Design Specification Document

Project: **Lab Activity 14**

Group 4

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Contents

1 Introduction

This Design Specification outlines all components, tools, and dependencies used in the development and deployment of the system. It provides detailed descriptions of each module and the required libraries for proper system execution within Docker containers.

2 System Components

2.1 Frontend

The frontend serves as the user interface of the system. It allows users to upload files, view results, and interact with the application.

2.2 Backend

The backend handles file processing, API requests, database interactions, and routing.

2.3 Database

A PostgreSQL database is used to store structured metadata and case information.

3 Docker Container Architecture

The system is deployed using Docker Compose, which orchestrates three primary containers:

- **Frontend Container** – React-based UI, exposed on port 3000.

- **Backend Container** – Node/Express API, exposed on port 5000.

- **Database Container** – PostgreSQL instance, internal port 5432.

Each container runs in an isolated environment and communicates over a shared Docker network created by Docker Compose.

4 Container Dependencies and Required Libraries

This section lists all packages and dependencies required inside each Docker container to run the system.

4.1 Frontend Container Dependencies

- **Base Image:** node:20-alpine
- **JavaScript Libraries:**
  - react
  - react-dom
  - react-router-dom
  - vite or react-scripts

4.2 Backend Container Dependencies

- **Base Image:** node:20-alpine
- **Required Node Packages:**
  - express
  - pg
  - cors
  - multer
  - dotenv
  - nodemon

4.3 Database Container Dependencies

- **Base Image:** postgres:16
- **Internal Tools:**
  - psql command-line tools
  - persistent Docker volume (`db-data`)

4.4 Host Machine Requirements

- Docker Desktop installed
- Internet access to pull images
- Disk space for database volume and container layers