Guide Approval (initials/date): _____

CAP4001 – Capstone Project Proposal Report

(Individual Report)

Student Name	Adnan Hasshad Md
Student Register Number	22BCE9357
Programme	Bachelor of Technology
Semester/Year	Fall sem (2025-26)
Guide(s)	Saroj Kumar Panigrahy
Project Title	A Real-Time Player Finding System

Team Composition

Provide the information below for each member of the project team. Include all project team members, not just those in your discipline or those enrolled for Capstone project. Please also include yourself!

Reg. No	Name	Major	Specialization
22BCE9357	Adnan Hasshad Md	CSE	Core
22BCE20420	Tatikonda Srilekha	CSE	Core
22BCE9911	Mayakuntla Lokesh	CSE	Core
22BCE9745	Thokala Sravan	CSE	Core

Project and Task Description

Provide a brief (one or two page) technical description of the design project and your specific tasks, as outlined below: (use a separate sheet)

Provide a summary of the project

The project, "A Real-Time Player Finding System," is an MVP (Minimum Viable Product) social platform designed to help users find and connect with others for specific gaming activities. The app's purpose is to address the common problem of finding compatible teammates or opponents for online games. The MVP focuses on core functionality and a good UI, including user profiles, a public request board, a 1v1 and team finder. The approach is to build a modern, serverless application that prioritizes immediate, action-oriented requests.

Describe the specific role and tasks that you individually will be completing

(1) Define project requirements, create timeline and milestones, coordinate team efforts, facilitate communication, manage scope and deliverables.

(2) Design system architecture and technology stack, plan database schema, define API specifications, establish coding standards.

(3) Implement Express.js backend server, develop REST API endpoints for player discovery and requests, implement WebSocket integration, build player finding business logic.

(4) Integrate third-party services (Google OAuth, Firebase), configure deployment, manage environment variables, oversee system testing.

(5) Create technical documentation, API specifications, provide team guidance, maintain repository standards.

Discuss in detail the specific approach that will be used to complete your portion of the design

Phase 1 (Week 1-2): Planning and requirements analysis, architecture design, technology stack selection, database schema design.

Phase 2 (Week 3-4): Backend infrastructure development, API endpoint development, authentication implementation (OAuth, Firebase), team support.

Phase 3 (Week 5-6): Third-party service integration, WebSocket implementation for real-time features, system coordination, performance optimization.

Phase 4 (Week 7-8): Project finalization, documentation completion, deployment configuration, quality assurance testing.

Describe the phases of the design process

Phase 1 (Week 1-2): Planning, requirements analysis, architecture design, technology selection, database schema planning.

Phase 2 (Week 3-4): Core infrastructure development, API implementation, authentication setup.

Phase 3 (Week 5-6): Real-time features, request board logic, system integration, performance optimization.

Phase 4 (Week 7-8): Testing, documentation, deployment preparation, quality assurance.

Outcome Matrix

Describe your plan to demonstrate each of the outcomes below.

Outcomes	Plan for demonstrating outcome
a) an ability to apply knowledge of mathematics, science, and engineering	Will apply software engineering principles, data structures for algorithms, relational database theory, and distributed systems patterns.
c) an ability to design a system, component, or process to meet desired needs within realistic constraints	Will design system architecture balancing feature completeness, performance, scalability, 8-week timeline, and free/low-cost cloud platform constraints.
d) an ability to function on multidisciplinary teams	Will collaborate with team members, facilitate communication, coordinate efforts across frontend, backend, and management roles.
e) an ability to identify, formulate, and solve engineering problems	Will identify bottlenecks, formulate solutions for challenges, solve scalability issues, and troubleshoot integration problems.
g) an ability to communicate effectively	Will create technical documentation, communicate decisions clearly, provide guidance, and maintain code documentation.
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	Will utilize React, Express.js, TypeScript, PostgreSQL, Drizzle ORM, WebSocket API, OAuth 2.0, Cloudflare R2, and Git.

Realistic Constraints

Development Timeline: 8-week cycle with MVP prioritization. **Team Resources:** 4-member team requiring coordination. **Infrastructure:** Free/low-cost cloud platform (Replit, Neon PostgreSQL). **Technical Complexity:** Real-time request board, WebSocket connectivity, service integration. **Performance:** Responsive design across devices with acceptable load times. **Scalability:** MVP design with extensible architecture for future growth.

Engineering Standards

Code Standards: TypeScript strict mode, ESLint configuration, consistent naming. **Database:** Normalized design (3NF), proper indexing, referential integrity. **API:** RESTful principles, HTTP status codes, Zod validation, documentation. **Security:** Input validation, SQL injection prevention, OAuth 2.0, CORS headers. **Testing:** Unit, integration, end-to-end tests. **Documentation:** API docs, architecture diagrams, code comments. **Version Control:** Meaningful commits, branch management, code reviews.