BANO QABIL

ASSIGNMENT 1

(PYTHON)

Variables & Data Types (Q1–Q10)

1. 1. Create a variable `student_name`, assign your name, and print its type.
2. 2. Store your age in a variable. Multiply it by 2 and print the result.
3. 3. Create three variables with an integer, a string, and a float. Print their types.
4. 4. Convert the integer `55` to a string and concatenate with " is a number".
5. 5. Input two numbers, print their sum and the type of the result.
6. 6. Assign `a = "5"` (string) and `b = 3`. Add them correctly and explain the result.
7. 7. Swap values of two variables without a third variable.
8. 8. What is the type and output of: `result = 3 + 4.0 + True`?
9. 9. Input a float number and print if it's an integer (without using `int()`).
10. 10. Use `isinstance()` to check whether an input is float or integer.

Conditions (if/elif/else) (Q11–Q20)

11. 11. Check if a number is positive, negative, or zero.
12. 12. Input marks; print "Passed" if ≥50, else "Failed".
13. 13. Find the largest of three numbers using if/elif/else.
14. 14. Input age. Print: Child (age <13), Teen (13–19), Adult (20+).
15. 15. Check whether a number is even or odd using `%`.
16. 16. Input two subjects' marks. Print: "Both Passed", "One Passed", or "None Passed".
17. 17. Classify a triangle as Equilateral, Isosceles, or Scalene using its sides.
18. 18. Input a number. Print "Fizz" if divisible by 3, "Buzz" if 5, "FizzBuzz" if both.
19. 19. Input temperature. Print: Freezing (<0), Cold (0–15), Moderate (16–30), Hot (>30).
20. 20. Validate username and password: Username ≥5 chars, Password has 1 digit and 1 special char.

Lists (Q21–Q27)

21. 21. Create a list of 5 favorite fruits. Print the 3rd fruit.
22. 22. Add a new fruit to the end. Print updated list.
23. 23. Remove the 2nd item. Print the list.
24. 24. Sort the list alphabetically and print it.
25. 25. Replace all even numbers in a list of 5 numbers with "Even" using a loop.
26. 26. Write a function that returns a new list with only unique elements.
27. 27. Sort a list of words by word length (not alphabetically).

Tuples (Q28–Q32)

28. 28. Create a tuple of 5 countries. Try changing the 2nd country and observe what happens.
29. 29. Print the last two countries using slicing.
30. 30. Count how many times "Pakistan" appears in a tuple.
31. 31. Given: `t = (1, 2, 3, [4, 5])`. Add 6 to the list inside the tuple and explain the result.
32. 32. Convert tuple `(1, 2, 3)` to string "1-2-3" using `join()`.

Dictionaries (Q33–Q38)

33. 33. Create dictionary `student` with keys: `name`, `age`, `grade`. Print all key-value pairs.
34. 34. Add new key `subject` to the dictionary. Print updated dictionary.
35. 35. Search for a key. If found, print the value.
36. 36. Create dictionary of 3 students and their marks. Calculate average.
37. 37. Given items and prices in a dictionary, input a budget and list affordable items.

Given:

```
marks = {"Ali": 45, "Sara": 70, "Shayan": 65, "Osama": 30}
```

Print students scoring ≥50.
Count how many failed.

Interview & Conceptual (Q39–Q50)

38. 39. What's the difference between mutable and immutable types? Give examples.
39. 40. Explain the difference between `is` and `==` in Python.
40. 41. Can you change values in a tuple? Why or why not?
41. 42. Explain how `elif` works. Can it exist without `if`?
42. 43. What happens when accessing a non-existent dictionary key? How to avoid it?
43. Why are strings immutable in Python? What are the benefits?
44. 46. Difference between `list.copy()` and using `=` assignment? Show example.
45. 47. Can a tuple contain mutable items? Give a code example.
46. 48. What is the difference between `in` when used in a list vs a dictionary?
47. 49. Explain shallow copy vs deep copy with a list example.
48. 50. What is the output of:

```
x = [1, 2, 3]
y = x
y.append(4)
print(x)
```

Explain the result.