### Student Management System

### Software Requirements Specification

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### 28th – March – 2024

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### VIth Semester(2024)

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### 1. Introduction

### The Student Management System (SMS) is a comprehensive software application designed to streamline the process of managing student information within educational institutions. This document outlines the functional and non-functional requirements of the SMS, along with data management, user interface, testing, performance evaluation, maintenance and support, deployment plan, risks, and assumptions.

### *1.1 Purpose*

### The purpose of the SMS is to provide an efficient and user-friendly platform for administrators to manage student data, including personal information, academic records, and other relevant details. Additionally, the SMS aims to facilitate communication between stakeholders, automate administrative tasks, and enhance decision-making through data analysis.

### *1.2 Scope*

### The SMS encompasses functionalities such as adding, updating, deleting, and searching for student records, as well as data display and reporting. Future enhancements may include advanced analytics, integration with external systems, and support for additional user roles and permissions.

### 2. Functional Requirements

### *2.1 User Authentication*

### The system shall authenticate users with a username and password.

### Upon successful authentication, users shall gain access to the student management functionalities.

### *2.2 Student Data Management*

### Add Student: Users can add new student records by entering relevant details such as roll number, name, class, section, contact information, father's name, address, gender, and date of birth.

### Update Student: Users can update existing student records with modified information.

### Delete Student: Users can delete student records from the system.

### Search Student: Users can search for student records based on various criteria including name, roll number, contact, father's name, class, section, date of birth, and gender.

### View All Students: Users can view all student records stored in the system.

### *2.3 Data Display*

### Student records shall be displayed in a tabular format with columns for roll number, name, class, section, contact, father's name, address, gender, and date of birth.

### The system shall provide functionality to scroll through records in case of large datasets.

### *2.4 Reporting*

### The system shall generate reports summarizing student demographics, academic performance, attendance, and other relevant metrics.

### Reports shall be exportable in various formats such as PDF, Excel, and CSV for further analysis and sharing.

### *2.5 Use casesim.png2.6 Classes/Objectsco.png*

### 3. Non-Functional Requirements

### *3.1 Performance*

### The system shall be responsive and provide quick responses to user actions.

### Database operations such as insertion, retrieval, and deletion shall be optimized for efficiency.

### *3.2 Usability*

### The user interface shall be intuitive and easy to navigate.

### Error messages shall be clear and informative to aid users in resolving issues.

### *3.3 Security*

### User authentication shall ensure that only authorized users have access to the system.

### Data encryption techniques shall be employed to secure sensitive information stored in the database.

### *3.4 Reliability*

### The system shall be robust and capable of handling concurrent user sessions without crashing.

### Regular backups of the database shall be performed to prevent data loss in case of system failures.

### 4. Data Management

### The system shall adhere to data privacy regulations and guidelines such as GDPR.

### Data integrity checks shall be implemented to ensure the accuracy and consistency of student records.

### Data archival and purging mechanisms shall be in place to manage historical data and optimize database performance.

### 5. User Interface

### The user interface shall be aesthetically pleasing and responsive across different devices and screen sizes.

### Accessibility features such as keyboard navigation and screen reader compatibility shall be incorporated to ensure inclusivity.

### The interface shall support multiple languages and customizable themes to accommodate diverse user preferences.

### 6. Testing Requirements

### The system shall undergo rigorous testing including unit testing, integration testing, system testing, and user acceptance testing.

### Test cases shall be developed to validate functional requirements, edge cases, and performance benchmarks.

### Automated testing tools and frameworks shall be utilized to expedite the testing process and ensure thorough coverage.

### 7. Performance Evaluation

### Performance metrics such as response time, throughput, and resource utilization shall be monitored using performance monitoring tools.

### Load testing and stress testing shall be conducted to assess the system's scalability and resilience under varying levels of user activity.

### Performance optimization techniques such as query optimization, caching, and indexing shall be employed to enhance system responsiveness.

### 8. Maintenance and Support

### The system shall have a dedicated maintenance team responsible for addressing bug fixes, feature enhancements, and system upgrades.

### Regular software updates and patches shall be released to address security vulnerabilities and improve system stability.

### Technical support services shall be provided to assist users with troubleshooting issues and maximizing system utilization.

### 9. Deployment Plan

### The system shall be deployed in a phased manner, starting with a pilot rollout in a controlled environment to validate functionality and gather user feedback.

### Deployment environments such as development, testing, staging, and production shall be established to facilitate smooth transition and minimize downtime.

### Deployment documentation and training materials shall be prepared to guide system administrators and end-users through the deployment process.

### 10. Risks and Assumptions

### *10.1 Risks*

### Technical challenges such as database performance issues, integration complexities, and security vulnerabilities may pose risks to project success.

### User adoption and resistance to change could impact the acceptance and effectiveness of the SMS.

### External factors such as regulatory changes, budget constraints, and resource limitations may affect project timelines and deliverables.

### *10.2 Assumptions*

### It is assumed that adequate resources including hardware, software, and personnel will be available to support the development, deployment, and maintenance of the SMS.

### Stakeholders are expected to actively participate in the requirements gathering process and provide timely feedback throughout the project lifecycle.

### The SMS will comply with relevant laws, regulations, and industry standards pertaining to data privacy, security, and accessibility.

### 11.FLOWCHART

### flowchart.png

### 12.UNIFIED MODELLING LANGUAGE (UML) DIAGRAM

### uml.png

### 13.SEQUENCE DIAGRAM

### sequence.png

### 14.data flow diagram (DFD)

### dfd.png

### 15. STATE -TRANSITION DIAGRAM (STD)

### std.png

### 16. Glossary

### SMS: Student Management System

### SRS: Software Requirements Specification

### GDPR: General Data Protection Regulation

### 17.FUTURE ENHANCEMENTS

### The Student Management System (SMS) is designed to evolve and adapt to the changing needs of educational institutions. Future enhancements may include:

### *17.1 Advanced Analytics*

### Integration of machine learning algorithms for predictive modeling, trend analysis, and student performance forecasting.

### Implementation of natural language processing (NLP) techniques for sentiment analysis of student feedback and automated response generation.

### *17.2 Integration with Learning Management Systems (LMS)*

### Seamless integration with popular LMS platforms such as Moodle, Canvas, and Blackboard for streamlined data synchronization, course enrollment, and grade management.

### Support for single sign-on (SSO) authentication to provide a unified user experience across multiple educational platforms.

### *17.3 Mobile Application*

### Development of a mobile application for students, parents, and faculty to access real-time information, receive notifications, and perform essential tasks on the go.

### Integration of push notifications for timely reminders about assignment deadlines, exam schedules, and important announcements.

### *17.4 Automated Notifications*

### Implementation of automated notifications for attendance tracking, fee payment reminders, and academic progress updates.

### Personalized notifications based on student preferences, academic performance, and engagement levels to encourage proactive communication and support.

### *17.5 Enhanced Reporting*

### Expansion of reporting capabilities to include predictive analytics, cohort analysis, and comparative benchmarking against peer institutions.

### Integration with data visualization tools such as Tableau or Power BI for interactive dashboards and exploratory data analysis.

### *17.6 Student Engagement Features*

### Introduction of gamification elements such as badges, achievements, and leaderboards to incentivize student participation and foster a sense of community.

### Integration of discussion forums, virtual study groups, and collaborative project spaces to promote peer-to-peer learning and knowledge sharing.

### *17.7 Alumni Management*

### Development of alumni portals for maintaining connections with former students, facilitating networking opportunities, and soliciting feedback for program improvement.

### Alumni engagement campaigns, events, and surveys to nurture lifelong relationships and promote institutional loyalty.

### *17.8 Accessibility and Inclusivity*

### Implementation of accessibility features such as screen reader compatibility, keyboard shortcuts, and text-to-speech functionality to ensure equal access for all users.

### Compliance with Web Content Accessibility Guidelines (WCAG) and usability standards to accommodate users with disabilities and diverse learning needs.

### *17.9 Continuous Improvement*

### Establishment of feedback mechanisms for soliciting input from stakeholders, including students, parents, faculty, and administrative staff.

### Agile development methodologies such as iterative releases, user stories, and sprint planning to facilitate rapid iteration and continuous improvement.

### By incorporating these future enhancements, the SMS can evolve into a comprehensive educational ecosystem that empowers stakeholders, fosters student success, and drives institutional excellence.Top of Form

### 18. Conclusion

### The Student Management System outlined in this document represents a comprehensive solution for managing student information within educational institutions. By addressing functional and non-functional requirements, data management, user interface design, testing, performance evaluation, maintenance and support, deployment plan, risks, and assumptions, the SMS aims to streamline administrative processes, enhance user experience, and improve decision-making capabilities for stakeholders.