Semester 3 – Sprint 1

Comprehensive Project Exam

Duration: 10 days **Mode:** Individual

Subjects Integrated

- Data Structures & Algorithms II
- NoSQL Databases – MongoDB & Firebase
- Business 2 – Customer Acquisition, Sales & Operations

Project Theme

Customer Acquisition to Loyalty: Sales Funnel & Operations Dashboard

You will design and implement a complete system that captures leads, qualifies them, converts them into customers, and provides business insights through a real-time dashboard. The goal is to demonstrate practical skills in algorithms, database design, and business process analysis.

Technology Rules

- **Backend**
    - All server logic in plain JavaScript or a JS framework of your choice.
    - Allowed tools: built-in http/fetch APIs, Firebase Functions, browser window objects.
- **Database**
    - MongoDB or Firebase—use whichever fits your design.

- Frontend
    - Any technology stack (HTML/CSS/JS, etc.).

Features

State the Features that you are going to implement:

1. Customer Acquisition to Loyalty (Business + DSA)

- Lead-capture form that stores prospects in MongoDB.
- Lead-qualification engine using a Priority Queue.

2. Sales Funnel & CRM (Business + DSA)

- Move leads through stages: Prospect → Qualified → Customer → Loyal.
- Use Hashing to detect duplicate customers.

3. Business Metrics Dashboard (Business + NoSQL)

- Real-time dashboard powered by Firebase.
- MongoDB Aggregation Pipelines for:
    - RFM Segmentation
    - Customer Lifetime Value (CLV)
    - Net Promoter Score (NPS)

4. Operations Module (Business + DSA)

- Simple order and inventory tracking.
- Channel-wise sales performance with an omnichannel view.

5. Algorithms & Data Structures Focus

Implement any of the following:

- Balanced BST / Heap – product search or recommendations.

- Sliding Window / Two-Pointer – recent activity metrics.
- Graph / BFS / DFS – referral network analysis.

Deliverables

1. Code Repository

Structure : Backend Folder & Frontend Folder.

README.md : Project title, scenario, setup instructions, features

2. Business Report (PDF or Word)

Include:

- Full customer journey (Acquisition → Loyalty)
- Screenshots of dashboards (NPS, RFM, CLV)
- Sales funnel description and operations plan
- Brand-building and reputation-management strategy

Panel	**Focus**	**Marks**
Data Structures & Algorithms II	Algorithm design and implementation	50
NoSQL	MongoDB schema, indexes, aggregation; Firebase authentication & real-time integration; data consistency	50
Business 2		50

	Customer-journey insight; accuracy of metrics (NPS, RFM, CLV); acquisition & loyalty strategy; operations analysis	
Soft-copy submission on Lisa	Proper upload of code & report	30 marks

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Notes to Students

- Clarity, correctness, and completeness matter more than excessive complexity.
- Document and test your project end-to-end.
- Be prepared to explain every technology you choose (e.g., Node.js, Express.js, JavaScript, Firebase).
