

BANO QABIL – PYTHON ASSIGNMENT

■ Python Assignment — Loops, Functions & Interview Questions (Real-World Oriented)

Section A: For Loop (Real-Life + Interview Qs)

1. Print all file names in a given list of files.
2. Print each student's name from a list with roll numbers.
3. Loop through an email list and print only those ending with '@gmail.com'.
4. Display all product prices from a list with "PKR" appended.
5. Loop through contacts and mask their phone number except last 4 digits.
6. Loop through a list of transactions and print those above 50,000 PKR.
7. Print all words from a sentence in reverse order.
8. Loop through a shopping cart and print "Out of stock" if quantity = 0.
9. Print all pending tasks from a to-do list.
10. Print first 5 notifications from a list.

💡 Interview Qs:

11. Explain difference between 'for item in list:' and 'for i in range(len(list)):'
12. How does Python handle iterators internally in for loops?

Section B: While Loop (Real-Life + Interview Qs)

13. Keep asking user for password until it matches "secure123".
14. ATM PIN check with max 3 attempts.
15. Simulate downloading progress '[###] 30%'.
16. While loop to collect student marks until "done" entered.
17. Keep looping until internet connection = True.
18. While loop for chatbot (keep asking until user types "bye").
19. While loop for traffic light simulation.
20. Simulate a taxi meter counting distance.

💡 Interview Qs:

21. Difference between while loop and do-while loop (Python alternative)?
22. What happens if while loop condition is always True?

Section C: Nested Loops (Real-World + Interview Qs)

23. Print all seat numbers in cinema (Rows A-C, Seats 1-5 → A1, A2...).
24. Generate all shirt-pant combinations from 2 lists.
25. Print every minute from 12:00 → 12:10.
26. Nested loop to show timetable: Days 1-3, Slots Morning/Evening.
27. Print seating chart for bus (Rows 1-3, Seats A-D).
28. Print a Tic-Tac-Toe 3×3 board.
29. Print a star pyramid pattern.
30. Nested loop to find all team pairs from player list.
31. Generate full multiplication tables from 2-5.
32. Print shopping categories and their products.

Interview Qs:

33. Time complexity of nested loops?
34. When would you replace nested loops with list comprehensions?

Section D: Functions + Loops (Real-Life + Interview Qs)

35. Function to count how many `.pdf` files are in a list.
36. Function to check username availability.
37. Function to return longest word in a sentence.
38. Function that checks if string is palindrome using loop.
39. Function that prints multiplication table.
40. Function to simulate dice roll until 6 appears.
41. Function to filter products under given price.
42. Function that masks all passwords in list.
43. Function to count frequency of words in sentence.
44. Function to extract hashtags from social media post.

Interview Qs:

45. Difference between `return` and `print` in functions?
46. Can functions in Python return multiple values?

Section E: Real-World Looping Challenges

47. Loop through employee salaries, print only above average.
48. Loop through list of student grades, print pass/fail.
49. Remove duplicates from list manually (without set).
50. Flatten a nested list using loop.
51. Loop to validate email addresses (must contain `@`).
52. Count number of urgent messages in chat logs.
53. Loop to show only Pakistani contacts (+92).
54. Simulate inventory reduction when order placed.
55. Loop through doctor profiles and print specialists only.
56. Loop through dictionary of courses per student.

💡 Interview Qs:

57. How do you iterate over both keys and values in dictionary?
58. How to break out of multiple nested loops in Python?

Section F: Interview-Style String Challenges

59. Remove duplicate characters from string (no set).
60. Find first non-repeated character in string.
61. Rotate string left (`abc` → `bca`).
62. Compress string (`aaabb` → `a3b2`).
63. Reverse words in sentence without slicing.
64. Count uppercase vs lowercase letters.
65. Validate password (min 8 chars, at least 1 digit).
66. Find duplicate words in paragraph.
67. Count frequency of vowels.
68. Check if two strings are anagrams.

💡 Interview Qs:

69. Difference between immutable (string, tuple) vs mutable (list, dict)?
70. Why strings are immutable in Python?

Section G: Lambda Functions (Real-Life + Interview Qs)

71. Lambda to check even/odd.
72. Lambda with map() → double numbers.
73. Lambda with filter() → select emails ending with `.edu`.

- 74. Lambda with `reduce()` → product of list.
- 75. Lambda to extract first character of each word.
- 76. Lambda to sort employees by salary.
- 77. Lambda to filter only premium users.
- 78. Lambda with `sorted()` → sort by last name.
- 79. Lambda to format phone numbers.
- 80. Lambda to filter all `.jpg` files.

💡 Interview Qs:

- 81. Difference between lambda and def function?
- 82. Limitations of lambda functions?

Section H: List Comprehension (Real-Life + Interview Qs)

- 83. Generate roll numbers `[BSE-1, BSE-2, ..., BSE-50]`.
- 84. Extract vowels from string.
- 85. Get only words starting with "S" from list.
- 86. Flatten nested list using comprehension.
- 87. Create dictionary `{word: length}` from list of words.
- 88. Extract domain names from emails.
- 89. Create list of even numbers from 1–100.
- 90. Filter transactions above 100,000 PKR.
- 91. Extract hashtags from tweets.
- 92. List comprehension for seat numbers A1–C5.

💡 Interview Qs:

- 93. When to prefer list comprehension over loops?
- 94. Can list comprehensions replace map/filter?

Section I: Hard Interview Questions

- 95. Implement your own `range()` using generator.
- 96. Write your own `enumerate()` logic with loop.
- 97. Reverse dictionary `{key: value} → {value: key}`.
- 98. Find all unique pairs in list that sum to target.
- 99. Check balanced parentheses using loop.
- 100. Implement a basic menu-driven system (1=Add, 2=Delete, 3=Exit).
- 101. Print JSON-like dictionary with nested loop.
- 102. Simulate login with dictionary `{username: password}`.

103. Implement word frequency counter without using collections.
104. Implement pagination (show 5 records per page).
105. Simulate restaurant order system with while + dict.