Relational Database Management System Lab

Project Report

On

"STUDENT DATABASE MANAGEMENT SYSTEM"

Submitted in the Partial fulfillment of the requirement for the Award of Degree of

Bachelor of Technology

in

COMPUTER SCIENCE & ENGINEERING

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Subject – RDBMS LAB

(ACCS-16408)

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ACKNOWLEDGEMENT

A project is major milestone during the study period of a student. As such this project was a challenge to us and was an opportunity to prove our caliber. We are highly grateful and obliged to each and everyone making us help out of problems being faced by us.

It would not have been possible to see through the undertaken project without the guidance **Er. Ajay Sharma**. It was purely on the basis of their experience and knowledge that we are able to clear all the theoretical and technical hurdles during the development phases of this project work.

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Introduction to Relational Database Model

Relational Data Model has an advantage that it is simple to implement and easy to understand as it uses table format. In this approach, a relation is only constructed by setting the association among the attributes of an entity as well the relationship among different entities.

One of the main reasons for introducing this model was to increase the productivity of the application programmers by eliminating the need to change application program, when a change is made to the database. Data structure used in the data model is represented by both entities and relationship between them.

Information is represented in the relational model in shape of tables. There are columns in a table which represent the attributes of an entity about which the table is constructed. The rows of a table are referred to as tuples .

1.1 Introduction to Oracle Database

Oracle database (Oracle DB) is a relational database management system (RDBMS) from the Oracle Corporation. Originally developed in 1977 by Lawrence Ellison and other developers, Oracle DB is one of the most trusted and widely-used relational database engines.

The system is built around a relational database framework in which data objects may be directly accessed by users (or an application front end) through structured query language (SQL). Oracle is fully scalable relational database architecture and is often used by global enterprises, which manage and process data across wide and local area networks. The Oracle database has its own network component to allow communications across networks.

A key feature of Oracle is that its architecture is split between the logical and the physical. This structure means that for large-scale distributed computing, also known as grid computing, the data location is irrelevant and transparent to the user, allowing for a more modular physical structure that can be added to and altered without affecting the activity of the database, its data or users. The sharing of resources in this way allows for very flexible data networks whose capacity can be adjusted up or down to suit demand, without degradation of service. It also allows for a robust system to be devised as there is no single point at which a failure can bring down the database, as the networked schema of the storage resources means that any failure would be local only.

1.2 STRUCTURED QUERY LANGUAGE

Oracle tables, which consists of rows and columns, are used for storing data. The columns refer to the attributes. Each column in a table has a column name and a data type. A value's data type associates a fixed set of properties with a value. The data types available in Oracle fall under the following categories.

Category	**Available data types**
Character	CHAR, VARCHAR, VARCHAR2, NCHAR, NVARCHAR2, LONG, RAW, LONGRAW
Number	Number
Date/Time	Date
LOB"s (Large Objects)	BFILE, BLOB CLOB, NCLOB

WHAT IS A TABLE ?

A table is a database object which is used to store data in relational databases. Each table consists of rows and columns. A column in the database table represents the table's attributes and a row represents a single set of column values in a database table. Each column of the table has a column name and a data type associated with it. The data types which can be used include VARCHAR2, NUMBER, DATE etc. A row of a table is also known as record. Within a table foreign keys are used to represent relationships.

CREATING A TABLE

In order to store and manage data it is necessary to create tables. In Oracle, tables are created using CREATE TABLE command which is one of the important DDL statement. The CREATE TABLE command specifies the name of the table, name of columns in the table as well as the data types and if required constraints associated with each column of the table.

INTEGRITY CONSTRAINTS IN CREATE TABLE

Oracle uses integrity constraints to prevent invalid data entry into the base tables of the database.

One can define integrity constraints to enforce the business rules that one wants to associate with the information in the database. If the integrity constraints are violated due to the execution of any of DML statements (Insert, Update, Select) then Oracle rolls back the statement and returns an error. The different kinds of constraints are:

- Primary Key Constraint
- Unique Key Integrity Constraint
- NOT NULL Integrity Constraint
- Foreign Key Constraint

OBJECTIVES OF THE PROJECT

This project aims at building an online student database management system .It is divided into various modules which is explained fully using data flow diagrams of the modules. This project manages the student details , the parents details , section details and admission details . This system deals with students issue, their admission details, their parents details ,their section issue and their class incharge details,etc. . Student Database Management System is an application that is suitable for small and medium structured students data. It is divided into different modules to make it more user-friendly. The main objective of the proposed system is that any modification can be made by just the touch of a button instead of going through directory and keep on turning pages. The front –end is designed using Python3.

2.1 Introduction to Python Programming language :

Python is a general purpose programming language that is often applied in scripting roles. It is also called as Interpreted language.

Features Of Python:

- It's Free:: Downloading and installing Python is free and easy. Source code is easily accessible.
- Its Portable:: Python runs virtually on every major platform used today. Programs runs exactly in the same manner irrespective of platform.
- It's Powerful :: Dynamic typing , Built-in types and tools , library utilities , third-party utilities(e.g. Numpy , Scipy)
- It's Mixable :: Integration of python with other languages is widely used .
- Its Object – Oriented and Functional

  Python is instead directly *interpreted* into machine instructions.

SYSTEM ANALYSIS AND DATA TABLES

3.1 Data Tables

- **Students**

COLUMN NAME	NULL?	TYPE	CONSTRAINTS
ROLLNO	NOT NULL	NUMBER(7)	PRIMARY KEY
NAME	NOT NULL	VARCHAR2(20)	Foreign Key
DOB		DATE	
GENDER		VARCHAR2(10)	CHECK(GENDER IN('Male','Female',Others))
ADDRESS	NOT NULL	VARCHAR2(25)	
STATE		VARCHAR2(25)	
EMAIL		VARCHAR2(25)	
MOBILENO	NOT NULL	NUMBER(10)	

- **PARENTS**

COLUMN NAME	NULL?	TYPE	CONSTRAINTS
ROLLNO		NUMBER(7)	FOREIGN KEY
NAME	NOT NULL	VARCHAR2(25)	PRIMARY KEY
FATHERNAME	NOT NULL	VARCHAR2(20)	
MOTHERNAME	NOT NULL	VARCHAR2(20)	
FATHEROCCUPATION		VARCHAR2(16)	
MOTHEROCCUPATION		VARCHAR2(16)	
EMAIL		VARCHAR2(30)	
MOBILENO	NOT NULL	NUMBER(10)	

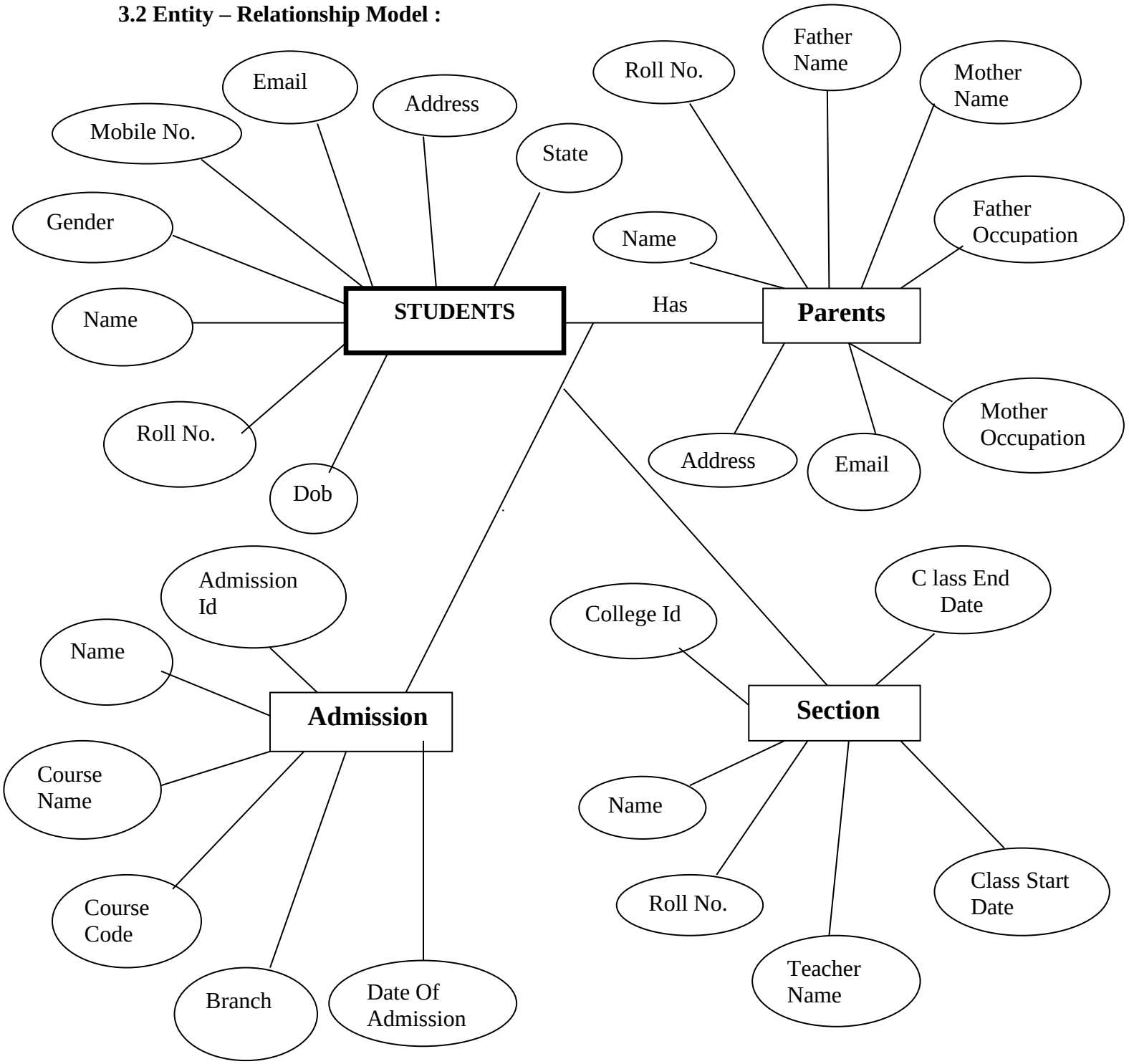
- **SECTION**

COLUMN NAME	NULL?	TYPE	CONSTRAINTS
COLLEGEID	NOT NULL	NUMBER(7)	PRIMARY KEY
ROLLNO	NOT NULL	NUMBER(7)	FOREIGN KEY
NAME		VARCHAR2(25)	FOREIGN KEY
TEACHERNAME		VARCHAR2(30)	
CLASSSTARTDATE		DATE	
CLASSENDDATE		DATE	

- **ADMISSION**

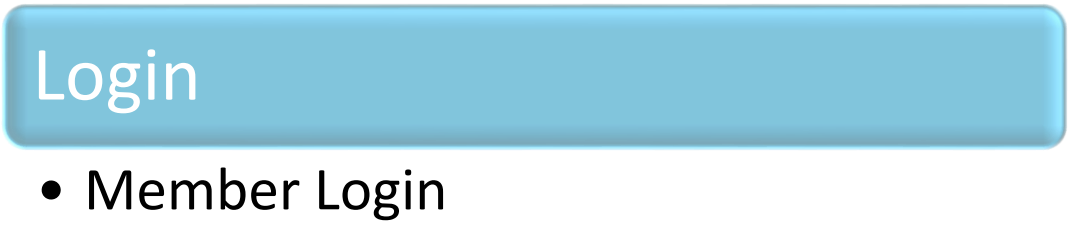
COLUMN NAME	NULL?	TYPE	CONSTRAINTS
ADMISSIONID	NOT NULL	VARCHAR2(10)	PRIMARY KEY
NAME		VARCHAR2(30)	FOREIGN KEY
COURSECODE		VARCHAR2(10)	
COURSENAME		VARCHAE2(20)	
BRANCH		VARCHAR2(20)	
DATEOFADMISSION		DATE	

3.2 Entity – Relationship Model :



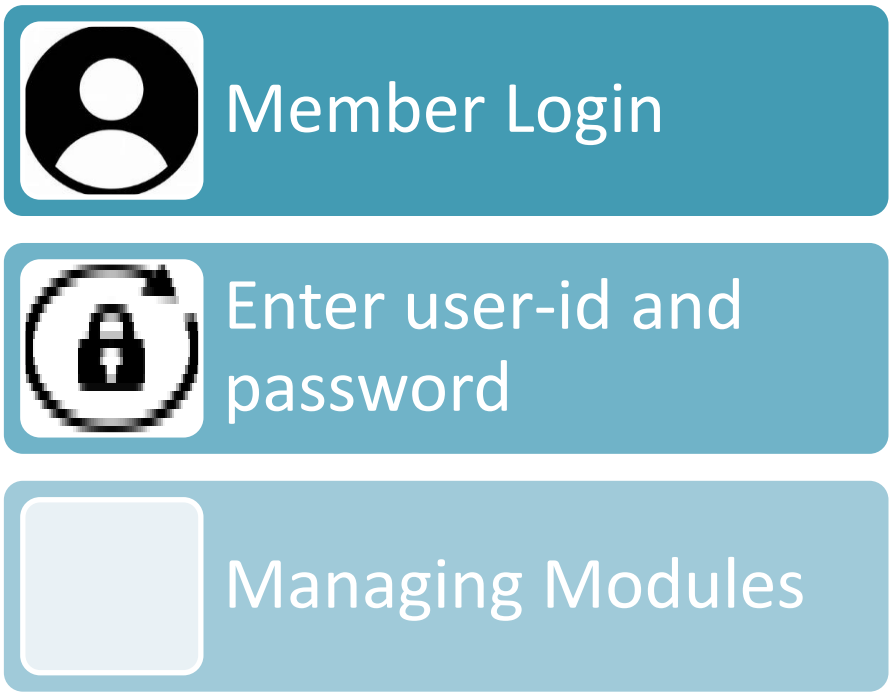
DATA FLOW DIAGRAMS:

3.2.1 Login System



3.2.2Member Login

- **Authorization and Authentication**

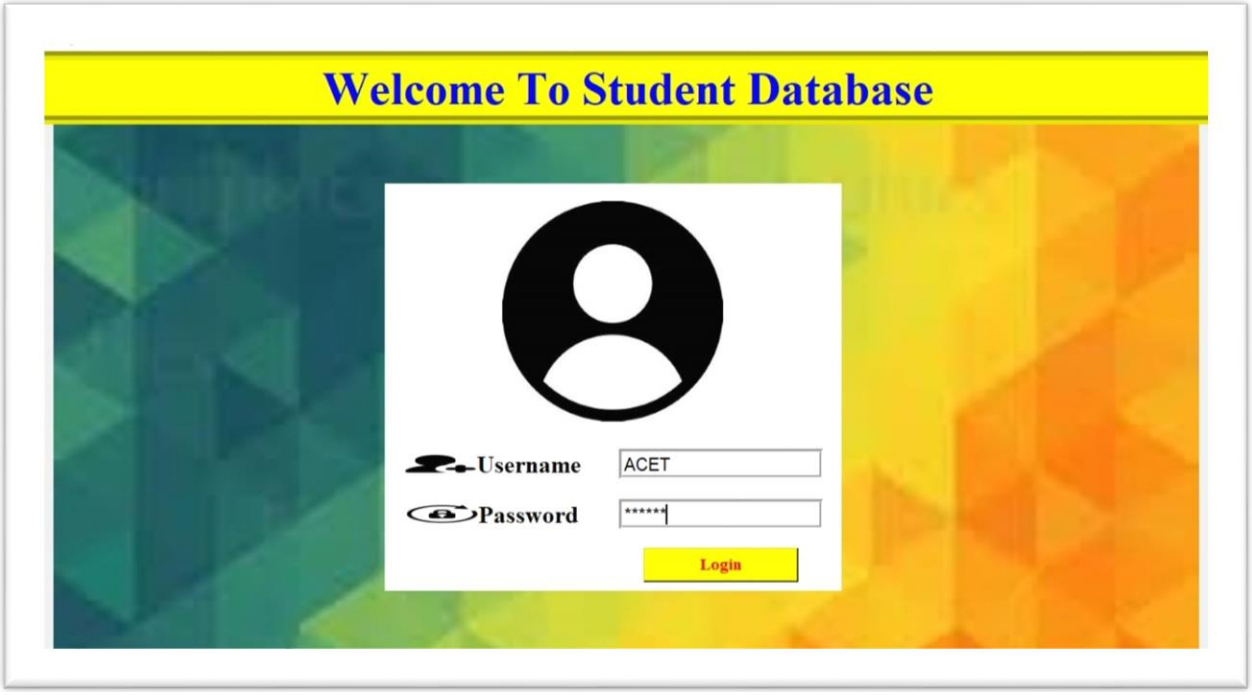


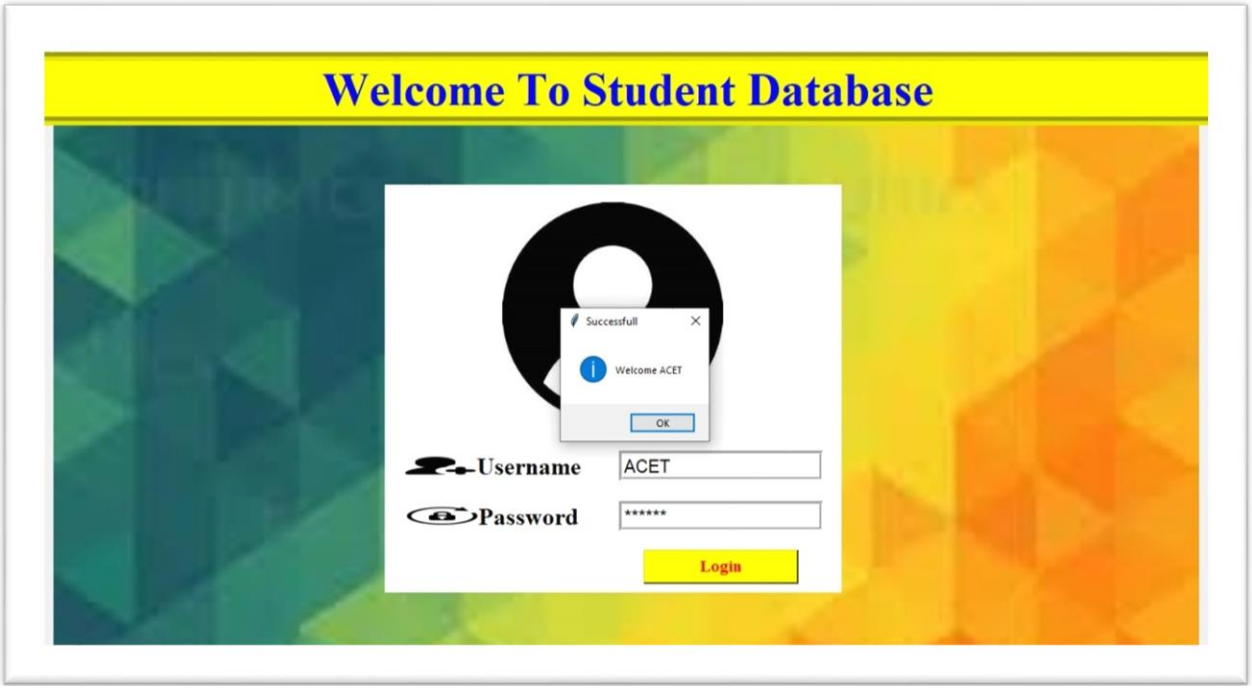
This module is used by the user which means member in the department. They need to login to the system using their id and password which is then authenticated from details relation stored in the oracle database. In order to distinguish to user's level, user can access to different module when successfully login. For example, only admin level are able to access the manage members module.

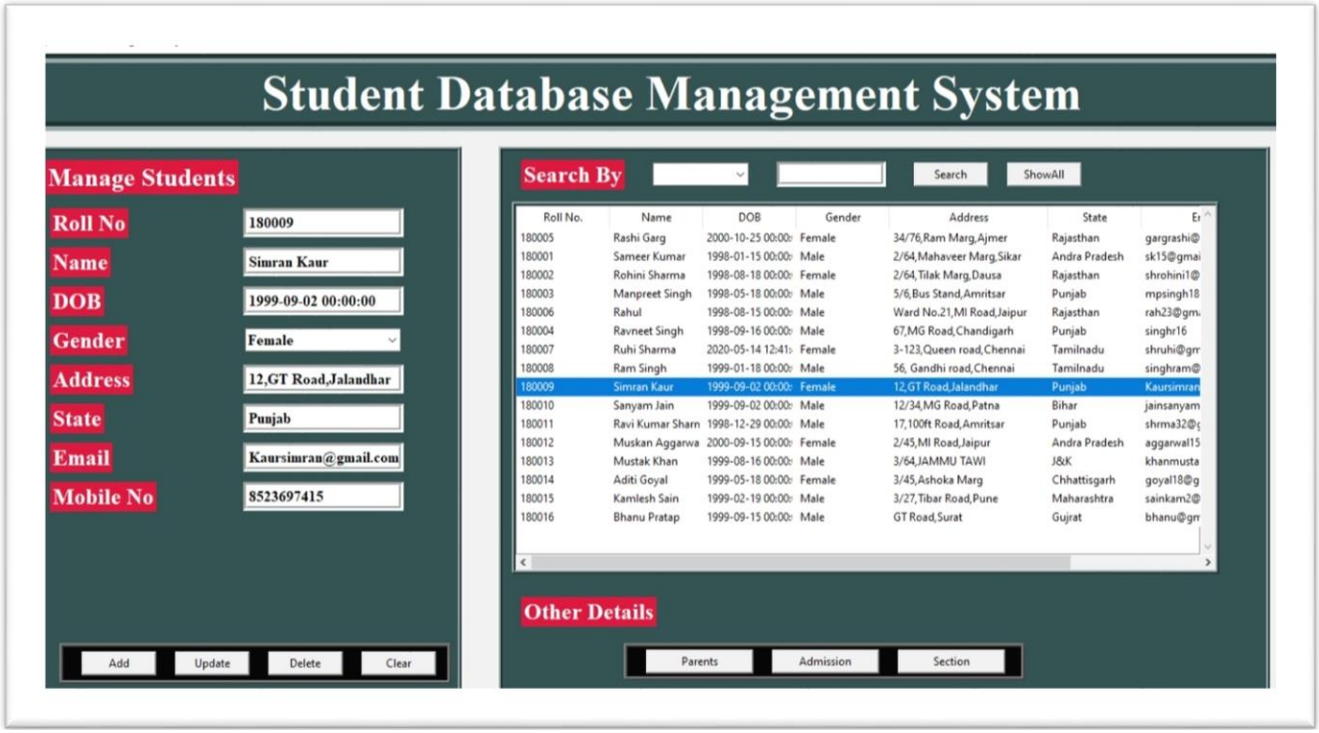
Manage module :

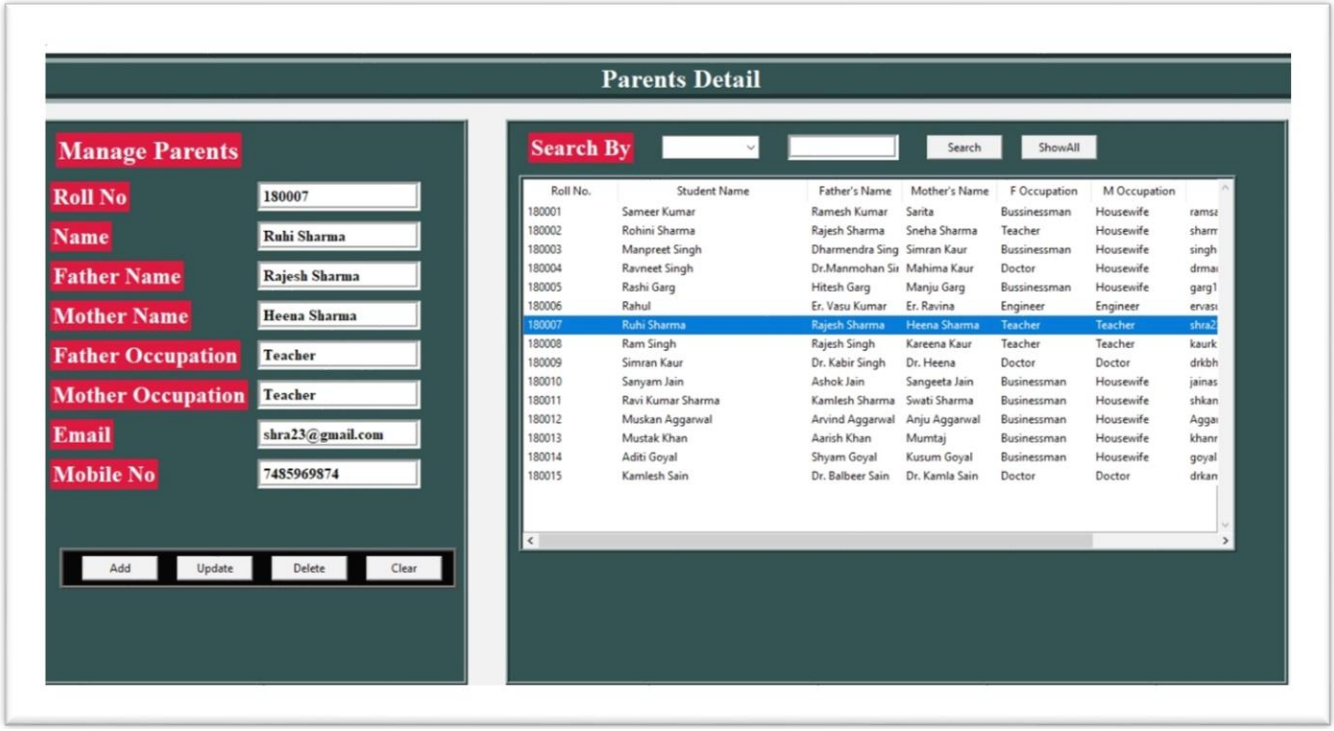
Admin user can manage student ,parents,section and admission details i.e. add , delete operation on the details . It can view the complete staff details . Students details can be updated as to maintain the data and from their whole student record is fetched**.**

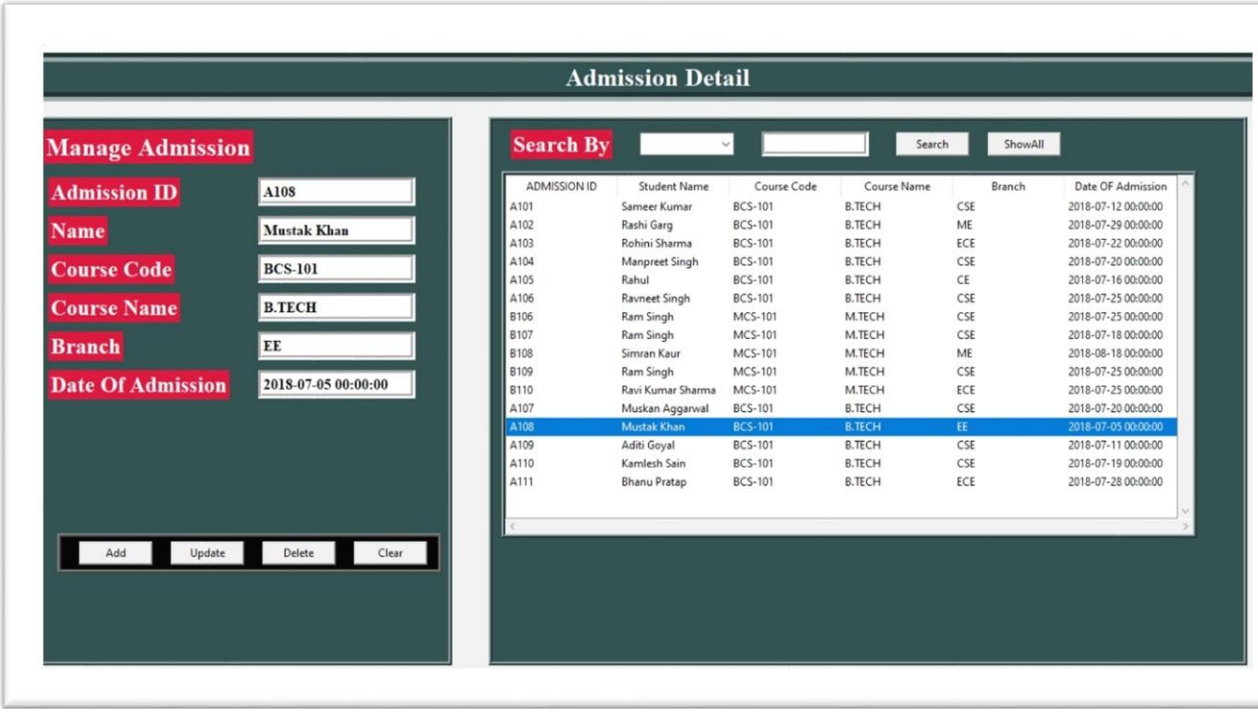
DESIGN OF FRONT-END APPLICATION

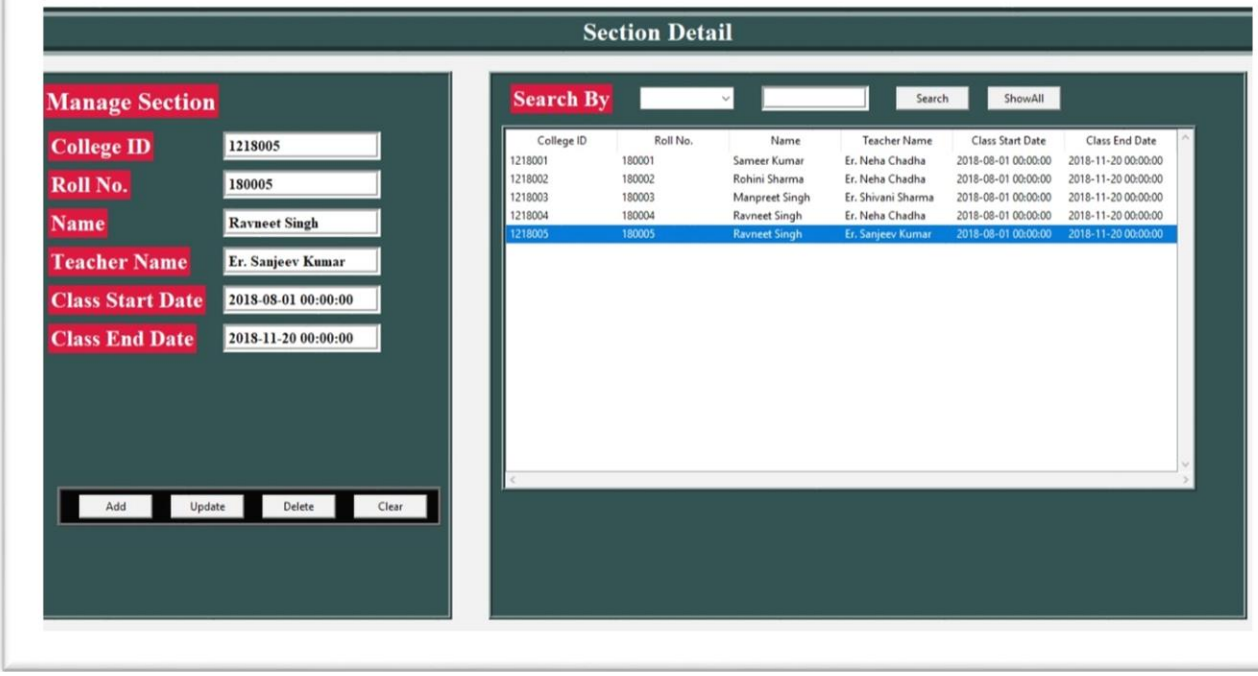


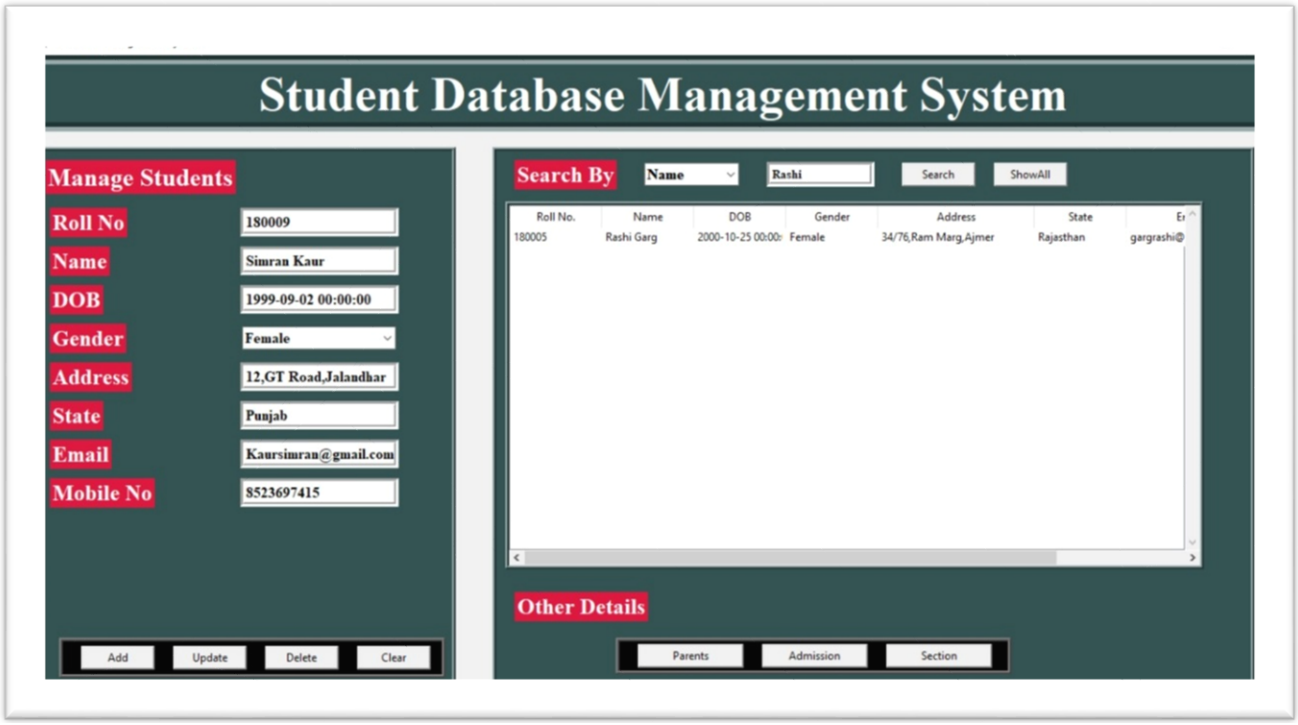



Student Database Management System
Manage Students
Roll No
180009
Name
Simran Kaur
DOB
1999-09-02 00:00:00
Gender
Female
Address
12,GT Road,Jalandhar
State
Punjab
Email
Kaursimran@gmail.com
Mobile No
8523697415
Add
Update
Delete
Clear
Search By
Search
ShowAll
Roll No. Name DOB Gender Address State
180005 Rashi Garg 2000-10-25 00:00: Female 34/76,Ram Marg,Ajmer Rajasthan gargrashi@
180001 Sameer Kumar 1998-01-15 00:00: Male 2/64,Mahaveer Marg,Sikar Andra Pradesh sk15@gmai
180002 Rohini Sharma 1998-08-18 00:00: Female 2/64,Tilak Marg,Dausa Rajasthan shrohini1@
180003 Manpreet Singh 1998-05-18 00:00: Male 5/6,Bus Stand,Amritsar Punjab mpsingh18
180006 Rahul 1998-08-15 00:00: Male Ward No.21,MI Road,Jaipur Rajasthan rah23@gm
180004 Ravneet Singh 1998-09-16 00:00: Male 67,MG Road,Chandigarh Punjab singhr16
180007 Ruhi Sharma 2020-05-14 12:41: Female 3-123,Queen road,Chennai Tamilnadu shruhi@gm
180008 Ram Singh 1999-01-18 00:00: Male 56, Gandhi road,Chennai Tamilnadu singhram@
180009 Simran Kaur 1999-09-02 00:00: Female 12,GT Road,Jalandhar Punjab Kaursimran
180010 Sanyam Jain 1999-09-02 00:00: Male 12/34,MG Road,Patna Bihar jainsanyam
180011 Ravi Kumar Sharn 1998-12-29 00:00: Male 17,100ft Road,Amritsar Punjab shrma32@
180012 Muskan Aggarwa 2000-09-15 00:00: Female 2/45,MI Road,Jaipur Andra Pradesh aggarwal15
180013 Mustak Khan 1999-08-16 00:00: Male 3/64,JAMMU TAWI J&K khanmusta
180014 Aditi Goyal 1999-05-18 00:00: Female 3/45,Ashoka Marg Chhattisgarh goyal18@g
180015 Kamlesh Sain 1999-02-19 00:00: Male 3/27,Tibar Road,Pune Maharashtra sainkam2@
180016 Bhanu Pratap 1999-09-15 00:00: Male GT Road,Surat Gujrat bhanu@gm
Other Details
Parents
Admission
Section


Parents Detail
Manage Parents
Roll No
180007
Name
Ruhi Sharma
Father Name
Rajesh Sharma
Mother Name
Heena Sharma
Father Occupation
Teacher
Mother Occupation
Teacher
Email
shra23@gmail.com
Mobile No
7485969874
Add
Update
Delete
Clear
Search By
Search
ShowAll
Roll No. Student Name Father's Name Mother's Name F Occupation M Occupation
180001 Sameer Kumar Ramesh Kumar Sarita Bussinessman Housewife
180002 Rohini Sharma Rajesh Sharma Sneha Sharma Teacher Housewife
180003 Manpreet Singh Dharmendra Sing Simran Kaur Bussinessman Housewife
180004 Ravneet Singh Dr.Manmohan Sir Mahima Kaur Doctor Housewife
180005 Rashi Garg Hitesh Garg Manju Garg Bussinessman Housewife
180006 Rahul Er. Vasu Kumar Er. Ravina Engineer Engineer
180007 Ruhi Sharma Rajesh Sharma Heena Sharma Teacher Teacher
180008 Ram Singh Rajesh Singh Kareena Kaur Teacher Teacher
180009 Simran Kaur Dr. Kabir Singh Dr. Heena Doctor Doctor
180010 Sanyam Jain Ashok Jain Sangeeta Jain Businessman Housewife
180011 Ravi Kumar Sharma Kamlesh Sharma Swati Sharma Businessman Housewife
180012 Muskan Aggarwal Arvind Aggarwal Anju Aggarwal Businessman Housewife
180013 Mustak Khan Aarish Khan Mumtaj Businessman Housewife
180014 Aditi Goyal Shyam Goyal Kusum Goyal Businessman Housewife
180015 Kamlesh Sain Dr. Balbeer Sain Dr. Kamla Sain Doctor Doctor


Admission Detail
Manage Admission
Admission ID
A108
Name
Mustak Khan
Course Code
BCS-101
Course Name
B.TECH
Branch
EE
Date Of Admission
2018-07-05 00:00:00
Add
Update
Delete
Clear
Search By
Search
ShowAll
ADMISSION ID
Student Name
Course Code
Course Name
Branch
Date OF Admission
A101 Sameer Kumar BCS-101 B.TECH CSE 2018-07-12 00:00:00
A102 Rashi Garg BCS-101 B.TECH ME 2018-07-29 00:00:00
A103 Rohini Sharma BCS-101 B.TECH ECE 2018-07-22 00:00:00
A104 Manpreet Singh BCS-101 B.TECH CSE 2018-07-20 00:00:00
A105 Rahul BCS-101 B.TECH CE 2018-07-16 00:00:00
A106 Ravneet Singh BCS-101 B.TECH CSE 2018-07-25 00:00:00
B106 Ram Singh MCS-101 M.TECH CSE 2018-07-25 00:00:00
B107 Ram Singh MCS-101 M.TECH CSE 2018-07-18 00:00:00
B108 Simran Kaur MCS-101 M.TECH ME 2018-08-18 00:00:00
B109 Ram Singh MCS-101 M.TECH CSE 2018-07-25 00:00:00
B110 Ravi Kumar Sharma MCS-101 M.TECH ECE 2018-07-25 00:00:00
A107 Muskan Aggarwal BCS-101 B.TECH CSE 2018-07-20 00:00:00
A108 Mustak Khan BCS-101 B.TECH EE 2018-07-05 00:00:00
A109 Aditi Goyal BCS-101 B.TECH CSE 2018-07-11 00:00:00
A110 Kamlesh Sain BCS-101 B.TECH CSE 2018-07-19 00:00:00
A111 Bhanu Pratap BCS-101 B.TECH ECE 2018-07-28 00:00:00


Section Detail
Manage Section
College ID
1218005
Roll No.
180005
Name
Ravneet Singh
Teacher Name
Er. Sanjeev Kumar
Class Start Date
2018-08-01 00:00:00
Class End Date
2018-11-20 00:00:00
Add
Update
Delete
Clear
Search By
Search
ShowAll
College ID
Roll No.
Name
Teacher Name
Class Start Date
Class End Date
1218001 180001 Sameer Kumar Er. Neha Chadha 2018-08-01 00:00:00 2018-11-20 00:00:00
1218002 180002 Rohini Sharma Er. Neha Chadha 2018-08-01 00:00:00 2018-11-20 00:00:00
1218003 180003 Manpreet Singh Er. Shivani Sharma 2018-08-01 00:00:00 2018-11-20 00:00:00
1218004 180004 Ravneet Singh Er. Neha Chadha 2018-08-01 00:00:00 2018-11-20 00:00:00
1218005 180005 Ravneet Singh Er. Sanjeev Kumar 2018-08-01 00:00:00 2018-11-20 00:00:00



SQL QUERIES EXECUTED :

1. SELECT * FROM STUDENTS;
2. SELECT * FROM PARENTS;
3. SELECT * FROM ADMISSION;
4. SELECT * FROM SECTION;
5. SELECT * FROM STUDENTS WHERE ROLLNO=180001;
6. SELECT * FROM STUDENTS JOIN PARENTS USING(ROLLNO);
7. UPDATE STUDENTS SET NAME=”RAMAN” WHERE ROLLNO=180003;
8. SELECT * FROM STUDENTS JOIN ADMISSION USING(NAME);
9. SELECT * FROM STUDENTS JOIN SECTION USING(ROLLNO);
10. SELECT FATHERSNAME,MOTHERSNAME FROM PARENTS JOIN SECTION USING(ROLLNO);

SOURCE CODE:

```
from tkinter import *
from PIL import ImageTk
from tkinter import messagebox


class Login():
    def __init__(self,root):
        self.root=root
        self.root.title("Login")
        self.root.geometry("1350x700+0+0")


        self.bg_icon=ImageTk.PhotoImage(file="bg.jpg")
        self.user_icon=PhotoImage(file="main.png")
        self.pass_icon=PhotoImage(file="pass.png")
        self.logo_icon=ImageTk.PhotoImage(file="user.jpg")
        self.uname=StringVar()
        self.pass_=StringVar()

        bg_lbl=Label(self.root,image=self.bg_icon).pack()

        title=Label(self.root,text="Welcome To Student Database",font=("times new roman",40,"bold"),bg="yellow",fg="blue",bd=10,relief=GROOVE)
        title.place(x=0,y=0,relwidth=1)


        Login_win=Frame(self.root,bg="white")
        Login_win.place(x=400,y=150)
        logolbl=Label(Login_win,image=self.logo_icon,bd=0)
        logolbl.grid(row=0,columnspan=3,pady=20)


lbluser=Label(Login_win,text="Username",image=self.user_icon,compound=LEFT,font=("times new roman",20,"bold"),bg="white").grid(row=1,column=0,padx=20,pady=10)

txtuser=Entry(Login_win,bd=5,textvariable=self.uname,relief=GROOVE,font=("",15)).grid(row=1,column=1,padx=20)


lblpass=Label(Login_win,text="Password",image=self.pass_icon,compound=LEFT,font=("times new roman",20,"bold"),bg="white").grid(row=2,column=0,padx=20,pady=10)

txtpass=Entry(Login_win,bd=5,textvariable=self.pass_,show='*',relief=GROOVE,font=("",15)).grid(row=2,column=1,padx=20)
```

```
        btn_log=Button(Login_win,text="Login",width=15,command=self.login,font=("times
new roman",14,"bold"),bg="yellow",fg="red").grid(row=3,column=1,pady=10)



    def login(self):
        def is_valid_password(password):
            import hashlib
            password_hash = hashlib.sha256(password.encode("utf=8")).hexdigest()
            return                                  password_hash                                  ==
"0300dc429eeb82775c426d87a5fd72c1bba7a35f56a4804df8b3c35c38df6813"

        if self.uname.get()=="" or self.pass_.get()=="" :
            messagebox.showerror("Error","All fields are required!!")
        elif self.uname.get()=="ACET" and is_valid_password(self.pass_.get()):
            messagebox.showinfo("Successfull",f"Welcome {self.uname.get()}")
            self.pass_.set("")
            self.Student1()
        else:
            messagebox.showerror("Error","Invalid Username or Password")
            print('invalid')


    def Student1(self):
        from pk import Student
        root4=Toplevel()
        ob4=Student(root4)
        root4.mainloop()


root=Tk()
obj=Login(root)
root.mainloop()
```

References:

- https://www.geeksforgeeks.org/dbms/
- https://docs.oracle.com/en/database/index.html
- **Database System Concepts by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, 6th Edition, McGraw-Hill Education,2010.**