In Python, **constants** are values that do not change during the execution of a program. Think of them as variables that are meant to stay the same throughout the code.

**Key Points:**

1. **Purpose:** Constants are used to represent fixed values like the speed of light, mathematical constants (e.g., π), or settings in your program (like screen size or a tax rate).
2. **Naming Convention:**
   * By convention, constants are written in **uppercase letters** with words separated by underscores (\_).
   * Example: PI = 3.14159 or MAX\_SCORE = 100
3. **No True Constants in Python:** Python doesn’t have a built-in way to make a variable “constant,” meaning someone could technically change it. But, by following the convention of using uppercase, programmers understand that these values should not be changed.

**Example in Code:**

# Defining a constant

GRAVITY = 9.8 # Acceleration due to gravity (m/s^2)

PI = 3.14159 # Value of pi

# Using constants

radius = 5

area\_of\_circle = PI \* (radius \*\* 2)

print("The area of the circle is:", area\_of\_circle)

# Even though we shouldn't, Python allows us to change constants

# (this is bad practice)

PI = 3

print("The modified value of PI is:", PI) # Not recommended!

**Why Use Constants?**

* **Clarity:** Makes the code easier to understand.
* **Ease of Maintenance:** If a constant value needs to be updated, you only change it in one place.
* **Avoid Errors:** Reduces the risk of accidentally changing a value that shouldn't be modified.

In summary, constants are like a promise in your code: "I will not change this value!"

Complete the tasks below:

**Task 1: Calculate the Area of a Circle**

* Use a constant for the value of π (PI).
* Calculate the area of a circle given a radius.

**Task 2: Convert Pounds to Kilograms**

* Use a constant for the conversion rate (1 pound = 0.453592 kilograms).

**Task 3: Calculate Total Price with Tax**

* Use a constant for the tax rate (e.g., 20%).

**Task 4: Convert Temperature from Celsius to Fahrenheit**

* Use a constant for the formula conversion factor (9/5) and offset (32).

**Task 5: Calculate Distance Travelled**

* Use a constant for a fixed speed and calculate the distance using the formula: distance = speed × time.

Solutions:

**Task 1**:

# Task 1: Area of a Circle

PI = 3.14159

radius = float(input("Enter the radius of the circle: "))

area = PI \* (radius \*\* 2)

print(f"The area of the circle is {area}")

**Task 2:**

# Task 2: Pounds to Kilograms

POUNDS\_TO\_KG = 0.453592

pounds = float(input("Enter the weight in pounds: "))

kilograms = pounds \* POUNDS\_TO\_KG

print(f"The weight in kilograms is {kilograms}")

**Task 3:**

# Task 3: Total Price with Tax

TAX\_RATE = 0.20

price = float(input("Enter the price of the item: £"))

total\_price = price + (price \* TAX\_RATE)

print(f"The total price with tax is £{total\_price}")

**Task 4:**

# Task 4: Celsius to Fahrenheit

CONVERSION\_FACTOR = 9 / 5

OFFSET = 32

celsius = float(input("Enter the temperature in Celsius: "))

fahrenheit = (celsius \* CONVERSION\_FACTOR) + OFFSET

print(f"The temperature in Fahrenheit is {fahrenheit}")

**Task 5:**

# Task 5: Distance Travelled

SPEED = 60 # Speed in miles per hour

time = float(input("Enter the time travelled in hours: "))

distance = SPEED \* time

print(f"The distance travelled is {distance} miles")