35 Complex Computing Problem Ideas (Uncategorized)

These problems are designed for beginning-level programming fundamentals students in C language. They are more complex than simple exercises and suitable for small group projects (3 members) over 7 weeks. They do not require database knowledge, and focus on using arrays, loops, conditions, switch-case, functions, and bitwise operators.

- 1. Develop a grading system that assigns grades, calculates averages, and generates remarks for multiple students.
- 2. Build a scientific calculator that supports basic arithmetic, power, factorial (recursion), and square root.
- 3. Write a program that checks if a given date (dd/mm/yyyy) is valid, considering leap years and month lengths.
- 4. Design a payroll system that calculates salary with tax deductions, overtime pay, and bonuses.
- 5. Create a system to determine university admission eligibility based on multiple exam scores and a merit formula.
- 6. Simulate a digital clock showing hh:mm:ss using nested loops.
- 7. Develop an ATM withdrawal simulator that breaks an amount into available notes (5000, 1000, 500, etc.).
- 8. Write a program to print Pascal's Triangle with proper alignment using nested loops.
- 9. Fill a matrix in a zig-zag (snake) pattern using nested loops.
- 10. Generate a spiral matrix where numbers are filled in a spiral order.
- 11. Create a student result management system to store marks, calculate totals, averages, toppers, and failed students.
- 12. Build a hospital patient record system that stores details and allows search by ID or disease.
- 13. Implement a library management system to add, search, issue, and return books.
- 14. Create a cinema ticket booking system to manage seat availability in a 2D array.
- 15. Simulate an airline reservation system with economy and business class seat booking.
- 16. Build a banking system with functions for deposit, withdraw, transfer, and balance inquiry.
- 17. Write a matrix calculator with functions for addition, subtraction, multiplication, transpose, and determinant.
- 18. Represent polynomials using arrays and perform addition and multiplication.
- 19. Implement a Caesar cipher encryption and decryption tool using functions.
- 20. Create a scientific unit converter for temperature, distance, weight, and currency.
- 21. Build a two-player tic-tac-toe game with win/draw detection.
- 22. Write a Sudoku validator that checks if a given Sudoku board is valid.
- 23. Implement a simplified Battleship game using 2D arrays for placement and hit detection.
- 24. Represent an image as binary pixels in 2D array and apply filters like invert or brightness adjustment.
- 25. Create a bitwise calculator with AND, OR, XOR, shifts, and bit count features.
- 26. Build a mini shopping cart system that calculates bill and applies discounts.
- 27. Design a quiz game with multiple-choice questions, scoring, and lifelines.
- 28. Implement a digital voting machine simulation to record and display results.
- 29. Create a weather data analyzer that stores weekly data and finds averages, min, and max values.
- 30. Simulate a railway reservation system for booking, canceling, and passenger list management.
- 31. Extend a banking system to include report generation using arrays (no database).
- 32. Build a hospital OPD management system for patient registration, doctor allocation, and billing.
- 33. Create an inventory management system to add, remove, update, and search products.

- 34. Develop a simple hostel/hotel management system for room allocation, checkout, and rent calculation.
- 35. Implement a student course registration system where students can select/drop courses and calculate credit hours.