St. Francis Institute of Technology,
Mumbai-400 103

A.Y. 2023-24
Class: SE-ITA/ITB,
Semester: IV Subject:
Python Lab.

Experiment –12: GUI and Database Connectivity using Python

1. Aim: To implement a Graphical User Interface in Python using tkinter and Database using Sqlite3

2. Objectives: After study of this experiment, the student will be able to implement GUI using tkinter including windows, frames, canvas and widgets.

3. Outcomes: Students shall be able to create GUI for application and connect it to a database (LO- 404.3).

4. **Prerequisite:** Knowledge of Python basics.

5. **Requirements:** Personal Computer (PC), Windows /Linux Operating System, Python IDE.

6. Pre-Experiment Exercise:

Theory:

The tkinter package (Tk interface) is the standard Python interface to the Tk GUI toolkit. Both Tk and tkinter are available on most Unix platforms, as well as on Windows systems. Python offers tkinter module to create graphics programs. It enables use of the classes TK module of TCL/TK language. A window is where all the GUI is visible a window is an object of class Tk.The frames and canvas or a widget is added to the window using a pack(),grid() or place() method.

pack(): It organizes the widgets in the block.

grid(): It organizes the widgets in table-like structure.

place(): It&#39;s used to place the widgets at a specific position you want.
A widget is a GUI component that is displayed on the screen and canperform a task as given by the user. Different widgets in Python are:Text, Label, Dropdown, Checkbutton, Radiobutton, Entry, Listbox ,Menu, Spinbox, ScrollBar.

To use SQLite3 in Python, import the sqlite3 module and then create a connection object which will connect us to the database and will let us execute the SQL statements. To execute SQLite statements in Python,you need a cursor object, create it using the cursor() method. Use the cursor object to call the execute() method to execute any SQL queries for creating a table, adding entries in the table.

7. Laboratory Exercise:

A. Procedure:

i. Open IDE for python programming

ii. Open new python file from menu file-new

iii. Type python code with proper syntax

iv. Save file with .py extension

v. Execute and observe the output

B. Program code with comments:

Write and execute your program code to achieve the given aim and attach it

with your own comments with neat indentation.

8. Post-Experiments Exercise:

A. Extended theory:

i. Explain the use of a canvas and create a shape using the same.

ii. Explain the syntax and explore all the different widgets that can be used in Tkinter.

iii. Show creation of image buttons and use of Messagebox in tkinter Python GUI.

B. Results/Observations/Program output:

Present the program input/output results and comment on the same

C. Questions/Programs:

i. Create a GUI with frame and widgets: First name and Last name (Text), Gender (Radiobutton), Subject (dropdown menu)

ii. Add 3 buttons the GUI window created in i. To display the given input, reset and exit the window.

ii. Connect the form to a database and enter values from the form into the database.

D. Conclusion:

1. Write what was performed in the experiment/program.

2. What is the significance of experiment/program?

3. Mention a few applications of what was studied.

E. References:

[1] James Payne, “Beginning Python: Using Python 2.6 and Python 3.1”,Wrox Publication

[2] https://docs.python.org/3/library/tkinter.html#tkinter-modules

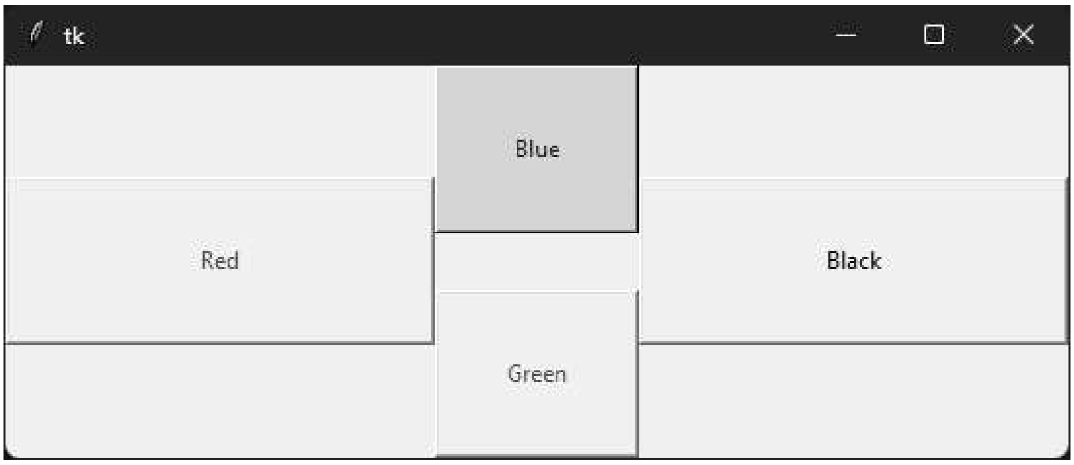
[3] https://docs.python.org/3/library/sqlite3.html

In-Lab Exercise:

Program 1:

```
from tkinter import *

r = Tk()

redbutton   =  Button(r,  text  =  "Red",  fg  =  "red",  width=30,    height=5,
activebackground="yellow")
redbutton.pack( side = LEFT)

greenbutton  =  Button(r,  text  =  "Black",  fg  =  "black",  width=30,   height=5,
activeforeground="purple")
greenbutton.pack( side = RIGHT )

bluebutton = Button(r, text = "Blue", fg = "blue", width=30, height=5, bg="pink")
bluebutton.pack( side = TOP )

blackbutton = Button(r, text = "Green", fg = "green", width=30, height=5)
blackbutton.pack( side = BOTTOM)

r.mainloop()
```

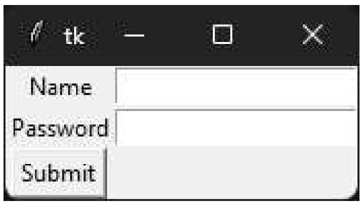
Output of Program 1:



Program 2:

```
from tkinter import *
parent = Tk()
name = Label(parent,text = "Name").grid(row = 0, column = 0)
e1 = Entry(parent).grid(row = 0, column = 1)
password = Label(parent,text = "Password").grid(row = 1, column = 0)
e2 = Entry(parent).grid(row = 1, column = 1)
submit = Button(parent, text = "Submit").grid(row = 2, column = 0)
parent.mainloop()
```

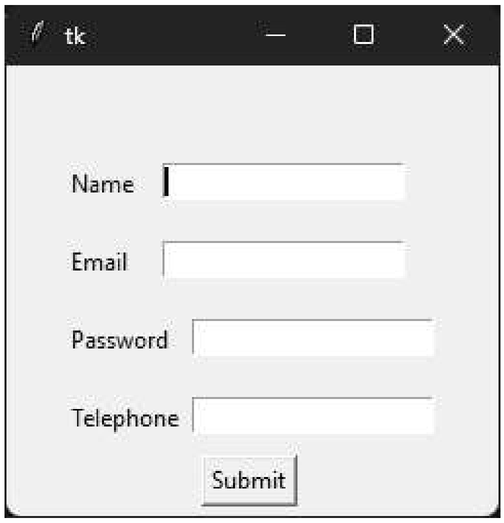
Output of Program 2:



Program 3:

```
from tkinter import *
top = Tk()
top.geometry("400x250")
name = Label(top, text = "Name").place(x = 30,y = 50)
email = Label(top, text = "Email").place(x = 30, y = 90)
password = Label(top, text = "Password").place(x = 30, y = 130)
telephone = Label(top, text = "Telephone").place(x = 30, y = 170)
e1 = Entry(top).place(x = 80, y = 50)
e2 = Entry(top).place(x = 80, y = 90)
e3 = Entry(top).place(x = 95, y = 130)
e4 = Entry(top).place(x = 95, y = 170)
submit = Button(top, text = "Submit" , command = top.destroy).place(x = 100 , y =
200)
top.mainloop()
```

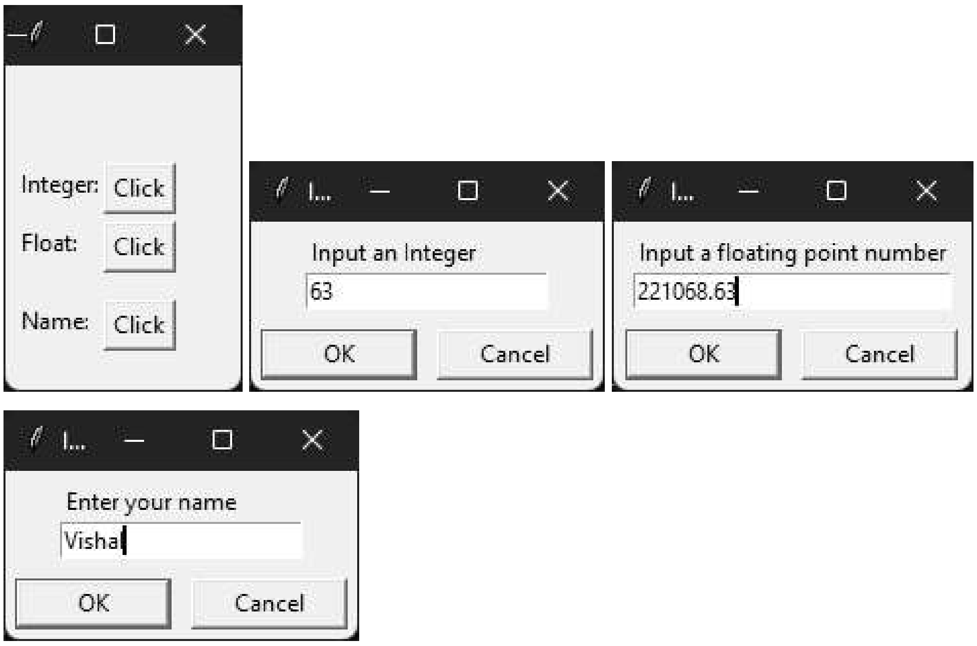
Output of Program 3:

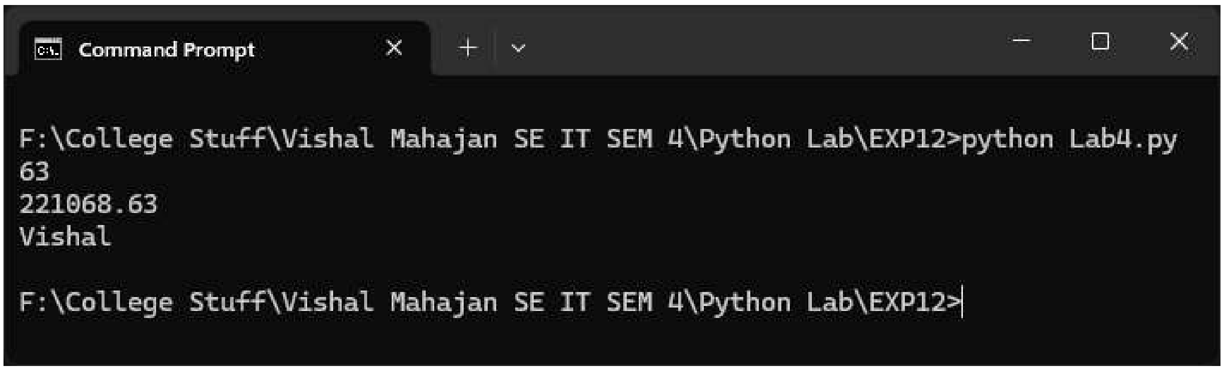


Program 4:

```
from tkinter.simpledialog import askinteger
from tkinter.simpledialog import askfloat
from tkinter.simpledialog import askstring
from tkinter import *
from tkinter import messagebox
top = Tk()
top.geometry("100x100")
#For integer
def show():
   num = askinteger("Input", "Input an Integer")
   print(num)
Integer  = Label(top, text = "Integer:").place(x = 5,y = 50)
B = Button(top, text ="Click", command = show)
B.place(x=50,y=50)
#For float
def show1():
   num = askfloat("Input", "Input a floating point number")
   print(num)
Float  = Label(top, text = "Float:").place(x = 5,y = 80)
B = Button(top, text ="Click", command = show1)
B.place(x=50,y=80)
#For string
def show2():
   name = askstring("Input", "Enter your name")
   print(name)
Name  = Label(top, text = "Name:").place(x = 5,y = 120)
B = Button(top, text ="Click", command = show2)
B.place(x=50,y=120)
top.mainloop()
```

Output of Program 4:



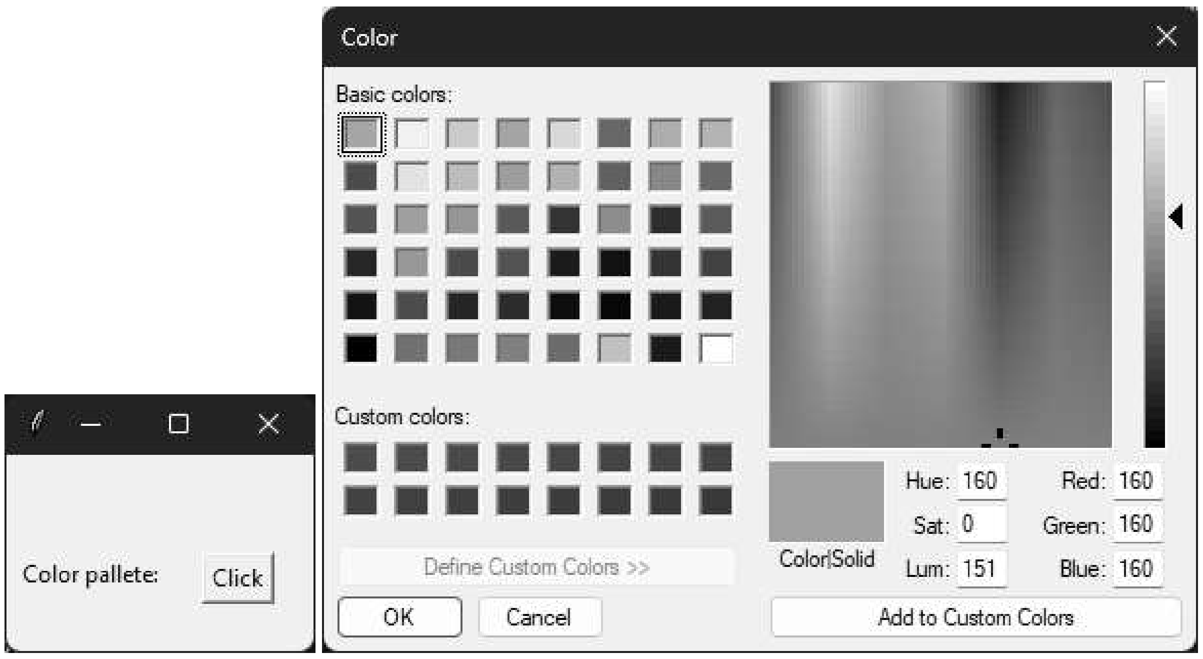


```
F:\College Stuff\Vishal Mahajan SE IT SEM 4\Python Lab\EXP12>python Lab4.py
63
221068.63
Vishal

F:\College Stuff\Vishal Mahajan SE IT SEM 4\Python Lab\EXP12>
```

Program 5:

```
from tkinter.colorchooser import askcolor
from tkinter import *
top = Tk()
top.geometry("100x100")
def show():
   color = askcolor()
   print(color)
Color = Label(top, text = "Color pallete:").place(x = 5,y = 50)
B = Button(top, text ="Click", command = show)
B.place(x=100,y=50)
top.mainloop()
```

Output of Program 5:

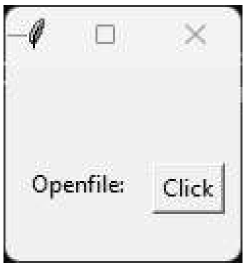


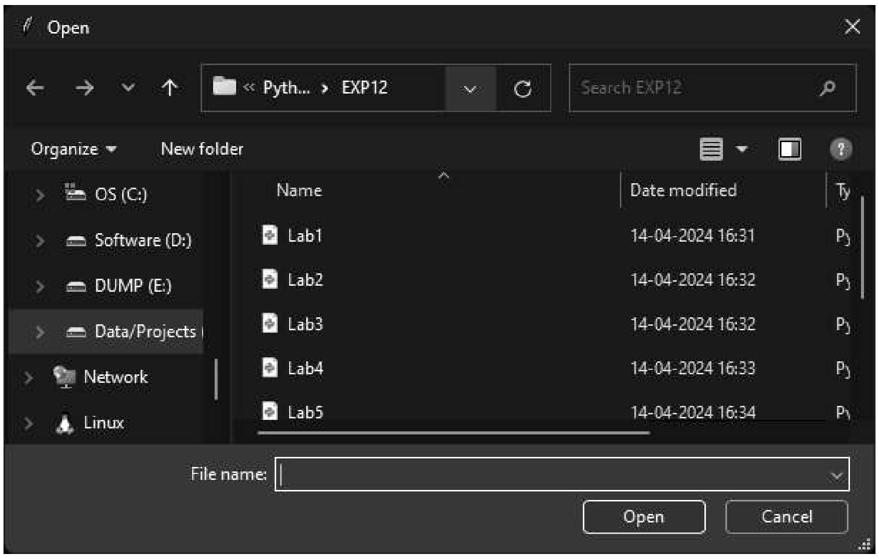
Hue: 160 Sat: 0 Lum: 151
Red: 160 Green: 160 Blue: 160

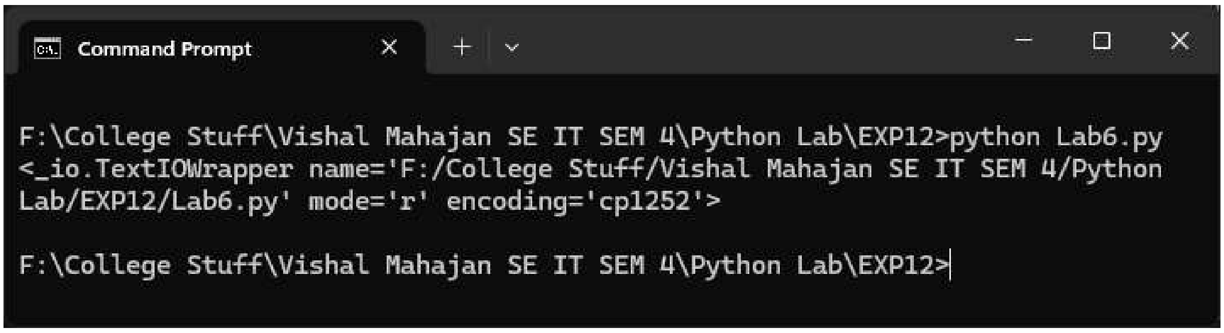
Program 6:

```
from tkinter.filedialog import askopenfile
from tkinter import *
top = Tk()
top.geometry("100x100")
def show():
   filename = askopenfile()
   print(filename)
Openfile = Label(top, text = "Openfile:").place(x = 10, y = 50)
B = Button(top, text ="Click", command = show)
B.place(x=75,y=50)
top.mainloop()
```

Output of Program 6:







```
F:\College Stuff\Vishal Mahajan SE IT SEM 4\Python Lab\EXP12>python Lab6.py
<_io.TextIOWrapper name='F:/College Stuff/Vishal Mahajan SE IT SEM 4/Python
Lab/EXP12/Lab6.py' mode='r' encoding='cp1252'>

F:\College Stuff\Vishal Mahajan SE IT SEM 4\Python Lab\EXP12>
```

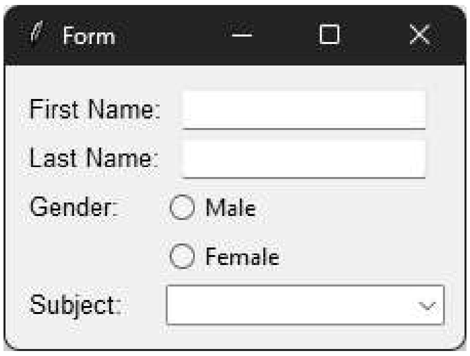
Post-Lab Exercise:

1. Create a GUI with frame and widgets: First name and Last name (Text), Gender (Radiobutton), Subject (dropdown menu)

```
import tkinter as tk

from tkinter import ttk



# Create the main window

root = tk.Tk()

root.title("Form")



# Create a frame

frame = ttk.Frame(root, padding="10")

frame.pack()



# Create 'First name' and 'Last name' labels and text entry boxes

first_name_label = ttk.Label(frame, text="First Name:", font=('Helvetica', 10))

first_name_label.grid(row=0, column=0, sticky=tk.W, pady=2)

first_name_entry = ttk.Entry(frame)

first_name_entry.grid(row=0, column=1, pady=2)
```

```
last_name_label = ttk.Label(frame, text="Last Name:", font=('Helvetica',
10))

last_name_label.grid(row=1, column=0, sticky=tk.W, pady=2)

last_name_entry = ttk.Entry(frame)

last_name_entry.grid(row=1, column=1, pady=2)



# Create 'Gender' radio buttons

gender_label = ttk.Label(frame, text="Gender:", font=('Helvetica', 10))

gender_label.grid(row=2, column=0, sticky=tk.W, pady=2)

gender = tk.StringVar()

male_radio = ttk.Radiobutton(frame, text="Male", variable=gender,
value="Male")

male_radio.grid(row=2, column=1, sticky=tk.W, pady=2)

female_radio = ttk.Radiobutton(frame, text="Female", variable=gender,
value="Female")

female_radio.grid(row=3, column=1, sticky=tk.W, pady=2)



# Create 'Subject' dropdown menu

subject_label = ttk.Label(frame, text="Subject:", font=('Helvetica',
10))

subject_label.grid(row=4, column=0, sticky=tk.W, pady=2)

subject = ttk.Combobox(frame, values=["Automata Theory", "EM-4",
"COA","UNIX"])

subject.grid(row=4, column=1, pady=2)



# Run the main loop

root.mainloop()
```

OUTPUT:



2. Add 3 buttons the GUI window created in 1. To display the given input, reset and exit the window.

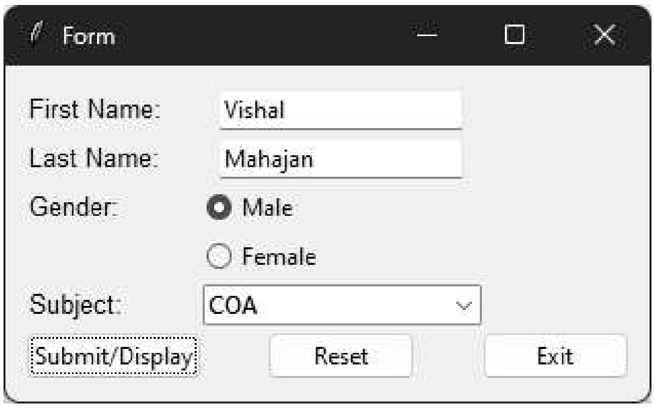
Added CodeBlock:

```python
def display_input():

    messagebox.showinfo("Input", f"First Name: {first_name_entry.get()}\nLast Name: {last_name_entry.get()}\nGender: {gender.get()}\nSubject: {subject.get()}")



# Function to reset the form

def reset_form():

    first_name_entry.delete(0, tk.END)

    last_name_entry.delete(0, tk.END)

    gender.set('')

    subject.set('')



# Create 'Display', 'Reset', and 'Exit' buttons

display_button = ttk.Button(frame, text="Submit/Display", command=display_input)

display_button.grid(row=5, column=0, pady=1)



reset_button = ttk.Button(frame, text="Reset", command=reset_form)
```

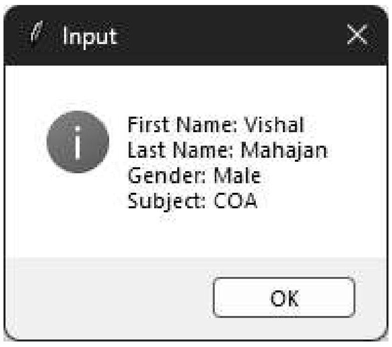
```
reset_button.grid(row=5, column=1, pady=1)



exit_button = ttk.Button(frame, text="Exit", command=root.destroy)

exit_button.grid(row=5, column=2, pady=1)
```

Output:

1) Display

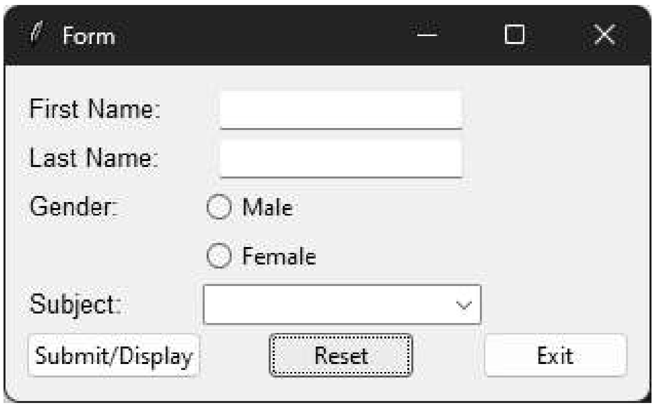


First Name: Vishal
Last Name: Mahajan
Gender: ● Male ○ Female
Subject: COA



First Name: Vishal
Last Name: Mahajan
Gender: Male
Subject: COA

2) Reset



First Name:
Last Name:
Gender: ○ Male ○ Female
Subject:

3. Connect the form to a database and enter values from the form into the database.

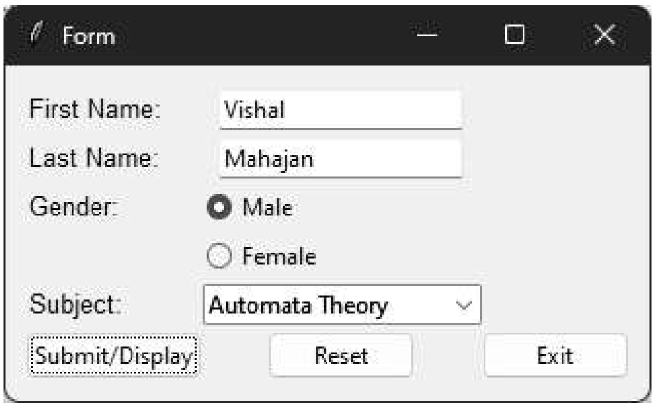
Added Code:

```
# Connect to the SQLite database (or create it if it doesn't exist)

conn = sqlite3.connect('form_data.db')

c = conn.cursor()



# Create a new table (if it doesn't exist)

c.execute('''

    CREATE TABLE IF NOT EXISTS form_data (

        first_name TEXT,

        last_name TEXT,

        gender TEXT,

        subject TEXT

    )

''')



# Function to submit the form

def submit_form():

    # Insert the form data into the database
    c.execute('''

        INSERT INTO form_data VALUES (?, ?, ?, ?)

    ''', (first_name_entry.get(), last_name_entry.get(), gender.get(), 
subject.get()))



    # Commit the changes and close the connection

    conn.commit()



    # Display the input

    display_input()



# Function to display the input

def display_input():

    messagebox.showinfo("Input", f"First Name: {first_name_entry.get()}\nLast 
Name: {last_name_entry.get()}\nGender: {gender.get()}\nSubject: 
{subject.get()}")
```

And Updated the Submit/Display Button to Submit

```
submit_button = ttk.Button(frame, text="Submit/Display", command=submit_form)

submit_button.grid(row=5, column=0, pady=1)
```

Output:

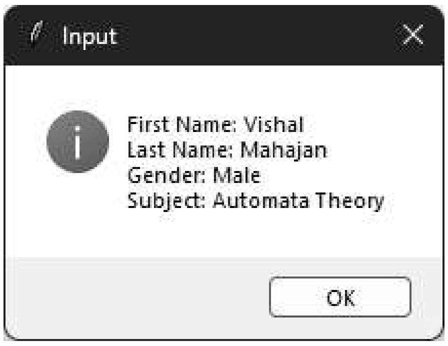


First Name: Vishal

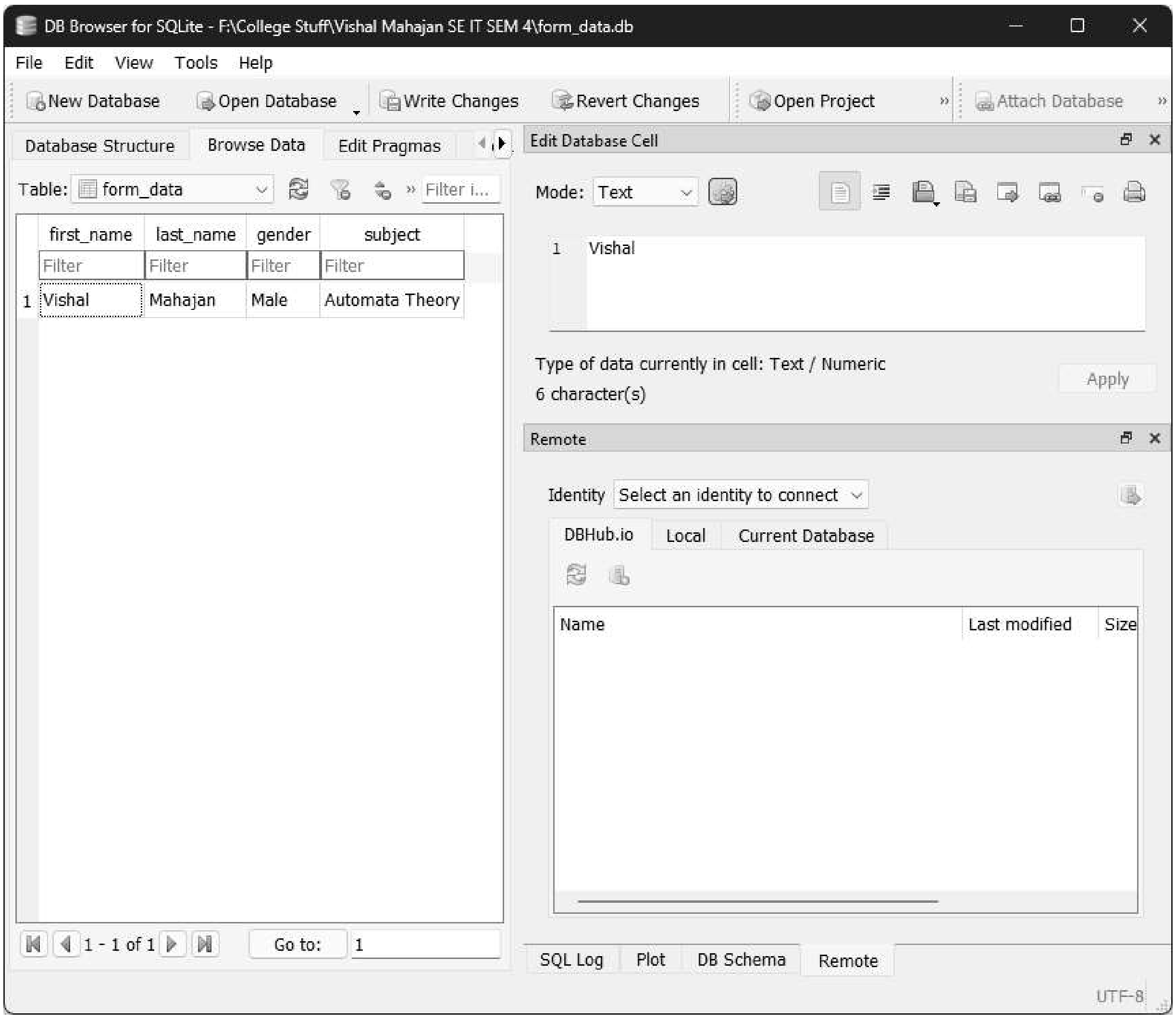
Last Name: Mahajan

Gender: [✓ Male] Female

Subject: Automata Theory



First Name: Vishal
Last Name: Mahajan
Gender: Male
Subject: Automata Theory



DB Browser for SQLite - F:\College Stuff\Vishal Mahajan SE IT SEM 4\form_data.db

Table: form_data

	first_name	last_name	gender	subject
1	Vishal	Mahajan	Male	Automata Theory

Edit Database Cell

Mode: Text

1 Vishal

Type of data currently in cell: Text / Numeric
6 character(s)