WEB PROGRAMMING

CAPSTONE PROJECT

GROUP 3

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Introduction

The Job Portal Web Application addresses critical challenges in the modern job market by providing a comprehensive platform for employers and job seekers. This documentation outlines the system's architecture, features, and technical implementation, supported by references to relevant research and industry standards.

System Architecture

The application follows a modern **MERN-like stack** with MySQL as the database:

- Frontend: React.js with Vite build tool
- Backend: Node.js with Express.js framework
- Database: MySQL (Relational Database Management System)
- Authentication: JWT-based security
- Management: Redux Toolkit
- Styling: Tailwind CSS with Material-UI components

Directory Structure

The project is organized into three main sections:

Frontend

```
client/
 ├── public/          # Static assets
 ├── src/
 │    ├── components/     # Reusable UI components
 │    ├── pages/          # Application views
 │    ├── services/       # API services
 │    ├── context/        # React contexts
 │    └── utils/      # Utility functions
```

Backend

```
server/
 ├── config/         # Configuration files
 ├── controllers/    # Business logic
 ├── middleware/           # Request processing
 ├── models/         # Database models (MySQL)
 ├── routes/         # API endpoints
 ├── services/       # Core services
 └── utils/          # Utility functions
```

Supporting Files

```
docs/               # Documentation
tests/              # Test cases
.env.example        # Environment variables
.gitignore          # Version control
```

User Roles and Access Control

The system implements role-based access control with three main user types:

1. Administrator

- Full system control and oversight
- User management and system configuration
- Content moderation and reporting

2. Employer

- Company profile management
- Job posting and applicant tracking
- Interview scheduling and communication

3. <u>Job Seeker</u>

- Personal profile and resume management
- Job search and application tracking
- Career development tools

<u>Key Features</u>

<u>Core Functionalities</u>

- User authentication and authorization
- Job posting and application management
- Resume builder and skills assessment
- Real-time notifications
- Comprehensive reporting and analytics

<u>Technical Features</u>

- Responsive web design
- RESTful API architecture
- Secure file uploads
- Data validation and sanitization
- Error handling and logging

<u>Application Flow</u>

1. <u>Job Creation Process</u>

- Employer fills job creation form
- Frontend validates input
- API request to backend
- Database operation (MySQL)
- Response handling and UI update

2. <u>Job Application Process</u>

- Job seeker views job details

- Submits application
- Backend processes application
- Notifications sent to employer
- Application tracking updates

3. Authentication Flow

- User submits credentials
- Backend validates and generates JWT
- Token stored in AuthContext
- Protected routes enforce access control

Technical Implementation

Frontend Technologies

- React.js with functional components
- React Router for navigation
- Redux Toolkit for state management
- Axios for HTTP requests
- Formik and Yup for form handling

Backend Technologies

- Express.js framework
- MySQL with Sequelize ORM
- JWT for authentication
- Nodemailer for email services
- Multer for file uploads

Utility Implementations

- Comprehensive validation rules
- Data formatting utilities
- Custom hooks for common operations
- Error handling middleware

- Logging and monitoring

Error Handling

The system implements a comprehensive error handling strategy:

1. Frontend validation for user input
2. API error handling middleware
3. Database operation error handling
4. User-friendly error messages
5. Logging for debugging and monitoring

Development Setup

Prerequisites

- Node.js (v18+)
- MySQL (v8+)
- Git

Installation

- bash

Clone repository

- git clone https://github.com/your-repo/job-portal.git

Install dependencies

- cd job-portal
- npm install

Configure environment

- cp .env.example .env

Running the Application

- bash

Start development server

- npm run dev

Build for production

- npm run build

Run tests

- npm test

Testing Strategy

The application implements a comprehensive testing approach:

Unit Testing

- Component rendering
- Utility functions
- Redux slices

Integration Testing

- API endpoints
- Database operations
- Authentication flow

End-to-End Testing

- User workflows
- Cross-browser compatibility
- Performance testing

Future Enhancements

1. Real-time chat functionality
2. AI-powered job matching
3. Advanced analytics dashboard
4. Mobile application development

5. Integration with professional networks
6. Multi-language support
7. Enhanced security features

References

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