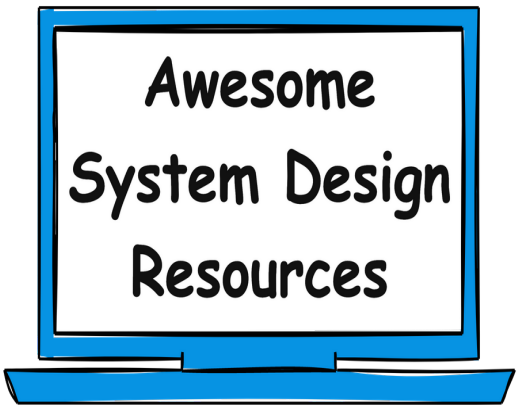

This repository contains free resources to learn System Design concepts and prepare for interviews.

👉 Subscribe to my AlgoMaster Newsletter and get a **FREE System Design Interview Handbook** in your inbox.

✅ If you are new to System Design, start here: System Design was HARD until I Learned these 30 Concepts

📌 System Design Key Concepts

- Scalability
- Availability
- CAP Theorem
- ACID Transactions
- Consistent Hashing
- Rate Limiting
- SPOF
- Fault Tolerance

- Consensus Algorithms
- Gossip Protocol
- Service Discovery
- API Design
- Disaster Recovery
- Distributed Tracing

🛠️ System Design Building Blocks

- APIs
- Content Delivery Network (CDN)
- Proxy vs Reverse Proxy
- Domain Name System (DNS)
- Caching
- Caching Strategies
- Distributed Caching
- API Gateway
- Load Balancing
- Databases Types
- SQL vs NoSQL
- Database Indexes
- Consistency Patterns
- HeartBeats
- Circuit Breaker
- Idempotency
- Database Scaling
- Data Replication
- Data Redundancy
- Database Sharding
- Database Architectures
- Failover
- Bloom Filters
- Message Queues

- WebSockets
- Checksums
- Microservices Guidelines
- Distributed Locking

⚖️ System Design Tradeoffs

- Top 15 Tradeoffs
- Vertical vs Horizontal Scaling
- Concurrency vs Parallelism
- Long Polling vs WebSockets
- Batch vs Stream Processing
- Stateful vs Stateless Design
- Strong vs Eventual Consistency
- Read-Through vs Write-Through Cache
- Push vs Pull Architecture
- REST vs RPC
- Synchronous vs. asynchronous communications
- Latency vs Throughput

🖇️ System Design Architectural Patterns

- Client-Server Architecture
- Microservices Architecture
- Serverless Architecture
- Event-Driven Architecture
- Peer-to-Peer (P2P) Architecture

✅ How to Answer a

System Design Interview Problem

💻 System Design Interview Problems

Easy

- Design URL Shortener like TinyURL
- Design Leaderboard
- Design Content Delivery Network (CDN)
- Design Parking Garage
- Design Vending Machine
- Design Distributed Key-Value Store
- Design Distributed Cache
- Design Authentication System
- Design Unified Payments Interface (UPI)

Medium

- Design WhatsApp
- Design Spotify
- Design Distributed Job Scheduler
- Design a Scalable Notification Service
- Design Instagram
- Design Tinder
- Design Facebook
- Design Twitter
- Design Reddit

- Design Netflix
- Design Youtube
- Design Google Search
- Design E-commerce Store like Amazon
- Design TikTok
- Design Shopify
- Design Airbnb
- Design Autocomplete for Search Engines
- Design Rate Limiter
- Design Distributed Message Queue like Kafka
- Design Flight Booking System
- Design Online Code Editor
- Design Stock Exchange System
- Design an Analytics Platform (Metrics & Logging)
- Design Payment System
- Design a Digital Wallet

Hard

- Design Location Based Service like Yelp
- Design Uber
- Design Food Delivery App like Doordash
- Design Google Docs
- Design Google Maps
- Design Zoom
- Design Distributed Counter
- Design File Sharing System like Dropbox
- Design Ticket Booking System like BookMyShow

- Design Distributed Web Crawler
- Design Code Deployment System
- Design Distributed Cloud Storage like S3
- Design Distributed Locking Service
- Design Slack
- Design Live Comments

📚 Books

- Designing Data-Intensive Applications

📩 Newsletters

- AlgoMaster Newsletter

📺 YouTube Channels

- Tech Dummies Narendra L
- Gaurav Sen
- codeKarle
- ByteByteGo
- System Design Interview
- sudoCODE
- Success in Tech

📜 Must-Read Engineering Articles

- How Discord stores trillions of messages
- Building In-Video Search at Netflix

- How Canva scaled Media uploads from Zero to 50 Million per Day
- How Airbnb avoids double payments in a Distributed Payments System
- Stripe's payments APIs - The first 10 years
- Real time messaging at Slack

🗞️ Must-Read Distributed Systems Papers

- Paxos: The Part-Time Parliament
- MapReduce: Simplified Data Processing on Large Clusters
- The Google File System
- Dynamo: Amazon's Highly Available Key-value Store
- Kafka: a Distributed Messaging System for Log Processing
- Spanner: Google's Globally-Distributed Database
- Bigtable: A Distributed Storage System for Structured Data
- ZooKeeper: Wait-free coordination for Internet-scale systems
- The Log-Structured Merge-Tree (LSM-Tree)
- The Chubby lock service for loosely-coupled distributed systems