**EduReg: A Centralized Student Registration System**

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**1. Abstract**

This document outlines the proposal for **EduReg**, a modern, web-based student registration system designed for Ethiopian secondary schools. EduReg aims to replace outdated, manual, paper-based processes with a centralized digital platform. The system will serve approximately 5,000 students, 100 teachers, and various administrative stakeholders, including the school director. Key features include a secure online application portal, digital document submission, class and section assignment for a fixed curriculum, and a real-time analytics dashboard for administrators.

The front-end will be developed using **React** for a responsive user interface, with **Node.js** and **Firebase** serving as the backend and database solution. This technology stack ensures scalability, security, and real-time data synchronization. The final outcome will be a user-friendly, efficient, and secure platform that significantly reduces administrative workload, minimizes data entry errors, and provides stakeholders with immediate access to critical information, thereby improving the overall efficiency of the school's registration cycle.

**2. Introduction**

In the educational landscape of Ethiopia, administrative efficiency is paramount for secondary schools. However, many institutions still rely on traditional, paper-based systems for student registration. This manual process is often characterized by long queues, cumbersome paperwork, a high risk of data entry errors, and inefficient communication channels between the school, students, and parents. Fee payments, conducted manually through bank deposits or Telebirr, require physical submission of receipts, adding another layer of complexity and potential for record-keeping errors.

This outdated approach consumes valuable time and resources that could be better allocated to educational activities. The **EduReg** web application is designed to solve these problems by providing a smart, centralized, and streamlined digital registration experience. It acts as a single source of truth for all student data, from initial application to enrollment and class assignment. By automating the registration workflow, we empower administrators with powerful tools for management and reporting, provide parents and students with a convenient and accessible platform, and enhance the operational efficiency of the entire institution.

**3. Project Description (The Software System Proposal)**

EduReg is a comprehensive, web-based application designed to be a one-stop solution for managing the entire student registration lifecycle within the context of a fixed curriculum. The core of the system is a robust backend that supports distinct user portals and automates key administrative tasks.

In general, the application has the following core features:

* **Secure User Portals:** Separate, role-based login access for **Administrators**, **Teachers**, **Students**, and **Parents/Guardians**, ensuring users only see relevant information and functions.
* **Online Application & Document Upload:** An intuitive digital application form that allows new and returning students to input their information and securely upload required documents (e.g., transcripts, ID cards, photos).
* **Class and Section Assignment:** A module for administrators to assign students to their appropriate grade-level classes and sections. Students and parents can then view these assignments and their timetables online.
* **Fee Status Tracking:** A dedicated module for administrators to manually log and verify fee payments made externally via Telebirr or bank deposit, and for parents to view the status of their payments.
* **Administrative Dashboard & Reporting:** A powerful dashboard for the registrar and director to monitor the registration process in real-time, view enrollment statistics, manage student records, and generate custom reports.

**4. Stakeholders**

**Primary Users:**

* **Students:** New and returning students who will use the system to apply, register, and view their class assignments.
* **Parents/Guardians:** Will use the platform to fill out forms on behalf of their children, upload documents, and check registration and fee payment status.
* **School Administrators (Registrar, Admissions Officers):** The primary operators of the system, responsible for managing applications, verifying documents, verifying payments, and overseeing the entire registration process.
* **Teachers:** Will use the system to view class rosters and access student contact information.

**Secondary Stakeholders:**

* **School Director/Principal:** Will use the dashboard to access high-level analytics and enrollment reports for strategic planning.
* **IT Department:** Responsible for system maintenance, support, and ensuring data security.
* **Finance Department:** Will use the system to track and reconcile fee payment records that are managed externally.

**5. Current System**

Currently, the registration process is fragmented and manual, involving the following steps:

1. Parents and students physically visit the school to collect paper application forms.
2. Forms are filled out by hand and submitted along with physical photocopies of documents.
3. Administrative staff manually vet each application and enter the data into spreadsheets.
4. Fee payments are made through **Telebirr or bank deposits**, requiring parents to bring the physical receipt to the school for verification.
5. Staff manually cross-reference the receipts with their records, a time-consuming and error-prone process.
6. This process is inefficient, lacks a centralized system for tracking, and often leads to misplaced records.

**Comparison Between Existing Systems and Our System**

| Feature | Manual Paper System | Generic School ERPs | **EduReg (Ours)** |
| --- | --- | --- | --- |
| **Online Accessibility** | No (In-person only) | Yes, but often with complex, non-intuitive UIs | Yes (Core feature, designed for ease of use) |
| **Data Centralization** | No (Fragmented in files & spreadsheets) | Yes | Yes (Real-time Firestore database) |
| **Fee Status Verification** | Manual (Physical receipt checking) | Limited / Not applicable | Yes (Dedicated module for tracking external payments) |
| **Real-Time Reporting** | No (Manual report generation is slow) | Limited (Often requires IT support to generate custom reports) | Yes (Dynamic, self-service dashboard for admins) |

**6. Key Problems and Challenges**

**Technical Challenges:**

* **Data Security and Privacy:** Ensuring that the personal data of over 5,000 students is stored and transmitted securely, in compliance with data protection regulations.
* **Scalability and Performance:** The system must handle high traffic volumes during peak registration periods without performance degradation.
* **Robust Verification System:** Developing a reliable system for administrators to log and verify externally made payments based on uploaded receipts or transaction IDs.
* **Data Integrity:** Developing robust validation rules to prevent incorrect data entry and maintain a clean database.

**User Experience Challenges:**

* **Digital Literacy:** Designing an intuitive and easy-to-use interface for stakeholders with varying levels of technical skill.
* **Onboarding and Training:** Ensuring that all users, especially administrative staff, are properly trained to use the new system effectively.
* **Building Trust:** Convincing stakeholders to trust a new digital system with sensitive information and critical processes.

**7. Technologies To Be Used**

| Category | Technology |
| --- | --- |
| **Front End** | React, Tailwind CSS, Framer Motion |
| **Backend** | Node.js |
| **Database** | Firebase (Firestore & Storage) |
| **Cloud & Deployment** | Firebase Authentication, Vercel |

**8. Team Members' Brief CV**

*(Participant details are placeholders adapted from the provided document)*

* **Olira Tesgera:** Full Stack Developer with experience in React and Node.js. Projects include
* **Yisak Demelash:** Frontend Developer specializing in React and Java. Projects include a Job Search Application and a University Course Scheduler.

**9. System Justification and Social Impact**

The primary justification for EduReg is the immense gain in operational efficiency and data accuracy. In an institution managing over 5,000 students, the reduction in manual labor frees up administrative staff to focus on higher-value tasks, such as student support and parent engagement. The system provides the school's leadership with instant, data-driven insights for better decision-making.

The social impact is the **democratization of access**. By moving the process online, we remove the barrier of requiring parents to take time off work to visit the school for registration and receipt submission. It provides a transparent and equitable process for all families, regardless of their schedule. The system has a minimal environmental impact, as it significantly reduces paper consumption.

**10. Project Methodology Selection**

System Prototyping

For this project, we have selected the System Prototyping methodology. This approach involves rapidly building a working model of the system, which is then iteratively refined based on stakeholder feedback. This is ideal for a project like EduReg, where user interaction is central to its success.

**Justification:**

1. **Clarifying Complex Workflow Requirements:** The registration process involves multiple steps and stakeholders. A prototype allows administrators and parents to interact with the digital workflow early, providing concrete feedback to refine requirements.
2. **Early and Tangible Feedback:** Stakeholders can test the core registration flow, document upload, and dashboard features on a working model, ensuring the final product is intuitive and meets their practical needs before full-scale development.
3. **Effective Risk Management:** Building a prototype of the most complex features first (e.g., the fee verification module, database schema) allows us to identify and resolve technical challenges early in the lifecycle.

**11. The Project Management Work Plan**

*(Note: Dates are illustrative, starting from Sept 29, 2025)*

| ID | Task Name | Assigned To | Start Date | End Date | Duration (Days) |
| --- | --- | --- | --- | --- | --- |
| **1** | **Requirement Analysis & Planning** | **Team** | **29/09** | **11/10** | **13** |
| 1.1 | Define Functional & Non-functional Requirements |  | 29/09 | 04/10 | 6 |
| 1.2 | Identify Stakeholders & Define User Roles | Yisak | 05/10 | 08/10 | 4 |
| 1.3 | Finalize Tech Stack & Work Plan | Olira | 09/10 | 11/10 | 3 |
| **2** | **System Design & UML Modeling** | **Team** | **12/10** | **25/10** | **14** |
| 2.1 | Database Design (ERD, Firebase Schema) |  | 12/10 | 18/10 | 7 |
| 2.2 | UI/UX Wireframing and Mockups | Yisak | 15/10 | 22/10 | 8 |
| 2.3 | Create Activity & Sequence Diagrams | Olira | 19/10 | 25/10 | 7 |
| **3** | **Prototype Development (Iteration 1)** | **Team** | **26/10** | **22/11** | **28** |
| 3.1 | **Frontend:** Setup & User Portals UI | Olira | 26/10 | 01/11 | 7 |
| 3.2 | **Backend:** Firebase Auth & User Management |  | 28/10 | 05/11 | 9 |
| 3.3 | **Feature:** Basic Registration Form (UI & Backend) | Yisak | 02/11 | 12/11 | 11 |
| 3.4 | **Feature:** Document Upload (UI & Backend) | Olira | 06/11 | 16/11 | 11 |
| 3.5 | Internal Testing & Feedback | Team | 17/11 | 22/11 | 6 |
| **4** | **Full System Development & Deployment** | **Team** | **23/11** | **16/12** | **24** |
| 4.1 | Develop Admin Dashboard & Reporting |  | 23/11 | 03/12 | 11 |
| 4.2 | Develop Class Assignment Module | Yisak | 25/11 | 05/12 | 11 |
| 4.3 | Develop Fee Status Tracking Module | Olira | 04/12 | 11/12 | 8 |
| 4.4 | System Integration & Final Testing | Team | 12/12 | 14/12 | 3 |
| 4.5 | Deploy Frontend (Vercel) & Backend (Firebase) | Olira | 15/12 | 16/12 | 2 |

**12. Gantt Chart (Project Schedule)**

*A detailed Gantt chart will be maintained based on the Project Management Work Plan above to visualize timelines, dependencies, and progress.*

**13. Budget**

As an academic project, there is no budget for personnel. Costs are limited to cloud services that may exceed free-tier limitations.

| Category | Item | Estimated Cost | Justification |
| --- | --- | --- | --- |
| **Cloud Services** | Firebase (Firestore, Storage, Functions) | $0 - $50 | We will operate within the generous free tiers. A small budget is allocated for potential overages during load testing. |
| **Software & Libraries** | React, Node.js, Vercel, etc. | $0 | All planned development tools are open-source or have free tiers suitable for this project. |
| **Contingency** | Unforeseen service costs | $50 | A small buffer for any unexpected expenses. |
| **Total Estimated Budget** |  | **$0 - $100** |  |

**14. Conclusion**

The **EduReg** project addresses a critical need for modernization in Ethiopian secondary school administration. This proposal outlines a clear plan to develop a web application that replaces inefficient, manual registration with a streamlined, secure, and user-friendly digital experience. Our chosen technology stack—React for the front-end and Node.js with Firebase for the back-end—provides a robust foundation for building a scalable and real-time system.

By adopting a system prototyping methodology, we will ensure continuous stakeholder feedback, mitigate risks, and deliver a final product that is precisely aligned with the needs of students, parents, and administrators. Ultimately, EduReg is more than just an application; it is a tool to empower the school with efficiency, accuracy, and data-driven insights. Our team is committed to following the plan laid out in this document to deliver a high-quality system that makes a tangible, positive impact on the school community.

**15. References**

* Firebase. (n.d.). The backend platform for database, authentication, and hosting. Retrieved September 29, 2025, from [https://firebase.google.com](https://firebase.google.com/?authuser=3)
* React. (n.d.). The JavaScript library for building the user interface. Retrieved September 29, 2025, from [https://react.dev](https://react.dev/)
* Telebirr. (n.d.). A mobile money service in Ethiopia used for external fee payments. Retrieved September 29, 2025, from <https://www.ethiotelecom.et/telebirr/>
* Vercel. (n.d.). The designated platform for deploying the front-end of the application. Retrieved September 29, 2025, from [https://vercel.com](https://vercel.com/)