

System Design Interview Questions

This document contains a comprehensive collection of system design interview questions for Engineering Manager positions.

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Data & AI/ML Systems

1. Design a multi-tenant analytics platform

Difficulty: Hard

Company: General

Tags: multi-tenancy, analytics, data-isolation, scalability

Architecture Focus: multi-tenancy, analytics, data-isolation, scalability

Relevant Frameworks: System Design, Scalability, Reliability

2. Design a real-time feature engineering pipeline

Difficulty: Hard

Company: General

Tags: feature-engineering, real-time-processing, streaming, ml-pipeline

Architecture Focus: feature-engineering, real-time-processing, streaming, ml-pipeline

Relevant Frameworks: System Design, Scalability, Reliability

3. Design a distributed graph processing system

Difficulty: Hard

Company: General

Tags: graph-processing, distributed-computing, graph-algorithms, big-data

Architecture Focus: graph-processing, distributed-computing, graph-algorithms, big-data

Relevant Frameworks: System Design, Scalability, Reliability

4. Design a real-time anomaly detection system

Difficulty: Hard

Company: General

Tags: anomaly-detection, real-time-ml, outlier-detection, monitoring

Architecture Focus: anomaly-detection, real-time-ml, outlier-detection, monitoring

Relevant Frameworks: System Design, Scalability, Reliability

5. Design a distributed machine learning training system

Difficulty: Hard

Company: General

Tags: distributed-training, ml-infrastructure, gpu-clusters, model-parallelism

Architecture Focus: distributed-training, ml-infrastructure, gpu-clusters, model-parallelism

Relevant Frameworks: System Design, Scalability, Reliability

6. Design a real-time recommendation system for e-commerce

Difficulty: Hard

Company: General

Tags: real-time-recommendations, e-commerce, personalization, ml

Architecture Focus: real-time-recommendations, e-commerce, personalization, ml

Relevant Frameworks: System Design, Scalability, Reliability

7. Design a data lake architecture

Difficulty: Hard

Company: General

Tags: data-lake, big-data, storage, analytics

Architecture Focus: data-lake, big-data, storage, analytics

Relevant Frameworks: System Design, Scalability, Reliability

8. Design a machine learning model serving platform

Difficulty: Hard

Company: General

Tags: ml-serving, model-deployment, inference, scalability

Architecture Focus: ml-serving, model-deployment, inference, scalability

Relevant Frameworks: System Design, Scalability, Reliability

9. Design a personalization engine for e-commerce

Difficulty: Hard

Company: General

Tags: personalization, e-commerce, user-modeling, real-time-recommendations

Architecture Focus: personalization, e-commerce, user-modeling, real-time-recommendations

Relevant Frameworks: System Design, Scalability, Reliability

10. Design a computer vision pipeline for autonomous vehicles

Difficulty: Hard

Company: General

Tags: computer-vision, autonomous-vehicles, real-time-processing, edge-computing

Architecture Focus: computer-vision, autonomous-vehicles, real-time-processing, edge-computing

Relevant Frameworks: System Design, Scalability, Reliability

11. Design a data warehouse system like Snowflake

Difficulty: Hard

Company: Snowflake

Tags: data-warehouse, olap, columnar-storage, query-optimization

Architecture Focus: data-warehouse, olap, columnar-storage, query-optimization

Relevant Frameworks: System Design, Scalability, Reliability

12. Design a real-time analytics platform like Google Analytics

Difficulty: Hard

Company: Google

Tags: real-time-analytics, data-processing, dashboard, metrics

Architecture Focus: real-time-analytics, data-processing, dashboard, metrics

Relevant Frameworks: System Design, Scalability, Reliability

13. Design YouTube's video recommendation algorithm

Difficulty: Hard

Company: Google

Tags: video-recommendation, content-understanding, engagement-prediction

Architecture Focus: video-recommendation, content-understanding, engagement-prediction

Relevant Frameworks: System Design, Scalability, Reliability

14. Design Spotify's music recommendation system

Difficulty: Hard

Company: General

Tags: music-recommendation, collaborative-filtering, audio-analysis, playlist-generation

Architecture Focus: music-recommendation, collaborative-filtering, audio-analysis, playlist-generation

Relevant Frameworks: System Design, Scalability, Reliability

15. Design a real-time fraud detection system

Difficulty: Hard

Company: General

Tags: fraud-detection, real-time-ml, anomaly-detection, risk-scoring

Architecture Focus: fraud-detection, real-time-ml, anomaly-detection, risk-scoring

Relevant Frameworks: System Design, Scalability, Reliability

16. Design Google Search's indexing and ranking system

Difficulty: Hard

Company: Google

Tags: search-engine, indexing, ranking, web-crawling

Architecture Focus: search-engine, indexing, ranking, web-crawling

Relevant Frameworks: System Design, Scalability, Reliability

17. Design TikTok's For You Page Algorithm

Difficulty: Hard

Company: TikTok

Tags: recommendation, video-ranking, engagement-prediction, real-time-ml

Architecture Focus: recommendation, video-ranking, engagement-prediction, real-time-ml

Relevant Frameworks: System Design, Scalability, Reliability

18. Design Netflix's Content Recommendation System

Difficulty: Hard

Company: Netflix

Tags: recommendation, machine-learning, personalization, collaborative-filtering

Architecture Focus: recommendation, machine-learning, personalization, collaborative-filtering

Relevant Frameworks: System Design, Scalability, Reliability

19. Design a machine learning model monitoring system

Difficulty: Medium

Company: General

Tags: model-monitoring, drift-detection, performance-tracking, ml-ops

Architecture Focus: model-monitoring, drift-detection, performance-tracking, ml-ops

Relevant Frameworks: System Design, Scalability, Reliability

20. Design a data quality monitoring system

Difficulty: Medium

Company: General

Tags: data-quality, monitoring, validation, data-governance

Architecture Focus: data-quality, monitoring, validation, data-governance

Relevant Frameworks: System Design, Scalability, Reliability

21. Design a machine learning experiment tracking system

Difficulty: Medium

Company: General

Tags: experiment-tracking, ml-ops, model-versioning, reproducibility

Architecture Focus: experiment-tracking, ml-ops, model-versioning, reproducibility

Relevant Frameworks: System Design, Scalability, Reliability

22. Design a data versioning and lineage system

Difficulty: Medium

Company: General

Tags: data-versioning, data-lineage, data-governance, metadata-management

Architecture Focus: data-versioning, data-lineage, data-governance, metadata-management

Relevant Frameworks: System Design, Scalability, Reliability

23. Design a content-based recommendation system

Difficulty: Medium

Company: General

Tags: content-based-filtering, feature-extraction, similarity-matching

Architecture Focus: content-based-filtering, feature-extraction, similarity-matching

Relevant Frameworks: System Design, Scalability, Reliability

24. Design a clickstream analytics system

Difficulty: Medium

Company: General

Tags: clickstream, user-analytics, behavioral-data, real-time-processing

Architecture Focus: clickstream, user-analytics, behavioral-data, real-time-processing

Relevant Frameworks: System Design, Scalability, Reliability

25. Design a data pipeline for ETL processing

Difficulty: Medium

Company: General

Tags: etl, data-pipeline, batch-processing, data-transformation

Architecture Focus: etl, data-pipeline, batch-processing, data-transformation

Relevant Frameworks: System Design, Scalability, Reliability

26. Design a time series forecasting system

Difficulty: Medium

Company: General

Tags: time-series, forecasting, anomaly-detection, trend-analysis

Architecture Focus: time-series, forecasting, anomaly-detection, trend-analysis

Relevant Frameworks: System Design, Scalability, Reliability

27. Design a natural language processing pipeline

Difficulty: Medium

Company: General

Tags: nlp, text-processing, sentiment-analysis, language-models

Architecture Focus: nlp, text-processing, sentiment-analysis, language-models

Relevant Frameworks: System Design, Scalability, Reliability

28. Design an A/B testing platform

Difficulty: Medium

Company: General

Tags: ab-testing, experimentation, statistical-analysis, feature-flags

Architecture Focus: ab-testing, experimentation, statistical-analysis, feature-flags

Relevant Frameworks: System Design, Scalability, Reliability

29. Design a feature store for machine learning

Difficulty: Medium

Company: General

Tags: feature-store, ml-infrastructure, feature-engineering, data-pipeline

Architecture Focus: feature-store, ml-infrastructure, feature-engineering, data-pipeline

Relevant Frameworks: System Design, Scalability, Reliability

30. Design Amazon's product recommendation engine

Difficulty: Medium

Company: Amazon

Tags: e-commerce, recommendation, collaborative-filtering, product-ranking

Architecture Focus: e-commerce, recommendation, collaborative-filtering, product-ranking

Relevant Frameworks: System Design, Scalability, Reliability

Distributed Systems & Infrastructure

1. Design a distributed health check system

Difficulty: Easy

Company: General

Tags: health-checks, service-discovery, monitoring, availability

Architecture Focus: health-checks, service-discovery, monitoring, availability

Relevant Frameworks: System Design, Scalability, Reliability

2. Design a distributed event sourcing system

Difficulty: Hard

Company: General

Tags: event-sourcing, cqrs, event-store, eventual-consistency

Architecture Focus: event-sourcing, cqrs, event-store, eventual-consistency

Relevant Frameworks: System Design, Scalability, Reliability

3. Design a distributed search engine like Elasticsearch

Difficulty: Hard

Company: General

Tags: distributed-search, indexing, sharding, full-text-search

Architecture Focus: distributed-search, indexing, sharding, full-text-search

Relevant Frameworks: System Design, Scalability, Reliability

4. Design a distributed lock service like Chubby

Difficulty: Hard

Company: Google

Tags: distributed-locks, coordination, consensus, high-availability

Architecture Focus: distributed-locks, coordination, consensus, high-availability

Relevant Frameworks: System Design, Scalability, Reliability

5. Design a distributed consensus system like Raft

Difficulty: Hard

Company: General

Tags: consensus, raft, distributed-systems, leader-election

Architecture Focus: consensus, raft, distributed-systems, leader-election

Relevant Frameworks: System Design, Scalability, Reliability

6. Design a distributed backup and disaster recovery system

Difficulty: Hard

Company: General

Tags: backup, disaster-recovery, replication, data-protection

Architecture Focus: backup, disaster-recovery, replication, data-protection

Relevant Frameworks: System Design, Scalability, Reliability

7. Design a distributed message queue like Apache Kafka

Difficulty: Hard

Company: General

Tags: message-queue, kafka, streaming, pub-sub

Architecture Focus: message-queue, kafka, streaming, pub-sub

Relevant Frameworks: System Design, Scalability, Reliability

8. Design a service mesh architecture like Istio

Difficulty: Hard

Company: General

Tags: service-mesh, istio, traffic-management, security

Architecture Focus: service-mesh, istio, traffic-management, security

Relevant Frameworks: System Design, Scalability, Reliability

9. Design a container orchestration platform like Kubernetes

Difficulty: Hard

Company: General

Tags: container-orchestration, kubernetes, scheduling, resource-management

Architecture Focus: container-orchestration, kubernetes, scheduling, resource-management

Relevant Frameworks: System Design, Scalability, Reliability

10. Design a microservices architecture for a large enterprise

Difficulty: Hard

Company: General

Tags: microservices, service-mesh, api-gateway, distributed-systems

Architecture Focus: microservices, service-mesh, api-gateway, distributed-systems

Relevant Frameworks: System Design, Scalability, Reliability

11. Design a distributed database system like Cassandra

Difficulty: Hard

Company: General

Tags: distributed-database, nosql, consistency, partition-tolerance

Architecture Focus: distributed-database, nosql, consistency, partition-tolerance

Relevant Frameworks: System Design, Scalability, Reliability

12. Design a distributed file storage system (like HDFS)

Difficulty: Hard

Company: General

Tags: distributed-storage, fault-tolerance, replication

Architecture Focus: distributed-storage, fault-tolerance, replication

Relevant Frameworks: System Design, Scalability, Reliability

13. Design Meta's News Feed system

Difficulty: Hard

Company: Meta

Tags: social-media, feed-generation, ranking, real-time

Architecture Focus: social-media, feed-generation, ranking, real-time

Relevant Frameworks: System Design, Scalability, Reliability

14. Design a Content Delivery Network (CDN)

Difficulty: Hard

Company: General

Tags: cdn, caching, global-distribution, edge-computing

Architecture Focus: cdn, caching, global-distribution, edge-computing

Relevant Frameworks: System Design, Scalability, Reliability

15. Design a distributed auto-scaling system

Difficulty: Medium

Company: General

Tags: auto-scaling, resource-management, load-monitoring, elasticity

Architecture Focus: auto-scaling, resource-management, load-monitoring, elasticity

Relevant Frameworks: System Design, Scalability, Reliability

16. Design a distributed circuit breaker system

Difficulty: Medium

Company: General

Tags: circuit-breaker, fault-tolerance, resilience, failure-handling

Architecture Focus: circuit-breaker, fault-tolerance, resilience, failure-handling

Relevant Frameworks: System Design, Scalability, Reliability

17. Design a distributed job queue system like Celery

Difficulty: Medium

Company: General

Tags: job-queue, task-processing, worker-nodes, async-processing

Architecture Focus: job-queue, task-processing, worker-nodes, async-processing

Relevant Frameworks: System Design, Scalability, Reliability

18. Design a distributed session store

Difficulty: Medium

Company: General

Tags: session-management, distributed-cache, user-sessions, scalability

Architecture Focus: session-management, distributed-cache, user-sessions, scalability

Relevant Frameworks: System Design, Scalability, Reliability

19. Design a distributed rate limiting system

Difficulty: Medium

Company: General

Tags: rate-limiting, throttling, distributed-systems, api-protection

Architecture Focus: rate-limiting, throttling, distributed-systems, api-protection

Relevant Frameworks: System Design, Scalability, Reliability

20. Design a distributed secret management system like Vault

Difficulty: Medium

Company: General

Tags: secret-management, encryption, access-control, security

Architecture Focus: secret-management, encryption, access-control, security

Relevant Frameworks: System Design, Scalability, Reliability

21. Design a distributed tracing system like Jaeger

Difficulty: Medium

Company: General

Tags: distributed-tracing, observability, performance-monitoring

Architecture Focus: distributed-tracing, observability, performance-monitoring

Relevant Frameworks: System Design, Scalability, Reliability

22. Design a distributed metrics collection system like Prometheus

Difficulty: Medium

Company: General

Tags: metrics, monitoring, time-series, alerting

Architecture Focus: metrics, monitoring, time-series, alerting

Relevant Frameworks: System Design, Scalability, Reliability

23. Design a distributed API gateway

Difficulty: Medium

Company: General

Tags: api-gateway, rate-limiting, authentication, load-balancing

Architecture Focus: api-gateway, rate-limiting, authentication, load-balancing

Relevant Frameworks: System Design, Scalability, Reliability

24. Design a distributed task scheduler like Airflow

Difficulty: Medium

Company: General

Tags: task-scheduling, workflow, dag, orchestration

Architecture Focus: task-scheduling, workflow, dag, orchestration

Relevant Frameworks: System Design, Scalability, Reliability

25. Design a distributed configuration management system

Difficulty: Medium

Company: General

Tags: configuration-management, distributed-config, consistency

Architecture Focus: configuration-management, distributed-config, consistency

Relevant Frameworks: System Design, Scalability, Reliability

26. Design a distributed logging system like ELK Stack

Difficulty: Medium

Company: General

Tags: logging, elasticsearch, log-aggregation, search

Architecture Focus: logging, elasticsearch, log-aggregation, search

Relevant Frameworks: System Design, Scalability, Reliability

27. Design a CI/CD pipeline system like Jenkins

Difficulty: Medium

Company: General

Tags: ci-cd, automation, deployment, testing

Architecture Focus: ci-cd, automation, deployment, testing

Relevant Frameworks: System Design, Scalability, Reliability

28. Design a distributed caching system like Redis Cluster

Difficulty: Medium

Company: General

Tags: distributed-cache, redis, sharding, replication

Architecture Focus: distributed-cache, redis, sharding, replication

Relevant Frameworks: System Design, Scalability, Reliability

29. Design a global load balancer system

Difficulty: Medium

Company: General

Tags: load-balancing, traffic-distribution, health-checks

Architecture Focus: load-balancing, traffic-distribution, health-checks

Relevant Frameworks: System Design, Scalability, Reliability

30. Design a cloud monitoring service (like Azure Monitor)

Difficulty: Medium

Company: Microsoft

Tags: monitoring, metrics, alerting, observability

Architecture Focus: monitoring, metrics, alerting, observability

Relevant Frameworks: System Design, Scalability, Reliability

Product & Platform Systems

1. Design a recipe sharing platform

Difficulty: Easy

Company: General

Tags: recipe-sharing, social-features, search, user-generated-content

Architecture Focus: recipe-sharing, social-features, search, user-generated-content

Relevant Frameworks: System Design, Scalability, Reliability

2. Design a hotel booking platform like Booking.com

Difficulty: Hard

Company: General

Tags: hotel-booking, availability, pricing, reviews

Architecture Focus: hotel-booking, availability, pricing, reviews

Relevant Frameworks: System Design, Scalability, Reliability

3. Design a marketplace platform like eBay

Difficulty: Hard

Company: General

Tags: marketplace, auctions, payments, trust-safety

Architecture Focus: marketplace, auctions, payments, trust-safety

Relevant Frameworks: System Design, Scalability, Reliability

4. Design a digital wallet platform like PayPal

Difficulty: Hard

Company: General

Tags: digital-wallet, payments, financial-services, security

Architecture Focus: digital-wallet, payments, financial-services, security

Relevant Frameworks: System Design, Scalability, Reliability

5. Design a multi-tenant SaaS platform

Difficulty: Hard

Company: General

Tags: multi-tenancy, saas, data-isolation, scalability

Architecture Focus: multi-tenancy, saas, data-isolation, scalability

Relevant Frameworks: System Design, Scalability, Reliability

6. Design a financial trading platform like Robinhood

Difficulty: Hard

Company: General

Tags: financial-trading, real-time-data, order-execution, portfolio-management

Architecture Focus: financial-trading, real-time-data, order-execution, portfolio-management

Relevant Frameworks: System Design, Scalability, Reliability

7. Design a video streaming platform like Netflix

Difficulty: Hard

Company: Netflix

Tags: video-streaming, content-delivery, recommendation, adaptive-bitrate

Architecture Focus: video-streaming, content-delivery, recommendation, adaptive-bitrate

Relevant Frameworks: System Design, Scalability, Reliability

8. Design a ride-sharing platform like Lyft

Difficulty: Hard

Company: General

Tags: ride-sharing, two-sided-marketplace, matching-algorithm, pricing

Architecture Focus: ride-sharing, two-sided-marketplace, matching-algorithm, pricing

Relevant Frameworks: System Design, Scalability, Reliability

9. Design a food delivery platform like DoorDash

Difficulty: Hard

Company: General

Tags: food-delivery, three-sided-marketplace, logistics, real-time-tracking

Architecture Focus: food-delivery, three-sided-marketplace, logistics, real-time-tracking

Relevant Frameworks: System Design, Scalability, Reliability

10. Design a social media platform like Instagram

Difficulty: Hard

Company: Meta

Tags: social-media, photo-sharing, feed-generation, content-moderation

Architecture Focus: social-media, photo-sharing, feed-generation, content-moderation

Relevant Frameworks: System Design, Scalability, Reliability

11. Design Airbnb's booking and reservation system

Difficulty: Hard

Company: Airbnb

Tags: booking-system, availability-management, payment-processing, two-sided-marketplace

Architecture Focus: booking-system, availability-management, payment-processing, two-sided-marketplace

Relevant Frameworks: System Design, Scalability, Reliability

12. Design an e-commerce platform like Amazon

Difficulty: Hard

Company: Amazon

Tags: e-commerce, inventory-management, payment-processing, order-fulfillment

Architecture Focus: e-commerce, inventory-management, payment-processing, order-fulfillment

Relevant Frameworks: System Design, Scalability, Reliability

13. Design a password manager platform

Difficulty: Medium

Company: General

Tags: password-manager, encryption, security, sync

Architecture Focus: password-manager, encryption, security, sync

Relevant Frameworks: System Design, Scalability, Reliability

14. Design a photo storage platform like Google Photos

Difficulty: Medium

Company: Google

Tags: photo-storage, image-recognition, search, sharing

Architecture Focus: photo-storage, image-recognition, search, sharing

Relevant Frameworks: System Design, Scalability, Reliability

15. Design a news aggregation platform like Reddit

Difficulty: Medium

Company: Reddit

Tags: news-aggregation, voting, communities, content-ranking

Architecture Focus: news-aggregation, voting, communities, content-ranking

Relevant Frameworks: System Design, Scalability, Reliability

16. Design a fitness tracking platform

Difficulty: Medium

Company: General

Tags: fitness-tracking, wearables, health-data, social-features

Architecture Focus: fitness-tracking, wearables, health-data, social-features

Relevant Frameworks: System Design, Scalability, Reliability

17. Design a dating platform like Tinder

Difficulty: Medium

Company: General

Tags: dating-app, matching-algorithm, geolocation, user-preferences

Architecture Focus: dating-app, matching-algorithm, geolocation, user-preferences

Relevant Frameworks: System Design, Scalability, Reliability

18. Design a freelancer platform like Upwork

Difficulty: Medium

Company: General

Tags: freelancer-platform, matching, payments, project-management

Architecture Focus: freelancer-platform, matching, payments, project-management

Relevant Frameworks: System Design, Scalability, Reliability

19. Design a event ticketing platform like Eventbrite

Difficulty: Medium

Company: General

Tags: event-ticketing, payments, event-management, qr-codes

Architecture Focus: event-ticketing, payments, event-management, qr-codes

Relevant Frameworks: System Design, Scalability, Reliability

20. Design a inventory management system

Difficulty: Medium

Company: General

Tags: inventory, supply-chain, tracking, optimization

Architecture Focus: inventory, supply-chain, tracking, optimization

Relevant Frameworks: System Design, Scalability, Reliability

21. Design a subscription management platform

Difficulty: Medium

Company: General

Tags: subscriptions, billing, recurring-payments, customer-management

Architecture Focus: subscriptions, billing, recurring-payments, customer-management

Relevant Frameworks: System Design, Scalability, Reliability

22. Design a content management system like WordPress

Difficulty: Medium

Company: General

Tags: cms, content-management, publishing, themes

Architecture Focus: cms, content-management, publishing, themes

Relevant Frameworks: System Design, Scalability, Reliability

23. Design a real estate platform like Zillow

Difficulty: Medium

Company: General

Tags: real-estate, property-search, valuation, marketplace

Architecture Focus: real-estate, property-search, valuation, marketplace

Relevant Frameworks: System Design, Scalability, Reliability

24. Design a healthcare platform for telemedicine

Difficulty: Medium

Company: General

Tags: telemedicine, video-consultation, patient-records, scheduling

Architecture Focus: telemedicine, video-consultation, patient-records, scheduling

Relevant Frameworks: System Design, Scalability, Reliability

25. Design a customer support platform like Zendesk

Difficulty: Medium

Company: General

Tags: customer-support, ticketing, knowledge-base, automation

Architecture Focus: customer-support, ticketing, knowledge-base, automation

Relevant Frameworks: System Design, Scalability, Reliability

26. Design a learning management system like Coursera

Difficulty: Medium

Company: General

Tags: e-learning, course-management, video-streaming, assessment

Architecture Focus: e-learning, course-management, video-streaming, assessment

Relevant Frameworks: System Design, Scalability, Reliability

27. Design a project management platform like Jira

Difficulty: Medium

Company: General

Tags: project-management, issue-tracking, workflow, reporting

Architecture Focus: project-management, issue-tracking, workflow, reporting

Relevant Frameworks: System Design, Scalability, Reliability

28. Design a cloud storage platform like Dropbox

Difficulty: Medium

Company: General

Tags: cloud-storage, file-sync, collaboration, version-control

Architecture Focus: cloud-storage, file-sync, collaboration, version-control

Relevant Frameworks: System Design, Scalability, Reliability

29. Design a professional networking platform like LinkedIn

Difficulty: Medium

Company: LinkedIn

Tags: professional-networking, job-matching, content-feed, messaging

Architecture Focus: professional-networking, job-matching, content-feed, messaging

Relevant Frameworks: System Design, Scalability, Reliability

30. Design a minimum viable product (MVP) architecture that can scale

Difficulty: Medium

Company: Startups & Scale-ups

Tags: mvp, scalability, startup-architecture, cost-optimization

Architecture Focus: mvp, scalability, startup-architecture, cost-optimization

Relevant Frameworks: System Design, Scalability, Reliability

Real-time & Communication Systems

1. Design a real-time comment system

Difficulty: Easy

Company: General

Tags: comments, real-time-updates, moderation, social-features

Architecture Focus: comments, real-time-updates, moderation, social-features

Relevant Frameworks: System Design, Scalability, Reliability

2. Design a real-time social media feed

Difficulty: Hard

Company: General

Tags: social-feed, real-time-updates, personalization, content-ranking

Architecture Focus: social-feed, real-time-updates, personalization, content-ranking

Relevant Frameworks: System Design, Scalability, Reliability

3. Design a real-time collaborative code editor

Difficulty: Hard

Company: General

Tags: collaborative-editing, code-editor, real-time-sync, conflict-resolution

Architecture Focus: collaborative-editing, code-editor, real-time-sync, conflict-resolution

Relevant Frameworks: System Design, Scalability, Reliability

4. Design a real-time recommendation engine

Difficulty: Hard

Company: General

Tags: real-time-recommendations, personalization, streaming, ml

Architecture Focus: real-time-recommendations, personalization, streaming, ml

Relevant Frameworks: System Design, Scalability, Reliability

5. Design a real-time fraud detection for payments

Difficulty: Hard

Company: General

Tags: fraud-detection, real-time-ml, payments, risk-scoring

Architecture Focus: fraud-detection, real-time-ml, payments, risk-scoring

Relevant Frameworks: System Design, Scalability, Reliability

6. Design a real-time event streaming platform

Difficulty: Hard

Company: General

Tags: event-streaming, real-time-processing, pub-sub, kafka

Architecture Focus: event-streaming, real-time-processing, pub-sub, kafka

Relevant Frameworks: System Design, Scalability, Reliability

7. Design a real-time stock trading platform

Difficulty: Hard

Company: General

Tags: stock-trading, real-time-data, order-matching, market-data

Architecture Focus: stock-trading, real-time-data, order-matching, market-data

Relevant Frameworks: System Design, Scalability, Reliability

8. Design a real-time multiplayer game backend

Difficulty: Hard

Company: General

Tags: multiplayer-gaming, real-time-sync, game-state, latency-optimization

Architecture Focus: multiplayer-gaming, real-time-sync, game-state, latency-optimization

Relevant Frameworks: System Design, Scalability, Reliability

9. Design a real-time collaborative document editor like Google Docs

Difficulty: Hard

Company: Google

Tags: collaborative-editing, operational-transform, conflict-resolution, real-time-sync

Architecture Focus: collaborative-editing, operational-transform, conflict-resolution, real-time-sync

Relevant Frameworks: System Design, Scalability, Reliability

10. Design Twitch's live streaming platform

Difficulty: Hard

Company: General

Tags: live-streaming, video-processing, chat, content-delivery

Architecture Focus: live-streaming, video-processing, chat, content-delivery

Relevant Frameworks: System Design, Scalability, Reliability

11. Design Discord's voice and text chat system

Difficulty: Hard

Company: General

Tags: voice-chat, text-chat, gaming, real-time-communication

Architecture Focus: voice-chat, text-chat, gaming, real-time-communication

Relevant Frameworks: System Design, Scalability, Reliability

12. Design Zoom's video conferencing system

Difficulty: Hard

Company: General

Tags: video-conferencing, real-time-communication, media-streaming, webrtc

Architecture Focus: video-conferencing, real-time-communication, media-streaming, webrtc

Relevant Frameworks: System Design, Scalability, Reliability

13. Design WhatsApp's messaging system

Difficulty: Hard

Company: Meta

Tags: messaging, real-time, end-to-end-encryption, group-chat

Architecture Focus: messaging, real-time, end-to-end-encryption, group-chat

Relevant Frameworks: System Design, Scalability, Reliability

14. Design Uber's Real-time Ride Matching System

Difficulty: Hard

Company: Uber

Tags: real-time-matching, geospatial, optimization, location-services

Architecture Focus: real-time-matching, geospatial, optimization, location-services

Relevant Frameworks: System Design, Scalability, Reliability

15. Design a real-time price monitoring system

Difficulty: Medium

Company: General

Tags: price-monitoring, real-time-updates, alerts, e-commerce

Architecture Focus: price-monitoring, real-time-updates, alerts, e-commerce

Relevant Frameworks: System Design, Scalability, Reliability

16. Design a real-time dashboard system

Difficulty: Medium

Company: General

Tags: real-time-dashboard, data-visualization, streaming, analytics

Architecture Focus: real-time-dashboard, data-visualization, streaming, analytics

Relevant Frameworks: System Design, Scalability, Reliability

17. Design a real-time delivery tracking system

Difficulty: Medium

Company: General

Tags: delivery-tracking, real-time-location, logistics, notifications

Architecture Focus: delivery-tracking, real-time-location, logistics, notifications

Relevant Frameworks: System Design, Scalability, Reliability

18. Design a real-time polling and voting system

Difficulty: Medium

Company: General

Tags: polling, voting, real-time-results, aggregation

Architecture Focus: polling, voting, real-time-results, aggregation

Relevant Frameworks: System Design, Scalability, Reliability

19. Design a real-time presence system

Difficulty: Medium

Company: General

Tags: presence, online-status, real-time-updates, user-activity

Architecture Focus: presence, online-status, real-time-updates, user-activity

Relevant Frameworks: System Design, Scalability, Reliability

20. Design a real-time collaborative whiteboard

Difficulty: Medium

Company: General

Tags: collaborative-editing, real-time-sync, drawing, conflict-resolution

Architecture Focus: collaborative-editing, real-time-sync, drawing, conflict-resolution

Relevant Frameworks: System Design, Scalability, Reliability

21. Design a real-time leaderboard system

Difficulty: Medium

Company: General

Tags: leaderboard, real-time-updates, ranking, gaming

Architecture Focus: leaderboard, real-time-updates, ranking, gaming

Relevant Frameworks: System Design, Scalability, Reliability

22. Design a real-time chat moderation system

Difficulty: Medium

Company: General

Tags: content-moderation, real-time-processing, ml, safety

Architecture Focus: content-moderation, real-time-processing, ml, safety

Relevant Frameworks: System Design, Scalability, Reliability

23. Design a real-time notification system

Difficulty: Medium

Company: General

Tags: notifications, push-notifications, real-time, messaging

Architecture Focus: notifications, push-notifications, real-time, messaging

Relevant Frameworks: System Design, Scalability, Reliability

24. Design a real-time weather monitoring system

Difficulty: Medium

Company: General

Tags: weather-monitoring, sensor-networks, data-aggregation, forecasting

Architecture Focus: weather-monitoring, sensor-networks, data-aggregation, forecasting

Relevant Frameworks: System Design, Scalability, Reliability

25. Design a real-time auction system like eBay

Difficulty: Medium

Company: General

Tags: auction-system, bidding, real-time-updates, payment-processing

Architecture Focus: auction-system, bidding, real-time-updates, payment-processing

Relevant Frameworks: System Design, Scalability, Reliability

26. Design a real-time location tracking system

Difficulty: Medium

Company: General

Tags: location-tracking, gps, real-time-updates, geofencing

Architecture Focus: location-tracking, gps, real-time-updates, geofencing

Relevant Frameworks: System Design, Scalability, Reliability

27. Design a real-time IoT data processing system

Difficulty: Medium

Company: General

Tags: iot, sensor-data, real-time-processing, edge-computing

Architecture Focus: iot, sensor-data, real-time-processing, edge-computing

Relevant Frameworks: System Design, Scalability, Reliability

28. Design a live sports scoring and updates system

Difficulty: Medium

Company: General

Tags: live-sports, real-time-updates, data-ingestion, push-notifications

Architecture Focus: live-sports, real-time-updates, data-ingestion, push-notifications

Relevant Frameworks: System Design, Scalability, Reliability

29. Design Slack's real-time messaging platform

Difficulty: Medium

Company: General

Tags: team-messaging, channels, real-time, collaboration

Architecture Focus: team-messaging, channels, real-time, collaboration

Relevant Frameworks: System Design, Scalability, Reliability

30. Design Twitter's real-time timeline system

Difficulty: Medium

Company: General

Tags: real-time-feed, social-media, timeline-generation, fanout

Architecture Focus: real-time-feed, social-media, timeline-generation, fanout

Relevant Frameworks: System Design, Scalability, Reliability
