

## Tutorial 03

### Part 01: Guided Programming Exercises

#### Simple Exercise

1. **If Statement:**
  - o Write an **if** statement to check if a number is divisible by 5. If it is, print "Divisible by 5".
2. **Else Statement:**
  - o Create a program using **if-else** to determine if a person is eligible to vote (age  $\geq 18$ ). Print appropriate messages for both conditions.
3. **Elif Statement:**
  - o Use **if-elif-else** to categorize a number as 'Negative', 'Zero', or 'Positive'.
4. **Nested If-Else Statement:**
  - o Write a nested if-else program that checks if a number is less than 10. If it is, check if it is even or odd and print the result.

#### Moderate Exercise

5. **If Statement:**
  - o Create a program to check if a given year is a leap year.
6. **Else Statement:**
  - o Write a program to determine whether a character entered is a vowel or consonant.
7. **Elif Statement:**
  - o Develop a program that categorizes a character as 'Lowercase', 'Uppercase', 'Digit', or 'Special Character'.
8. **Nested If-Else Statement:**
  - o Implement a nested if-else structure to calculate different types of discounts based on purchase amount: above 1000, 10% discount; between 500 and 1000, 5% discount; below 500, no discount.

## Part 02: Unguided Programming Exercises [TO BE COMPLETED AND SUBMITTED TO BB]

### Hard Exercise

#### Tax Calculator Based on Gross Income

- **Scenario:** In this simplified tax system, the income tax rates are as follows:
  - No tax for income up to £12,500.
  - 20% tax for income between £12,500 and £50,000.
  - 40% tax for income between £50,000 and £150,000.
  - 45% tax for income above £150,000.
- **Objective:** Write a Python program to calculate the tax owed based on the gross income input by the user. Then, calculate and display the net income after tax deductions.
- **Guidelines:**
  - Use selection statements (if-elif-else) to determine the tax bracket based on the user's gross income.
  - Calculate the tax owed for each bracket appropriately.
  - Subtract the tax from the gross income to find the net income.
  - Print the tax owed and the net income.
- **Sample Input/Output:**
  - If the user inputs a gross income of £60,000, the program should calculate the tax owed (£7,500 for the first £37,500 over £12,500 and £4,000 for the next £10,000) and display the net income (£48,500).

#### Task: Advanced Grade Calculation System

- **Scenario:** Create a program to calculate the final grade of a student based on weighted assessments. The grading system is as follows:
  - Coursework counts for 40% of the final grade.
  - Midterm exam counts for 25%.
  - Final exam counts for 35%.
- **Objective:** The program should prompt for the student's scores in coursework, midterm, and final exams. Then, calculate the weighted score for each component and the overall final grade.
- **Guidelines:**
  - Use selection statements to assign letter grades based on the final score: A (70-100), B (50-69), C (40-49), and F (<40).
  - Validate inputs to ensure scores are within reasonable ranges (e.g., 0-100).
  - Calculate the weighted score for each assessment.
  - Sum these scores to determine the final grade.
  - Display both the numeric final grade and the letter grade.

- **Sample Output:**

- If a student scores 80 in coursework, 70 in the midterm, and 60 in the final exam, calculate and display the weighted final grade and corresponding letter grade.

## Quizzes:

1. What is the output of **if 0: print("Yes") else: print("No")**?
  - o A) Yes
  - o B) No
  - o C) Error
  - o D) Nothing
2. What does the following code output? **x = 5 if x > 10: print("A") elif x == 5: print("B") else: print("C")**
  - o A) A
  - o B) B
  - o C) C
  - o D) No output
3. Determine the result of **if False: print("True") else: print("False")**.
  - o A) True
  - o B) False
  - o C) Error
  - o D) Nothing
4. If **a = 4**, what will **if a < 5: print("Hello") if a % 2 == 0: print("Even") else: print("Odd")** output?
  - o A) Hello
  - o B) Even
  - o C) Hello Even
  - o D) Syntax Error
5. What does **if not 1: print("False") else: print("True")** print?
  - o A) False
  - o B) True
  - o C) Error
  - o D) Nothing
6. Evaluate the output: **age = 20; if age > 18: print("Adult") if age > 30: print("Senior") else: print("Young Adult")**
  - o A) Adult
  - o B) Senior
  - o C) Young Adult
  - o D) Adult Young Adult
7. What is the result of **if 3 + 2 == 5: print("Five") else: print("Not Five")**?
  - o A) Five
  - o B) Not Five
  - o C) Error
  - o D) Nothing

8. Determine the output: **num = 10; if num < 20: print("Less") elif num > 10: print("Greater") else: print("Equal")**
- o A) Less
  - o B) Greater
  - o C) Equal
  - o D) Less Greater
- o
9. What does **x = -1 if x > 0: print("Positive") elif x < 0: print("Negative") else: print("Zero")** output?
- o A) Positive
  - o B) Negative
  - o C) Zero
  - o D) Error
- o
10. If **a = 5**, what will **if a > 3: print("One") if a < 10: print("Two") else: print("Three")** output?
- o A) One
  - o B) Two
  - o C) One Two
  - o D) Three
- o
11. What is the result of **if True or False: print("Yes") else: print("No")**?
- o A) Yes
  - o B) No
  - o C) Error
  - o D) Nothing
- o
12. Evaluate the output: **score = 75 if score > 80: print("A") elif score > 70: print("B") else: print("C")**
- o A) A
  - o B) B
  - o C) C
  - o D) No output
- o
13. What does **if 1 == 1 and 2 == 2: print("Correct") else: print("Incorrect")** print?
- o A) Correct
  - o B) Incorrect
  - o C) Error
  - o D) Nothing
- o
14. If **x = 15**, what will **if x > 10: print("Greater") elif x < 20: print("Less") else: print("Equal")** output?
- o A) Greater
  - o B) Less
  - o C) Equal
  - o D) Greater Less

15. Determine the result of **if not True: print("False") else: print("True")**.
- o A) False
  - o B) True
  - o C) Error
  - o D) Nothing
  - o
16. What is the output of **if "": print("Empty") else: print("Not Empty")**?
- o A) Empty
  - o B) Not Empty
  - o C) Error
  - o D) Nothing
  - o
17. Evaluate the output: **x = 0; if x: print("Non-zero") else: print("Zero")**
- o A) Non-zero
  - o B) Zero
  - o C) Error
  - o D) No output
  - o
18. What does **if "hello": print("Yes") else: print("No")** print?
- o A) Yes
  - o B) No
  - o C) Error
  - o D) Nothing
  - o
19. If **num = 15**, what will **if num % 5 == 0: print("Divisible by 5") else: print("Not Divisible")** output?
- o A) Divisible by 5
  - o B) Not Divisible
  - o C) Error
  - o D) Nothing
  - o
20. Determine the result of **if 5 > 10 or 4 < 8: print("True") else: print("False")**.
- o A) True
  - o B) False
  - o C) Error
  - o D) Nothing
  - o
21. What is the output of **a = 5; if a > 10: print("Greater") elif a == 5: print("Equal") else: print("Smaller")**?
- o A) Greater
  - o B) Equal
  - o C) Smaller
  - o D) No output
  - o
22. Evaluate the output: **if not(1 == 1): print("True") else: print("False")**
- o A) True
  - o B) False
  - o C) Error
  - o D) Nothing

23. What does `if 3 < 5 < 7: print("In Range") else: print("Out of Range")` print?
- o A) In Range
  - o B) Out of Range
  - o C) Error
  - o D) Nothing
  - o
24. If `x = 10`, what will `if x < 5: print("Low") elif x <= 10: print("Medium") else: print("High")` output?
- o A) Low
  - o B) Medium
  - o C) High
  - o D) Low Medium
  - o
25. Determine the result of `if "False": print("True") else: print("False")`.
- o A) True
  - o B) False
  - o C) Error
  - o D) Nothing
  - o
26. What is the output of `if -1: print("True") else: print("False")`?
- o A) True
  - o B) False
  - o C) Error
  - o D) Nothing
  - o
27. Evaluate the output: `x = 5; if x: print("Non-zero") else: print("Zero")`
- o A) Non-zero
  - o B) Zero
  - o C) Error
  - o D) No output
  - o
28. What does `if 10 > 5 and 8 > 10: print("Correct") else: print("Incorrect")` print?
- o A) Correct
  - o B) Incorrect
  - o C) Error
  - o D) Nothing
  - o
29. If `age = 18`, what will `if age >= 18: print("Adult") if age > 21: print("Over 21") else: print("Under 21")` output?
- o A) Adult
  - o B) Over 21
  - o C) Under 21
  - o D) Adult Under 21
  - o
30. Determine the result of `if not 0: print("Zero") else: print("Non-zero")`.
- o A) Zero
  - o B) Non-zero
  - o C) Error
  - o D) Nothing