perplexity

Mastering if, else, and elif in Python

Theory (35%)

1. What are if, else, and elif?

- These are **conditional statements** in Python—used to run certain blocks of code based on conditions.
- They help your program make **decisions** ("if this happens, do this; else, do that").

2. Basic Structure

```
if condition:
    # code block for if
elif condition2:
    # code block for elif
else:
    # code block for else
```

- **if:** Checks a condition; if True, runs the associated block.
- **elif:** (else if) Checks another condition, only if the previous `if` or `elif` was False.
- **else:** Runs if none of the above conditions are True; *no condition here*.

3. Indentation Matters!

Python uses **indentation** (spaces/tabs) to define the blocks underneath `if`, `elif`, and `else`.

4. How are Conditions Evaluated?

- Conditions use **comparison operators** (`==`, `!=`, `>`, `<`, `>=`, `<=`)
- and **logical operators** (`and`, `or`, `not`) for more complex checks.

5. Why Use These?

- To **control program flow**.

- To handle **alternatives and choices**.

💡 Coding Examples (65%)

Example 1: Basic if Statement

```
age = 18

if age >= 18:
    print("You are an adult!")  # This line runs because the condition is True
```

Example 2: Adding `else`

```
age = 16

if age >= 18:
    print("You are an adult!")
else:
    print("You are a minor!")   # Thank the `else` block, as age < 18
```

Example 3: `elif` for Multiple Choices

```
marks = 85

if marks >= 90:
    print("Grade: A")
elif marks >= 80:
    print("Grade: B")    # This line runs, as 85 >= 80
elif marks >= 70:
    print("Grade: C")
else:
    print("Grade: D")
```

Example 4: Multiple `elif` and `else`

```
number = 0

if number > 0:
    print("Positive Number")
elif number < 0:
    print("Negative Number")
else:
    print("Zero")
```

Example 5: Using Logical Operators

```
temperature = 25

if temperature > 20 and temperature < 30:
    print("It's a pleasant day!")  # Runs if temperature is between 20 and 30
else:
    print("It's not a pleasant day.")
```

Example 6: Nested if Statements

```
score = 95

if score >= 90:
    print("Excellent!")
    if score == 100:
        print("Perfect Score!")    # Checks for a perfect score inside the previous if
else:
    print("Keep trying!")
```

Example 7: Practical Example (Even or Odd)

```
number = 7

if number % 2 == 0:
    print("Even")
else:
    print("Odd")   # Since 7 % 2 == 1, will print "Odd"
```

Example 8: Chained Conditions (if-elif-else)

```
num = -8

if num > 0:
    print("Positive")
elif num == 0:
    print("Zero")
else:
    print("Negative")   # num is negative, so this will print
```

Example 9: Short if-else on One Line (Ternary Operator)

```
age = 20

print("Adult" if age >= 18 else "Minor")  # Prints "Adult"
# Useful for quick checks!
```

Example 10: Real World Scenario

```
traffic_light = "yellow"

if traffic_light == "red":
    print("Stop!")
elif traffic_light == "yellow":
    print("Ready to go!")   # Will print this
elif traffic_light == "green":
    print("Go!")
else:
    print("Invalid color")
```

🤓 Some Handy Tips & Reminders

- **Indentation is ESSENTIAL.** Forgetting indents = errors!
- You can have **multiple `elif`**, but only **one `else`** per `if` chain.
- Conditions check from top to bottom—**first True wins**.
- Use parentheses `()` for complex conditions to avoid confusion.

- Always end your `if-elif-else` block—they don't have to include all three.

🛠 Practice Task

Try these for yourself:

1. Write a program to check if a user-entered number is positive, negative, or zero.
2. Create a grade calculator using `if-elif-else`.
3. Make a simple login system where the user enters a password. If correct → "Welcome", else → "Try Again".

🔑 Key Takeaways

- **`if`** evaluates a condition; if True, runs its block.
- **`elif`** offers extra choices in a sequence.
- **`else`** acts as a catch-all for everything else.
- Use comparison and logical operators to build conditions.
- Indentation and order matter!

🎉 **With these explanations and coding examples, you'll NEVER forget how to control the flow in Python using `if, elif, and else`!**

Happy Coding! 🚀