For Loops

Mastering Iteration in Python

What is a For Loop?

- A for loop is used to iterate over a sequence (like a list) or other iterable objects.

Basic For Loop

```python
for item in sequence:
    # Code to execute for each item
```

Iterating Over Lists

```python
fruits = ["apple", "banana", "cherry"]

# Basic list iteration
for fruit in fruits:
    print(f"Current fruit: {fruit}")
```

Output:

```
Current fruit: apple
Current fruit: banana
Current fruit: cherry
```

Range()

- The `range()` function generates a sequence of numbers.

- This sequence can be used to iterate over a loop.

Using Range()

```python
# Iterate through numbers 0-4
for i in range(5):
    print(i)
```

Output:

```
0
1
2
3
4
```

Specify start/end

```python
# Iterate through numbers 2-5
for x in range(2, 6):
    print(x)
```

Output:

```
2
3
4
5
```

Specify step

```python
# Iterate through numbers 0-10 by 2
for y in range(0, 11, 2):
    print(y)
```

Output:

```
0
2
4
6
8
10
```

Example1: Sum numbers from 1 to 10

```python
# Sum numbers from 1 to 10
total = 0
for number in range(1, 11):
    total = total + number
print(f"Sum of numbers: {total}")
```

Output:

```
Sum of numbers: 55
```

Demonstrates range with step parameter to process every 2nd number

Example2: Generate list of squares

```python
# Generate list of squares
squares = []
for n in range(5):
    squares.append(n ** 2)
print(f"Squares: {squares}")
```

Output:

```
Squares: [0, 1, 4, 9, 16]
```

Shows how range can build complex data structures through iteration

Practice Exercises

1. Basic: Print numbers 1-10

2. Intermediate: Print even numbers 2-20

3. Advanced: Print cubes of numbers 1-5