

Top 50+ Creative DSA Project Ideas for Students

Here are the top 50+ creative DSA project ideas that will help you apply your skills, build confidence, and stand out in coding interviews.

Beginner DSA Project Ideas (Easy & Fun)

If you're just starting out, these projects will help you understand basic concepts without feeling overwhelmed.

1. **Stack-Based Calculator** – Evaluate arithmetic expressions using a stack.
2. **Queue Simulation (Bank/ATM)** – Simulate customers in a queue system.
3. **Music Playlist with Linked List** – Manage songs using a doubly linked list.
4. **Binary Search Guessing Game** – Use binary search to guess a number.
5. **Palindrome Checker** – Check palindromes using stack operations.
6. **Bracket Validator** – Verify balanced brackets using a stack.
7. **To-Do List with Arrays** – Add and remove tasks using arrays.
8. **Contact Book using HashMap** – Store and search contacts efficiently.
9. **Student Record Manager** – Handle student records using linked lists.
10. **Sorting Visualizer** – Visually demonstrate sorting algorithms.
11. **Autocomplete Chatbot using Trie and Priority Queue** – Predict user input.
12. **Balanced Parentheses Generator using Recursion** – Generate valid bracket patterns.
13. **Simple Voting App using Arrays and Counters** – Track votes using arrays.
14. **Number Converter (Binary, Decimal, Hex)** – Convert numbers using stacks.

Intermediate DSA Project Ideas (Problem-Solving Skills)

If you've already grasped the basics, try these intermediate projects to challenge yourself.

15. **Trie-Based Autocomplete System** – Suggest words using a trie structure.
16. **LRU Cache Simulator** – Simulate a least-recently-used cache.
17. **Graph-Based Map Route Finder** – Find routes using BFS/DFS.
18. **Expression Tree Evaluator** – Evaluate math expressions via tree traversal.
19. **Binary Search Tree Inventory Manager** – Search and sort product data.
20. **Online Voting System with Heap Leaderboard** – Display top choices using heaps.
21. **Job Scheduler with Priority Queue** – Order tasks using priorities.
22. **Maze Solver with Backtracking** – Navigate a maze recursively.
23. **Undo/Redo Text Editor (Stacks)** – Implement version control in typing.
24. **Word Frequency Counter from Text File** – Count words using a hash map.
25. **URL Shortener using Hashing** – Create unique links with hash functions.
26. **Median Finder with Two Heaps** – Track medians in a dynamic data stream.
27. **Calendar Booking with Interval Trees** – Avoid event overlaps efficiently.
28. **Event Reminder App with Min-Heap** – Alert users before events.

29. **Password Manager with Hash Tables** – Securely store login details.
30. **Railway Reservation System with Queues** – Manage bookings and cancellations.
31. **E-commerce Filter Using Hash Tables** – Quickly find products by category.
32. **File Directory Tree Structure** – Simulate a file explorer.
33. **Spell Checker using Levenshtein Distance** – Suggest correct words using string distance.
34. **Quiz System with Scoring (Stacks & HashMaps)** – Handle user answers and scoring.
35. **Tournament Bracket Generator with Binary Trees** – Auto-generate sports brackets.
36. **Online Poll Result Analyzer (Hash + Heap)** – Track real-time voting results.

These projects are ideal for college submissions or interview prep.

Advanced DSA Project Ideas (For Experts & Final Year Students)

Take your DSA skills to the next level with these complex and impressive projects.

37. **Huffman Encoding & Compression Tool** – Compress data with binary trees.
38. *A Pathfinding Visualizer** – Visualize shortest paths with A*.
39. **Red-Black Tree File System Simulation** – Balanced data access and storage.
40. **Social Network Graph Analyzer** – Discover friends of friends or mutuals.
41. **Dynamic Programming Spell Checker** – Suggest accurate corrections efficiently.
42. **T9 Text Prediction with Trie** – Predict words from number keys.
43. **Pattern-Matching Chatbot with KMP** – Build a rule-based message responder.
44. **Blockchain Data Structure** – Create a simple blockchain for data integrity.
45. **Concurrency Task Manager (Thread-safe Queues)** – Handle tasks in parallel systems.
46. **Proctored Exam Tree System** – Organize and schedule exams hierarchically.
47. **Graph Coloring for Class Scheduling** – Avoid conflicts in schedules.
48. **Peer File Sharing with Hashing** – Send files using chunks and hashes.
49. **MapReduce Simulation using Core DSA** – Model distributed data processing.
50. **Web Crawler using Graph Search** – Crawl and index web pages.
51. **Voice Search System using Trie** – Match voice input to commands.
52. **Dependency Resolver with Topological Sort** – Resolve module build order.
53. **AI Snake Game with Heaps** – Guide the snake intelligently using shortest path logic.
54. **Real-Time Chat Queue Manager** – Queue messages in a scalable chat system.
55. **Dynamic Memory Allocator using BST** – Simulate memory blocks with binary search trees.
56. **Airport Flight Schedule System with Heaps** – Prioritize arrivals/departures by time.

These projects are great for final-year projects, research, and advanced portfolios