**Problem Statement**

The system requires an application that efficiently process data by

* Connecting to a Database securely with an SSL/TLS: Perform CRUD operations on a relational database MySQL
* Redis Cache: Interact with Redis for caching frequently used data to reduce database load and improve performance.
* Optimize performance, parallel threading must be implemented to increase throughput and handle multiple database queries and cache updates simultaneously and reduce latency.

**Requirements**

1. Database operations
   1. Establish and maintain a reliable database connection.
   2. Handle multiple queries concurrently, ensuring thread safety during read and write operations.
2. Redis Cache:
3. Connect to Redis for key-value data storage and retrieval.
4. Cache results of database queries and invalidate/update the cache when data changes.
5. Parallel Threading:
6. Implement multithreading or asynchronous programming to ensure tasks run concurrently.
7. Safeguard against race conditions, deadlocks, and resource contention.
8. Error Handling & Resilience:
9. Handle connection failures to Redis, or the database gracefully.
10. Ensure retry mechanisms and fallback strategies are in place.
11. Performance Metrics:
12. Measure and log performance metrics for thread execution and cache hit/miss rates.
13. Optimize the system for high throughput and low latency.

**Deliverables**

1. Code Implementation: A module or service that connects to the database, Redis, while supporting parallel processing.

2. Documentation: Provide setup instructions, code architecture details.

3. Test Cases: Include unit and integration tests for all components (database, Redis).

4. Performance Reports: Show how parallel threading improves system throughput and latency (sequential vs parallel calls)

**Technical Stack**

1. Programming Language: Java/Springboot
2. Database: MySQL
3. Cache: Redis
4. Concurrency Library: excutorservice (preferably)

Note: You can have MySQL and REDIS installed locally in your system and upload the code to a **public github** and share the link back to recruitment team.

You will get **2 days** to complete this task.