

## C PROJECT IDEAS

#	Project Name	Short Description
<b>BASIC PROJECTS</b>		
1	Scientific Calculator	Perform advanced mathematical operations (trigonometry, logarithms, exponents)
2	Add/Sub/Multiplication Table Generator	Generate addition, subtraction, and multiplication tables for any number
3	Grade Calculator of Student Marks	Calculate total, percentage, and assign letter grades based on marks
4	Birthday Calculator	Calculate age in years, months, days from birthdate; display zodiac sign
5	Currency Converter	Convert between different currencies using fixed or fetched exchange rates
6	ATM Menu Simulation	Withdraw, deposit, check balance, mini statement with PIN validation
7	Electricity Bill Calculator	Calculate bill based on units consumed with slab-based pricing
8	Password Validation System	Check password strength, validate against criteria (length, special chars, numbers)
9	Number Guessing Game	Computer picks random number, player guesses with hints (higher/lower)
10	Student Result Management System	Enter marks, generate report cards, rank students, store results
11	Bank Loan Eligibility System	Check loan eligibility based on income, credit score, existing loans
12	Attendance Management System	Mark attendance, generate attendance percentage reports
13	Simple Quiz Application	Multiple choice questions, score tracking, timer functionality
14	Number System Converter	Convert between binary, octal, decimal, hexadecimal
15	Daily Expense Tracker	Record daily expenses, categorize, view summaries, set budgets

## INTERMEDIATE PROJECTS

16	Library Management System	Add, search, issue, return books; member management; fine calculation; file storage
17	Employee Database	CRUD operations on employee records; search, sort; salary calculation; file I/O
18	Snake Game	Classic snake movement, food collection, increasing speed, score, collision detection
19	Hangman	Word guessing with gallows visualization, category selection, hint system
20	Tic-Tac-Toe	Two-player console game, win detection, draw condition, score tracking
21	Word Counter	Count words, characters, lines, paragraphs; readability statistics; file analysis
22	Digital Clock	Live time display (HH:MM:SS), date, alarm, stopwatch, timer; console graphics
23	URL Shortener	Convert long URLs to short codes; hash map storage; redirect logic
24	Sorting Visualizer	Visual representation of bubble, selection, insertion, quick, merge sort
25	File Compression Tool	Huffman encoding or LZW algorithm; compress/decompress text files
26	Spell Checker	Dictionary using trie; suggest corrections; levenshtein distance
27	Sudoku Solver	Solve any valid Sudoku; backtracking algorithm; puzzle generator
28	Maze Generator/Solver	Generate random mazes using DFS; find shortest path using BFS/A*
29	Chess Engine	Basic chess rules; move validation; check/checkmate detection; simple AI

## ADVANCED PROJECTS

30	Web Server	Serve static files; handle HTTP/1.1 requests; multiple connections; MIME types
31	Compiler	Lexical analyzer; parser; abstract syntax tree; code generation for subset of C
32	Operating System Kernel	Minimal x86 bootloader; interrupt handling; memory management; simple scheduler
33	Database Engine	B-tree implementation; SQL parser; CRUD operations; transaction support

34	Network Packet Sniffer	Capture packets using raw sockets; protocol analysis (TCP/UDP/IP); filtering
35	RSA Encryption	Key generation (public/private); encryption/decryption; large integer arithmetic
36	Emulator/VM	Emulate CHIP-8 or Game Boy; CPU instructions; memory; graphics; ROM execution
37	Chat Application	Multi-client server; TCP sockets; threading; private messages; chat rooms
38	Ray Tracer	3D scene rendering; lighting; shadows; reflections; camera positioning
39	Task Scheduler	Priority-based scheduling; FCFS, SJF, Round Robin; Gantt chart; wait/turnaround time
40	Image Processor	Read/write BMP/PNG; filters (grayscale, blur, edge detection, sharpen); histogram

### EMBEDDED/HARDWARE PROJECTS

42	Traffic Light Controller	Simulate 4-way intersection; timers; pedestrian crossing; emergency override
43	Temperature Monitor	Read LM35/DHT11 sensor; log to file; CSV export; threshold alerts
44	Smart Home System	Control lights, fans, AC; motion detection; scheduling; web interface
45	RFID Door Lock	Read RFID cards; authorized user database; access log; buzzer/LED indicators

**Total Projects: 45** (11 Basic, 18 Intermediate, 12 Advanced, 4 Embedded/Hardware)