

Veer Narmad South Gujarat University, Surat.

Department of Information and Communication Technology

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Project Report

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1. Introduction

1.1 Project Profile:

E-hastakshar, our cutting-edge Digital Signature System designed to simplify document signature tasks. Just like having personal online pen and paper, but with extra safety and ease! With just a few clicks, we can quickly and securely sign any pdf.

With E-hastakshar, we can:

- Sign any PDF document securely with just a few clicks.
- Upload new documents for others to sign and send them out in a specific order.
- Manage multiple PDFs.
- Add multiple recipients in the signing process.
- Create custom templates to set signature positions and default recipient details.
- Schedule document sends to streamline workflow management.

Basic Information:

Project Title	Digital Signature System
Organization	Quantum IT Solution
Front End Tools	React JS, DevExtreme, ChakraUI
Back End Tools	Django (APIs)
Database	MySQL
Cloud	Amazon AWS
Project Category	Web Based Application
Duration	3 Months
Internal Project Guide	Dr. Pushpal Desai
External Project Guide	Mr. Rajesh Prajapati
Submitted By	Rajvi Gajjar, Aayushi Modi, Siddhi Naik.
Submitted To	Department of ICT, VNSGU

1.2 Scope:

The scope of this web app is wide-ranging and can be expanded in various ways to enhance its functionality and meet the evolving needs of your users. Here are some potential areas for scope expansion:

1. **User Registration and Authentication:**

Provides a secure user registration system with authentication to ensure that only authorized individuals can access the platform. This includes features such as account creation, password management, login with google and multi-factor authentication for enhanced security.

2. **Setup signature details:**

During registration, users personalize their signature style by entering their full name or initials using three methods: typing, drawing, or uploading an image. They also have the choice to upload a company stamp as well.

3. **Signing single document for single or multiple recipients:**

Enable users to:

- Upload pdf
- Can apply any pre-defined template for signing.
- Add recipient(s) along with their roles and order
- Customized mail messages, set expiration date & reminder accordingly.
- Setup signature fields
- Send/ Download/ Schedule/ Save as Draft

4. **Bulk document signing:**

Users can upload multiple pdf files, enabling signers to execute signatures across multiple documents in one go. This feature significantly boosts efficiency and productivity, particularly for users handling large volumes of documents.

5. **Create template:**

Provide tools for users to create and customize templates allowing for the assignment of fields, roles, and precise signing positions for recipients. This functionality guarantees document reusability and maintains consistency across diverse documents.

You can add default document and setup default recipient details and fix the signature positions of recipients, it can help you sign the PO, SO, Invoices.

6. **Email Scheduling:**

Users can schedule emails to send the document to recipients for signing.

7. Recipient Signing Order:

- Concurrent access
Multiple users can access and sign/ review document the at the same time.
- Sequential access
One user can access & sign the document after the completion of the previous user's activity.
- Both concurrent and sequential (First- sequential and others- concurrently)
Sender has authority to decide the order in which other users can get the email and modify the document.

8. Set expiration and reminders:

Users can set expiration date of signing the document and also schedules reminders.

9. Integration with AWS S3:

Integration with AWS S3 for storage and management of pdfs and images.

10. Tracking:

Sender can track all activities related to document signing details.

2. Software Requirement Specification (SRS)

2.1 Functional Requirements:

1. User:

Users shall be able to register with the system providing necessary details.

The system shall authenticate users securely using username/password or other authentication methods like Google login and multi-factor authentication.

Users shall be able to manage their passwords securely.

2. Document signing:

The system will enable users to sign a single or bulk documents directly. Additionally, users will have the option to utilize pre-defined templates for signing purposes. Users can apply their own signature or collaborate with other users by sending documents for their signatures.

3. Bulk Document Signing:

Users shall be able to upload and sign multiple PDF files simultaneously.

The system shall facilitate efficient signing across multiple documents for improved productivity.

4. Create template:

Sender will have the capability to create templates, enabling them to assign fields, roles, and signing positions for other users to sign.

5. Recipient management:

Sender should be able assign roles, signing positions and signing order to recipients.

Recipient positions should include details such as field name, recipient email, page number, coordinates, and dimensions.

6. Email scheduling:

Sender can schedule emails to notify recipients about document signing deadlines and reminders. Scheduling email details include recipient email, schedule time, sent status, expiration days, and reminder intervals.

7. Set Expiration and Reminders:

Sender shall be able to set expiration dates for document signing. Reminder schedules shall be customizable by sender.

8. Signing order:

The system supports concurrent, sequential as well as combination of both concurrent and sequential access for signing, ensuring consistency in workflow management.

9. Tracking:

Senders shall be able to track all activities related to document signing.

10. Admin:

The administrator requirements for this web app involve a robust and user-friendly admin panel that enables comprehensive user management and monitoring, reviewing and tracking of system.

The functional requirements ensure that this web app provides functionalities to enable users to securely sign pdf documents and manage signature workflows efficiently. It offers a seamless and intuitive experience for users to streamline document signing processes effectively.

2.2 Non-Functional Requirements:

1. Performance:

The web app should be able to handle a large number of users simultaneously without significant degradation in performance. Response times for actions and loading times for pages should be fast and efficient.

2. Scalability:

The web app should have the ability to scale and accommodate increasing user demands and growing data volumes. It should be able to handle additional users, messages, and data without impacting performance.

3. Security:

The web app should incorporate robust security measures to protect user data, including encryption of sensitive information, secure authentication and authorization mechanisms, and protection against common security vulnerabilities such as cross-site scripting (XSS) and SQL injection.

4. Reliability:

The web app should be reliable, ensuring high availability and minimal downtime. It should be able to recover from failures or disruptions gracefully and provide appropriate error handling and logging mechanisms.

5. Usability:

The web app should have a user-friendly interface that is intuitive and easy to navigate. It should provide clear instructions, informative error messages, and consistent design elements to enhance the user experience.

6. Compatibility:

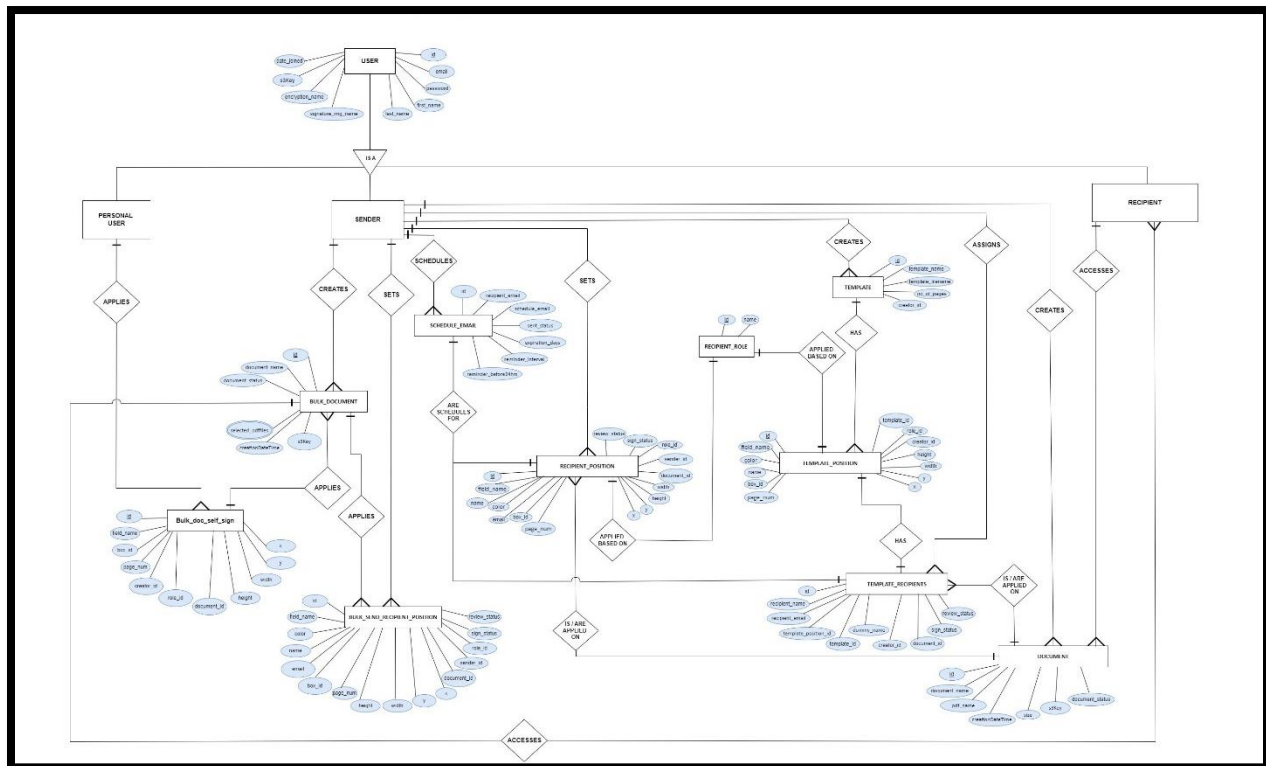
The web app should be compatible with different web browsers, operating systems, and devices. It should be responsive and adaptable to various screen sizes and resolutions.

7. Maintainability:

The web app should be designed and implemented in a modular and maintainable manner, allowing for easy updates, bug fixes, and future enhancements. It should follow coding best practices and have clear documentation for developers.

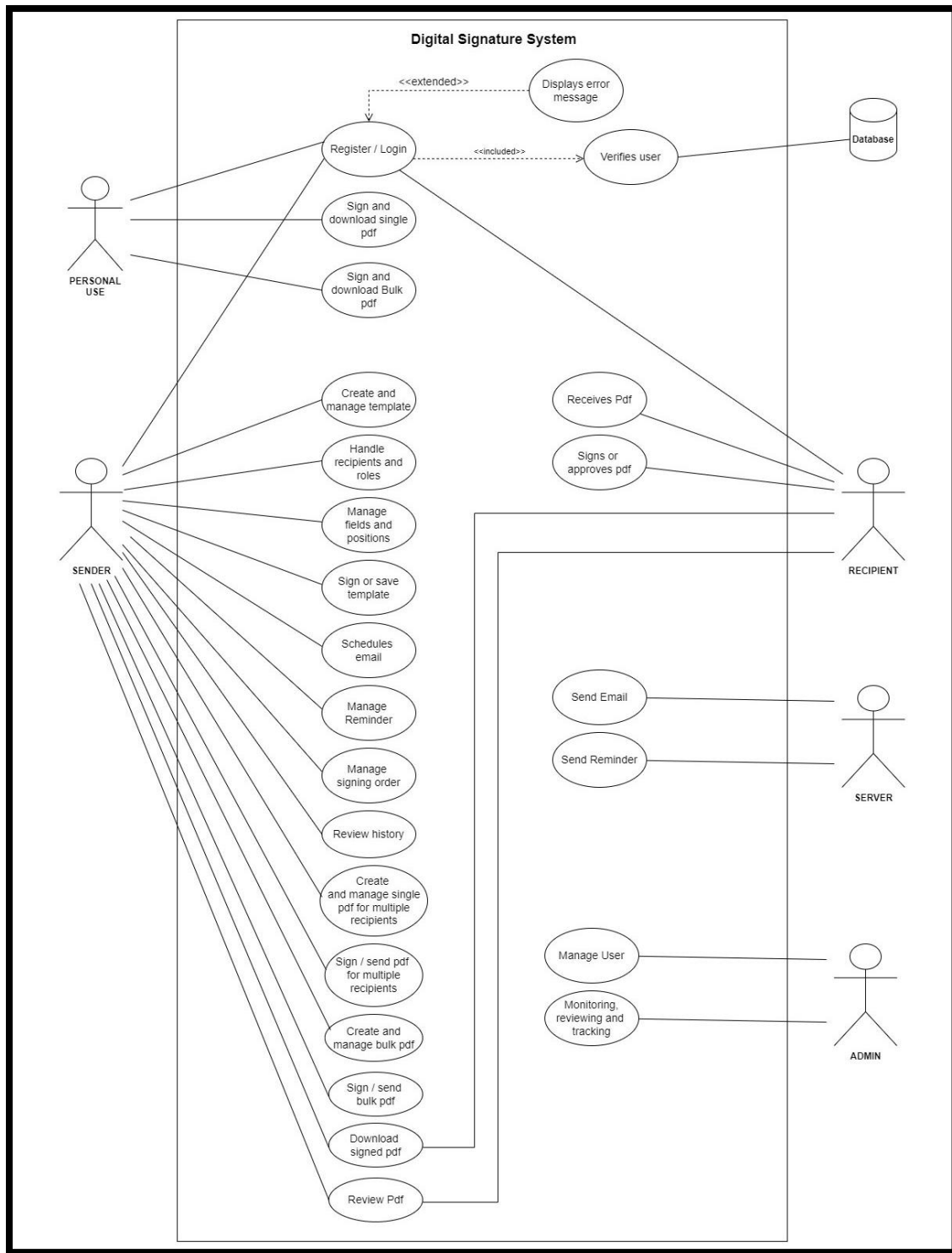
These non-functional requirements ensure that the web app meets specific quality attributes and provides a reliable, secure, performant, accessible, and user-friendly experience to its users.

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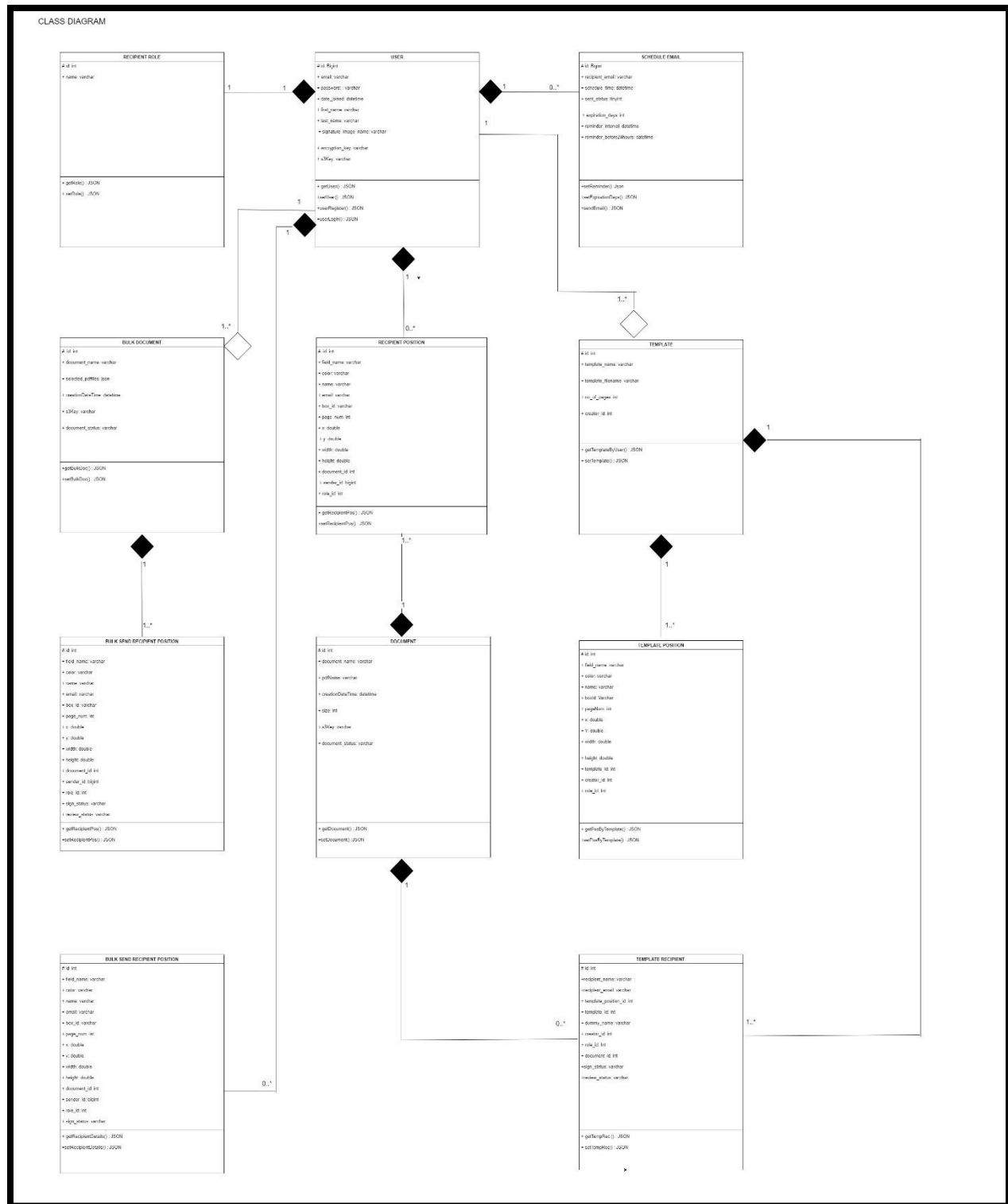


4. Unified Modeling Language (UML) Diagrams

4.1 Use-Case Diagram:



4.2 Class Diagram:

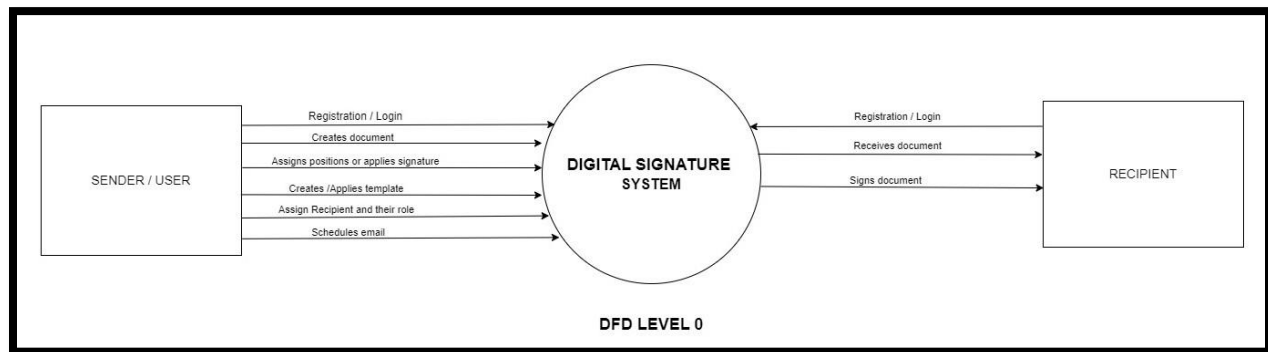


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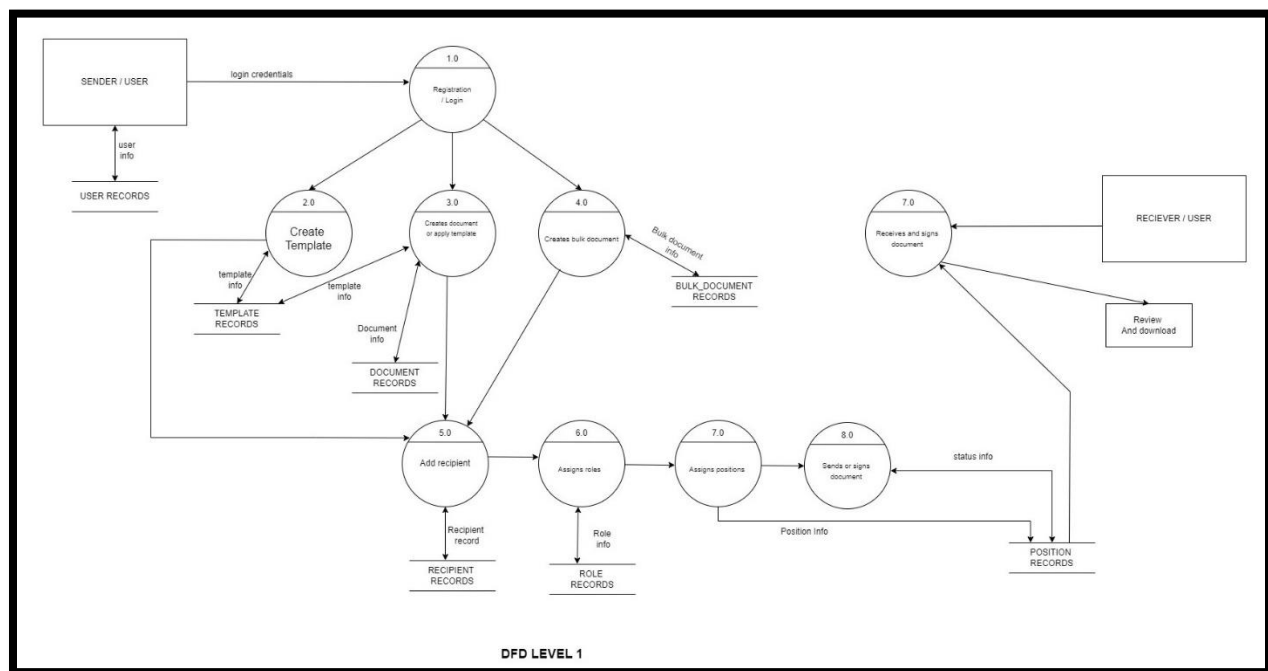


5. Data-Flow-Diagram (DFD)

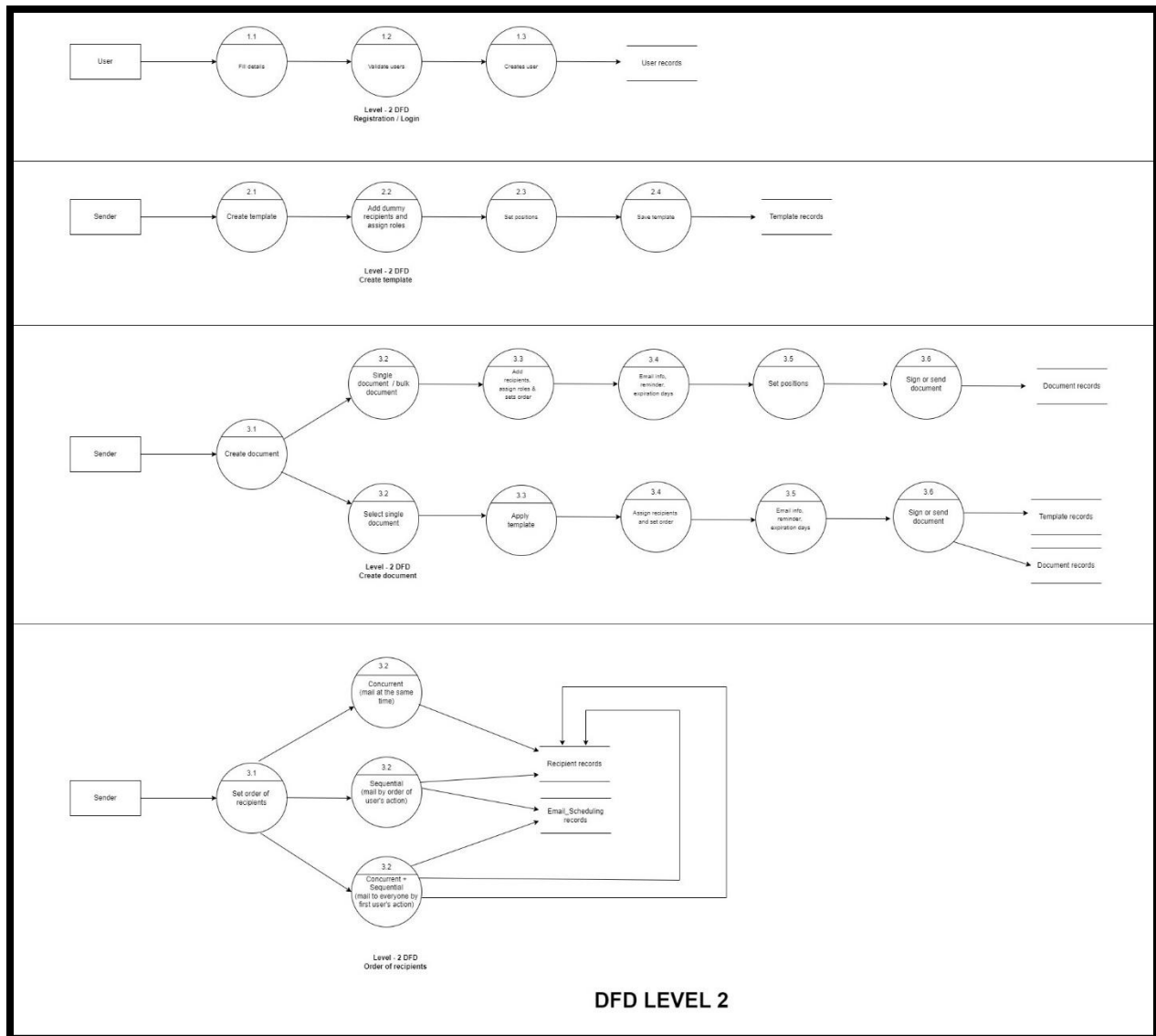
5.1 0-Level DFD:



5.2 1-Level DFD:



5.3 2-Level DFD:



6. Software Design

6.1 Database Design

1) Table: USER

Element Name	Datatype	Constraint	Description
id	Bigint	Primary key	Unique id of user
email	varchar	Not null	Email of user
password	varchar	Not null	Password of user
date_joined *	datetime	Not null	Registration date/time
first_name	varchar	Not null	First name of user
last_name	varchar	Null	Last name of user
signature_image_name	varchar	Null	Image of user's signature
encryption_key	varchar	Null	User wise key for encryption & decryption of user's signature image
s3Key	varchar	Null	Unique key of AWS S3 bucket

2) Table: SCHEDULE_EMAIL

Element Name	Datatype	Constraint	Description
Id	Bigint	Primary key	Unique id of scheduling email
recipient_email	varchar	Not null	Email of user
schedule_time	datetime	Not null	Scheduling date/time
sent_status	tinyint	Not null	Scheduling success status (0: pending, 1: sent)
expiration_days	int	Not null	Expiration date for signing pdf
reminder_interval	datetime	Null	Reminder based on interval of days
reminder_before24hours	datetime	Null	Reminder before 24 hours of the expiration date

3) Table: DOCUMENT (Single pdf)

Element Name	Datatype	Constraint	Description
id	int	Primary key	Unique id of document
document_name	varchar	Not null	Name of document
pdfName	varchar	Not null	Pdf file name
creationDateTime	datetime	Not null	Creation date/time of document
size	int	Not null	Length of document
s3Key	varchar	Null	Unique key of AWS S3 bucket
document_status	varchar	Not null	Indication of whether all recipients have signed the document

4) Table: RECIPIENT_ROLE

Element Name	Datatype	Constraint	Description
id	int	Primary key	Unique id of recipient role
name	varchar	Not null	Name of recipient role (signer, reviewer)

5) Table: RECIPIENT_POSITION (Without template - Single pdf, multiple recipient)

Element Name	Datatype	Constraint	Description
id	int	Primary key	Unique id of recipient's position details
field_name	varchar	Not null	Type of field assigned for signing
color	varchar	Not null	Color for recipient's box's identity
name	varchar	Not null	Name of recipient
email	varchar	Not null	Email of recipient
box_id	Varchar	Not null	Unique id for recipient's box for signing position
page_num	int	Not null	Pdf's page number where associated box is placed
x	double	Not null	x co-ordinate of recipient's box for particular page

y	double	Not null	y co-ordinate of recipient's box for particular page
width	double	Not null	width of recipient's box for particular page
height	double	Not null	height of recipient's box for particular page
document_id	int	Foreign key	document Id of document table
sender_id	bigint	Foreign key	User who sets positions and sends document
role_id	Int	Foreign key	Role id of role table
sign_status	varchar	null	Status of whether signer has signed the document
review_status	varchar	null	Status of whether reviewer has approved the document

6) Table: BULK_DOCUMENT (multiple pdf)

Element Name	Datatype	Constraint	Description
id	Int	Primary key	Unique id of document
document_name	varchar	Not null	Name of document
selected_pdffiles	json	Not null	Pdf file name & size
creationDateTime	datetime	Not null	Creation date/time of document
s3Key	varchar	Null	Unique key of AWS S3 bucket
document_status	varchar	Not null	Indication of whether all recipients have signed the document

7) Table: BULK_SEND_RECIPIENT_POSITION (Without template - multiple pdf, multiple recipient)

Element Name	Datatype	Constraint	Description
id	int	Primary key	Unique id of recipient's position details
field_name	varchar	Not null	Type of field assigned for signing
color	varchar	Not null	Color for recipient's box's identity
name	varchar	Not null	Name of recipient
email	varchar	Not null	Email of recipient

box_id	Varchar	Not null	Unique id for recipient's box for signing position
page_num	int	Not null	Pdf's page number where associated box is placed
x	double	Not null	x co-ordinate of recipient's box for particular page
y	double	Not null	y co-ordinate of recipient's box for particular page
width	double	Not null	width of recipient's box for particular page
height	double	Not null	height of recipient's box for particular page
document_id	int	Foreign key	document Id of document table
sender_id	bigint	Foreign key	User who sets positions and sends document
role_id	Int	Foreign key	Role id of role table
sign_status	varchar	null	Status of whether signer has signed the document
review_status	varchar	null	Status of whether reviewer has approved the document

8) Table: BULK_DOC_SELF_SIGN (Without template - multiple pdf, self sign)

Element Name	Datatype	Constraint	Description
id	int	Primary key	Unique id of recipient's position details
field_name	varchar	Not null	Type of field assigned for signing
box_id	Varchar	Not null	Unique id for recipient's box for signing position
page_num	int	Not null	Pdf's page number where associated box is placed
x	double	Not null	x co-ordinate of recipient's box for particular page
y	double	Not null	y co-ordinate of recipient's box for particular page

width	double	Not null	width of recipient's box for particular page
height	double	Not null	height of recipient's box for particular page
document_id	int	Foreign key	document Id of document table
creator_id	int	Foreign key	User who creates template
role_id	Int	Foreign key	Role id of role table

9) Table: TEMPLATE

Element Name	Datatype	Constraint	Description
id	int	Primary key	Unique id of template
template_name	varchar	Not null	Name of template
template_filename	varchar	Not null	Pdf file name on which template is created
no_of_pages	int	Not null	Total number of pages in template file
creator_id	int	Foreign key	User who creates template

10) Table: TEMPLATE_POSITION (With template)

Element Name	Datatype	Constraint	Description
id	int	Primary key	Unique id of dummy recipient's position details
field_name	varchar	Not null	Type of field assigned for signing
color	varchar	Not null	Color for recipient's box's identity
name	varchar	Not null	Name of dummy recipient
boxId	Varchar	Not null	Unique id for dummy recipient's box for signing position
pageNum	int	Not null	Pdf's page number where associated box is placed
x	double	Not null	x co-ordinate of recipient's box for particular page
Y	double	Not null	y co-ordinate of recipient's box for particular page

width	double	Not null	width of recipient's box for particular page
height	double	Not null	height of recipient's box for particular page
template_id	int	Foreign key	Template Id of template table
creator_id	int	Foreign key	User who creates template
role_id	Int	Foreign key	Role id of role table

11) Table : TEMPLATE_RECIPIENTS

Element Name	Datatype	Constraint	Description
id	int	Primary key	Unique id of actual recipient of template
recipient_name	varchar	Not null	Name of actual recipient
recipient_email	varchar	Not null	Email of actual recipient
template_position_id	Int	Foreign key	id of dummy recipient's position details
template_id	int	Foreign key	Template Id of template table
dummy_name	varchar	Not null	Name of dummy recipient
creator_id	int	Foreign key	User who creates template
document_id	int	Foreign key	document Id of document table
sign_status	varchar	null	Status of whether signer has signed the document
review_status	varchar	null	Status of whether reviewer has approved the document