Learning Material: If-Else and Loops

Introduction to Control Structures

Control Structures

Control structures determine how a program makes decisions and repeats actions. They control the flow of execution.

Two major types:

- Decision-Making (If-Else)
- Repetition (Loops)

These structures allow programs to think and react, not just run line by line.

If-Else Statements (Decision-Making)

Purpose of If-Else

They allow programs to choose different actions depending on conditions.

Basic Structure

```
if condition:
    # code if condition is true
else:
    # code if condition is false
```

Example

```
age = 18


if age >= 18:
    print("You are an adult.")
else:
    print("You are a minor.")
```

Else-If (elif)

Allows multiple conditions.

```
score = 85

if score >= 90:
    print("Excellent!")
elif score >= 75:
    print("Good job!")
else:
    print("Keep improving!")
```

Common Uses

Checking login inputs

Validating age, grades, or required fields

Making menu selections

Controlling program decisions

Loops (Repetition Structures)

Why Use Loops?

Loops allow repeated execution without writing the same code many times.

Types of Loops

For Loop

While Loop

1. For Loop

Used when the number of repetitions is known.

Basic Structure

```
for i in range(5):

    print(i)
```

Example

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

for fruit in fruits:

    print(fruit)
```

2. While Loop

Repeats as long as a condition is true.

Basic Structure

```
count = 1

while count <= 5:

    print(count)

    count += 1
```

Common Uses of Loops

Reading multiple inputs

Processing lists or arrays

Counting and calculations

Repeating tasks until a condition changes

Combining If-Else and Loops

Example: Even or Odd Checker

```
for num in range(1, 6):

    if num % 2 == 0:

        print(num, "is even")

    else:

        print(num, "is odd")
```

Example: Login Attempts

```python
attempts = 0

while attempts < 3:
    password = input("Enter password: ")

    if password == "1234":
        print("Access granted!")
        break
    else:
        print("Wrong password.")
        attempts += 1
```

Example: Menu Program

```python
while True:
    print("1. Start")
    print("2. Exit")
    choice = input("Choose: ")

    if choice == "1":
        print("Program started!")
    elif choice == "2":
        print("Exiting...")
        break
    else:
        print("Invalid choice!")
```

Short Exercises

1. Write an If-Else program that checks if a number is positive or negative.
2. Display numbers from 1 to 10 using a loop.
3. Use a For Loop to print the squares of numbers 1–5.
4. Create a While Loop that asks for input until the user types "stop".
5. Write a program that asks the user's grade and prints "Pass" or "Fail".