**PYTHON IF & ELSE CONDITION QUESTION AND ANSWER:**

**1. Difference between if, elif, and else Statements in Python**

* **if**: This statement checks a condition. If the condition evaluates to True, the block of code under if is executed. If it evaluates to False, Python moves to the next condition or block.
* **elif**: Short for "else if," elif allows you to check multiple conditions. If the if condition is False, Python checks the elif condition. If the elif condition is True, the corresponding block is executed.
* **else**: This statement provides a fallback option. If all preceding if and elif conditions evaluate to False, the code block under else is executed.

**2. How and, or, and not Operators Work in Python Conditional Statements**

* **and**: This operator checks if **both** conditions are True. The combined condition is True only if both conditions are True.

x = 5

y = 10

if x > 0 and y > 5:

print ("Both conditions are true")

* **or**: This operator checks if **at least one** condition is True. The combined condition is True if any one of the conditions is True.

x = 5

y = 2

if x > 0 or y > 5:

print ("At least one condition is true")

* **not:** This operator inverts the condition. If the condition is True, not makes it False, and vice versa.

x = 5

if not x == 10:

print ("x is not 10")

**3. How Python Evaluates a Chain of if-elif-else Statements**

Python evaluates the if-elif-else statements from top to bottom. As soon as it finds a condition that evaluates to True, it executes the corresponding block and skips the rest of the conditions. If none of the conditions is True, the else block is executed.

**4. Using Nested if Statements in Python**

Nested if statements allow you to check a condition within another condition. This is useful when you need to perform an additional check only if the first condition is True.

**Example:**

x = 10

if x > 5:

if x < 20:

print ("x is between 5 and 20")

Here, the second if statement is evaluated only if the first condition (x > 5) is True.

**5. The Significance of Indentation in Python's Conditional Statements**

Indentation is crucial in Python as it defines the scope of the code blocks. Every block of code associated with a control statement (if, elif, else) must be indented. Python uses indentation instead of braces {} or keywords like begin and end to define blocks, making the code more readable.

**6. Handling Multiple Comparisons in Python**

Python can evaluate multiple comparisons in a single statement. For example, 5 < x < 10 checks if x is greater than 5 and less than 10. Python evaluates this as:

5 < x and x < 10

**Practical Examples**

**7. Checking if a Number is Positive, Negative, or Zero**

number = float (input ("Enter a number: "))

if number > 0:

print ("The number is positive.")

elif number < 0:

print ("The number is negative.")

else:

print ("The number is zero.")

**8. Checking if a Number is Even or Odd**

number = int (input ("Enter a number: "))

if number % 2 == 0:

print ("The number is even.")

else:

print ("The number is odd.")

**9. Categorizing Age**

age = int (input ("Enter your age: "))

if age < 13:

print("Child")

elif age < 20:

print("Teen")

elif age < 60:

print("Adult")

else:

print("Senior")

**10. Calculating Student Grade**

score = float (input ("Enter your score: "))

if score >= 90:

grade = 'A'

elif score >= 80:

grade = 'B'

elif score >= 70:

grade = 'C'

elif score >= 60:

grade = 'D'

else:

grade = 'F'

print (f" Your grade is {grade}.")

**11. Checking if a String is a Palindrome**

text = input ("Enter a string: ")

if text == text [::-1]:

print ("The string is a palindrome.")

else:

print ("The string is not a palindrome.")

**12. Checking if a Character is a Vowel or Consonant**

char = input ("Enter a character: "). Lower ()

if char in 'aeiou':

print ("The character is a vowel.")

else:

print ("The character is a consonant.")

**13. Checking Divisibility by 4 and 5**

number = int (input ("Enter a number: "))

if number % 4 == 0 and number % 5 == 0:

print ("The number is divisible by both 4 and 5.")

elif number % 4 == 0:

print ("The number is divisible by 4 only.")

elif number % 5 == 0:

print ("The number is divisible by 5 only.")

else:

print ("The number is not divisible by 4 or 5.")