Bahria University, Karachi Campus

COURSE: SOFTWARE CONSTRUCTION

TERM: FALL 2025, CLASS: BSE- 5 (B)

PROJECT NAME

BuildFlow: An Integrated Communication and Documentation Management System for Construction Companies

TO:

Engr. MUNIBA HUMAYUN

S.NO	Student Name	Enrollment #
1	Israr Ayub	02-131232-012
2	Mir Hamza	02-131232-057
3	Tahir Hameed	02-131232-106
4	Faiz Ur Rehman	02-131232-126

Signed Remarks: Score:

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Abstract

The construction industry requires efficient communication and documentation. Traditional methods like handwritten notes cause inefficiency. Paper-based documentation leads to errors and duplication. Scattered emails and files delay important decisions. These outdated practices affect collaboration and project delivery. BuildFlow will provide a centralized digital management platform. The system will integrate communication and documentation features. It will include six major functional modules. The first module will be the email sender. The second module will be the meeting summarizer. The third module will generate predefined company applications. The fourth module will provide a project dashboard. The fifth module will enable task tracking operations. The sixth module will manage centralized document storage. Together, these modules will streamline project communication effectively. Managers will receive instant updates through visual dashboards. Engineers and HR staff will generate applications. Employees will manage tasks with reminders and tracking. Clients will receive structured summaries and progress updates. The system will ensure transparency and accountability throughout. Automation will reduce repetitive work and human errors. All data will be stored in one repository. Search and filtering will simplify document retrieval operations. The project will be developed within eight weeks. The budget will be around PKR 60,000. A four-member team will complete the entire development. BuildFlow will transform construction management with efficiency and collaboration.

1. Introduction

Construction projects are large-scale endeavors that involve a variety of stakeholders, including project managers, engineers, contractors, HR personnel, and clients. Coordinating activities between these groups is critical, as poor communication and fragmented documentation can easily derail timelines and increase costs. Traditionally, construction firms in Pakistan rely on informal practices such as handwritten notes, manual emails, and verbal instructions. While these methods may work for small projects, they become unreliable and inefficient in larger projects where accountability and speed are vital.

BuildFlow offers a modern, digital approach to solving these challenges. By integrating all essential communication and documentation activities into a single platform, it minimizes delays and ensures accuracy in project management. The system provides structured tools for sending emails through templates, summarizing meeting minutes into key decisions and tasks, generating formal applications like leave requests and NOCs, and storing all documents in a centralized repository for easy retrieval.

Furthermore, BuildFlow enhances collaboration between managers and engineers by providing task tracking modules that assign responsibilities and send reminders, ensuring deadlines are not missed. Its dashboard functionality gives an instant overview of project status, allowing managers to make informed decisions faster.

The importance of this system lies in its ability to eliminate inefficiencies caused by outdated processes. With automation and centralization at its core, BuildFlow transforms traditional construction workflows into a streamlined, transparent, and accountable digital system. By doing so, it not only reduces human error but also empowers companies to achieve better productivity and improved client satisfaction

.2. Background

The construction sector in Pakistan and worldwide continues to face significant challenges related to documentation and communication. Projects often involve multiple contractors, sub-contractors, suppliers, engineers, and HR staff who need to exchange information quickly and accurately. However, the reality is that many firms still depend on fragmented systems such as paper-based forms, scattered Excel sheets, and unstructured communication through email and phone calls. These outdated practices create mismanagement, loss of data, and frequent delays in decision-making.

For instance, meeting notes are often written manually, making them prone to misinterpretation or being misplaced. Applications such as leave requests, NOCs, and material requisitions are processed slowly because they must be drafted manually each time. Similarly, there is no proper system to track tasks across departments, leading to duplication of efforts and confusion over responsibilities. The lack of a centralized repository also means that important project documents are stored in multiple locations, making retrieval inefficient and unreliable.

BuildFlow is specifically designed to address these challenges by automating and centralizing communication, documentation, and task management. Its AI-powered meeting summarizer extracts key points and deadlines, ensuring clarity and accountability. The application generator provides standardized templates, reducing time and errors in creating documents. Task tracking modules assign responsibilities clearly, while document storage ensures quick retrieval and secure storage.

By providing these features in a unified platform, BuildFlow helps construction companies overcome the inefficiencies of traditional methods. It creates a transparent workflow where all stakeholders have access to updated information, enabling faster, smarter decision-making and ensuring projects are delivered on time

.3. Project Definition

BuildFlow is an integrated system for construction companies that streamlines communication and documentation. It allows managers, engineers, and staff to send emails, summarize meeting minutes, generate applications, assign tasks, and store documents in one platform. The current problem of manual communication, scattered records, and unclear responsibilities is solved by providing automation, transparency, and centralized control. The system improves efficiency, reduces errors, and enhances collaboration across all project stakeholders.

3.1. key functionalities

Email Sender: Provides predefined templates such as progress updates, meeting invites, and safety notices. It also includes a custom email composer with attachment support and an email log to track communication history.

Meeting Minutes Summarizer: Allows users to upload meeting notes or transcripts, which are then processed by AI/NLP models to extract decisions, action items, and deadlines. The summaries can be exported to PDF/Word and emailed directly to attendees.

Application Generator: Offers templates for frequently used forms like leave requests, NOCs, material requisitions, and safety compliance reports. Users fill in details, and the system generates professional documents with the company's branding.

Project Dashboard: Displays recent activities such as sent emails, generated applications, task updates, and summaries, giving managers a quick overview of ongoing projects.

Task Assignment & Tracking: Enables managers to assign tasks derived from meeting summaries or entered manually. Task status is monitored in real time with automated reminder notifications.

Document Storage & Search: Creates a centralized repository where all documents are indexed and can be searched by project, keyword, or date.

In summary, BuildFlow unifies communication and documentation processes into one platform, replacing scattered tools and manual workflows with a structured, efficient, and transparent system.

4. Scope

The scope of BuildFlow encompasses the automation of communication, documentation, and task management for construction companies. The system will be used by project managers, engineers, HR staff, and other stakeholders involved in construction projects. Its primary features include email automation, AI-powered meeting summarization, application generation, task assignment and tracking, dashboards, and centralized document storage. These functionalities will help streamline workflows and improve collaboration across all teams.

In the initial release, BuildFlow will focus on essential modules: email sender, meeting summarizer, application generator, dashboard, task tracker, and document repository. These modules will cover the most immediate needs of construction firms, such as reducing delays in communication, centralizing records, and eliminating redundancy in repetitive tasks.

In future releases, the system may be extended with advanced features like calendar integration to sync meetings and deadlines, voice-to-text transcription for on-site meetings, Google Maps integration for site tracking, and automated generation of weekly or monthly progress reports. These additions will enhance its functionality and position it as a scalable enterprise solution.

The system is intentionally designed to exclude certain complex features such as payroll processing, ERP-level resource planning, and real-time GPS workforce tracking. By limiting the scope initially, BuildFlow ensures timely development and delivery while leaving room for enhancements later.Ultimately, the scope of BuildFlow is to provide a modular, flexible, and scalable system that addresses core communication and documentation challenges in construction project management while laying the foundation for future growth.

5. Resources

5.1. Technical Resources

I. The system will use Node.js for backend logic.

II. Express.js will provide scalable and secure backend APIs.

III. React will be used for the web interface.

IV. MongoDB will store documents, emails, tasks, and applications.

V. TensorFlow.js or OpenAI APIs will process meeting summaries.

VI. docx and pdf-lib libraries will generate Word and PDF files.

VII. Nodemailer will handle email sending via Gmail or Outlook.

VIII. Development will run on standard laptops or PCs.

IX. Deployment will be possible on servers or cloud.

5.2. Human Resources

I. Backend Developer: Will develop APIs, server logic, and automation.

II. Frontend Developer: Will design the user interface using React.

III. Database Administrator: Will create and manage MongoDB collections.

IV. QA & Documentation Lead: Will test modules and prepare documentation.

6. PROJECT TEAM:

The BuildFlow project will be executed by a team of four members, each assigned a specific role to ensure balanced responsibility and smooth collaboration.

- Team Leader & Backend Developer – Israr Ayub
  Israr will oversee the overall system architecture, manage backend APIs, and integrate business logic for the platform. His role will also include ensuring that system functionality aligns with requirements and identifying technical risks.

- Frontend Developer – Mir Hamza
  Hamza will design and implement the user interface using React. His primary focus will be creating a clear, user-friendly interface that simplifies navigation between modules such as the dashboard, email sender, and application generator.

- Database Administrator – Tahir Bin Hameed
  Tahir will be responsible for designing, maintaining, and optimizing the MongoDB database. He will ensure proper storage of emails, meeting summaries, applications, tasks, and documents, while also managing indexing and search functionalities for quick document retrieval.

- QA & Documentation Lead – Faiz Ur Rehman
  Faiz will test the system thoroughly, validate workflows against requirements, and prepare user manuals, reports, and project documentation. He will also ensure all modules are integrated seamlessly before deployment.

This team structure provides a strong balance of technical development, design, database management, and quality assurance. By clearly distributing responsibilities, BuildFlow will ensure efficient teamwork and accountability, allowing the project to be completed within schedule and at a high standard of quality.

7. Budget

Module	Estimated Cost (PKR)	Description
Email Sender Module	15.000	Includes predefined templates, custom composer, and email logs.
Meeting Minutes Summarizer	15.000	Covers file upload, summarization, export, and email distribution features.
Application Generator	20,000	Provides templates for leave requests, NOCs, and material requisitions.
Project Dashboard	20,000	Displays updates, charts, and quick navigation to system modules.
Task Assignment & Tracking	25,000	Includes task creation, assignment, status tracking, and reminders.
Document Storage & Search	30,000	Centralized repository with indexing, filters, and preview/download options.
Total Estimated Cost	125,000	Covers development hours, testing, and documentation.

8. Schedule

Week(s)	Phase	Description
1-2	Requirement Analysis & System Design	Finalize features, design database schema, and prepare Data Flow Diagrams (DFDs) and Use Case Diagrams.
3-4	Email Sender & Meeting Summarizer	Develop core communication modules, integrate with email servers, and test summarization functionality.
5	Application Generator	Develop standardized templates for leave requests, NOCs, and material requisitions.
6	Dashboard & Task Tracker	Create project dashboard and implement task assignment, tracking, and reminder features.
7	Document Storage & Search	Integrate centralized repository, indexing, and retrieval with filters for projects, dates, and keywords.
8	Testing, Deployment, and Documentation	Integrate all modules, conduct full system testing, deploy solution, and prepare final documentation.

9. Diagrams

- Level 1 DFD

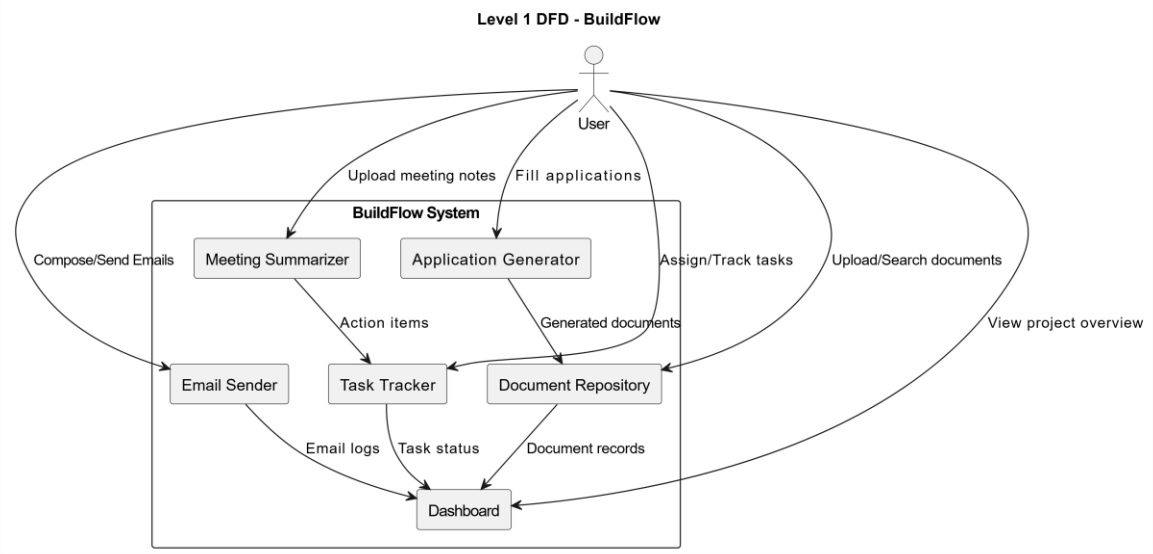

Figure 1 DFD

The Level 1 DFD breaks down the system into individual modules, including the email sender, meeting summarizer, application generator, dashboard, task tracker, and document repository. It demonstrates how data flows between modules and the central database.

- ER Diagram

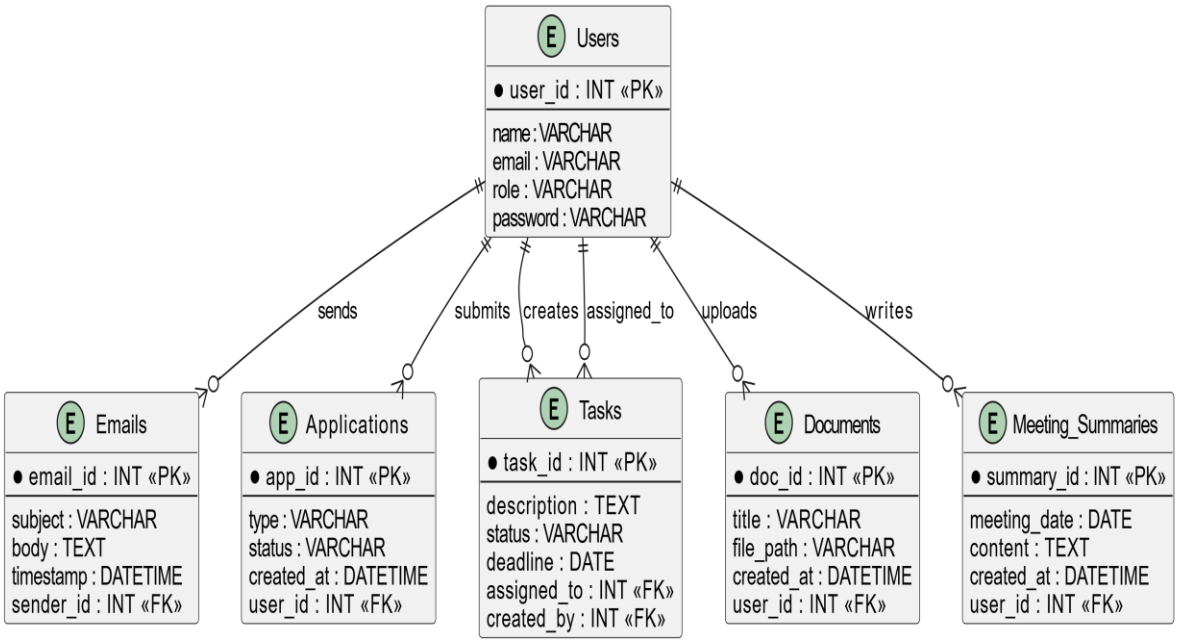

Figure 2 ERD

The ER Diagram represents the database structure, showing entities like Users, Emails, Applications, Tasks, Documents, and Meeting Summaries, along with their relationships. Together, these diagrams form the backbone of system design, ensuring clarity before development begins.

10. Conclusion

BuildFlow is designed to address one of the most pressing challenges in the construction industry: inefficient communication and documentation. By integrating email management, AI-powered meeting summaries, application generation, dashboards, task tracking, and document storage, BuildFlow creates a single platform that centralizes operations. This not only saves time but also ensures transparency and accountability across all stakeholders.

The system eliminates inefficiencies caused by manual processes, reduces duplication of work, and improves collaboration among project managers, engineers, HR staff, and clients. Automation ensures that repetitive tasks such as sending standardized emails or drafting applications are completed quickly and with minimal errors. The centralized repository creates a single source of truth, allowing project teams to retrieve any document with ease.

Moreover, task assignment and reminders provide clear accountability, ensuring that responsibilities are tracked and deadlines are met. With the addition of dashboards, decision-makers gain instant insights into project progress, enabling faster and more informed actions.

In conclusion, BuildFlow is not just a digital tool but a transformative solution that empowers construction companies to move away from outdated practices. By combining automation, centralization, and transparency, it lays the foundation for more efficient project delivery, greater productivity, and improved stakeholder satisfaction.

11. Appendix

A. Tools & Technologies

- Frontend: React.js, HTML, CSS, JavaScript
- Backend: Node.js, Express.js
- Database: MongoDB (with GridFS for file storage)
- Document Generation: docx, pdf-lib
- Email Sending: Nodemailer (Gmail/Outlook integration)
- IDE: VS Code
- Hosting/Deployment: Azure / AWS (planned)

B. Team Roles

- Israr Ayub: Team Leader & Backend Developer
- Mir Hamza: Frontend Developer
- Tahir Bin Hameed: Database Administrator
- Faiz Ur Rehman: QA & Documentation Lead

C. Key Features

- User registration & secure login
- Automated email sender with templates & logs
- Meeting minutes summarizer with export options
- Application generator (leave requests, NOCs, material requests)
- Dashboard for project overview
- Task assignment and tracking with reminders
- Centralized document storage & search

12. Mind Mapping

The mind map will provide a structured overview of the BuildFlow Communication and Documentation Management System, broken into four key areas:

- **Users:**
    - Project Managers: send emails, assign tasks, review dashboards
    - Engineers: upload meeting notes, request materials, track tasks
    - HR Staff: generate applications, manage documentation
    - Clients/Stakeholders: receive summaries, reports, and updates
- **System:**
    - Email management and template handling
    - Meeting summarization and action item extraction
    - Task assignment, monitoring, and notifications
    - Document indexing, storage, and retrieval
- **Technology:**
    - MERN stack: React.js (frontend), Node.js & Express.js (backend), MongoDB (database)

- Libraries: docx & pdf-lib (document generation), Nodemailer (email sending)

- Project Phases:
  - Requirement Analysis & Design
  - Development of modules (Email, Summarizer, Applications, Dashboard, Tasks, Storage)
  - Testing & Deployment

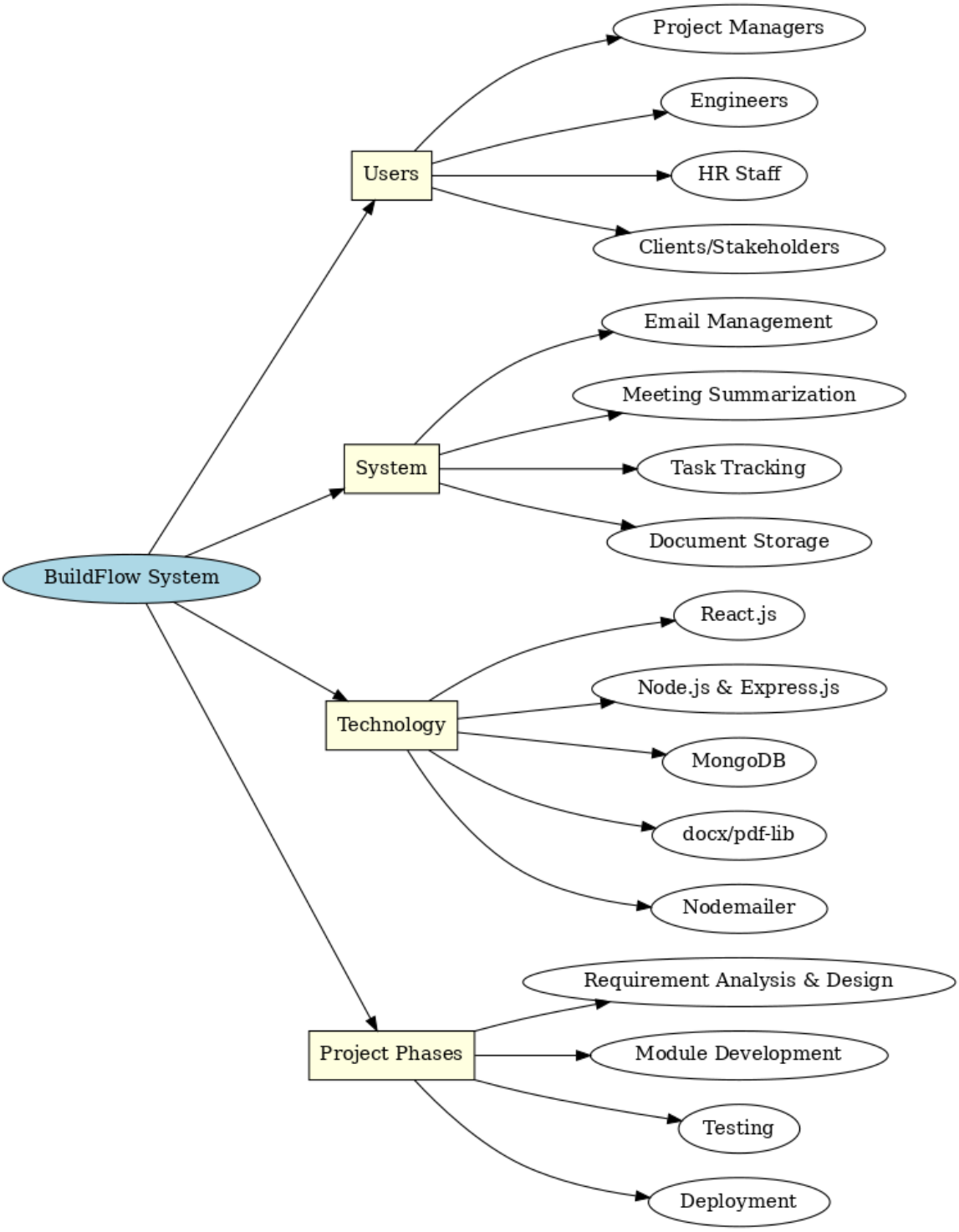

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Figure 3 MIND MAP

13. Story Board

1. Login

- The user logs into the platform securely.
- Role-based access decides available features.

2. Email Communication

- Project manager selects a predefined template.
- Custom details are filled in and email is sent.
- The system logs the email for record-keeping.

3. Upload Meeting Notes

- Engineers upload meeting transcripts or text notes.
- The system summarizes them into action items and deadlines.
- Summaries are exported as PDF/Word and emailed to attendees.

4. Generate Applications

- HR staff select a template (leave, NOC, material).
- They fill out project-specific details.
- The system generates a professional document for approval.

5. Dashboard Overview

- Project managers view latest emails, tasks, and applications.
- Graphical charts show progress and deadlines.

6. Task Assignment & Tracking

- Tasks are created from meeting summaries or manually.

- Responsibilities are assigned with deadlines.
- Automated reminders are sent for pending tasks.

7. Document Storage & Retrieval

- All documents (emails, applications, summaries) are stored centrally.
- Users search and filter by keyword, date, or project.
- Documents can be previewed or downloaded.

8. System Processing

- Data is stored securely in MongoDB.
- Notifications are triggered for emails, tasks, and reminders.
- Reports are auto-generated for stakeholders.

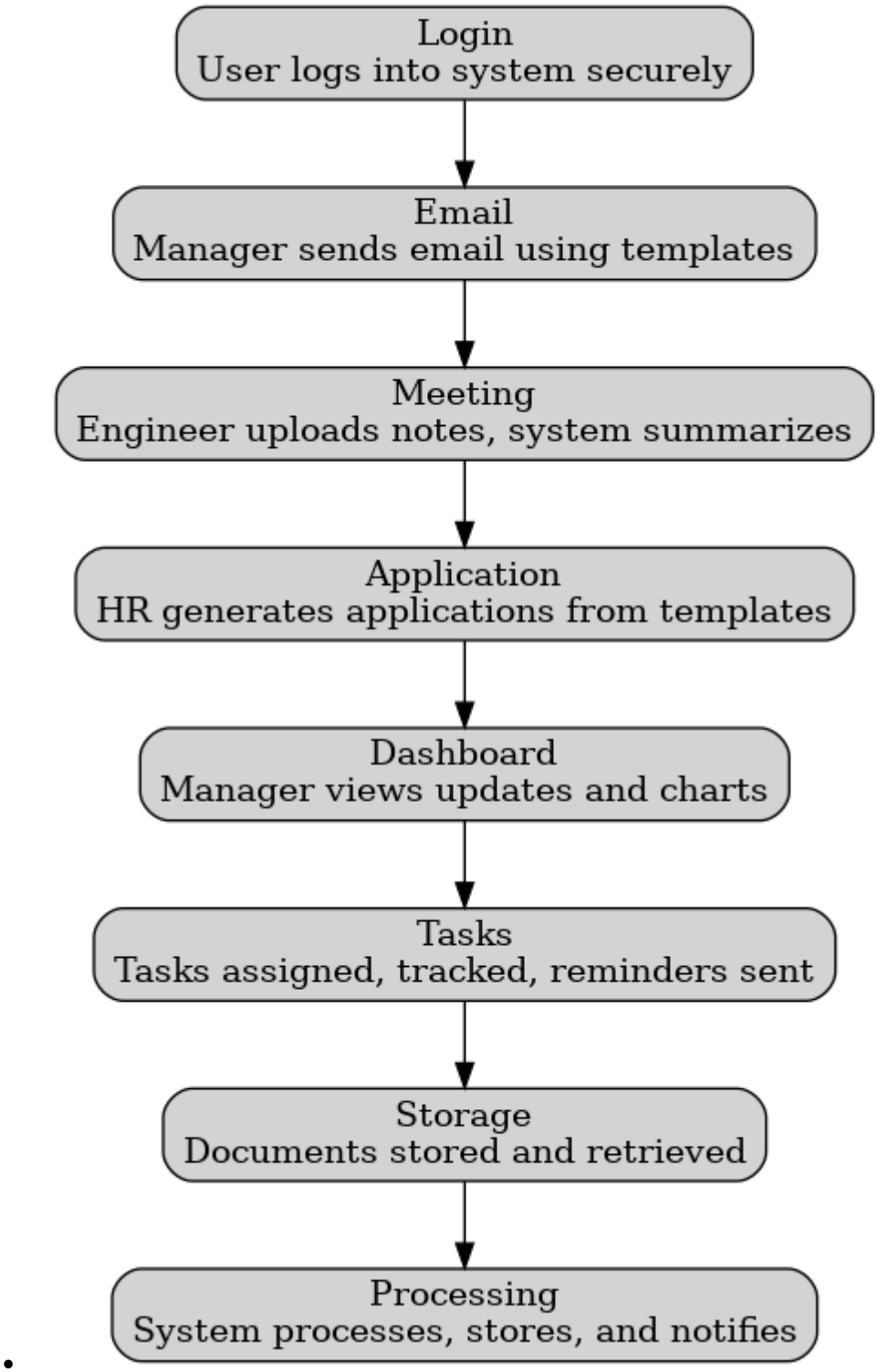

Figure 4 STORY BOARD