Course Project on

STUDENT GRADE MANAGEMENT SYSTEM

Submitted to

the faculty of Engineering and Technology of

Kakatiya University, Warangal

in partial fulfillment of the requirements

to award

Bachelor of Technology

in

Information Technology

By

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B20IT018

Under the Guidance of

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C E R T I F I C A T E

This is to certify that **BLAISE MARIA JAMES (B20IT018)** of IV Semester B.Tech. Information Technology has satisfactorily completed the **Course Project** entitled **"STUDENT GRADE MANAGEMENT SYSTEM", U18IT405: Database Management Systems,** in the partial fulfillment of the requirement of B.Tech. degree during this academic year 2021-2022.

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Assistant Professor, Dept. of I.T.	**Professor & Head, Dept. of I.T.**

ACKNOWLEDGEMENT

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In completing this Course Project successfully all our faculty members have given an excellent cooperation by guiding us in every aspect. All your guidance helped me a lot and I am very grateful to you.

BLAISE MARIA JAMES
(B20IT018)

ABSTRACT

A College System generates and uses a large amount of data. This data must be communicated appropriately to students, faculty and parents. This SQL Based C++ project helps colleges store, manage and distribute this data. This project mainly focuses on storing records of students' academic performance by taking their marks for a semester, calculating overall academic performance of the same, and storing them into database. This project works on many key assumptions which are mentioned below:

Assumptions taken while designing the Database

- Does include null values
- No multi-valued Attributes

Assumptions taken while writing the Source Code

- Only for one academic year
- Only for B. Tech students
- No Lateral Entries
- Complete Data entry in a single operation
- No Failures

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CHAPTER 1

INTRODUCTION

The Student Grade Management System project provides us with a convenient interface for updating information about student academic performance. It can be used by educational institutions or colleges to conveniently keep track of their students' records. Using a manual approach to achieve this goal is difficult because the information is dispersed and redundant, and collecting relevant data might take a long time. This project is used to solve all these issues.

The project offers services such as registration and faculty-student profile development, decreasing paperwork and simplifying the record-keeping process in educational institutions. The emphasis has been on providing information in a simple and systematic manner throughout the project. The project is particularly beneficial to people interested in learning more about Student Information Management Systems and developing software or websites based on the same.

The project is coded in C++ using embedded SQL statements accessing the SQLite database. Code::Blocks v20.30 was used as C++ IDE at the front-end, and SQLITE v3.38.0 as database at the back-end. SQLite is a C-language library that implements a small, fast, self-contained, highly reliable, full-featured, SQL database engine. SQLite is the most used database engine in the world. To connect the C++ code to the database, SQLite comes with various interfaces routines. Following are important C/C++ SQLite interface routines, which can suffice our requirement to work with SQLite database from our C++ project.

1. sqlite3_open(const char *FileName, sqlite3 **DatabaseObject)

This routine opens a connection to a SQLite database file and returns a database connection object to be used by other SQLite routines.

2. sqlite3_exec(sqlite3*, const char *sql, sqlite_callback, void *data, char **errmsg)

This routine provides a quick, easy way to execute SQL commands provided by SQL argument which can consist of more than one SQL command.

3. sqlite3_close(sqlite3*)

This routine closes a database connection previously opened by a call to sqlite3_open().

CHAPTER 2

PROBLEM STATEMENT

This C++ project is on UNIVERSITY database for maintaining information concerning students, courses, and grades in a university environment. The figure below shows the database structure and a few sample data for such a database. The database is organized as four files, each of which stores data records of the same type. The STUDENT file stores data on each student, the COURSE file stores data on each course, the SECTION file stores data on each section of a course, and the GRADE_REPORT file stores the grades that students receive in the various sections they have completed.

STUDENT

Name	Student_number	Class	Major
Smith	17	1	CS
Brown	8	2	CS

COURSE

Course_name	Course_number	Credit_hours	Department
Intro to Computer Science	CS1310	4	CS
Data Structures	CS3320	4	CS
Discrete Mathematics	MATH2410	3	MATH
Database	CS3380	3	CS

SECTION

Section_identifier	Course_number	Semester	Year	Instructor
85	MATH2410	Fall	07	King
92	CS1310	Fall	07	Anderson
102	CS3320	Spring	08	Knuth
112	MATH2410	Fall	08	Chang
119	CS1310	Fall	08	Anderson
135	CS3380	Fall	08	Stone

GRADE_REPORT

Student_number	Section_identifier	Grade
17	112	B
17	119	C
8	85	A
8	92	A
8	102	B
8	135	A

CHAPTER 3

PROPOSED METHOD

The aim of this project is to develop a user-friendly and straightforward platform that makes the administrator's job easier. To achieve this, various key features are introduced. They include:

STRONG ERROR MANAGEMENT

The System is always prone to errors which may include taking invalid input from users due to the wrong data type or wrong input range. Keeping this in mind, the System is designed in such a way that it is capable enough of handling these run time errors.

DYNAMIC AND EXTENSIBLE

The System is dynamic as it can adapt to its evolving environment and is extensible, so can be upgraded anytime to manage any number of departments, sections, and courses by changing the source code by a verified programmer based on the requirement.

SIMPLE LOGIN INTERFACE

- The System follows a simple login interface that includes three different login portals for admin, faculty, and student.
- It uses a username and a password as a set of credentials and allows up to three chances for authenticating a user.
- If a user fails to validate himself/herself within the given constraint, the program is made to terminate for security reasons.
- The faculty or student after login, can change their password at any time.

SUPPORTS MULTIPLE VIEWS

- A view can be a subset of the database or can have virtual data extracted from the database files but not explicitly saved.
- Some users may not need to know if the data they're referring to is either stored or derived.
- The System usually has three main users, each of whom may require a unique perspective or view of the database, and accordingly, facilities are provided to define each view.

MULTI USER SYSTEM

- The System is a multi-user program. It has mainly three users. Each user has a role to play. They are:

  ADMIN
  - Admin can manage faculty and student data which includes adding, updating, deleting, and viewing faculties' and students' personal information.
  - Admin can even assign various roles to faculty such as, assign a course, assign as class teacher of a class, and assign as head of the department.
  - Admin can even view the faculty or students deleted in the archives section.

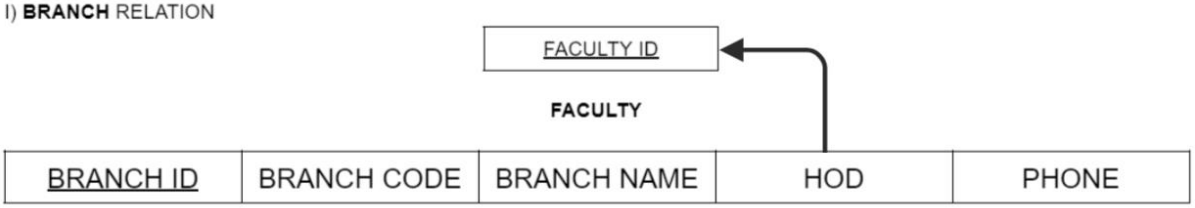
  FACULTY
  - Faculty, if is a Course Teacher, can manage student marks in the course, he/she is handling which includes adding, updating or viewing student marks.
  - Faculty, if is a Class Teacher can view all marks allotted to students of the section, he/she is handling, subject-wise and can also generate and view SGPA for students with all marks available.

  STUDENT
  - Student can view his/her overall academic performance.

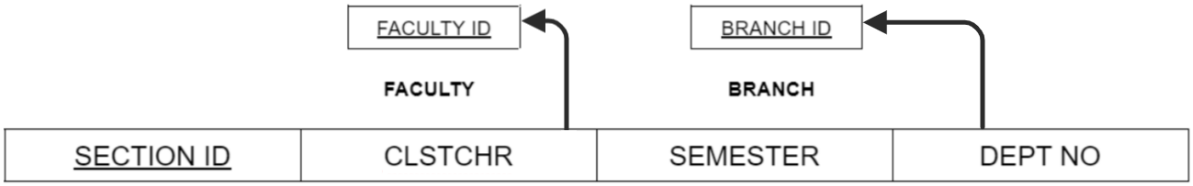
SUPPORTS CONCURRENCY

- As discussed above, the System is a multi-user program. It is a must to ensure when several users try to modify the same data, try to do so in a strictly controlled environment so that the result of any modification made is consistent. This is known as concurrency.
- The System is designed to ensure concurrency support. It ensures that there are no partial updates, maintains consistency of data, and changes made are durable.

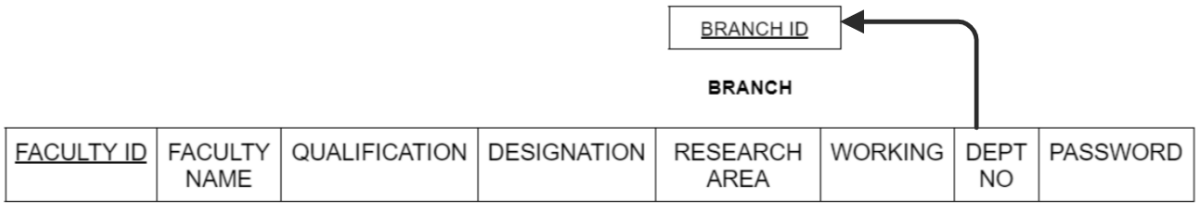
I) **BRANCH** RELATION



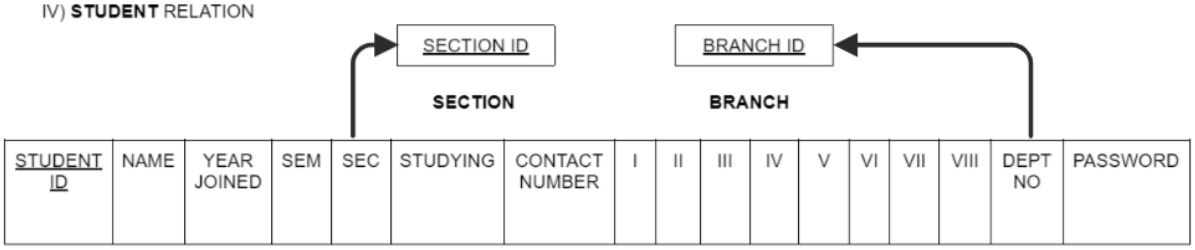
II) **SECTION** RELATION



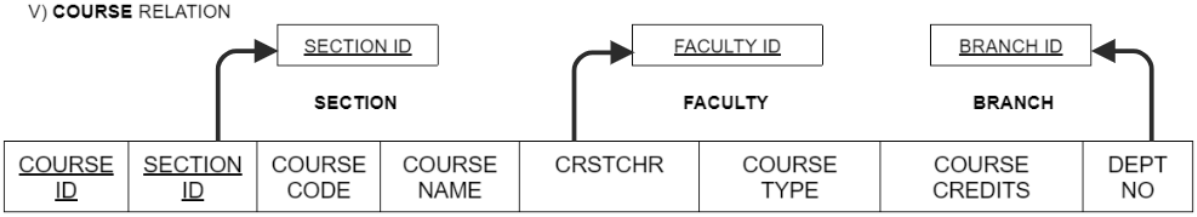
III) **FACULTY** RELATION



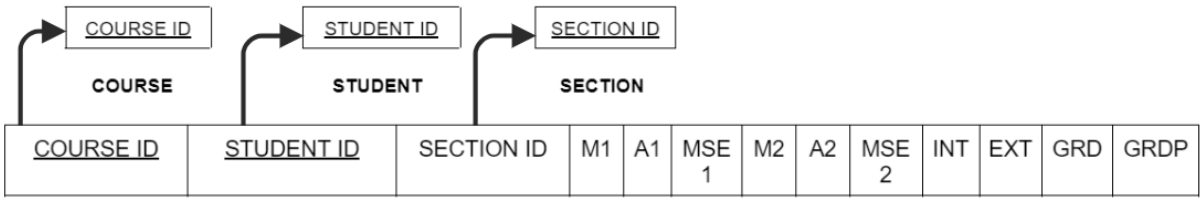
IV) **STUDENT** RELATION



V) **COURSE** RELATION



VI) **GRADEREPORT** RELATION

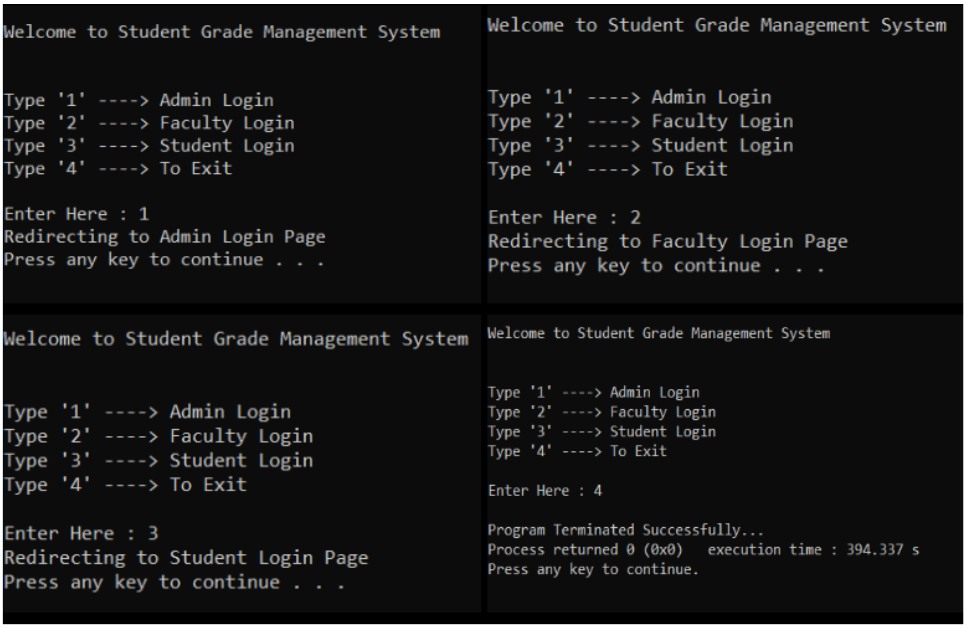


A simple schematic view of Student Grade Management System

CHAPTER 4

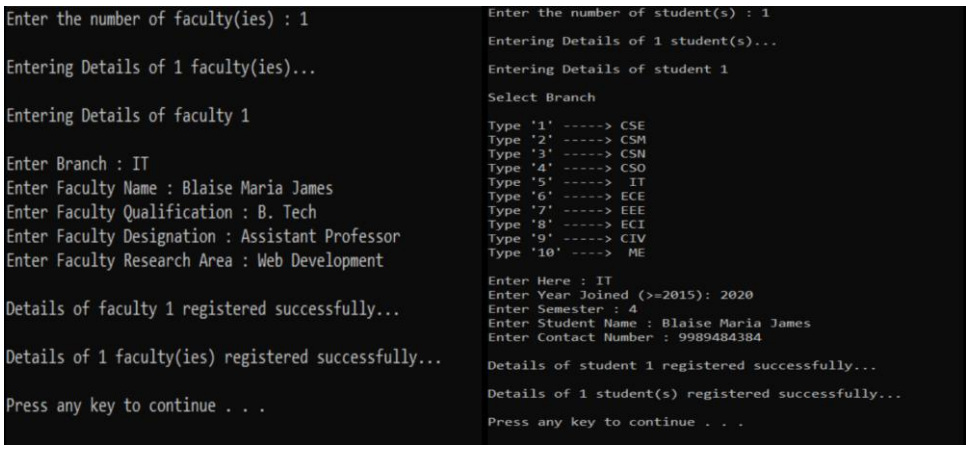
EXPERIMENTS AND SIMULATIONS

1. Login Interface



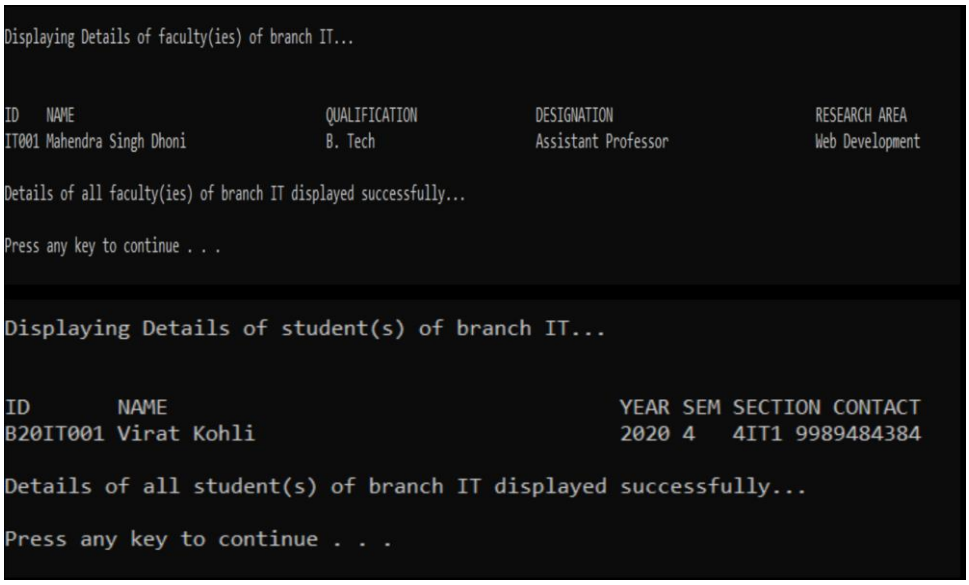
2. Admin Faculty-Student Edit Operations

Add Faculty/Student

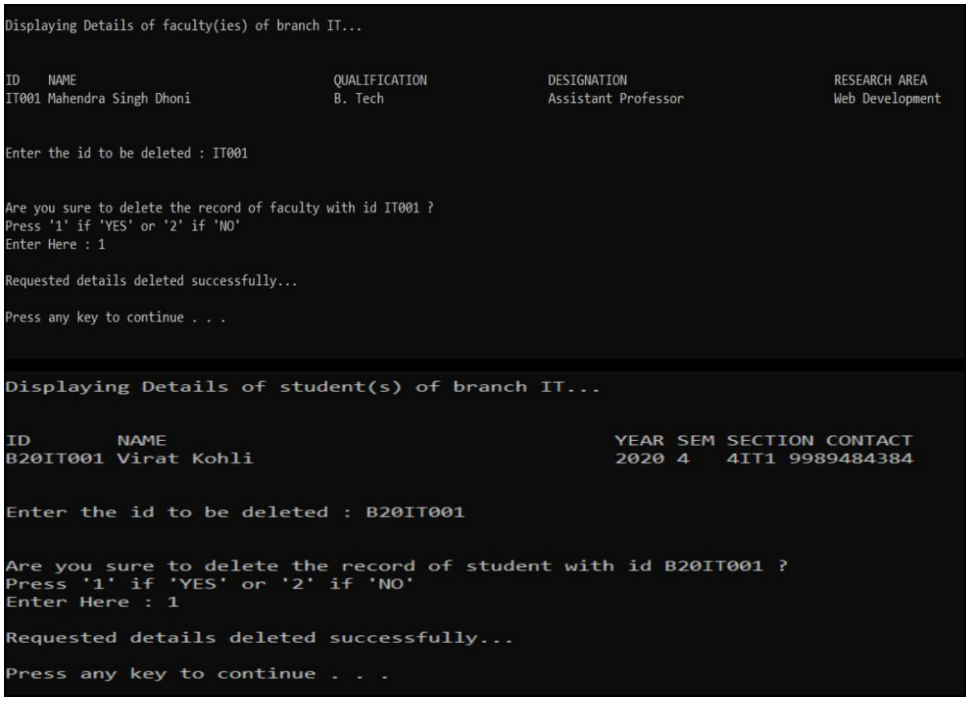


Update Faculty/Student

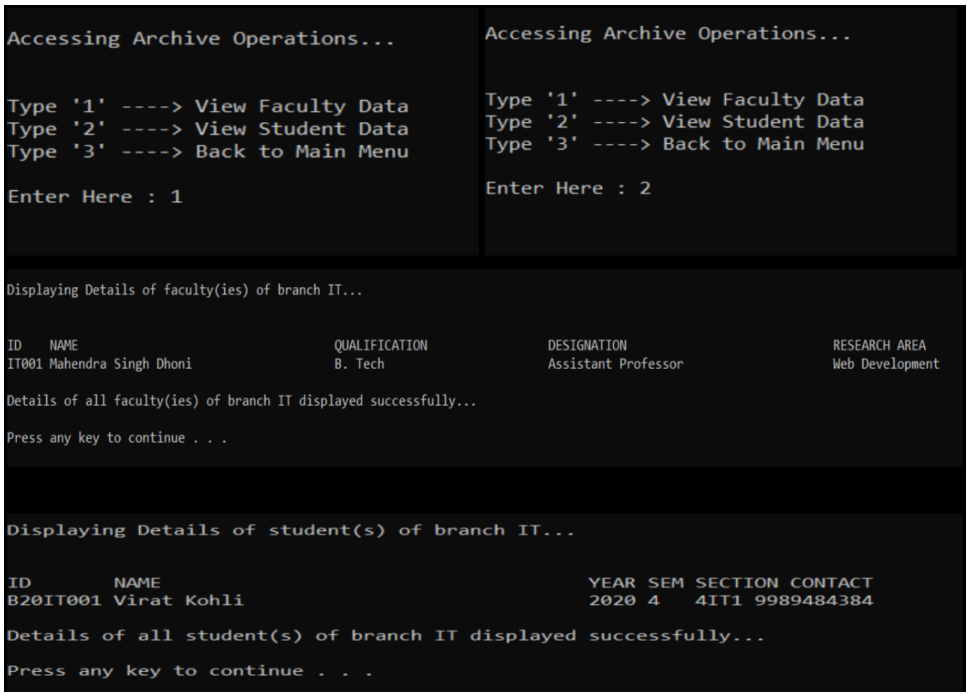
View Faculty/Student



Delete Faculty/Student



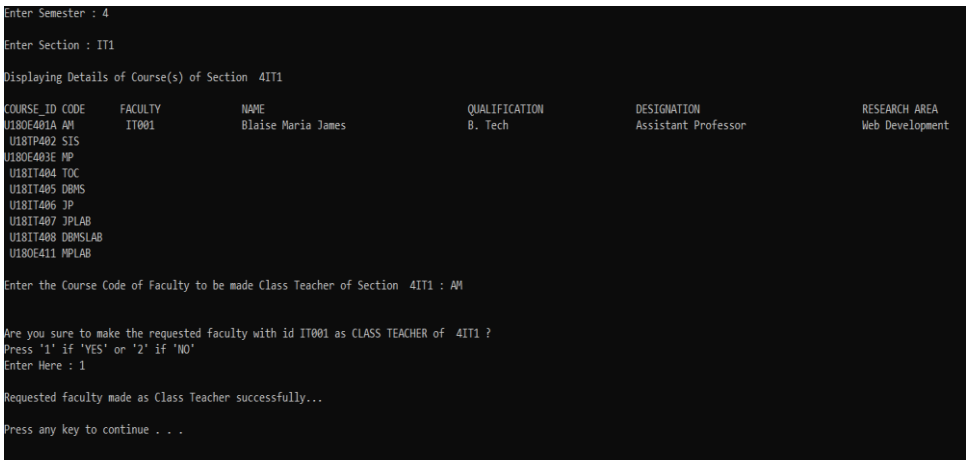
3. Admin Archive Operations (View Deleted Faculty/Student)



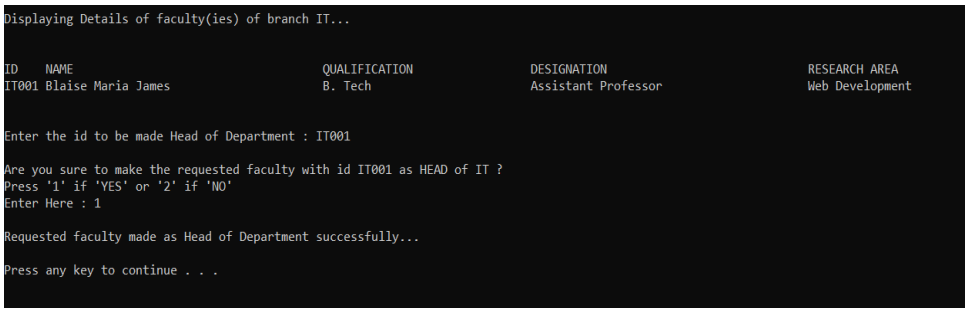
4. Admin Faculty Assign Operations

Assign a Course

Assign as Class Teacher



Assign as Head of Department



5. Course Teacher Add, Update, View Student Marks

Add Marks

```
Entering details of Section  4IT1

Enter the number of student(s) : 2

Entering Details of 2 student(s)...

Enter Roll Number : B20IT001

Enter internal marks of JPLAB : 40
Enter external marks of JPLAB : 60


Are you sure that the entered marks are correct  ?
Press '1' if 'YES' or '2' if 'NO'
Enter Here : 1

Enter Roll Number : B20IT002

Enter internal marks of JPLAB : 40
Enter external marks of JPLAB : 49


Are you sure that the entered marks are correct  ?
Press '1' if 'YES' or '2' if 'NO'
Enter Here : 1

Details of 2 student(s) registered successfully...

Press any key to continue . . .
```

Update Marks

```
Selected Section :  4IT1  Selected Course : JPLAB

Select the field to be updated...


Type '1' ----> Update Internal Marks
Type '2' ----> Update External Marks
Type '3' ----> Back to Main Menu

Enter Here : 1

Displaying Details of student(s)...

ROLL NUMBER     NAME                                SECTION        INT     ESE
B20IT001        Veerlapati Vaishnavi                4IT1           40      60
B20IT002        Pola Sai Pranav                     4IT1           40      49

Enter the ID to be updated : B20IT002
Enter updated marks : 35

Requested details updated successfully...

Press any key to continue . . .
```

View Marks

```
Displaying Details of student(s)...

ROLL NUMBER     NAME                                SECTION        INT     ESE
B20IT001        Veerlapati Vaishnavi                4IT1           40      60
B20IT002        Pola Sai Pranav                     4IT1           35      49
B20IT003        Pingili Pravalika                   4IT1           NA      NA
B20IT004        Pulla Ashish                        4IT1           NA      NA
B20IT005        Peechara Lohith                     4IT1           NA      NA
B20IT006        Kummari Anand                       4IT1           NA      NA
B20IT007        Kadaru Sai Mishra                   4IT1           NA      NA

Note : NA ---> Not Awarded

Details of all student(s) displayed successfully...

Press any key to continue . . .
```

6. Class Teacher SGPA Operations

Generate SGPA

```
Displaying Status of Marks Updation of Section  4IT1...

ROLL NUMBER  AM         SIS        MP         TOC        DBMS       JP         JPLAB      DBMSLAB    MPLAB
B20IT001     YES        YES        YES        YES        YES        YES        YES        YES        YES
B20IT002     YES        YES        YES        YES        YES        YES        YES        YES        YES
B20IT003     YES        YES        YES        YES        YES        YES        YES        YES        YES
B20IT004     NO         NO         NO         NO         NO         NO         NO         NO         NO
B20IT005     NO         NO         NO         NO         NO         NO         NO         NO         NO
B20IT006     NO         NO         NO         NO         NO         NO         NO         NO         NO
B20IT007     NO         NO         NO         NO         NO         NO         NO         NO         NO


Total No. of Students : 7

No of. Students with all marks available to generate SGPA : 3

No of. Students with SGPA already generated : 0

No of. students whose SGPA can be generated : 3

WARNING: STUDENT MARKS CANNOT BE UPDATED, ONCE SGPA IS GENERATED...

Are you sure to continue?
Press '1' if 'YES' or '2' if 'NO'
Enter Here : 1

SGPA Generated Successfully for 3 student(s) of Section  4IT1...

Press any key to continue . . .
```

View SGPA

```
Displaying details of Section  4IT1

Enter the number of student(s) : 1

Entering Details of 1 student(s)...

Enter Roll Number : B20IT003

Displaying marks of B20IT003...


Course          M1      A1      Mse1    M2      A2      Mse2    Internal        External        Grade   Gradepoint
AM              10      10       30     10      10       30       40              39              B       8
SIS             --      --       --     --      --       --       40              39              B       8
MP              10      10       30     10      10       30       40              39              B       8
TOC             10      10       30     10      10       30       40              39              B       8
DBMS            10      10       30     10      10       30       40              30              B       8
JP              10      10       30     10      10       30       40              60              S       10
JPLAB           --      --       --     --      --       --       40              60              S       10
DBMSLAB         --      --       --     --      --       --       40              60              S       10
MPLAB           --      --       --     --      --       --       40              39              B       8

Final Gradepoint : 8.47619

Marks of B20IT003 displayed successfully...

Press any key to continue . . .
```

View Subject-Wise Marks

```
Displaying Details of Course(s) of Section  4IT1

COURSE_ID CODE      FACULTY         NAME                    QUALIFICATION           DESIGNATION                     RESEARCH AREA
U18OE401A AM        IT001           Blaise Maria James      B. Tech                 Assistant Professor             Web Development
 U18TP402 SIS       CS001           Arjun Kishore           Ph. D                   Associate Professor             AI/ML
U18OE403E MP        CS002           Raghavendra Prasad      M. Tech                 Assistant Professor             Data Science
 U18IT404 TOC       CS002           Raghavendra Prasad      M. Tech                 Assistant Professor             Data Science
 U18IT405 DBMS      IT001           Blaise Maria James      B. Tech                 Assistant Professor             Web Development
 U18IT406 JP        CS003           Neeti Mohan             Ph. D                   Associate Professor             Software Engineering
 U18IT407 JPLAB     CS003           Neeti Mohan             Ph. D                   Associate Professor             Software Engineering
 U18IT408 DBMSLAB   IT001           Blaise Maria James      B. Tech                 Assistant Professor             Web Development
 U18OE411 MPLAB     CS002           Raghavendra Prasad      M. Tech                 Assistant Professor             Data Science

Enter the Course Code whose marks are to be displayed : AM


Displaying Details of student(s)...

ROLL NUMBER     NAME                            SECTION     M1      A1      MSE1    M2      A2      MSE2    INT     ESE
B20IT001        Veerlapati Vaishnavi            4IT1        10      10      30      10      10      30      40      60
B20IT002        Pola Sai Pranav                 4IT1        10      10      30      10      10      30      40      49
B20IT003        Pingili Pravalika               4IT1        10      10      30      10      10      30      40      39
B20IT004        Pulla Ashish                    4IT1        NA      NA      NA      NA      NA      NA      NA      NA
B20IT005        Peechara Lohith                 4IT1        NA      NA      NA      NA      NA      NA      NA      NA
B20IT006        Kummari Anand                   4IT1        NA      NA      NA      NA      NA      NA      NA      NA
B20IT007        Kadaru Sai Mishra               4IT1        NA      NA      NA      NA      NA      NA      NA      NA

Note : NA ---> Not Awarded

Details of all student(s) displayed successfully...

Press any key to continue . . .
```

7. Student View My Marks

```
Displaying your marks...

Course          M1      A1      Mse1    M2      A2      Mse2    Internal    Grade    Gradepoint
AM              10      10      30      10      10      30      40          A        9
SIS             --      --      --      --      --      --      40          A        9
MP              10      10      30      10      10      30      40          A        9
TOC             10      10      30      10      10      30      40          A        9
DBMS            10      10      30      10      10      30      40          A        9
JP              10      10      30      10      10      30      40          S        10
JPLAB           --      --      --      --      --      --      40          A        9
DBMSLAB         --      --      --      --      --      --      40          A        9
MPLAB           --      --      --      --      --      --      40          A        9

Final Gradepoint : 9.14286

Press any key to continue . . .
```

8. Faculty/Student Change My Password

```
Enter new password : mynewpassword

Confirm password : mynewpassword


Are you sure to change your password ?
Press '1' if 'YES' or '2' if 'NO'
Enter Here : 1

Requested details updated successfully...

Press any key to continue . . .
```

9. Multiple View

```
Welcome Admin


Type '1' ----> Manage Faculty Data
Type '2' ----> Manage Student Data
Type '3' ----> Archives
Type '4' ----> Back to Main Menu

Enter Here :
```

```
Welcome CS001


Personal Info :
Name : Arjun Kishore
Qualification : Ph. D
Designation : Associate Professor
Research Area : AI/ML

Type '1' ----> Add Student Marks
Type '2' ----> Update Student Marks
Type '3' ----> View Overall Marks
Type '4' ----> Update My Password
Type '5' ----> Back to Main Menu

Enter Here :
```

```
Welcome B20IT001


Personal Info :
Name : Veerlapati Vaishnavi
Semester : 4
Section :  4IT1
Contact : 9000000001

Type '1' ----> View My Marks
Type '2' ----> Update My Password
Type '3' ----> Back to Main Menu

Enter Here :
```

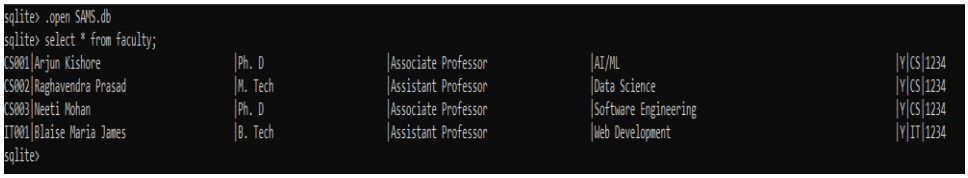
```
Welcome IT001

Logged in as Class Teacher
You are currently accessing operations of Section :  4IT1

Personal Info :
Name : Blaise Maria James
Qualification : B. Tech
Designation : Assistant Professor
Research Area : Web Development

Type '1' ----> Generate SGPA
Type '2' ----> View SGPA
Type '3' ----> View Subject-Wise Marks
Type '4' ----> View other allotted sections/Update Password
Type '5' ----> Back to Main Menu

Enter Here :
```

CHAPTER 5

RESULTS AND ANALYSIS

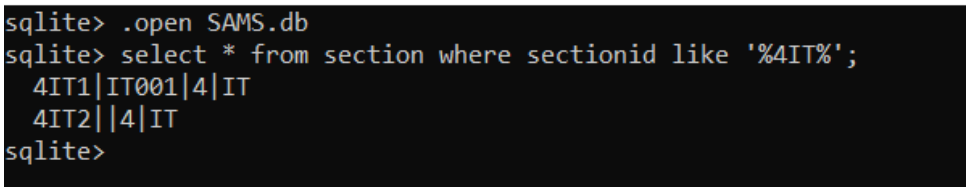
Changes made to database after performing the above experiments:

1. Faculty Table



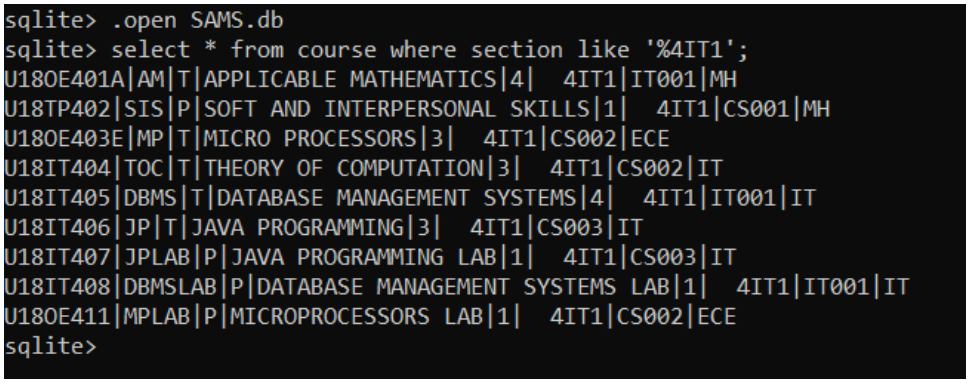
```
sqlite> .open SAMS.db
sqlite> select * from faculty;
CS001|Arjun Kishore          |Ph. D |Associate Professor |AI/ML             |Y|CS|1234
CS002|Raghavendra Prasad     |M. Tech|Assistant Professor|Data Science      |Y|CS|1234
CS003|Neeti Mohan            |Ph. D |Associate Professor |Software Engineering|Y|CS|1234
IT001|Blaise Maria James     |B. Tech|Assistant Professor|Web Development   |Y|IT|1234
sqlite>
```

2. Section Table



```
sqlite> .open SAMS.db
sqlite> select * from section where sectionid like '%4IT%';
  4IT1|IT001|4|IT
  4IT2||4|IT
sqlite>
```

3. Course Table



```
sqlite> .open SAMS.db
sqlite> select * from course where section like '%4IT1';
U18OE401A|AM|T|APPLICABLE MATHEMATICS|4|  4IT1|IT001|MH
U18TP402|SIS|P|SOFT AND INTERPERSONAL SKILLS|1|  4IT1|CS001|MH
U18OE403E|MP|T|MICRO PROCESSORS|3|  4IT1|CS002|ECE
U18IT404|TOC|T|THEORY OF COMPUTATION|3|  4IT1|CS002|IT
U18IT405|DBMS|T|DATABASE MANAGEMENT SYSTEMS|4|  4IT1|IT001|IT
U18IT406|JP|T|JAVA PROGRAMMING|3|  4IT1|CS003|IT
U18IT407|JPLAB|P|JAVA PROGRAMMING LAB|1|  4IT1|CS003|IT
U18IT408|DBMSLAB|P|DATABASE MANAGEMENT SYSTEMS LAB|1|  4IT1|IT001|IT
U18OE411|MPLAB|P|MICROPROCESSORS LAB|1|  4IT1|CS002|ECE
sqlite>
```

4. GradeReport Table

```
sqlite> .open SAMS.db
sqlite> select * from gradereport where sectionid like '%4IT1';
SIS|B20IT001|  4IT1|||||||40|60|S|10
SIS|B20IT002|  4IT1|||||||40|49|A|9
SIS|B20IT003|  4IT1|||||||40|39|B|8
MP|B20IT001|  4IT1|10|10|30|10|10|30|40|60|S|10
MP|B20IT002|  4IT1|10|10|30|10|10|30|40|49|A|9
MP|B20IT003|  4IT1|10|10|30|10|10|30|40|39|B|8
TOC|B20IT001|  4IT1|10|10|30|10|10|30|40|60|S|10
TOC|B20IT002|  4IT1|10|10|30|10|10|30|40|49|A|9
TOC|B20IT003|  4IT1|10|10|30|10|10|30|40|39|B|8
MPLAB|B20IT001|  4IT1|||||||40|60|S|10
MPLAB|B20IT002|  4IT1|||||||40|49|A|9
MPLAB|B20IT003|  4IT1|||||||40|39|B|8
JP|B20IT001|  4IT1|10|10|30|10|10|30|40|60|S|10
JP|B20IT002|  4IT1|10|10|30|10|10|30|40|60|S|10
JP|B20IT003|  4IT1|10|10|30|10|10|30|40|60|S|10
JPLAB|B20IT001|  4IT1|||||||40|60|S|10
JPLAB|B20IT002|  4IT1|||||||40|49|A|9
JPLAB|B20IT003|  4IT1|||||||40|60|S|10
AM|B20IT001|  4IT1|10|10|30|10|10|30|40|60|S|10
AM|B20IT002|  4IT1|10|10|30|10|10|30|40|49|A|9
AM|B20IT003|  4IT1|10|10|30|10|10|30|40|39|B|8
DBMS|B20IT001|  4IT1|10|10|30|10|10|30|40|60|S|10
DBMS|B20IT002|  4IT1|10|10|30|10|10|30|40|49|A|9
DBMS|B20IT003|  4IT1|10|10|30|10|10|30|40|30|B|8
DBMSLAB|B20IT001|  4IT1|||||||40|60|S|10
DBMSLAB|B20IT002|  4IT1|||||||40|49|A|9
DBMSLAB|B20IT003|  4IT1|||||||40|60|S|10
sqlite>
```

5. Student Table

```
sqlite> .open SAMS.db
sqlite> select * from student;
B20IT001|Veerlapati Vaishnavi                |2020|4|  4IT1|Y|9000000001||||10|||||IT|1234
B20IT002|Pola Sai Pranav                     |2020|4|  4IT1|Y|9000000002||||9.142858|||||IT|mynewpassword
B20IT003|Pingili Pravalika                   |2020|4|  4IT1|Y|9000000003||||8.476191|||||IT|1234
B20IT004|Pulla Ashish                        |2020|4|  4IT1|Y|9000000004|||||||||IT|1234
B20IT005|Peechara Lohith                     |2020|4|  4IT1|Y|9000000005|||||||||IT|1234
B20IT006|Kummari Anand                       |2020|4|  4IT1|Y|9000000006|||||||||IT|1234
B20IT007|Kadaru Sai Mishra                   |2020|4|  4IT1|Y|9000000007|||||||||IT|1234
sqlite>
```

CHAPTER 6

CONCLUSION

On a concluding note, simplicity is never easy to achieve. As we've seen in this project, developing a user-friendly and straightforward platform that makes the administrator's job easier is a complicated task. From understanding, the user needs to system design and eventually system prototype and finalization, every step involves in-depth understanding and commitment towards attaining the objectives of the project.

Although the student grade management system is not fully integrated and so cannot be used in real-time, the system prototype shows easy navigation and data storage systematically. Overall, productivity has increased and work processes have been streamlined. Even though almost all the goals were met, the system still has room for improvement. The system is robust and adaptable enough to accommodate future technological and device upgrades.

CHAPTER 7

REFERENCES

1. **The official website of SQLite: https://www.sqlite.org/index.html**
2. **How to connect to SQLite through C/C++: https://www.sqlite.org/cintro.html**
3. **Stack Overflow**

CHAPTER 8

POSTER

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL-506015
(AN AUTONOMOUS INSTITUTE UNDER KAKATIYA UNIVERSITY, WARANGAL)
DEPARTMENT OF INFORMATION TECHNOLOGY

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Student Grade Management System

1 Introduction

The Student Grade Management System mainly focuses on storing records of students' academic performance by taking their marks for a semester, calculating overall academic performance of the same, and storing them into database.

2 Problem Definition

Develop a project that offers services such as registration and faculty-student profile development, decreasing paperwork and simplifying the record-keeping process in educational institutions. The emphasis must be on providing information in a simple and systematic manner throughout the project.

3 Proposed Method

The Student Grade Management System project provides us with a convenient interface for updating information about student academic performance. It can be used by educational institutions or colleges to conveniently keep track of their student's records. Using a manual approach to achieve this goal is difficult because the information is dispersed and redundant, and collecting relevant data might take a long time. This project is used to solve all of these issues.

4 Experiments and Results

```
Displaying Status of Marks Updation of Section  4IT1...

ROLL NUMBER  AM          SIS         MP          TOC         DBMS        JP          JPLAB       DBMSLAB     MPLAB
B20IT001     YES         YES         YES         YES         YES         YES         YES         YES         YES
B20IT002     YES         YES         YES         YES         YES         YES         YES         YES         YES
B20IT003     YES         YES         YES         YES         YES         YES         YES         YES         YES
B20IT004     NO          NO          NO          NO          NO          NO          NO          NO          NO
B20IT005     NO          NO          NO          NO          NO          NO          NO          NO          NO
B20IT006     NO          NO          NO          NO          NO          NO          NO          NO          NO
B20IT007     NO          NO          NO          NO          NO          NO          NO          NO          NO

Total No. of Students : 7

No of. Students with all marks available to generate SGPA : 3

No of. Students with SGPA already generated : 0

No of. students whose SGPA can be generated : 3

WARNING: STUDENT MARKS CANNOT BE UPDATED, ONCE SGPA IS GENERATED...

Are you sure to continue?
Press '1' if 'YES' or '2' if 'NO'
Enter Here : 1

SGPA Generated Successfully for 3 student(s) of Section  4IT1...

Press any key to continue . . .
```

5 Conclusion

Although the student grade management system is not fully integrated and so cannot be used in real-time, the system prototype shows easy navigation and data storage systematically. Overall, productivity has increased and work processes have been streamlined.