GROUP #6:

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Project Homework #2

1.   Introduction

1.1   Purpose and Need of the System

A school management is more than just children on seats and a teacher delivering a lecture. A school works under a proper system. System that involve records of students, records of teachers, fees and dues, salaries and much more things alike them. Digitizing all the information records and schedules is a smart choice. Regularly followed procedures and routines of check and balance brought under a digital roof provides data protection, security and easy management.

1.2   Intended System Functions

The intended system functions mainly focus on modules:
Student Oriented Controls: includes functions like CRUD operations for Students Records, new admissions, filter of Student Records, fees record of students, attendance count of a student, a track of academic progression of a student.
Staff Oriented Controls: includes CRUD operations for Staff Records, Subjection to timetables, Staff Attendances, Salary and Pay scheduling of staff members
Administrative Controls: includes CRUD operations for staff and students, Access control, user authentication, total revenue per month, total revenue per year, fee dues and late payments(arrears), generate an annual financial report, send sms/email alerts to students and staff members and handling fee vouchers.

1.3   Product Scope

School can be a single setup or it can be part of multiple branch system of schools. So the scope of the project varies keeping in perspective the growth and expansion of schools.

2. Functional and Nonfunctional Requirements

2.1 Functional Requirements

Student Oriented Requirements

- Store, Edit , Delete Student records.
- Filter student records.
- Search student records.
- Profile view for students displaying additional information(fee information, academic records, attendance)
- Attendance management System
- Generate and print student transcript

Staff Oriented Requirements

- Store, Edit , Delete Staff information
- Create, Edit ,Delete Time Tables
- Manage Staff Attendance
- Staff salary management
- Staff allocation
- Statistics based on class assigned to teacher

Administrative Requirements

- Access control and user authentication
- Display total revenue generated (monthly, yearly)
- Track fee information for students
- Keep tracks of arrears in student fee
- Keep track fee collected per class
- Keep track of expenses
- Generate annual report (Growth rate, revenue, profit)

- Generate and send SMS alerts

- Generate and print fee vouchers

2.2 Non-Functional Requirements

❖ User Interface and Human Factors

The system will have a user-friendly interface and will be in English, The system will only have 4 users: The Principal, System Administrator, Head of teaching staff, Student Coordinator.
The application design will be minimalistic and easy to use, so that training time is reduced. The application will be designed with a design theme that follows modern operating systems.

❖ Documentation

The system will be very documented, which includes the system documentation and also the user manual. The system documentation is important because this may help in further development of the system and the user manual is necessary because the user may need some basic training about the functionality of the system.

❖ Hardware Requirements

The system will be installed in the principal's office or administration office.
The system hardware requirements will be:

- HDD: 500GB
- RAM: 2GB or higher
- CPU: Any recent dual core CPU that can run modern operating systems.
- GPU: Onboard graphics/ Dedicated graphics.
- Monitor, Mouse and Keyboard
- Printer
- Phone connected through usb or a desktop SIM Card Module.

❖ Software Requirements

- Windows 8/8.1/10
- Spreadsheet Viewer/Editor
- Device Drivers for SIM Card Module

❖ Performance

The system will be designed so that it consumes the least amount of system memory and system resources and will fast and accurate.

❖ **Error Handling**

The system will able to give error messages on invalid inputs and error messages in case of failure to perform an operation.
The data needs to be backed up frequently in the database and harddrive in case of system failure. Backups can be created on external media so that data can recovered in the event of hard drive failure.

❖ **Security**

There be user account on the system. To keep the passwords secure, they will be encrypted as well as the data stored in the database.

❖ **Resource Issues**

The system administrator will be responsible for backing up data on an external media, maintaining the system and installing updates.

3.   Specification of Requirements

Following are some specifications of the functional requirements:

➢ **Introduction:** The ability to **edit student records** in the database in order to make record manipulation easy and efficient.

School management system must have this functionality.
Rationale: Customer indicates that making changes to student records physically is difficult and time consuming process.
Inputs: Student Name\Student ID
Description: School management will be able to edit students information residing in the database.
A student record is available for editing if and only if:
·   Student Name and Student ID is valid
.   Student record exists in the database

If records is valid and it exists, the system administrator will be able to edit student records in the database.

Outputs: A profile view to edit student detail.
Post Conditions: Student record is updated in the database.
Related Requirements: #

> ➢ **Introduction:** The ability to **delete student records** from the digital database.
School management must have this functionality.
Rationale: Customer indicates that physical admission forms makes admission process time consuming and admission forms are hard to manage.
Inputs: Student Name/Unique Student ID.
Description: School management will be able to delete student records present in the database.
A student record is deleted if and only if:
·   Student Name and unique Student ID is valid
·   Student Record exists in the database
If records are valid and exist, the system administrator will be able to remove the records from the database.
Outputs: Confirmation Message upon deletion/removal.
Post Conditions: Number of Students is decremented, Student is removed from relevant class and section.
Related Requirements: ##

> ➢ **Introduction:** The ability to **mark student attendance**.
School management must have this functionality.
Rationale: Customer indicates that Student attendance records are difficult to keep track of and the staff has difficulty calculating the attendance at the end of school term.
Inputs: Student Name/Unique Student ID, Class ID, Date.
Description:
·   Student Name and unique Student ID is valid
·   Student Record exists in the database.
.   Class ID is valid
If records are valid and exist, the teacher will be able to mark student attendance.
Outputs: Student is marked present.
Post Conditions: Student mark sheet is updated.
Related Requirements: ##

> ➢ **Introduction:** The ability to **add new staff records** to a digital database speeds up the administrative process and ensures privacy of staff credentials.
School management system must have this functionality.
Rationale: Customers have indicated that physical admission of forms makes this process time consuming and forms are hard to manage.

Inputs: Name, Date of Birth, Contact, Address, Email, Salary, Designation.

Description: School management will be able to add staff members to the database.

A staff record is added if and only if the format is correct i.e:

· Staff Name is valid

· Contact info is a valid number

· Email is valid

· Date of Birth is valid

· Salary is selected

· Designation is selected

If a record is valid, a unique ID will be assigned to the staff member, and the record will be added to the database.

Outputs: Confirmation Message, Unique Staff ID.

Post Conditions: Number of Staff members is incremented.

Related Requirements: ##

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· Date of Birth is valid

· Salary is selected

· Designation is selected

If a record is valid, a unique ID will be assigned to the staff member, and the record will be added to the database.

Outputs: Confirmation Message, Unique Staff ID.

Post Conditions: Number of Staff members is incremented.

Related Requirements: ##

➢ **Introduction:** The ability to **edit staff records** to a digital database speeds up the administrative process.

School management system must have this functionality.

Rationale: Customers have indicated that physical editing of forms makes this process time consuming and forms are hard to manage.

Inputs: Name, Unique staff ID.

Description: School management will be able to edit staff member information in the database. A staff record is edited if and only if the format is correct i.e:

·   Staff Name is valid

·   Unique staff ID is valid

·   Record Exists

If a record is valid, the administrator will be able to edit the information.

Outputs: A profile view to edit staff detail.

Post Conditions: Staff record is updated in the database.

Related Requirements: ##

➢ **Introduction:** The ability to **delete staff records** to a digital database speeds up the administrative process.

School management system must have this functionality.

Rationale: Customers have indicated that getting rid of physical forms makes this process time consuming and forms are hard to manage.

Inputs: Name, Unique ID.

Description: School management will be able to delete staff records from the database. A staff record is deleted if and only if:

·   Staff Name is valid

·   Unique staff ID

·   Record Exists

If a record is valid, the administrator will be able to delete the record from the database.

Outputs: Confirmation Message upon deletion.

Post Conditions: Number of Staff members is decremented.

Related Requirements: ##

➢ **Introduction:** The ability to **create new time tables** to a digital database speeds up the administrative process and ensures the proper utilization of faculty and students time.

School management system must have this functionality.

Rationale: Customers have indicated that this system should be efficient one, in order to save the time of both students and faculty

Inputs: Teachers, Class ID

Description: School management will be able to allocate the time of teachers to specific classes. A time slot is assigned if and only if there is no clashes of time tables:

·   Staff Name

·   Class ID

· No clashes (classes already at that time with that particular teacher or class) already.

If it is valid, a time slot will be assigned to the teacher & class and the record will be added to the database.

Outputs: Confirmation Message.

Post Conditions: Time Table of Teacher and Class is Updated

Related Requirements: ##

➢ **Introduction:** The ability to **edit time tables** in a digital database speeds up the administrative process and ensures the proper utilization of faculty and students time.

School management system must have this functionality.

Rationale: Customers have indicated that this system should be efficient one, in order to save the time of both students and faculty

Inputs: Teachers, Class ID

Description: School management will be able to edit the allocated time of teachers to specific classes.

A time slot is edited if and only if there is valid Teacher Name & Class ID:

· Staff Name
· Class ID
· Record exists already.

If it is valid, administrator will be able to edit the the time table of the teacher

Outputs: A view in which all classes of teacher can be seen and edited.

Post Conditions: Time Table of Teacher and Class is Updated

Related Requirements: ##

➢ **Introduction:** The ability to **delete time tables** from a digital database speeds up the administrative process.

School management system must have this functionality.

Rationale: Customers have indicated that this system should be efficient one, in order to save the time of both students and faculty

Inputs: Teachers, Class ID

Description: School management will be able to delete the allocated time table of teachers to specific classes.

A time slot is deleted if and only if the following requirements are met:

· Staff Name
· Class ID
· A record already exists.

If it is valid, administrator will be able to delete the time slot assigned to the teacher & class.

Outputs: Confirmation Message upon deletion.

Post Conditions: Time Table of Teacher and Class is Updated

Related Requirements: ##

> ➢ **Introduction:** The ability to **mark staff attendance**.

School management must have this functionality.

Rationale: Customer indicates that Staff attendance records are difficult to keep track of and the administrator should keep a better record of the faculty to evaluate at the end of each term.

Inputs: Staff Name, Staff ID, Date

Description: Marks the attendance of the staff members.

· Staff Name and unique Staff ID is valid
· Staff Record exists in the database.
. Date is valid

If records are valid and exist, the administrator will be able to mark staff attendance.

Outputs: Staff is marked present.

Post Conditions: Staff Mark sheet is updated

Related Requirements: ##

> ➢ **Introduction:** The ability to **manage staff salary** in database.

School management must have this functionality.

Rationale: Customer indicates that Staff salary is an issue of high importance as its the monthly expenditure of customer's employees.

Inputs: Staff Name, Staff ID

Description: keeps track of the salary (raises or cuts) of the staff members.

· Staff Name and unique Staff ID is valid
· Staff Record exists in the database.

If records are valid and exist, the administrator will be able to edit/view staff salary.

Outputs: A view profile to edit/view the salary of desired staff member.

Post Conditions: Staff's salary is updated

Related Requirements: ##

> ➢ **Introduction:** The ability to **search and filter records** in the database.

School management must have this functionality.

Rationale: Customer indicates that looking up student records in a file takes a lot of time. Therefore, functionality to search and filter records isrequired for speed and efficiency.

Inputs: Name,ID

Description: Search and Filter records based on attributes

· Name and unique ID is valid
· Record exists in the database.

If records are valid and exist, the administrator will be able to search/filter records.

Outputs: A gridview showing search results/filtered records.

Post Conditions: #
Related Requirements: ##

➢ **Introduction: User Access Control** through user authentication.
School management must have this functionality.
Rationale: Customer indicates that there must be safeguards to prevent unauthorized access to the system and to make it more secure.
Inputs: Staff ID, Password
Description: Authenticates users and allows access to the system.
· unique Staff ID is valid
· Staff Record exists in the database
. Password is valid
. Staff member is registered as trusted user
If ID and password are valid and exist, the user will be allowed access to the system
Outputs: Authentication message is displayed and main application interface is revealed.
Post Conditions: #
Related Requirements: ##

➢ **Introduction:** Generate Annual/Monthly Report which can view by class or for specific students.
School management must have this functionality.
Rationale: Customer indicates that they want to automate the system of revenue calculation and fee collection as well as generate statistics that will help keep track of expenses.
Inputs: Student records, Staff records.
Description: Generates Annual/Monthly revenue and expense report
· Student records exist in the database
. Staff records exist in the database
If records are valid and exist, the administrator will be able to edit/view a report and statistics.
Outputs: A view showing revenue generated and expenses
Post Conditions: #
Related Requirements:
● The report view must have a selection menu to select records based on class , specific students or whole school.
● The report view must have an option to switch between monthly and annual report.
● Ability to student fee and show arrears.
● Show a list of expenditures.
● Salary report for the staff salaries.

➢ **Introduction:** The ability to **print student fee vouchers**.

School management must have this functionality.

Rationale: Customer indicates that print fee voucher is time consuming and requires manual printing. They want to automate the process to save time and cost.

Inputs: Student ID ,ClassID

Description: Print Student fee vouchers for specific students or for whole class

·   Student Record exists in the database.

.   Student ID is valid

If records are valid and exist, the administrator will be able to print student fee vouchers.

Outputs: Print job is sent to the printer to print fee vouchers.

Post Conditions: #

Related Requirements: An option to only print fee vouchers for class, specific students or whole school.

➢ **Introduction:** The ability to send SMS alerts to student and staff members.

School management must have this functionality.

Rationale: Customer indicates that distributing printed notices is very costly and inefficient. Therefore, they want to switch to an SMS based notification system.

Inputs: Student ID, Staff ID, Contact

Description: Sends customizable notifications to selected group of students or staff

·   Staff ID and Student ID is valid

·   Record exists in the database

.   Contact information is valid

If records are valid and exist, the administrator will be able to SMS notifications.

Outputs: SMS notification to the desired staff member/Student.

Post Conditions:

Related Requirements: A menu to select students and staff members.

4.   Metrics for Non-Functional Requirements

- **Time/Speed**
    - Transactions / sec
    - Response time /ms
    - Time to complete an operation /sec
- **Space**
    - Main memory /MB
    - Auxiliary memory /GB
    - (Cache)/ MB

- **Usability**
    - Training time /hrs
    - Number of choices
    - Mouse clicks
- **Reliability**
    - Mean time to failure
    - Downtime probability
    - Failure rate
    - Availability
- **Robustness**
    - Time to recovery /sec,mins
    - % of incidents leading to catastrophic failures
    - Data corruption probability after a failure
- **Portability**
    - % of non-portable code
    - Number of systems where software can run
- **Ease of use**
    - Training time /hrs