Conditional Statement

Problem_01

Task:

Define a variable x with a numeric value.

1. Use an if statement to print "Smaller" if x is less than 10.
2. Use another if statement to print "Bigger" if x is greater than 20.
3. Print "Finish" at the end of the program.

```
x = 5
if x < 10:
  print("Smaller")
if x > 20:
  print("Bigger")

print("Finish")
```

```
Smaller
Finish
```

Problem_01 (If statement)

Problem Statement: Soil Nutrient Concentration Assessment

Background: Soil nutrient concentration is a critical factor in determining soil health and fertility. It affects plant growth, crop yield, and the overall ecosystem. In agricultural and environmental sciences, regularly assessing soil nutrient concentration helps in making informed decisions about soil management and crop cultivation.

Task:

Develop an algorithm for a Python program that assesses the nutrient concentration in soil. The program should evaluate the concentration of nutrients (expressed in mg/kg) and categorize it into different levels: low if the concentration is below a certain threshold, and high if it exceeds another threshold. The user will input the nutrient concentration, and the program will output the assessment based on the given criteria.

```
# Nutrient concentration in soil (in mg/kg)
nutrient_concentration = 5

if nutrient_concentration < 10:
    print("Nutrient concentration is low.")

if nutrient_concentration > 20:
    print("Nutrient concentration is high.")

print("Assessment complete.")
```

Problem_02

Conditional Operator

Problem Statement: Bird Characteristic Evaluation

In ornithology, the study of birds, wing span is a critical physical attribute that can provide insights into a bird's species, flight capability, and ecological niche. Wing span, typically measured in feet or meters, varies significantly across different bird species and is a key identifier in avian research.

Task:

Develop a Python program that evaluates the wing span of a bird and provides specific observations based on its measurement. The program should analyze the wing span against various thresholds and output corresponding statements that describe the bird's wing span in relation to these thresholds.

```python
# Sample characteristics of a bird
wing_span = 5  # Wing span in feet

if wing_span == 5:
    print("Bird has a wing span equal to 5 feet.")

if wing_span <= 5:
    print("Bird's wing span is less than or equal to 5 feet.")

if wing_span < 6:
    print("Bird's wing span is less than 6 feet.")

if wing_span >= 5:
    print("Bird's wing span is greater than or equal to 5 feet.")

if wing_span > 4:
    print("Bird's wing span is greater than 4 feet.")
```

Problem_03

Problem Statement: Animal Classification System Based on Morphology

Background:

In zoology, the physical characteristics of animals, such as the number of legs, play a crucial role in their classification and understanding of their adaptations. The number of legs an animal has is often indicative of its lifestyle, habitat, and evolutionary history. For instance, quadrupeds (four-legged animals) are usually terrestrial and have evolved various adaptations for life on land.

Task:

Develop a Python program that classifies an animal based on the number of its legs. The program should first determine if the animal has more than two legs. If so, it should then check if the animal has exactly four legs and, based on this, classify the animal as a terrestrial quadruped. The user will input the number of legs, and the program will output the classification.

```python
# Number of legs of an animal
num_legs = 4

# Classification based on number of legs
if num_legs > 2:
    print("Animal has more than 2 legs.")

    # Further classification based on habitat
    if num_legs == 4:
        print(f"Animal is a quadruped.")

print("Classification complete.")
```

Problem_04 (else statement)

Problem Statement: Microorganism Size Classification System

Background:

In microbiology, the size of an organism is a fundamental characteristic used to classify it. Microorganisms, such as bacteria, viruses, and some fungi, are typically very small, often measured in micrometers (µm). Classifying an organism as a microorganism based on its size is crucial in fields like microbiology, biotechnology, and environmental science, as it helps in understanding the organism's role, behavior, and potential impact on its environment.

Task:

Develop a Python program that classifies an organism as a microorganism based on its size. The program should take the size of an organism (in micrometers) as input and determine whether it falls within the typical size range of microorganisms. For the purposes of this program, consider any organism smaller than 2 micrometers in size to be classified as a microorganism. The program should output a statement classifying the organism accordingly.

```python
# Size of an organism in micrometers (µm)
organism_size = 5

# Two-way decision: Check if the organism is a microorganism
if organism_size < 2:
    print("Organism is classified as a microorganism.")
else:
    print("Organism is larger than typical microorganisms.")

print("Classification complete.")
```

Problem_05

Problem Statement: Comprehensive Plant Water Requirement Classification System

Background:

Plant water requirements vary significantly across different species, influencing their adaptability to various environments. These requirements are a key factor in determining the ideal growing conditions for plants. Understanding and classifying plants based on their water needs is vital in fields like botany, agriculture, and horticulture.

Task:

Develop a Python program that classifies plants based on their weekly water requirements. The program should categorize plants into three types of environments: arid, moderate, and wet. The classification is based on the amount of water a plant needs per week, measured in millimeters. For instance, plants needing less than 1 mm/week are suited for arid environments, those requiring more than 4 mm/week are suited for wet environments, and those in between are suited for moderate environments. The program should output the appropriate classification for a given water requirement.

```python
# Water requirement of a plant in millimeters per week
water_requirement = 2

# Classification based on water requirement
if water_requirement < 1:
    print("Plant is suited for arid environments.")
elif water_requirement > 4:
    print("Plant is suited for wet environments.")
else:
    print("Plant is suited for moderate environments.")

print("Classification complete.")
```