

**Institute of Engineering and Management**

**ONLINE GAME PORTAL**

**Technical Report**

**Database Management System Project 2023**

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**Table of Contents**

|  |  |  |
| --- | --- | --- |
| **SLNo.** | **Topic** | **PageNo.** |
| 1 | Abstract | 3 |
| 2 | Introduction | 3 |
| 3 | System Architecture | 3 |
| 4 | Development Process | 4 |
| 5 | Key Technologies used | 5 |
| 6 | Conclusion | 6 |
| 7 | Future Enhancements | 6 |

**Technical Report for Development of Online Game Portal**

1. **Abstract**

This technical report details the development of an online game portal that includes three classic games: Tic Tac Toe, Snake, and Tetris. The portal is built using a full-stack JavaScript approach, employing React.js for the frontend, Node.js for the backend, and MySQL as the database system. The report provides an overview of the system architecture, development process, and key technologies used.

1. **Introduction**

Online game portals have gained immense popularity over the years, offering users a platform to enjoy a variety of games without the need for installation or downloads. In this project, we set out to create an online game portal featuring three classic games: Tic Tac Toe, Snake, and Tetris. The portal is built using modern web technologies to ensure a seamless user experience.

1. **System Architecture**

The system architecture of the online game portal is divided into three main components: the frontend, backend, and database.

**3.1) Frontend**

The frontend of the portal is developed using React.js, a popular JavaScript library for building user interfaces. The portal is responsive and offers a user-friendly experience on both desktop and mobile devices. Each game (Tic Tac Toe, Snake, and Tetris) has its dedicated interface, and users can easily switch between these games. Key features of the frontend include:

- User authentication and registration.

- Game lobbies and matchmaking.

- Real-time game sessions.

- Score tracking and leaderboards.

**3.2) Backend**

The backend of the portal is powered by Node.js, a runtime for executing JavaScript server-side. It provides the necessary API endpoints and game logic for managing user accounts and game sessions. Key backend functionalities include:

- User authentication and authorization.

- Database communication for game state and user profiles.

- Real-time communication using WebSocket for multiplayer games.

- Game logic for Tic Tac Toe, Snake, and Tetris.

**3.3) Database**

The database system used for this project is MySQL. It stores user profiles, game states, scores, and other essential data. The database schema is designed to support various aspects of the portal, such as user account information, game session records, and leaderboards.

1. **Development Process**

The development of the online game portal can be summarized in the following steps:

**4.1) Frontend Development**

- Initial Setup: Creating a React.js project with the necessary dependencies.

- User Authentication: Implementing user registration and authentication using JWT (JSON Web Tokens).

- Game Interfaces: Designing and developing individual user interfaces for Tic Tac Toe, Snake, and Tetris.

- Real-time Communication: Utilizing WebSocket for real-time communication during multiplayer games.

- Game Logic: Implementing game logic for each game using JavaScript.

**4.2) Backend Development**

- Node.js Server: Setting up a Node.js server using Express.js.

- User Management: Developing RESTful API endpoints for user registration, login, and profile management.

- Database Integration: Connecting the server to the MySQL database for data storage.

- Real-time Communication: Implementing WebSocket for real-time game synchronization.

- Game Logic: Creating game logic for Tic Tac Toe, Snake, and Tetris, including matchmaking and game sessions.

**4.3) Database Setup**

- Database Design: Designing the MySQL database schema to support user accounts, game states, and leaderboards.

- Database Connectivity: Using the MySQL driver for Node.js to connect the backend server to the database.

- Data Seeding: Populating the database with initial data, including sample user accounts and game configurations.

1. **Key Technologies Used**

**5.1) Frontend**

- React.js

- React Router

- Axios (for API communication)

- WebSocket API (for real-time communication)

**5.2)** **Backend**

- Node.js with Express.js

- WebSocket (using libraries like Socket.io)

- JSON Web Tokens (JWT) for authentication

- MySQL (via the mysql2 library)

**5.3) Database**

- MySQL

1. **Conclusion**

The development of the online game portal was successful, creating an engaging and user-friendly platform for playing classic games like Tic Tac Toe, Snake, and Tetris. The integration of React.js, Node.js, and MySQL allowed for a responsive frontend, a robust backend, and efficient data storage.

The portal supports user registration, authentication, real-time game sessions, and leaderboard tracking. With the use of modern web technologies and a well-defined architecture, we have created an interactive gaming experience that can be enjoyed by players of all ages.

1. **Future Enhancements**

In the future, there are several potential enhancements to consider:

- Expanding the game library with more classic and modern games.

- Implementing a chat system to allow players to communicate during game sessions.

- Enhancing the user interface for a more immersive experience.

- Adding user profile customization and avatars.

This technical report provides an overview of the development process for creating an online game portal featuring Tic Tac Toe, Snake, and Tetris. The project showcases the capabilities of modern web technologies and serves as a foundation for future enhancements and expansion.