1-5)|4
                                                                                                  Conversion History
1: 10.0 m = 32.8884 foot
3. Exiting the program
```

#### Sample Run 2: Temperature Conversion and Error Handling

This run will demonstrate:

- 1. A temperature conversion from Celsius to Fahrenheit
- 2. Attempting an invalid conversion (to unit "X"), showing error handling
- 3. Viewing the conversion history

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```
Welcome to Unit Converter Tool.
1. Length
2. Weight
3. Temperature
4. View History
5. Exit
Enter your choice (1-5):3
Enter the value to convert: 100
Available units: C (Celsius), F (Fahrenheit), K (Kelvin)
Enter the unit to convert from:
Enter the unit to convert to: f
100.0 C is equal to 212.0 F

Welcome to Unit Converter Tool.
1. Length
2. Weight
3. Temperature
4. View History
5. Exit
Enter your choice (1-5):3
Enter the value to convert: 30
Available units: C (Celsius), F (Fahrenheit), K (Kelvin)
Enter the unit to convert from: c
Enter the unit to convert from: c
Enter the unit to convert from: c
Enter the unit of convert to: x
Invalid units for temperature conversion.

Welcome to Unit Converter Tool.
1. Length
2. Weight
3. Temperature
4. View History
5. Exit
Enter your choice (1-5):4

Conversion History
1: 100.0 C = 212.0 F

Welcome to Unit Converter Tool.
1. Length
3. Temperature
4. View History
5. Exit
Enter your choice (1-5):5
Exit Conversion History
5. Exit Conversion History
7. Weight
7. Temperature
8. View History
9. Exit
Enter your choice (1-5):5
Exit Conversion History
9. Exit
Enter your choice (1-5):5
Exit Conversion History
9. Exit
Enter your choice (1-5):5
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Exit Enter your choice (1-5):5
Exit Enter you
```

# Credit and Resources

- 1. Length and Weight unit conversions
- Inch Calculator: https://www.inchcalculator.com/convert/
- 2. Temperature conversion formulas
- BYJU'S: https://byjus.com/temperature-conversion-formula/