Laboratory Activity No. 8

Converting TUI to GUI Programs

Course Code: CPE103	**Program:** BSCPE
Course Title: Object-Oriented Programming	**Date Performed:** March 15, 2025
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1. Objective(s):

This activity aims to convert a TUI program to GUI program with the Pycharm framework

2. Intended Learning Outcomes (ILOs):

The students should be able to:
2.1 Identify the main components in a GUI Application
2.2 Create a simple GUI Application that converts TUI program to GUI program

3. Discussion:

In general, programs consist of three components—input, processing, and output. In TUI programs, input is usually obtained from an input statement or by importing data from a file. Output is usually given by a print statement or stored in a file. When we convert a TUI program to a GUI program, we replace input and print statements with Label/Entry pairs. Processing data and inputting and outputting data to files works much the same in both types of programs. The primary difference is that the processing in GUI programs is usually triggered by an event

4. Materials and Equipment:

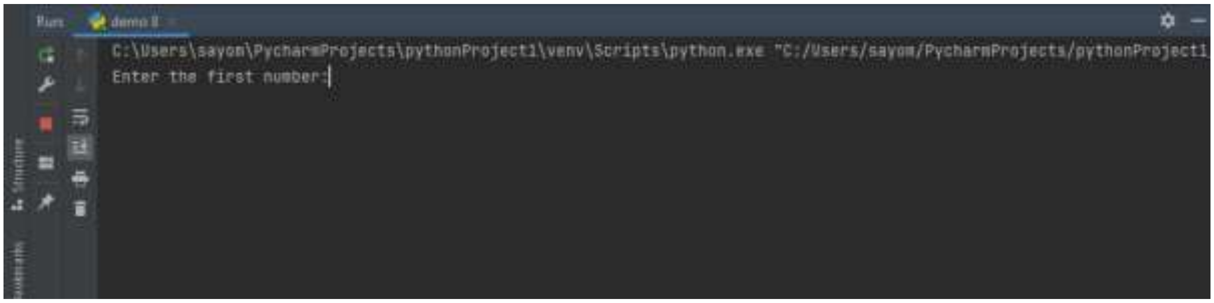
Desktop Computer with Anaconda Python or Pycharm
Windows Operating System

5. Procedure:

1. Type these codes in Pycharm:

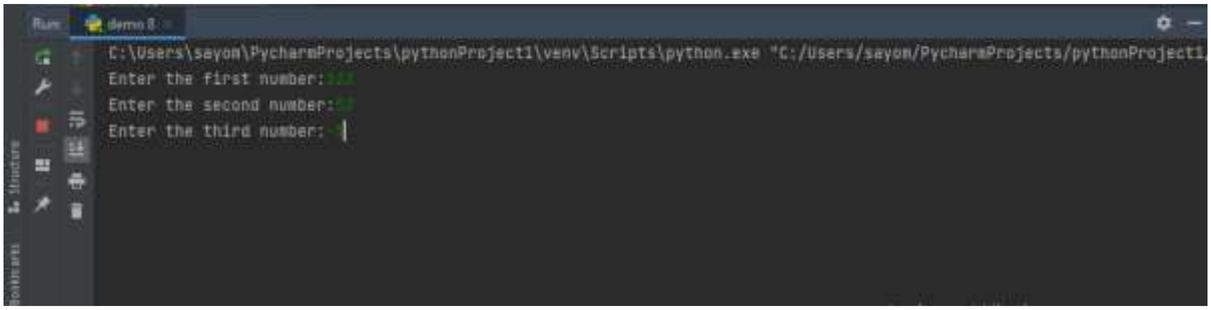
```
#TUI Form
def main():
    # Find the largest number among three numbers
    L = []
    num1 = eval(input("Enter the first number:"))
    L.append(num1)
    num2 = eval(input("Enter the second number:"))
    L.append(num2)
    num3 = eval(input("Enter the third number:"))
    L.append(num3)
    print("The largest number among the three is:",str(max(L)))
  main()
```

2. Run the program and observe the output.



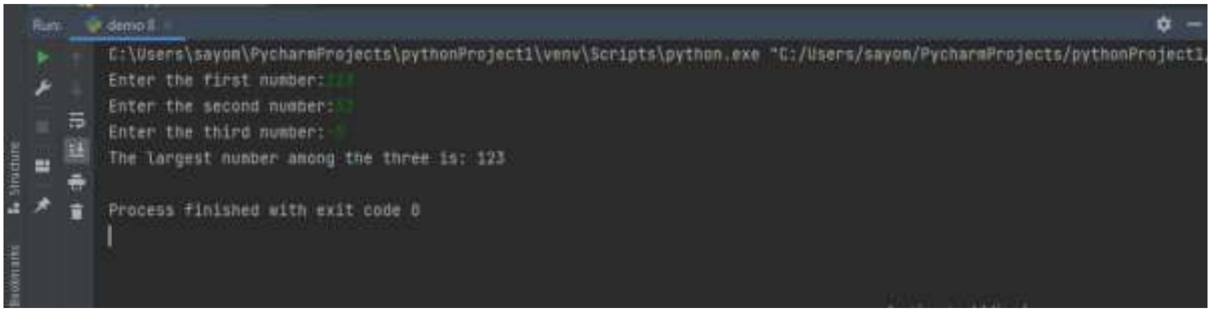
```
C:\Users\sayom\PycharmProjects\pythonProject1\venv\Scripts\python.exe "C:/Users/sayom/PycharmProjects/pythonProject1
Enter the first number:
```

Figure 1. TUI form



```
C:\Users\sayom\PycharmProjects\pythonProject1\venv\Scripts\python.exe "C:/Users/sayom/PycharmProjects/pythonProject1
Enter the first number:123
Enter the second number:[illegible]
Enter the third number: [illegible]
```

Figure 1(a) TUI form with three input numbers



```
C:\Users\sayom\PycharmProjects\pythonProject1\venv\Scripts\python.exe "C:/Users/sayom/PycharmProjects/pythonProject1
Enter the first number:123
Enter the second number:[illegible]
Enter the third number: [illegible]
The largest number among the three is: 123

Process finished with exit code 0
```

Figure 1(b) TUI form with output “The largest number among the three”

Method 1 above shows a TUI program and a possible output in Figures 1(a) and (b) while Figure 2 shows the output of the GUI program in Method 2.

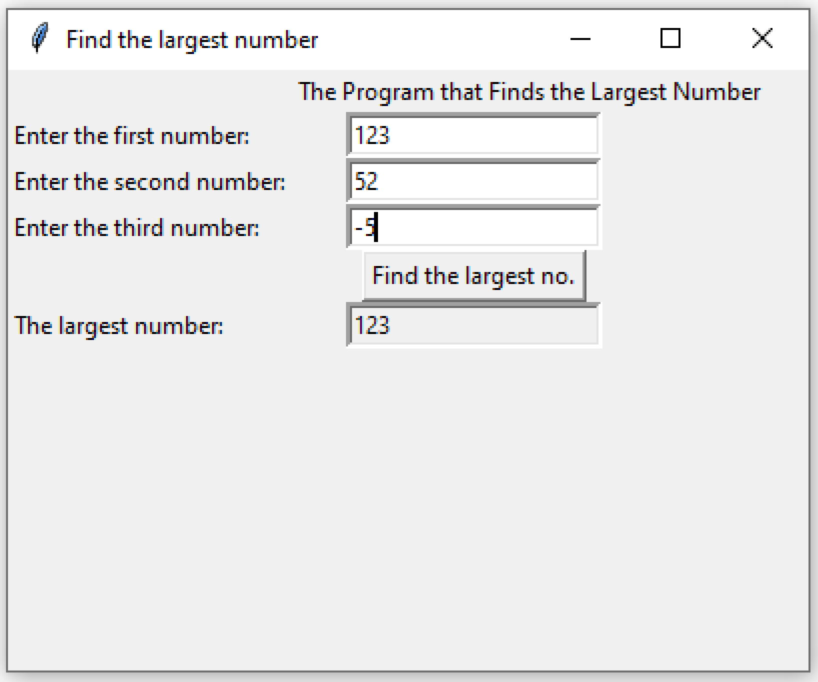
5. Procedure:

Method 2

```
from tkinter import *

window = Tk()
window.title("Find the largest number")
window.geometry("400x300+20+10")

def findLargest():
    L = []
    L.append(eval(conOfent2.get()))
    L.append(eval(conOfent3.get()))
    L.append(eval(conOfent4.get()))
    conOfLargest.set(max(L))

lbl1 = Label(window, text = "The Program that Finds the Largest Number")
lbl1.grid(row=0, column=1, columnspan=2,sticky=EW)
lbl2 = Label(window,text = "Enter the first number:")
lbl2.grid(row=1, column = 0,sticky=W)
conOfent2 = StringVar()
ent2 = Entry(window,bd=3,textvariable=conOfent2)
ent2.grid(row=1, column = 1)
lbl3 = Label(window,text = "Enter the second number:")
lbl3.grid(row=2, column=0)
conOfent3=StringVar()
ent3 = Entry(window,bd=3,textvariable=conOfent3)
ent3.grid(row=2,column=1)
lbl4 = Label(window,text="Enter the third number:")
lbl4.grid(row=3,column =0, sticky=W)
conOfent4 = StringVar()
ent4 = Entry(window,bd=3,textvariable=conOfent4)
ent4.grid(row=3, column=1)
```

```
btn1 = Button(window,text = "Find the largest no.",command=findLargest)
btn1.grid(row=4, column = 1)
lbl5 = Label(window,text="The largest number:")
lbl5.grid(row=5,column=0,sticky=W)
conOfLargest = StringVar()
ent5 = Entry(window,bd=3,state="readonly",textvariable=conOfLargest)
ent5.grid(row=5,column=1)

mainloop()
```

Results 2



Find the largest number

The Program that Finds the Largest Number

Enter the first number: 123

Enter the second number: 52

Enter the third number: -5

The largest number: 123

Figure 2. GUI program to find the largest number

Questions

1. What is TUI in Python?

   Text-based User Interface is a way to use program using text. It runs in the terminal where
    Users type commands. TUI's are simple, fast, and useful for systems without graphical display.

2. How to make a TUI in Python?

   We can create TUI in Python using the curses library to display text , menus, and take input.
   Start simple by showing text and responding to key presses, then add features like navigation or
    Input fields. Libraries like npyscreen and urwid make TUI development easier

3. What is the difference between TUI and GUI?

   A TUI uses text and keyboard input in a terminal, while GUI provides a visual interface with buttons and icons navigated by a mouse or touch. TUI's are simple and efficient, while GUI's are more user-friendly and visually appealing.

6. Supplementary Activity:

TUI Implementation

```
# Simple TUI Calculator

def add(a, b):
    return a + b

def subtract(a, b):
    return a - b

def multiply(a, b):
    return a * b

def divide(a, b):
    if b != 0:
        return a / b
    else:
        return "Error! Division by zero."

def main():
    print("Simple Calculator")
    print("Options:")
    print("1. Add")
    print("2. Subtract")
    print("3. Multiply")
    print("4. Divide")

    choice = input("Select operation (1/2/3/4): ")

    num1 = float(input("Enter first number: "))
    num2 = float(input("Enter second number: "))

    if choice == '1':
        print(f"{num1} + {num2} = {add(num1, num2)}")
    elif choice == '2':
        print(f"{num1} - {num2} = {subtract(num1, num2)}")
    elif choice == '3':
        print(f"{num1} * {num2} = {multiply(num1, num2)}")
    elif choice == '4':
        print(f"{num1} / {num2} = {divide(num1, num2)}")
    else:
        print("Invalid input.")

if __name____== "__main__":
    main()
```

GUI Conversion of the Calculator:

```
import tkinter as tk

# Functions for calculation
def add():
    result.set(float(entry1.get()) + float(entry2.get()))

def subtract():
    result.set(float(entry1.get()) - float(entry2.get()))

def multiply():
    result.set(float(entry1.get()) * float(entry2.get()))

def divide():
    try:
        result.set(float(entry1.get()) / float(entry2.get()))
    except ZeroDivisionError:
        result.set("Error! Division by zero.")

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

# Create StringVar to hold the result
result = tk.StringVar()

# Create the layout
tk.Label(root, text="Enter first number:").grid(row=0, column=0)
entry1 = tk.Entry(root)
entry1.grid(row=0, column=1)

tk.Label(root, text="Enter second number:").grid(row=1, column=0)
entry2 = tk.Entry(root)
entry2.grid(row=1, column=1)

# Buttons for operations
tk.Button(root, text="Add", command=add).grid(row=2, column=0)
tk.Button(root, text="Subtract", command=subtract).grid(row=2, column=1)
tk.Button(root, text="Multiply", command=multiply).grid(row=3, column=0)
tk.Button(root, text="Divide", command=divide).grid(row=3, column=1)

# Label to show result
tk.Label(root, text="Result:").grid(row=4, column=0)
result_label = tk.Label(root, textvariable=result)
result_label.grid(row=4, column=1)

# Start the main loop
root.mainloop()
```

Once you've successfully created the GUI version of the calculator, try adding the following features to enhance the program:

1. **Clear Button**: Add a button to clear the input fields and reset the result.
2. **History Feature**: Add a list or label to show the history of operations performed.
3. **Advanced Operations**: Implement additional operations such as square roots, powers, or trigonometric functions.
4. **Input Validation**: Add validation to ensure that the user only enters numeric values in the input fields.
5. **Styling**: Experiment with different styles (font sizes, button colors) to improve the appearance of the GUI.

6. Conclusion

In this activity, we learned how to change a Text-Based User Interface (TUI) program into a Graphical User Interface (GUI) program using Python and Tkinter. Instead of using text input and print statements, we used labels, entry boxes, and buttons to make the program easier to use. We also saw how GUI programs respond to user actions, like clicking a button. Converting the calculator program to a GUI version helped us understand how to design better, more user-friendly applications.