

Control Structures

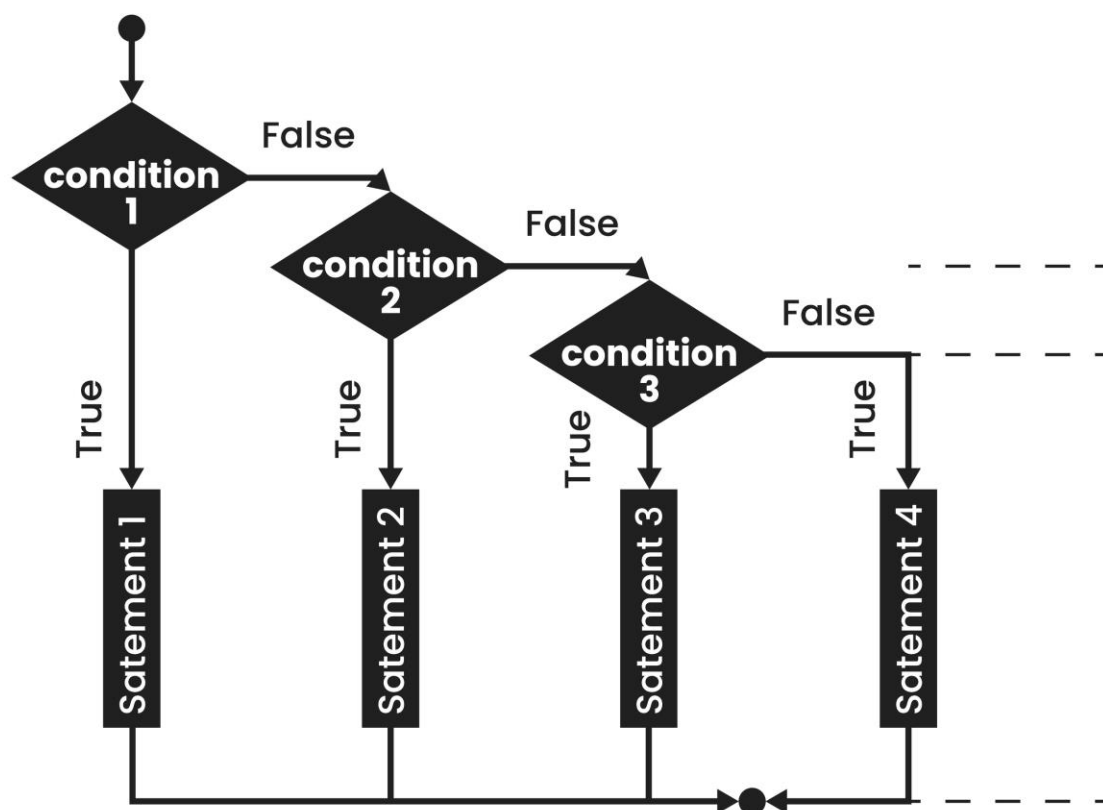
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The if Statement

Objective: To understand the basic syntax and functionality of the if statement for conditional execution.

Theory: The **if statement** is the most fundamental control structure. It executes a block of code only if a specified condition is True. If the condition is False, the code block is skipped entirely. This allows your program to make simple decisions.

IF-ELSE-IF STATEMENT



Syntax:

if condition:

code to execute if condition is True

Program:

```
# Program 1: Basic if statement
age = 20
if age >= 18:
    print("You are eligible to vote.")

# Program 2: if statement with a false condition
temperature = 10
if temperature > 25:
    print("It's a hot day.")
```

Output:

You are eligible to vote.

The if-else Statement

Objective: To learn how to use the if-else statement to provide an alternative path of execution when the condition is False.

Theory: The **if-else statement** provides a two-way decision. The code inside the if block is executed if the condition is True, while the code inside the else block is executed if the condition is False.

Syntax:

if condition:

 # code to execute if condition is True

else:

 # code to execute if condition is False

Program:

```
# Program 1: if-else statement for even/odd check
number = 7
```

```
if number % 2 == 0:
    print(f"{number} is an even number.")
else:
    print(f"{number} is an odd number.")

# Program 2: Another if-else example
is_raining = True
if is_raining:
    print("Remember to bring an umbrella.")
else:
    print("Enjoy the sunny weather.")
```

Output:

7 is an odd number.

Remember to bring an umbrella.

The if-elif-else Statement

Objective: To understand how to handle multiple conditions using the if-elif-else structure.

Theory: The **if-elif-else statement** allows for multi-way decision-making. The conditions are checked sequentially. The code block for the first condition that evaluates to True is executed, and all other elif and else blocks are skipped. The else block is optional and acts as a catch-all for cases where none of the if or elif conditions are met.

Syntax:

```
if condition1:
    # code if condition1 is True
elif condition2:
    # code if condition2 is True
else:
    # code if all conditions are False
```

Program:

```
# Program 1: Grade classification
score = 85
if score >= 90:
    print("Grade: A")
elif score >= 80:
    print("Grade: B")
elif score >= 70:
    print("Grade: C")
else:
    print("Grade: D or F")

# Program 2: Simple temperature check
temperature = 22
if temperature < 0:
    print("It's freezing.")
elif temperature <= 15:
    print("It's a bit chilly.")
elif temperature <= 25:
    print("The weather is nice.")
else:
    print("It's hot outside!")
```

Output:

Grade: B

The weather is nice.