



**UNIVERSITATEA TEHNICĂ  
DIN CLUJ-NAPOCA**

**FACULTATEA DE AUTOMATICĂ ȘI CALCULATOARE**

# **SCHOOL MANAGEMENT SYSTEM**

**CLASS: OBJECT ORIENTED PROGRAMMING  
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## **CONTENTS**

|                                 |   |
|---------------------------------|---|
| SHORT DESCRIPTION .....         | 3 |
| PRESENTATION OF USE-CASES ..... | 3 |
| SOLUTION PRESENTATION.....      | 5 |
| CONCLUSION.....                 | 7 |
| FURTHER IMPROVEMENTS.....       | 7 |

## SHORT DESCRIPTION

My project is a School Management System application that uses a MySQL database to process information about a school, its students and its staff. It is capable of adding, updating, deleting and showing all of this information that is connected to the database. I made the graphical user interface of the project using JavaFX and a bit of JFoenix (open source java library that implements the Google Material Design). I also used the MySQL Connector/J, that provides connectivity to the database in Java.

There are three standard accounts from which users can log into the application: the ‘admin’, ‘teacher’ and ‘student’ accounts. The first has control over everything and can edit the records in the database, like the school information, teachers’ data and students’ data. The ‘teacher’ and ‘student’ accounts can only view a table with all the school’s students organized by their year of study.

## PRESENTATION OF USE-CASES

After logging in as ‘admin’, the user sees the dashboard of the application, with three buttons named “School Information”, “Student Management” and “Staff Management



In the “School Information” section, the administrator can enter new info about the school in the 8 fields of text and then click the “Update” button. This will update the information about the school in the database. The black button with the arrow goes back to the dashboard window.



# School Information

Name of School : Gheorghe Sincai National College

Address : Sincai Gheorghe 25, Baia Mare

Classes Available : 8

Type of School : Public day high school

Postal Code : 430311

Date of Establishment : 1919-07-12

School ID No : 12345

Name of Principal : Leonard Mardar

**UPDATE**

In the “Student Management” section, the user can register new students (“Student Registration” button) or modify/view the data of the already registered students (“Student Information” button). In the registration section, 6 fields of text and two Radio buttons show up. These can be filled with the new student’s data and then the user can click the “Register” button to send everything to the database. In the “Student Information” section, the user can enter the ID of a student and then click the “Show” button, which will display the data of that particular student. Then, the admin can update the student’s information by modifying the text fields or he can delete the student from the database entirely, by clicking the “Delete” button. The user can also see a table with all of the students enrolled in the school by clicking the “Show all” button. Here, the year of study can be selected from a drop-down list and then the “Show” button can be clicked, which will display the table with the students in that year of study. This section is the only one that can be viewed by all the three main accounts.

School Management System

## Student Registration

|                    |  |
|--------------------|--|
| Admission Number : | <input type="text"/>   |
| Full Name :        | <input type="text"/>   |
| Year of study:     | <input type="text"/>   |
| Date of Birth:     | <input type="text"/>   |
| Gender :           | <input checked="" type="radio"/> Male <input type="radio"/> Female |
| Contact Number :   | <input type="text"/>   |
| Address :          | <input type="text"/>   |

School Management System

## Student Management

|                    |                      |
|--------------------|----------------------|
| Admission Number : | <input type="text"/> |
| Full Name :        | <input type="text"/> |
| Year of study:     | <input type="text"/> |
| Date of Birth:     | <input type="text"/> |
| Gender :           | <input type="text"/> |
| Contact Number:    | <input type="text"/> |
| Address :          | <input type="text"/> |

School Management System

## Student List

Year of Study:  SHOW

| Ad No | Full Name        | DOB        | Gender | Contact No | Address                         |
|-------|------------------|------------|--------|------------|---------------------------------|
| 19    | Chelsey Mitchell | 2003-12-12 | Female | 0134235233 | Wolfgang Goethe 20, Cluj-Napoca |
| 18    | Nathan Dyer      | 2004-09-11 | Male   | 0324235233 | Sindicatelor 1, Sibiu           |
| 17    | Cari Joseph      | 2005-09-24 | Female | 0342345322 | Sighisoarei 10, Timisoara       |
| 20    | Tony Clarke      | 2004-11-30 | Male   | 0324235222 | Traian Vuia 20, Cluj-Napoca     |
| 21    | Franklin Ashley  | 2004-01-19 | Male   | 0342523532 | Tipografiei 13, Craiova         |

Users can sort the data in the table by clicking the column name by which they want to sort (for example, sort alphabetically by clicking the “Full Name” column).

In the “Staff Management” section, the administrator can similarly register new teachers or modify/view data about them. Here, the user can search for staff members by employee number or by name, and then update information about them or delete teachers from the database entirely. A “Show all” button is present here as well, which leads to a window that generates a table with all the staff member’s information.

School Management System

## Staff Registration

Employee Number :

Teacher's Name :  Gender :  Male  Female

Taught Subject :  Contact Number :

Address :  Date of Birth :

Email :  RESET REGISTER

School Management System

## Staff Management

Employee Number :  Search by Employee No SHOW

Teacher's Name :  Taught Subject :  Search by Name SHOW

Date of Birth :  Gender :  UPDATE DELETE SHOW ALL

Contact Number :  Address :  Email :

School Management System

## Staff List

Generate

| Emp No | Name             | Taught Subject | DOB        | Gender | Email                | Phone      | Address                      |
|--------|------------------|----------------|------------|--------|----------------------|------------|------------------------------|
| 101    | Aysha Hudson     | Mathematics    | 1965-06-17 | Female | ayshahud@gmail...    | 0783242934 | Unirii 85, Cluj-Napoca       |
| 102    | Nicolas Gardner  | Programming    | 1985-10-08 | Male   | nigardner@gmail...   | 0723765913 | Mihai Viteazu 190, Baia Mare |
| 103    | Katelyn Lester   | Biology        | 1979-09-10 | Female | katelester@gmail...  | 0711345678 | Independentei 63, Brasov     |
| 104    | Alessandra Beck  | History        | 1990-02-02 | Female | alessandrabeck@...   | 0788123453 | Aleea Neptun 90, Cluj-Napoca |
| 105    | Jimmy Spence     | Chemistry      | 1989-01-01 | Male   | jimmyspence@gm...    | 0789991233 | Aristotel 9, Iasi            |
| 106    | Lisa-Marie Jones | English        | 1969-03-04 | Female | lisamarie@gmail...   | 0712812932 | Belis 8, Baia Mare           |
| 107    | Lucas Dalton     | Physics        | 1980-04-05 | Male   | daltonlucas@gmail... | 0792341243 | Victor Babes 1, Cluj-Napoca  |
| 108    | Jarod Davison    | Geography      | 1991-03-20 | Male   | jaroddavid@gmail...  | 0745234134 | George Bacovia 41, Ploiesti  |
| 109    | Isabell Thomson  | German         | 1982-10-10 | Female | isabellthomson@...   | 0732823843 | Ion Creanga 48, Timisoara    |
| 110    | Michael Stuart   | Mathematics    | 1978-09-29 | Male   | mikestuart@gmail...  | 0739224334 | Iuliu Maniu 2, Cluj-Napoca   |

## SOLUTION PRESENTATION

For this project I used the MVC design pattern. I separated the “model” layer into the main model one and the table model one. I did this as well with “controller” – the database controller layer and the main controller layer. “View”, the presentation of the application, contains the .fxml files corresponding to JavaFX. I also used Scene Builder to place the elements of the interface in an easier, more friendly manner.

The “DBConnection” class tries to connect to the MySQL database, while the classes from “dbController” execute queries and INSERT, UPDATE or DELETE operations on the “sms” database. In all of these, we use Getters from the “model” classes to access the information of the school, staff and students and modify the database. “getYears()” in “YearController” also returns an ArrayList of the distinct years of study from the database (the school may not have students at all in a certain year, or it may have multiple students in all years of study). This will be used in a ComboBox in the table of students.

The ”School”, ”Staff”, ”Student”, ”StaffTableModel” and ”StudentTableModel” classes have as fields the relevant information for each entity, as well as Constructors, Getters and Setters.

The ”LoginFormController” class makes sure than only the admin account gets access to the main dashboard of the application, while the teacher and student accounts are directed to the section with the table of students. The last two can only choose a year of study and show the corresponding student data, not being able to press the “Back” button that is available to the admin account. There are also errors for invalid username or password.

The rest of the controller classes describe the functionality of the various buttons in the project. For every add/register, search, delete and update operations I also made alerts that display possible errors. In ”ValidationController”, I added some more check methods: one to verify that the text fields in Student and Staff Registration are not left empty, one to verify that only numbers were input (using regex), one to validate phone numbers and one to validate dates.

The MySQL database that I created and connected to the Java application contains 4 tables, with information about the school, staff, students and the user accounts (username and password).

The screenshot shows the MySQL Workbench interface with several tabs open. On the left, the database structure is visible, showing a schema named 'sms' containing tables 'schoolinfo', 'staff', 'students', and 'users'. The 'schoolinfo' table is selected and its data is displayed in a grid view. The grid has columns: empNo, teacherName, taughtSubject, dob, gender, email, phone, and address. The data consists of 10 rows, each representing a teacher's information with their respective details.

| empNo  | teacherName      | taughtSubject | dob        | gender | email                    | phone      | address                       |
|--------|------------------|---------------|------------|--------|--------------------------|------------|-------------------------------|
| 1 101  | Aysha Hudson     | Mathematics   | 1965-06-17 | Female | ayshahud@gmail.com       | 0783242934 | Unirii 85, Cluj-Napoca        |
| 2 102  | Nicolas Gardner  | Programming   | 1985-10-08 | Male   | nicgardner@gmail.com     | 0723765913 | Mihai Viteazu 190, Baia Mare  |
| 3 103  | Katelyn Lester   | Biology       | 1979-09-10 | Female | katelester@gmail.com     | 0711345678 | Independentei 63, Brasov      |
| 4 104  | Alessandra Beck  | History       | 1990-02-02 | Female | alessandrabeck@gmail.com | 0788123453 | Alleea Neptun 90, Cluj-Napoca |
| 5 105  | Jimmy Spence     | Chemistry     | 1989-01-01 | Male   | jimmyspence@gmail.com    | 0789991233 | Aristotel 9, Iasi             |
| 6 106  | Lisa-Marie Jones | English       | 1969-03-04 | Female | lisamarie@gmail.com      | 0712812932 | Belis 8, Baia Mare            |
| 7 107  | Lucas Dalton     | Physics       | 1980-04-05 | Male   | daltonlucas@gmail.com    | 0792341243 | Victor Babes 1, Cluj-Napoca   |
| 8 108  | Jarod Davison    | Geography     | 1991-03-20 | Male   | jaroddavid@gmail.com     | 0745234134 | George Bacovia 41, Ploiesti   |
| 9 109  | Isabell Thomson  | German        | 1982-10-10 | Female | isabellthomson@gmail.com | 0732823843 | Ion Creanga 48, Timisoara     |
| 10 110 | Michael Stuart   | Mathematics   | 1978-09-29 | Male   | mikestuart@gmail.com     | 0739224334 | Iuliu Maniu 2, Cluj-Napoca    |

The screenshot shows the MySQL Workbench interface with several tabs open. The 'schoolinfo' table is selected and its data is displayed in a grid view. The grid has columns: SchoolName, SchoolAddress, classAvailable, schoolType, postalCode, dateOfEstd, schoolID, and name. The data consists of 1 row, representing the school's information with its respective details.

| SchoolName                       | SchoolAddress                 | classAvailable | schoolType             | postalCode | dateOfEstd | schoolID | name    |
|----------------------------------|-------------------------------|----------------|------------------------|------------|------------|----------|---------|
| Gheorghe Sincai National College | Sincai Gheorghe 25, Baia Mare | 8              | Public day high school | 430311     | 1919-07-12 | 12345    | Leonard |

The screenshot shows a MySQL Workbench interface with multiple tabs open. The current tab is 'students [sms@localhost]'. The table has 25 rows of data with the following columns: adNo, fullName, yearofstudy, dob, gender, phone, and address. The data includes various student names, their birth years, genders, phone numbers, and addresses across different cities in Romania.

|    | adNo | fullName          | yearofstudy | dob        | gender | phone      | address                           |
|----|------|-------------------|-------------|------------|--------|------------|-----------------------------------|
| 1  | 10   | Jason Medrano     | 5           | 2001-05-11 | Male   | 0747345923 | Iuliu Maniu 1, Cluj-Napoca        |
| 2  | 11   | Claire Kim        | 5           | 2002-07-03 | Female | 0793425245 | Independentei 8, Brasov           |
| 3  | 12   | Jarrod Savage     | 5           | 2000-10-28 | Male   | 0724534524 | Vasile Lucaciu 99, Baia Mare      |
| 4  | 19   | Chelsey Mitchell  | 7           | 2003-12-12 | Female | 0134235233 | Wolfgang Goethe 20, Cluj-Napoca   |
| 5  | 18   | Nathan Dyer       | 7           | 2004-09-11 | Male   | 0324235233 | Sindicatelor 1, Sibiu             |
| 6  | 17   | Cari Joseph       | 7           | 2005-09-24 | Female | 0342345322 | Sighisoarei 10, Timisoara         |
| 7  | 16   | Sophie Rodgers    | 6           | 2005-07-20 | Female | 0423523523 | Robert Schumann 91, Baia Mare     |
| 8  | 15   | Edgar Cousins     | 6           | 2007-02-03 | Male   | 0324324523 | Oltului 19, Pitesti               |
| 9  | 14   | Timothy Archer    | 6           | 2006-04-09 | Male   | 0732423553 | Mihail Eminescu 87, Constanta     |
| 10 | 13   | Riccardo Solomon  | 6           | 2005-08-10 | Male   | 0372846235 | Liviu Rebreanu 33, Cluj-Napoca    |
| 11 | 20   | Tony Clarke       | 7           | 2004-11-30 | Male   | 0324235222 | Traian Vuia 20, Cluj-Napoca       |
| 12 | 21   | Franklin Ashley   | 7           | 2004-01-19 | Male   | 0342523532 | Tipografiei 13, Craiova           |
| 13 | 22   | Thiago Flynn      | 8           | 2002-05-05 | Male   | 0231242353 | Semesului 2, Galati               |
| 14 | 23   | Joanna Ashton     | 8           | 2002-10-01 | Female | 0542345232 | Soporului 24, Cluj-Napoca         |
| 15 | 24   | Molly Lane        | 8           | 2003-09-04 | Female | 0432525233 | Radu Tudoran 3, Oradea            |
| 16 | 25   | Clayton Cooper    | 9           | 2001-05-28 | Male   | 0432523523 | Rahovei 5, Braila                 |
| 17 | 26   | Chanel Ryder      | 9           | 2001-07-18 | Female | 0342352452 | Gheorghe Marinescu 18, Arad       |
| 18 | 27   | Tyrell Woodward   | 9           | 2001-04-11 | Male   | 0852352355 | Napoca 90, Bacau                  |
| 19 | 28   | Jillian Ramsey    | 10          | 2000-03-20 | Female | 0342452352 | Mihail Kogalniceanu 13, Baia Mare |
| 20 | 29   | Ho Bridges        | 10          | 2000-09-10 | Female | 0742343243 | Luncii 28, Targu Mures            |
| 21 | 30   | Dora Bradshaw     | 10          | 2001-08-14 | Female | 0243124233 | Jiului 1, Botosani                |
| 22 | 31   | Tobi Sweeney      | 11          | 1999-04-30 | Male   | 0852353253 | Henri Coanda 30, Cluj-Napoca      |
| 23 | 32   | Luther Lister     | 11          | 1998-10-23 | Male   | 0423423532 | Gheorghe Dima 18, Satu Mare       |
| 24 | 33   | Daniella Peterson | 12          | 1997-09-01 | Female | 0842343252 | Emil Racovita 77, Suceava         |
| 25 | 34   | Angela Atkins     | 12          | 1996-11-07 | Female | 0723425322 | Cezar Petrescu 21, Cluj-Napoca    |

## CONCLUSION

All in all, this is a simple School Management System application that lets us register, modify, delete and view data about a school, its students and staff. It can be accessed with multiple accounts with different “permissions”, for safety reasons (only an administrator should edit or delete information from the school database). It also has a friendly user interface that was made using JavaFX and is connected to the MySQL database.

## FURTHER IMPROVEMENTS

The application could definitely be further improved by adding a grade book (record of the students’ grades at various subjects), an average grade system for exams, attendance lists, medical records and student schedules. It could also benefit from adding more functionality to the student and staff accounts and expanding some permissions, like teachers being able to modify students’ data, but not staff’s data.