Lab Exercises

1. Write Python script to print prime number form m to n. where m<n
2. Write Python script to create “Book” class with properties “id”, “author” and “price”. Create 4 Book objects and print details of books on console
3. Write Python script to list files and their sizes from a directory
4. Write Python script for performing simple mathematical calculations using GUI.
5. Write python script to generate Login Screen (GUI) and perform authentication using “client” and “server” as username and password respectively

1. Prime Number Printer (Python)

Aim:

The aim of this experiment is to develop a Python script that efficiently prints prime numbers within a specified range [m, n), where m is less than n. The script should utilize a loop and a primality check function to identify and print the prime numbers in the given range.

Algorithm:

Step 1: Start the process

Step 2: Prompt the user for two integers, `m` and `n`, representing the range within which prime numbers are generated.

Step 3: Define a function `is_prime` Check if a number is prime by iterating from 2 to the square root of the number and checking for divisibility.

Step 4: Print prime numbers within a given range by iterating through the range and using the `is_prime` function to determine primality.

Step 5: Display the prime numbers within the specified range or an error message if the inputs are invalid.

Step 6: Stop the process

Program:

```
def is_prime(num):
    if num <= 1:
        return False
    for i in range(2, int(num**0.5) + 1):
        if num % i == 0:
            return False
    return True
```

```
def print_prime(m, n):
    print("Prime numbers between", m, "and", n, "are:")
    for num in range(m, n + 1):
        if is_prime(num):
            print(num)
m = int(input("Enter the starting number(m): "))
n = int(input("Enter the ending number(n): "))
if m >= n:
    print("Error: Invalid range, m should be less than n.")
else:
    print_prime(m, n)
```

Output:

```
Enter the starting number(m): 2
Enter the ending number(n): 23
Prime numbers between 2 and 23 are:
2
3
5
7
11
13
17
19
23
```

Invalid input

```
Enter the starting number(m): 11
Enter the ending number(n): 7
Error: Invalid range, m should be less than n.
```

2. Book Class (Python)

Aim:

This Python script aims to define a "Book" class with properties such as "id," "author," and "price." The script then instantiates four Book objects and prints their details, demonstrating the creation and utilization of a class in Python.

Algorithm:

Step 1: Start the process

Step 2: Create a class named Book. Include an init method to initialize the properties of the class (book_id, author, and price).

Step 3: Create four instances of the Book class with different details.

Step 4: Display the details of each Book object using the print function.

Step 5: Run the script to see the printed details of the four Book objects

Step 6: Stop the process

Program:

```
class Book:
    def __init__(self, book_id, author, price):
        self.id = book_id
        self.author = author
        self.price = price

# Create an empty list to store Book objects
books = []

# Get input for creating Book objects using a for loop
for i in range(4):
    print("Enter details for Book", i + 1)
    book_id = int(input("Enter ID: "))
```

```
    author = input("Enter author: ")
    price = float(input("Enter price: "))
    books.append(Book(book_id, author, price))

# Print details of each book using a for loop
for book in books:
    print("\nDetails of Book", book.id)
    print("ID:", book.id)
    print("Author:", book.author)
    print("Price:", book.price)
```

Output:

```
Enter details for Book 1
Enter ID: 100
Enter author: J.K.Rowling
Enter price: 200
Enter details for Book 2
Enter ID: 101
Enter author: William Shakespeare
Enter price: 500
Enter details for Book 3
Enter ID: 102
Enter author: Kalki
Enter price: 550
Enter details for Book 4
Enter ID: 103
Enter author: Jayakanthan
Enter price: 350

Details of Book 100
ID: 100
Author: J.K.Rowling
Price: 200.0

Details of Book 101
ID: 101
Author: William Shakespeare
Price: 500.0

Details of Book 102
ID: 102
Author: Kalki
Price: 550.0

Details of Book 103
ID: 103
Author: Jayakanthan
Price: 350.0
```

3. Python Script to List Files and their Sizes

Aim:

The aim of this script is to list the files and their sizes within a specified directory.

Algorithm:

Step 1: Start the process

Step 2: Import the necessary module subprocess.

Step 3: Define the command to run the command variable holds the Ubuntu terminal command to be executed, in this case, "ls -l".

Step 4: Try-Except block for error handling

Step 5: Run the command

Step 6: Stop the process

Program:

```
import os
def list_files_and_size(directory):
  if not os.path.isdir(directory):
    print(f"Error:{directory}is not a valid directory:")
    return
  file = os.listdir(directory)
  print(f"listing files and size in directory:{directory}")
  for file_name in file:
    file_path = os.path.join(directory,file_name)
    if os.path.isfile(file_path):
      size =  os.path.getsize(file_path)
      print(f"{file_name}:{size}byte")
directory_path = r"C:\Users\Admin\Desktop\SSS\unit 1"
list_files_and_size(directory_path)
```

Output:

```
listing files and size in directory:C:\Users\Admin\Desktop\SSS\unit 1
UNIT-1-IntroductiontoServer-sideScriptingLanguages_e6edf4e22a10eff07df3a1438
d0c.pptx:2319641byte
UNIT-I-2-Webservices_532d63a1a979352b010b16d88b7ed74b.pptx:2164746byte
UNIT-I-3_572b8d9bf7156e61f4ed159520363831.pptx:2626114byte
UNIT-I-4_1201c46a9b36140d178597ec042bfaf8.pptx:1206395byte
UNIT-I-5_e2be3a1210593baa3a10def38dd2f484.pptx:2666948byte
UNIT-I-6_b3f21eb21f87f93680ee81a42249121a.pptx:767345byte
UNIT-I-7_ce808486bfaac2b67983e9a734ec4b33.pptx:489221byte
```

4. (Python) Script for GUI calculator

Aim:

The aim of this script for performing simple mathematical calculations using GUI.

Algorithm:

Step 1: Start the process

Step 2: Create a Tkinter window (root) titled "Simple Calculator".

Step 3: Add two entry widgets to the window to allow users to input numbers.

Step 4: Define a list of arithmetic operations (+, -, *, /).

Step 5: For each operation, create a button labeled with the corresponding symbol (+, -, *, /). Associate each button with the operate function using lambda functions, passing the respective operation as an argument.

Step 6: Inside the operate function, retrieve the values entered in the entry widgets, convert them to floats, and perform the selected operation. Handle division by zero gracefully. Update the result label with the calculated result or an error message.

Step 7: Start the main event loop using root.mainloop() to display the GUI and handle user interactions.

Step 6: Stop the process

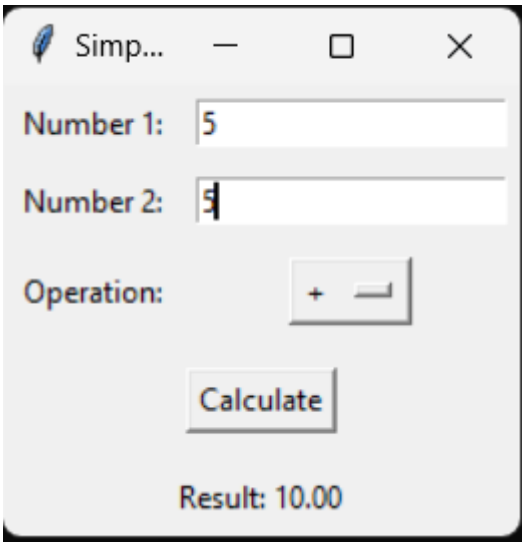
Program:

```
import tkinter as tk
from tkinter import messagebox

def calculate():
    try:
        num1 = float(num1_entry.get())
        num2 = float(num2_entry.get())
        operation = operation_var.get()

        if operation == '+':
            result = num1 + num2
        elif operation == '-':
            result = num1 - num2
```

```
        elif operation == '*':
            result = num1 * num2
        elif operation == '/':
            if num2 == 0:
                raise ZeroDivisionError
            result = num1 / num2

        result_label.config(text="Result: {:.2f}".format(result))
    except ValueError:
        messagebox.showerror("Error", "Invalid input! Please enter valid
numbers.")
    except ZeroDivisionError:
        messagebox.showerror("Error", "Cannot divide by zero.")

# Create main window
root = tk.Tk()
root.title("Simple Calculator")

# Number 1 label and entry
num1_label = tk.Label(root, text="Number 1:")
num1_label.grid(row=0, column=0, padx=5, pady=5, sticky=tk.E)

num1_entry = tk.Entry(root)
num1_entry.grid(row=0, column=1, padx=5, pady=5)

# Number 2 label and entry
num2_label = tk.Label(root, text="Number 2:")
num2_label.grid(row=1, column=0, padx=5, pady=5, sticky=tk.E)

num2_entry = tk.Entry(root)
num2_entry.grid(row=1, column=1, padx=5, pady=5)

# Operation label and dropdown
operation_label = tk.Label(root, text="Operation:")
operation_label.grid(row=2, column=0, padx=5, pady=5, sticky=tk.E)

operation_var = tk.StringVar(root)
operation_var.set('+')  # Default operation is addition

operation_dropdown = tk.OptionMenu(root, operation_var, '+', '-', '*', '/')
operation_dropdown.grid(row=2, column=1, padx=5, pady=5)

# Calculate button
calculate_button = tk.Button(root, text="Calculate", command=calculate)
calculate_button.grid(row=3, column=0, columnspan=2, pady=10)
```

```
-
# Result label
result_label = tk.Label(root, text="Result: ")
result_label.grid(row=4, column=0, columnspan=2, pady=5)

# Run the main event loop
root.mainloop()
```

Output:



5. Python Script for GUI Login Page

Aim:

To write a Python script to generate a Login Screen (GUI) and perform authentication using “client” and “server” as username and password respectively

Algorithm:

Step 1: Start the process

Step 2: Create a tkinter window with a login form.

Step 3: When the user clicks the login button, check if the entered username is "client" and the password is "server".

Step 4: If the username and password match, display the “Welcome, client!” message and close the login window.

Step 5 : If the username or password is incorrect, display an error message.

Step 6: Allow the user to attempt login again.

Step 7: Stop the process

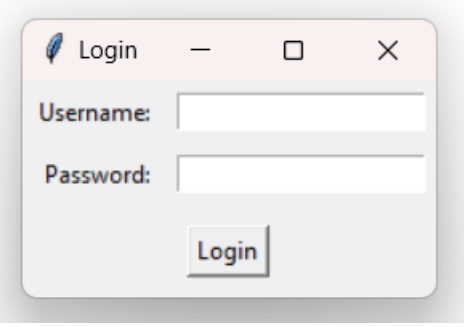
Program:

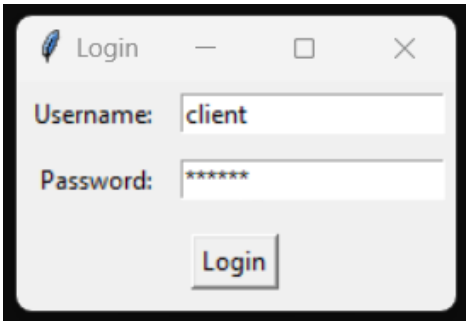
```
import tkinter as tk
from tkinter import messagebox


def authenticate():
    username = username_entry.get()
```

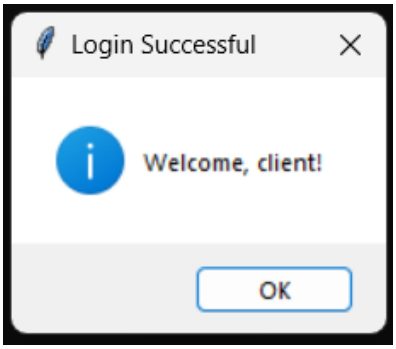
```
    password = password_entry.get()

    if username == "client" and password == "server":
        messagebox.showinfo("Login Successful", "Welcome, client!")
        # Here you can perform any action after successful login
    else:
        messagebox.showerror("Login Failed", "Invalid username or password")

# Create main window
root = tk.Tk()
root.title("Login")

# Username label and entry
username_label = tk.Label(root, text="Username:")
username_label.grid(row=0, column=0, padx=5, pady=5, sticky=tk.E)

username_entry = tk.Entry(root)
username_entry.grid(row=0, column=1, padx=5, pady=5)

# Password label and entry
password_label = tk.Label(root, text="Password:")
password_label.grid(row=1, column=0, padx=5, pady=5, sticky=tk.E)

password_entry = tk.Entry(root, show="*")
password_entry.grid(row=1, column=1, padx=5, pady=5)

# Login button
login_button = tk.Button(root, text="Login", command=authenticate)
login_button.grid(row=2, column=0, columnspan=2, pady=10)
```

```
# Run the main event loop
root.mainloop()
```

output:







INVALID :