Capstone Project Proposal Paper

EventEase

EventEase is a mobile-first event management platform that leverages Google Gemini LLM for AI-powered recommendations and integrates Chapa Payment for seamless transactions. It enables users to discover, book, and attend personalized events with ease, while providing organizers and administrators with robust tools for event creation, analytics, and secure payment processing.

1, Table of Content

2. Introduction **2**

3. Business Need and Opportunity **3**

3.1 Client Needs 3

3.2 Problems 3

4. Objective **3**

4.1 General Objective 3

4.2 Specific Objectives 4

5. Constraints and Assumptions **4**

5.1 Business and Technical Constraints 4

5.2 Assumptions 5

6. Business Scope **5**

6.1 User Stories 6

6.2 Acceptance Criteria 8

7. Technical Scope (Use Case Diagram) **8**

8. Applied Technology **12**

9. User Interface **13**

10. Road Map and Release Plan **15**

2. Introduction

EventEase is a mobile-based event management platform that connects users with relevant events through intelligent recommendations. It allows event organizers to create and manage events, while users can browse, book, and attend events with a personalized experience. The platform is built with modern technologies and enhanced with AI-based recommendation systems to ensure the most engaging and relevant event discovery experience.

In today's fast-paced and digitally-driven world, traditional event discovery methods often fail to provide users with timely and personalized suggestions, while organizers face difficulty in reaching their target audiences efficiently. EventEase addresses this gap by integrating machine learning algorithms that analyze user preferences, behavior, and location to recommend suitable events in real time. The system also provides a seamless experience for both attendees and organizers by offering intuitive interfaces, smart booking features, and administrative tools, ultimately creating a smarter and more dynamic event ecosystem.

Being developed in Ethiopia, EventEase is uniquely positioned to cater to the growing demand for digital solutions in the local event industry. As mobile penetration and digital literacy increase across the country, EventEase aims to become a leading platform that empowers event organizers and users alike. Whether it's cultural festivals, tech conferences, music shows, or educational seminars, EventEase bridges the gap between people and the experiences they care about most—bringing innovation to the heart of Ethiopia's vibrant social scene.

3. Business Need and Opportunity

Event planning has long relied on fragmented and outdated techniques that fail to capture the full potential of modern digital communication. With the increasing ubiquity of smartphones and the rising trend towards on-demand digital experiences, there is a significant gap between what traditional event management offers and what today's users demand.

3.1 Client Needs

- **Seamless User Experience:** Clients seek a user-friendly platform where they can easily browse, filter, and book events according to their personal interests.

- **Enhanced Event Promotion:** Organizers need intuitive tools for creating, updating, and promoting events without the steep learning curve of complex software.

- **Personalized Discoverability:** Through AI-powered recommendations, users can receive event suggestions that are uniquely tailored to their preferences.

- **Real-Time Management & Analytics:** Both users and organizers benefit from up-to-date analytics and instant notifications, which help in planning, executing, and refining events.

3.2 Problems

- **Inefficient Discovery Methods:** Traditional advertising often results in event details being scattered across multiple channels, reducing the likelihood that interested individuals will engage.

- **Limited Engagement:** Both users and organizers face challenges related to low engagement when events are not effectively matched to their needs.

- **Lack of Personalization:** The absence of intelligent filtering means users are burdened with generic recommendations, while organizers struggle to target the right audience.

- **Operational Fragmentation:** Multiple disjointed systems for event management lead to communication breakdowns and hinder smooth event execution.

4. Objective

The main objective of EventEase is to establish a cohesive, technology-driven platform that simplifies event management for users and organizers alike. With a focus on innovation, accessibility, and efficiency, the platform aims to set a new standard in the digital event management space.

4.1 General Objective

To build and deploy a robust, mobile-centric event management platform that utilizes advanced AI personalization, allowing users to effortlessly discover, reserve, and participate in events while providing organizers with a powerful toolkit for event creation, promotion, and detailed performance tracking.

4.2 Specific Objectives

- **Create a User-Centric Platform:** Design an interface that is accessible, engaging, and responsive for all stakeholders including users, organizers, and administrators.

- **Integrate Intelligent Algorithms:** Develop and implement AI-driven recommendation features to ensure that each user receives customized event suggestions.

- **Streamline Event Management:** Offer comprehensive tools for organizers to seamlessly create, update, and manage event listings with real-time analytics.

- **Simplify the Booking Experience:** Establish a reliable and efficient system for booking events that handles notifications and confirmations instantly.

- **Ensure Scalability and Security:** Build the solution on scalable architecture while ensuring robust security and performance to handle high user traffic.

- **Support Cross-Platform Functionality:** Develop mobile applications compatible with both Android and iOS to maximize reach and usability.

5. Constraints and Assumptions

To ensure that EventEase meets its objectives within practical parameters, several key constraints and assumptions have been identified. These factors will shape the development, implementation, and deployment strategy for the platform.

5.1 Business and Technical Constraints

- **Cross-Platform Compatibility:** The application must deliver consistent performance and seamless user experience across both Android and iOS devices.

- **Budgetary Considerations:** Initial development is budget-sensitive, particularly in the creation of a minimum viable product (MVP) that can be enhanced post-launch.

- **Time-to-Market Pressures:** A strict timeline is in place to capture early market share, necessitating rapid development cycles with prioritized features.

- **Reliance on Third-Party Services:** Integration with external APIs for real-time notifications, payment processing, and data handling introduces dependencies that must be managed carefully.

- **High-Volume Performance:** The backend infrastructure must be robust enough to support real-time updates, large user bases, and fluctuating data loads, ensuring reliable performance during peak periods.

- **Security and Compliance:** The platform must adhere to data security regulations and protect user information, especially regarding payment data and personal profiles.

5.2 Assumptions

- **Smartphone Accessibility:** It is assumed that the majority of our target demographic has access to internet-enabled smartphones, which supports wide adoption.

- **Verified Organizers:** Only verified event organizers will have access to publishing events, a measure assumed to maintain quality and trust on the platform.

- **Availability of Quality Data:** The effectiveness of the AI recommendation engine depends on access to accurate user data, including location, preferences, and interaction history.

- **Stable Third-Party Integrations:** External services such as notification systems and payment gateways are assumed to provide reliable and consistent performance throughout the lifecycle of the application.

- **Market Readiness:** There is a growing digital trend in Ethiopia and similar markets, which underpins the assumption that users and organizers will be eager to adopt a sophisticated, technology-driven event management platform.

6. Business Scope

EventEase is designed to be a full-spectrum event management platform that addresses the needs of diverse stakeholders through a centralized, technology-driven approach. The platform's business scope encompasses the complete lifecycle of event management, ensuring a streamlined process for all participants—users, organizers, and administrators.

For the users, EventEase provides a highly personalized experience. Users register, set their preferences, and enjoy a continuously curated feed of events powered by AI-driven recommendations. They can seamlessly search for events, book them with real-time confirmations, and later provide feedback through ratings and reviews. This ensures that users are engaged at every stage—from discovery to post-event evaluation.

Organizers, on the other hand, benefit from advanced tools designed to simplify complex event management tasks. One key innovation is the use of AI-enhanced templates for event cards. These prepopulated templates reduce the intricacies involved in event creation, allowing organizers to rapidly

design aesthetically pleasing and information-rich event pages. Once an event is approved by the system, organizers are provided with the capability to generate a secure and authentic invitation link. This link can be copied easily and shared across various third-party platforms, such as social media networks and messaging apps, thus enhancing the reach of their events. Additionally, organizers have access to a suite of analytical tools that display booking data, engagement metrics, and other performance indicators to continuously refine event strategies.

The administrative aspect of the business scope focuses on ensuring quality control and maintaining platform integrity. Administrators manage event submissions by approving or rejecting events based on predefined criteria, control user and organizer access, and utilize detailed reports and analytics to monitor overall platform performance. This governance ensures that EventEase consistently delivers high-quality event experiences and maintains a trustworthy environment for all users.

Below is a professionally formatted section for the User Stories (Part 6) of the EventEase proposal. This section is structured to clearly capture the needs, expectations, and desired functionality for each actor involved in the platform.

6.1 User Stories

EventEase is designed to cater to three distinct groups: Users, Organizers, and Administrators. The user stories below describe the functionalities and interactions that each group will experience. These stories serve as key requirements that guide our design and development process.

For Users

- **As a User, I want to register or log in seamlessly**

  So that I can easily access my personalized event dashboard and manage my bookings.

As a User, I want to set and update my event preferences*So that I receive tailored event recommendations that reflect my interests, location, and past interactions.*

- **As a User, I want to browse and search for events**

  So that I can discover events by filtering through categories, dates, and locations.

- **As a User, I want to receive AI-powered event recommendations**

  So that I am presented with events that closely match my interests and past behaviors, enhancing my overall experience.

- **As a User, I want to book events easily**

  So that I can reserve my spot in a timely fashion and receive immediate confirmation and details.

- **As a User, I want to confirm my attendance**

  So that my participation is registered and the system can accurately manage attendance data.

- **As a User, I want to submit ratings and reviews after attending an event**

  So that I can share my experience and help other users make informed decisions, while also providing feedback for future improvements.

For Organizers

- **As an Organizer, I want to register or log in and access a dedicated dashboard**

  So that I can manage my events, track user engagement, and monitor the performance of my event listings.

- **As an Organizer, I want to create events using AI-enhanced templates**

  So that I can simplify the event creation process, reduce the time required to design event cards, and maintain a professional appearance effortlessly.

- **As an Organizer, I want to edit or delete my events**

  So that I can keep my event details up-to-date or remove events that no longer meet my requirements.

- **As an Organizer, I want the system to generate a secure invitation link upon event approval**

  So that I can easily share my event via third-party platforms like social media, email, or messaging apps without compromising authenticity and security.

- **As an Organizer, I want to view booking analytics**

  So that I can access real-time data on user engagement, attendance, and other critical metrics to assess event performance and plan improvements for future events.

For Administrators

- **As an Admin, I want to approve or reject event submissions**

  So that I can ensure that all events meet the platform's quality and content standards before they are published.

- **As an Admin, I want to manage user and organizer accounts**

  So that I can handle tasks such as verification, blocking or unblocking accounts, and ensuring overall community safety and compliance with platform policies.

- **As an Admin, I want to view comprehensive reports and analytics**

  So that I can monitor the overall health of the platform, understand user engagement trends, and make informed strategic decisions.

6.2 Acceptance Criteria

- Users can register, log in, and manage their profiles securely.
- Users can browse, search, and filter.
- Personalized event suggestions appear based on user preferences and history.
- Bookings are tracked, and confirmation notifications are sent instantly.
- Organizers can upload images, set date/time, and manage capacity for events.
- Organizers can see event analytics including bookings, views, and feedback.
- Admins can approve or decline event submissions and verify new organizers.

7. Technical Scope (Use Case Diagram)

The technical scope of the EventEase platform is represented by a detailed use case diagram, which highlights the roles and interactions of the three primary actors: User, Organizer, and Administrator. This diagram outlines the primary functions of the system and the new functionalities introduced for organizers.

For the **User**:

- Users can register or log in, set their preferences, and browse or search for events.

- They receive AI-driven event recommendations, book events, confirm their attendance, and submit ratings/reviews post-event.

For the **Organizer**:

- Organizers register or log in and use AI-enhanced templates to create events quickly. These prepopulated event cards help streamline the event creation process.

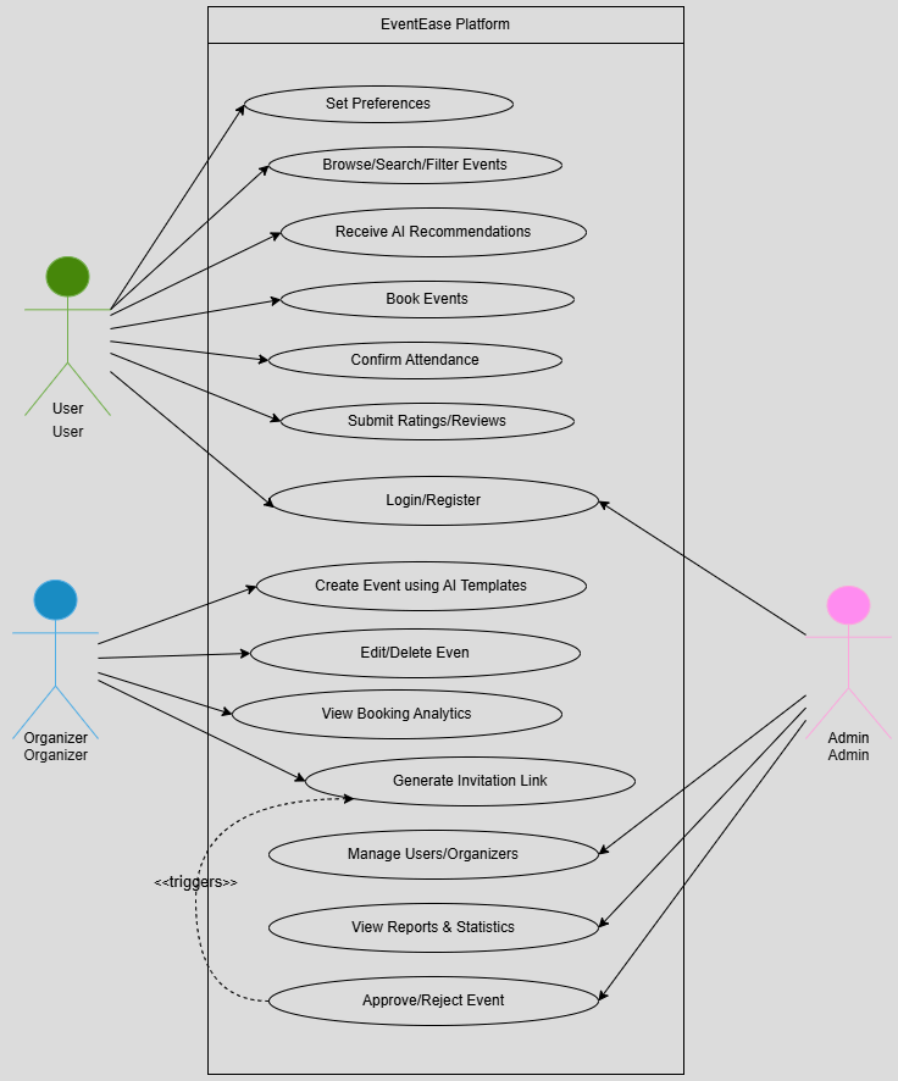
- They can edit or delete event listings as needed.

- Once their event is approved by the system, they benefit from an automated process that generates a secure, authentic invitation link for the event. This link is intended for sharing on various third-party platforms.

- Organizers also have access to a dashboard that provides real-time booking analytics and engagement metrics.

For the **Administrator**:

- Administrators log in to a secure dashboard where they have the authority to approve or reject event submissions, manage user and organizer accounts (including actions like blocking or unblocking), and generate comprehensive reports and statistics to oversee platform health.



The use case diagram, defined in the above figure, encapsulates these interactions and processes in a visually organized manner. The diagram is designed to serve as a blueprint for the system architecture, ensuring that all key user interactions are appropriately addressed.

USE CASE ID	USE CASE NAME	ACTOR(S)	DESCRIPTION	PRECONDITIONS	POSTCONDITIONS	MAIN FLOW	ALTERNATE FLOW/EXCEPTIONS
UC1	Register/Login	User, Organizer, Admin	The actor creates a new account or logs in to an existing one on the EventEase platform.	Actor must have internet access; valid credentials if logging in.	Actor is authenticated and directed to the relevant dashboard/home page.	1. Actor navigates to the login/registration page.2. Actor submits required credentials.3. System verifies credentials and grants access.	If credentials are invalid, the system displays an error message with options to retry or reset the password.
UC2	Set Preferences	User, Organizer	The actor sets or updates personal preferences (such as interests or event types) that will be used for personalized recommendations and content filtering.	Actor must be logged in.	Updated user preferences stored within the system; personalized recommendations are tailored accordingly.	1. Actor accesses the preferences section.2. Actor selects desired options.3. System updates the profile and refreshes recommendations accordingly.	If data is incomplete or invalid, prompt the actor to correct the entries.
UC3	Browse/Search Events	User	Allows the user to browse the event catalog or search for specific events based on keywords, categories, location, and dates.	User is logged in; event data is available in the system.	User is presented with a filtered list of events matching the search criteria.	1. User selects the search or browse function.2. User enters criteria.3. System filters and displays the events.	If no matching events are found, the system may suggest alternative categories or display popular events.
UC4	Receive AI Recommendations	User	The system provides personalized event recommendations to the user based on their set preferences, historical behavior, and location.	User has set up preferences and engaged with events previously.	The user sees a customized list of events that are most relevant to them.	1. System runs AI algorithm in the background.2. Retrieves user data and matches it with event data.3. Displays recommended events on the dashboard.	If data is insufficient, the system can fallback to trending or popular events as recommendations.
UC5	Book Events	User	Enables users to reserve spots for selected events using an intuitive booking process that confirms the reservation in real time.	User is authenticated; event is available for booking.	Booking confirmation is sent, and the event reservation is registered in the system.	1. User selects an event to book.2. User confirms booking details.3. System processes the booking.4. Confirmation notification is sent.	If the booking fails (e.g., due to capacity issues), the system notifies the user and suggests alternative options.
UC6	Confirm Attendance	User	After booking, the user confirms attendance either via a mobile app or linked email invitation as the event date approaches.	User has a confirmed booking.	Attendance is recorded in the system.	1. User receives reminder notification.2. User confirms attendance.3. System updates the attendance status.	If the user does not confirm, the system may mark it as tentative or send additional reminders.
UC7	Submit Ratings/Reviews	User	Post-event, users can rate the event and submit detailed reviews to share their experiences and feedback with other users.	User must have attended the event.	The system stores the rating and review; feedback is used to refine recommendations and event quality.	1. User navigates to the event review section.2. User submits a rating and/or review.3. System updates event details with user feedback.	If submitted review is inappropriate, it is flagged for administrative review.

UC8	Create Event using AI Templates	Organizer	Enables organizers to create new events using prepopulated AI-enhanced templates that simplify the process of event creation by providing suggested layouts and content.	Organizer is logged in and has necessary permissions; template library is available.	A draft event is created using a template and saved for further editing or submission.	1. Organizer selects the 'Create Event' option.2. System presents AI-powered templates.3. Organizer customizes details.4. Draft event is saved.	If required fields are missing, the system alerts the organizer to complete all required information.
UC9	Edit/Delete Event	Organizer	Allows organizers to edit details of an existing event or delete an event if needed.	Organizer must be logged in; event must belong to the organizer.	Changes are saved to the event; deleted events are removed from the active listing.	1. Organizer accesses event management dashboard.2. Selects an event for editing/deletion.3. Makes necessary changes or confirms deletion.4. System updates the event status.	If edits do not meet quality standards, the system may prompt for further clarification.
UC10	Generate Invitation Link	Organizer	Once an event is approved, the system automatically generates a secure and authentic invitation link. This link can then be shared by the organizer on various third-party platforms.	The event has been approved by an administrator.	An authentic, secure invitation link is created and made available for the organizer to copy and share externally.	1. Event is approved.2. System triggers an automated process to generate a unique invitation link.3. Link is displayed on the organizer's dashboard.	If link generation fails, the system logs an error and prompts a manual retry.
UC11	View Booking Analytics	Organizer	Provides organizers with a comprehensive dashboard displaying real-time data on bookings, user engagement, and other key performance indicators for their events.	Organizer must be logged in; event booking data must be available.	Organizer gains insights into event performance which can be used to refine future event strategies.	1. Organizer accesses the analytics dashboard.2. System retrieves and presents statistical data.3. Organizer reviews key metrics and trends.	If there is no booking data available, a message indicating 'No Data Found' is displayed.
UC12	Approve/Reject Event	Admin	Empowers administrators to review and either approve or reject submitted events to ensure they meet the quality and content standards of the EventEase platform.	Event submission is pending approval; admin is authenticated.	Event status is updated to approved or rejected.	1. Admin logs into the dashboard.2. Reviews pending event submissions.3. Approves or rejects events based on predetermined criteria.4. System notifies the organizer of the decision.	Rejected events prompt a notification with reasons for rejection and possible corrective actions.
UC13	Manage Users/Organizers	Admin	Allows administrators to manage platform accounts including actions such as verification, blocking, or unblocking of users and organizers to ensure a safe and compliant community.	Admin is authenticated; account information is available.	User or organizer statuses are updated; policies are enforced.	1. Admin accesses the user management panel.2. Views lists of current accounts.3. Performs actions like verification and blocking/unblocking.4. System updates account statuses accordingly.	If a management action fails, the system displays an error message and logs the activity.
UC14	View Reports & Statistics	Admin	Provides administrators with a detailed overview of the platform's performance, including metrics related to user engagement, event success, and system performance, which can be used for strategic decision-making.	Admin is logged in.	Comprehensive reports are generated and available for analysis.	1. Admin selects the reports section.2. System compiles and displays key metrics and analytical reports.3. Admin reviews the data and makes strategic decisions based on insights provided.	In the case of data unavailability, the system notifies the admin with a warning message.

8. Applied Technology

The technical foundation of EventEase is built on a modern, scalable, and secure technology stack that supports rapid development and future expansion. The selection of technologies is driven by the need to deliver an outstanding user experience, efficient performance, and robust security.

Backend:

EventEase will be powered by a Node.js backend utilizing the Express.js framework. This choice ensures fast, asynchronous processing and the ability to handle a high volume of concurrent users. The backend is designed to provide a RESTful API for communication with the client applications, including the mobile app and web portal. This architecture also simplifies integration with third-party services such as payment gateways and notification systems.

Frontend:

The web interface, particularly the administrative panel, will be developed using React. React's component-based architecture enables the rapid development of an interactive and dynamic user interface. This approach also guarantees ease of maintenance and scalability as the application grows.

Mobile Application:

For the mobile experience, the EventEase app will be developed using Flutter. Flutter is chosen for its cross-platform capabilities, allowing us to deliver a near-native experience on both Android and iOS devices from a single codebase. This ensures consistency in user experience and reduces development overhead.

Design and Prototyping:

The user interface design will be prototyped using Figma. We plan to include at least five Figma design screens that demonstrate key workflows, including the user authentication process and event feed

interaction. These design prototypes will guide the final implementation and ensure a consistent, intuitive user interface across all platforms.

Other Key Technologies and Tools:

- **Database:** PostgreSQL will be utilized to manage structured data efficiently, ensuring high performance and reliability in storing event, user, and transaction information.

- **Authentication & Security:** JSON Web Tokens (JWT) and Firebase Auth (if needed for rapid prototyping) will secure the authentication process. This ensures a robust and scalable solution while maintaining high security standards.

- **Cloud Hosting & Storage:** The application will be deployed on cloud platforms like AWS, Heroku, or Vercel, based on the performance and scalability requirements. AWS S3 will handle media storage, ensuring that event images and other assets are reliably served to users.

- **Notifications and Real-Time Updates:** Firebase Cloud Messaging and other notification services will be integrated to support real-time communication and update the users on booking confirmations, event changes, and more.

- **AI Recommendation Engine:** Google Gemini LLM, hosted on Google Cloud Vertex AI and exposed via a RESTful API, will drive personalized event recommendations by analyzing user preferences, behavior, and contextual data—ensuring each user receives highly relevant suggestions.
- **Third-Party Payment System:** Chapa Payment will be integrated via its secure REST API to handle all transaction flows (ticket purchases, refunds, etc.), offering a seamless and localized

payment experience for users in our target markets.

9. User Interface

The User Interface (UI) of EventEase is crucial to deliver a smooth and engaging experience that translates the complexity of event management into an intuitive and visually appealing application. The UI design will be crafted based on modern design principles, with usability, accessibility, and responsiveness at the core.

Key Screens and Design Approach:

- **Authentication Screens:**

  The login and registration flows will prioritize simplicity and security. The design will highlight clear input fields, social login options, and step-by-step onboarding processes to ensure new users can quickly get started.

- **Event Feed:**

  The event feed is central to the user experience. It will feature a clean and organized layout with filters, search functionality, and dynamic, AI-driven recommendations. The design emphasizes visual hierarchy, ensuring users can easily navigate and interact with event listings.

- **Dashboard and Analytics:**

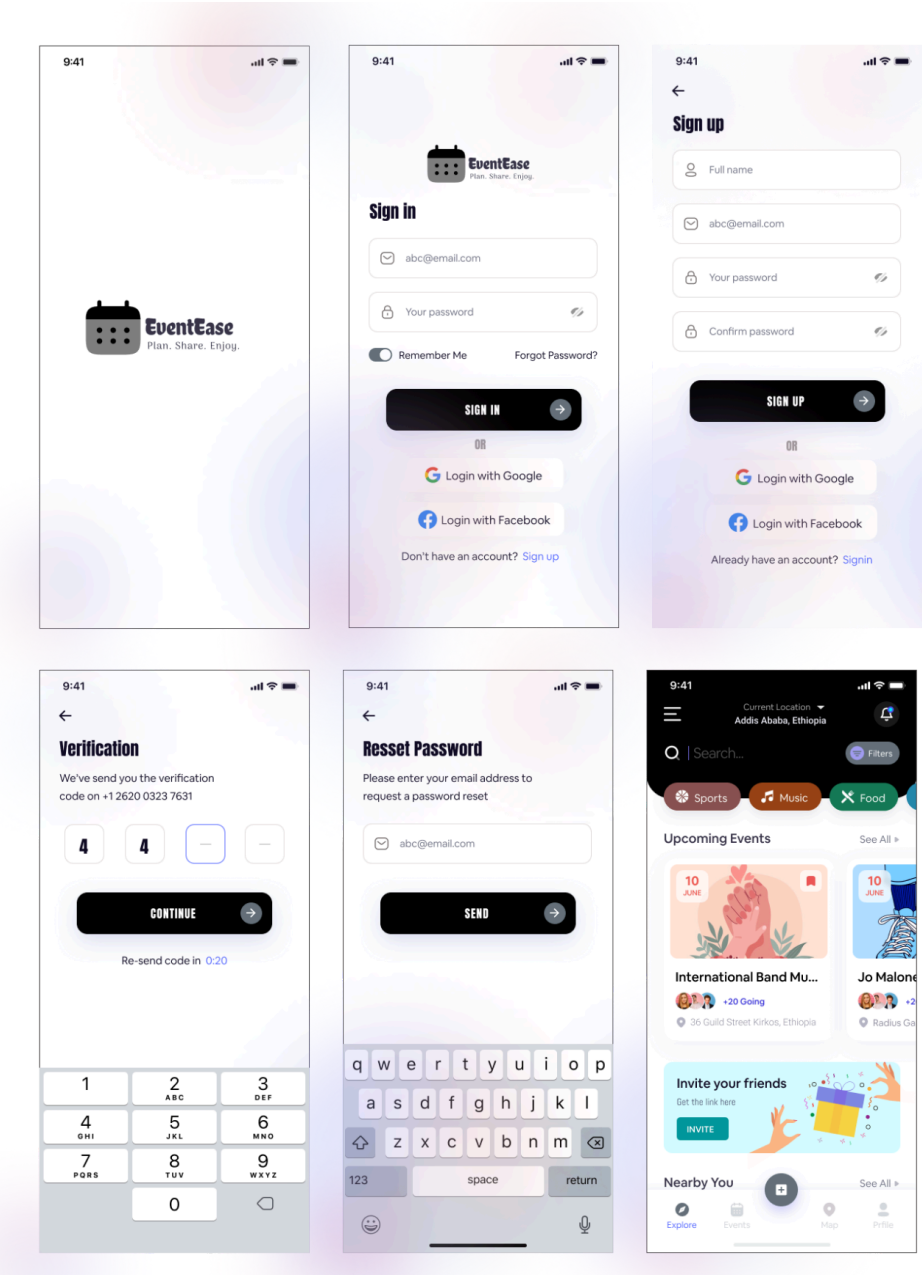
  For organizers and administrators, dedicated dashboards will provide real-time insights and management tools. The dashboards will feature data visualizations (graphs and charts), quick action panels, and alerts for important metrics such as booking counts, user engagement, and

event performance.

- **Figma Design Prototypes:**

  To validate the design direction and gather user feedback early in the development cycle, we will produce and share five detailed Figma screens. These prototypes will focus on:

  - **User Authentication Flow:** Showcasing the registration, login, and account recovery processes.
  - **Event Feed Interface:** Highlighting the listing, filtering, and personalized recommendation elements.
  - **Event Details:** Detailing how users view detailed event information along with organizer data.
  - **Organizer Dashboard:** Presenting the tools for creating events via AI-enhanced templates, viewing booking analytics, and managing event content.
  - **Administrative Panel:** Illustrating the controls for managing event approvals, user verification, and site-wide analytics.



Each screen is designed with an emphasis on clarity, consistency, and responsiveness, ensuring that the visual and functional design aligns with the overall project vision.

10. Road Map and Release Plan

A clear and well-structured roadmap is essential for the successful launch of EventEase. Our phased approach is designed to ensure rapid development and high-quality delivery, with each phase building upon the previous one to incrementally deliver a robust Minimum Viable Product (MVP) and prepare for future feature enhancements.

PHASE	WEEK	KEY ACTIVITIES	DELIVERABLES	DOCUMENTATION
1	1	• Requirement analysis & feature finalization• High-fidelity UI/UX design (Figma prototypes)	• Finalized feature list & user stories• 5 Figma screens for auth & feed flows	• Requirements specification• UI/UX design guide
2	2	• Implement authentication & registration• Role-Based Access Control for User, Organizer, Admin	• Auth APIs (Node.js/Express)• Secure login/register endpoints• RBAC middleware	• API specification (endpoints, schemas)• Security checklist
3	3	• Event CRUD (create, update, delete) workflows• Organizer dashboard with AI-template integration	• Event management APIs & UI• AI-enhanced template component• Initial organizer dashboard	• Use case documentation• Backend integration guide
4	4	• Booking system development (reserve/cancel)• User event feed & filtering• Admin panel core features	• Booking endpoints & UI flows• Interactive event feed (React & Flutter)• Admin panel MVP	• Booking & feed flow diagrams• Admin panel user guide
5	5	• Integrate AI recommendation engine• Real-time notifications (Firebase Cloud Messaging)	• Deployed recommendation service• Personalized feed updates• Notification service integration	• AI integration whitepaper• Notification implementation doc
6	6	• End-to-end testing (unit, integration, performance)• Bug fixes & optimizations• MVP deployment & launch	• Tested and stable MVP• Production deployment on cloud• Release notes and marketing brief	• Test reports & QA sign-off• Deployment guide• User manual

Post-Launch Strategy: Following the MVP launch, our focus will be on continuous improvement. This includes:

- Gathering extensive user analytics and feedback to refine features and UX.
- Rolling out iterative updates that incorporate advanced functionalities like enhanced AI capabilities, additional communication channels, and further multi-platform integrations.
- Expanding marketing initiatives to broaden the user base and solidify EventEase as the leading event management platform in the target market.