

# Python Programs List

## Basic List Operations

1. Create a list and print all elements
  2. Find the length of a list
  3. Access list elements using index
  4. Slice a list
  5. Append an element to a list
  6. Insert an element at a specific index
  7. Extend list with another list
  8. Remove an element by value
  9. Remove an element by index (`pop()`)
  10. Delete all elements from list (`clear()`)
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## Looping with Lists

11. Print all elements using a `for` loop
  12. Print all elements using a `while` loop
  13. Sum of all elements in a list
  14. Product of all elements in a list
  15. Find even numbers in a list
  16. Find odd numbers in a list
  17. Print elements in reverse order
  18. Count frequency of each element
  19. Find duplicates in a list
  20. Remove duplicates from a list
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## Sorting and Searching

21. Sort a list in ascending order
  22. Sort a list in descending order
  23. Find the largest number in a list
  24. Find the smallest number in a list
  25. Find the second largest element
  26. Find the second smallest element
  27. Linear search in a list
  28. Binary search in a sorted list
  29. Find index of a specific element
  30. Count occurrences of a value
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## Math and Statistics

31. Find mean of list
  32. Find median of list
  33. Find mode of list
  34. Find standard deviation
  35. Find the sum of squares
  36. Check if all numbers are positive
  37. Separate positive and negative numbers
  38. Find GCD of list elements
  39. Find LCM of list elements
  40. Find prime numbers from a list
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### **List Comprehensions**

41. Square of all elements
  42. Filter even numbers using comprehension
  43. Create list of numbers divisible by 3
  44. Replace negative numbers with 0
  45. Convert list of strings to uppercase
  46. Multiply each number by 10
  47. List of all numbers > 50
  48. Flatten a nested list
  49. List of tuples (index, value)
  50. Reverse each string in list
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### **Random and Shuffling**

51. Create a random list of N elements
  52. Shuffle a list randomly
  53. Get random element from a list
  54. Get N random samples from a list
  55. Generate random list of integers
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### **Nested Lists (2D lists)**

56. Create 2D list (matrix)
57. Access element in 2D list
58. Print 2D list row-wise
59. Transpose a matrix
60. Sum of all elements in matrix
61. Sum of each row
62. Sum of each column
63. Matrix addition
64. Matrix multiplication
65. Diagonal sum

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### **List of Strings**

- 66. Count vowels in each string
  - 67. Sort strings by length
  - 68. Filter strings starting with 'a'
  - 69. Find longest string
  - 70. Count total words in list of sentences
  - 71. Convert list of words to a sentence
  - 72. Find palindromes in list
  - 73. Find anagrams in list
  - 74. Remove punctuation from each string
  - 75. Find string with most vowels
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### **Advanced Manipulations**

- 76. Flatten deeply nested lists (recursive)
  - 77. Chunk a list into N parts
  - 78. Merge two sorted lists
  - 79. Rotate list left/right by k elements
  - 80. Interleave two lists
  - 81. Zip two lists into tuple list
  - 82. Unzip list of tuples
  - 83. Split list into odd/even index
  - 84. Replace all zeroes with -1
  - 85. Check if two lists are permutations
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### **Logic-based Challenges**

- 86. Check if list is sorted
  - 87. Find missing number in range
  - 88. Find first repeating element
  - 89. Find first non-repeating element
  - 90. Check if list is palindrome
  - 91. Rearrange list in increasing-decreasing order
  - 92. Find intersection of two lists
  - 93. Find union of two lists
  - 94. Find difference of two lists
  - 95. Find common elements in multiple lists
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### **Conversion and Type Casting**

- 96. Convert list to set
  - 97. Convert list to tuple
  - 98. Convert string to list
  - 99. Convert list of digits to number
  - 100. Convert number to list of digits
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### Extra Challenges

- 101. Merge list of dictionaries by key
- 102. Count total unique words from list of sentences
- 103. Implement list sorting without built-in functions
- 104. Extract emails from list of strings
- 105. Create frequency dictionary from list