**Project Design Phase-II**

**Technology Stack (Architecture & Stack)**

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| Date | 26-05-2025 |
| Team ID | LTVIP2025TMID61039 |
| Project Name | Rental Home: Finding Your Perfect Home |
| Maximum Marks | 4 Marks |

**Technical Architecture:**

**The system is designed as a 3-tier architecture (Presentation, Application, and Data layers) with integrations for external services.**

**Table-1 : Components & Technologies:**

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| **Component** | **Technology Options** | **Purpose** |
| **Frontend (Web & Mobile UI)** | **React.js / Angular / Vue.js, HTML5, CSS3, TailwindCSS, Flutter/React Native (for mobile)** | **Provides user interface for tenants, owners, and admins to interact with the system.** |
| **Backend (Application Layer)** | **Node.js with Express / Java Spring Boot / Python Django** | **Handles business logic, API services, authentication, and communication with database.** |
| **Database (Structured Data)** | **MySQL / PostgreSQL** | **Stores user profiles, property listings, transactions, and other relational data.** |
| **Database (Unstructured / Search)** | **MongoDB / ElasticSearch** | **Enables flexible storage and fast search/filtering of property details.** |
| **File Storage** | **AWS S3 / Google Cloud Storage / Azure Blob Storage** | **Stores property images, documents, and media files.** |
| **Authentication & Security** | **JWT / OAuth2, bcrypt, SSL/TLS** | **Ensures secure user login, password management, and encrypted communication.** |
| **Payment Gateway** | **Stripe / Razorpay / PayPal** | **Facilitates rental payments, deposits, or subscription fees.** |
| **Maps & Location Services** | **Google Maps API / Mapbox** | **Provides property location, directions, and nearby facilities.** |
| **Notifications** | **Firebase Cloud Messaging / Twilio / SendGrid** | **Sends alerts via SMS, push notifications, or email.** |
| **Infrastructure & Hosting** | **AWS (EC2, RDS, Lambda), Azure, GCP** | **Hosts the application and provides cloud infrastructure.** |
| **Containerization & Orchestration** | **Docker, Kubernetes** | **Ensures scalability, portability, and efficient deployment.** |
| **CI/CD & DevOps** | **GitHub Actions / Jenkins / GitLab CI** | **Automates testing, integration, and deployment of updates.** |
| **Monitoring & Logging** | **Prometheus, Grafana, ELK Stack** | **Tracks system performance, logs errors, and ensures uptime.** |
| **Analytics & Reports** | **Power BI / Tableau / Custom dashboards** | **Generates insights on property views, user activity, and market trends.** |

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**Application Characteristics Table**

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| **Characteristic** | **Description** | **Importance** |
| **Usability** | **The application should have a clean, intuitive, and mobile-friendly interface with simple navigation.** | **High** |
| **Scalability** | **Must support increasing users, property listings, and concurrent sessions without performance issues.** | **High** |
| **Performance** | **Search and property details should load within 2–3 seconds under normal load.** | **High** |
| **Security** | **Strong authentication, role-based access control, and encrypted communication (SSL/TLS).** | **High** |
| **Availability** | **System should be available 24/7 with minimum downtime (target 99.9% uptime).** | **High** |
| **Reliability** | **Application should ensure accurate data retrieval and consistent performance.** | **High** |
| **Maintainability** | **Codebase should follow modular architecture for easier debugging, updates, and enhancements.** | **Medium** |
| **Portability** | **Should work across platforms (web, mobile apps, tablets) without compatibility issues.** | **Medium** |
| **Interoperability** | **Ability to integrate with third-party APIs (maps, payment gateways, messaging services).** | **Medium** |
| **Data Integrity** | **Ensures correctness, consistency, and validation of property listings and user information.** | **High** |
| **Extensibility** | **New features (AI recommendations, chatbots, AR property tours) can be added with minimal changes.** | **Medium** |
| **Auditability** | **All transactions and user activities should be logged for compliance and tracking.** | **Medium** |
| **Localization** | **Should support multiple languages and currencies for wider user reach.** | **Low** |

**References:**

[**React.js Documentation**](https://react.dev/)

[**Node js Best Practice**](https://nodejs.org/en/learn/getting-started/introduction-to-nodejs)

[**JSON Web Server Referance**](https://www.npmjs.com/package/json-server)

[**https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d**](https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d)