

Real-World Python Programs (Functions, Recursion, Lambda)

Function-based Programs

1. Calculate Body Mass Index (BMI) for health analysis
2. Convert temperature from Celsius to Fahrenheit for weather app
3. Check if a number is prime for cryptography key generation
4. Calculate factorial of a number for combinatorics in AI
5. Find the highest scorer in a list of student scores
6. Count number of vowels in a paragraph for language analysis
7. Detect if a string is a palindrome for text normalization
8. Calculate total digits in an invoice number for validation
9. Generate Fibonacci series for population growth modeling
10. Build a simple calculator for basic arithmetic in fintech

Recursion-based Programs

11. Compute factorial recursively for algorithm teaching tool
12. Generate Fibonacci sequence recursively for bioinformatics
13. Calculate sum of N natural numbers for math learning app
14. Count digits in a large number recursively for compression tool
15. Compute exponential power (x^y) for financial prediction
16. Find GCD of two numbers for reducing fractions in data tables
17. Recursively sum up elements of a dataset for ETL process
18. Reverse a string for encryption-decryption logic
19. Check if a sentence is a palindrome recursively for NLP
20. Convert decimal to binary recursively for network mask generation

Lambda Function-based Programs

21. Calculate square of numbers in data streams using lambda
22. Classify even and odd numbers in event logs using lambda
23. Find maximum sales between two days using lambda function
24. Sort products by price using lambda in e-commerce app
25. Filter active users by ID from a list using lambda
26. Square customer ratings using map() and lambda for analytics

27. Compute total revenue using reduce() and lambda function
28. Convert list of usernames to uppercase for normalization
29. Identify if transaction amount is positive or fraudulent
30. Calculate cost of items dynamically using lambda
31. EMI calculator using lambda for banking loan app
32. Check leap year in calendar planning tool using lambda
33. Classify users into age groups using lambda in health app
34. Determine student grades dynamically using lambda function
35. Calculate simple interest using lambda for investment tracker
36. Calculate area of plots in land registry using lambda
37. Compute perimeter of packages for logistics using lambda
38. Reverse customer ID using lambda for privacy masking
39. Convert Fahrenheit to Celsius in weather forecasting tool
40. Return 'FizzBuzz' replacement for log-based number checks