iVEBSIM+: Visual Apps

Creating GUI Interfaces with Python & Tkinter

TÜRKİYE ULUSAL AJANSI
TURKISH NATIONAL AGENCY

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What are we doing today?

We are moving from "Text-Only" programming to modern **Graphical User Interfaces (GUI)**.

👉 Understand the visual "bricks" of a software.

👉 Learn the secret recipe to create windows.

👉 Build interactive buttons and text fields.

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Our Tool: Tkinter

Standard Library

No installation needed!

It is already built into Python.

Fast & Lean

It is small in size and launches instantly on any system.

Universal

One code works on Windows, macOS, and Linux.

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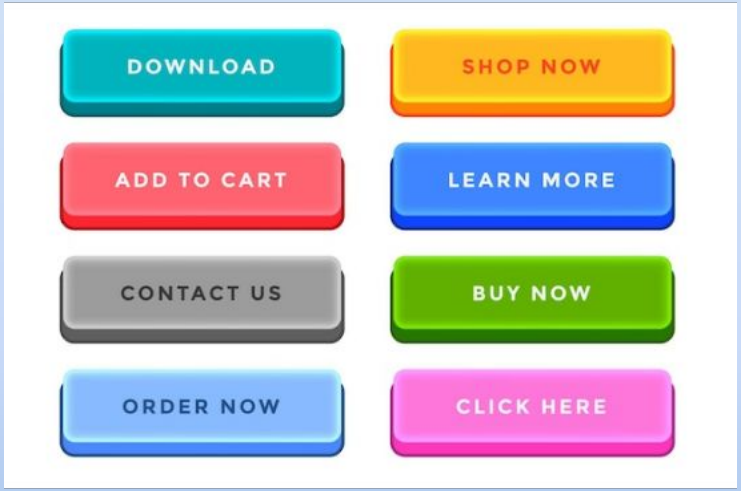
Meet the "Widgets"

The components of your interface



A **Widget** is a component that performs a specific task.

Think of them as LEGO bricks for your app:

- Frame: The container.
- Label: The text.
- Button: The action.
- Entry: The input.

💡 *Note: We will use **Ttk** (Themed Tk), a modern version of these widgets that automatically matches the style of your operating system (Windows/Mac) for a cleaner look!*

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How to Create a Window

The standard 4-step workflow

Every time we create a visual program in Python, we follow this exact recipe:

1. **Import Tkinter** 👉 Tell Python to load the graphics toolkit.
2. **Create the Window Object** 👉Generate the blank window.
3. **Set Properties** 👉 Define the title, size, and look.
4. **Start the Main Loop (mainloop)** 👉 Keep the window open and running, waiting for user interactions.

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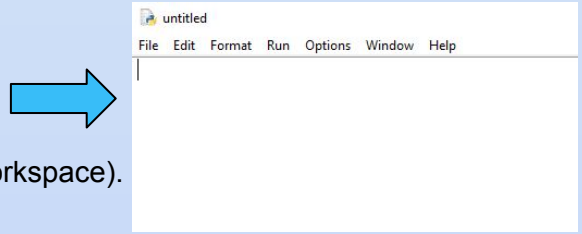
How to Write and Run your Code 🛠️

How to start: Your Python Editor

Step 1: Launch Python IDLE 🔍

- Press the **Windows Key** on your keyboard.
- Type **IDLE** in the search bar.
- Click on **IDLE (Python 3.x)** to open it.

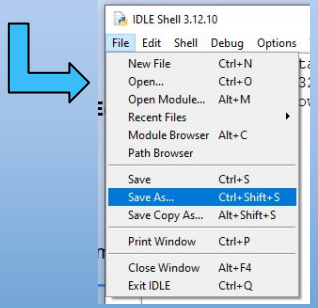
Step 2: Create a New File 📄



- In the top menu, click: **File → New File**.
- A new, blank white window will appear. This is your **Editor** (your workspace).

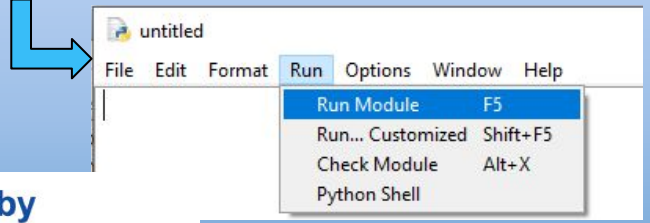
Step 3: Save your Work (Crucial!) 💾

- Go to **File → Save As...**.
- Choose a folder and give your file a name.
- **IMPORTANT:** You must add **.py** at the end of the name (es. exercise.py)



Step 4: Run your Program 🚀

- Once you have written your code, go to the menu: **Run → Run Module**.



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Your First Code! 💻

Let's Build a Window!

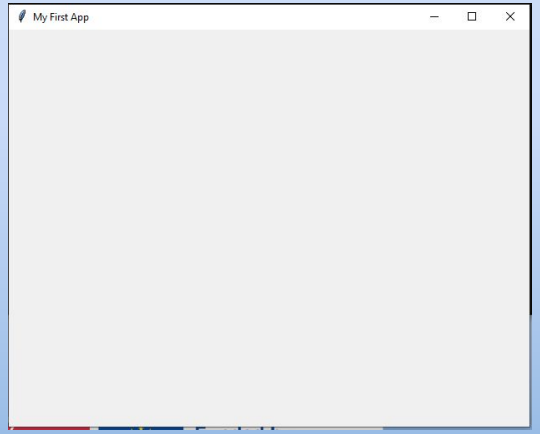
Copy this code into your Python editor:

```
import tkinter as tk

# Create the window
window = tk.Tk()

# Set window properties
window.title("My First App")
window.geometry("800x600")

# Start the application
window.mainloop()
```

🏃‍♀️ **Run the program:**

What happens?

You should see a blank window appear! 🎉



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Code Breakdown & Rules 🔍

Anatomy of the Code 🩺 Things to watch out for:

📦 `import tkinter as tk`

Loads the graphics toolkit. Writing `as tk` is just a shortcut to avoid typing the full word "tkinter" every time.

📐 `window.geometry("800x600")`

Sets Width x Height in pixels.

⚠️ *Warning:* Use the letter **"x"** inside the quotes, NOT the multiplication symbol (*).

🔄 `window.mainloop()`

This keeps the window alive and listening to your mouse/keyboard.

🛑 *Rule:* This must ALWAYS be the very last line of your script!

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Adding Content: Labels & Buttons

Let's meet our first interactive widgets

🏷️ The Label (Text Component) Used to display text on the screen:

```
>>>my_label = tk.Label(window, text="Hello Tkinter!", font=("Arial", 16))
```

Note: The first word inside the brackets (`window`) tells Python **where** to place the text.

🔘 The Button (Clickable Component) Creates a button that triggers an action:

```
>>>my_button = tk.Button(window, text="Click Me", command=say_hello)
```

`text`: What is written on the button.
`command`: The secret instructions (function) to run when clicked.

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The Golden Rule: Use `.pack()` 📌

Making widgets visible and organized

Creating a widget is not enough. To actually **see** it on the screen, you must "pack" it.

What does .pack() do?

It places the element into the window, stacking them from top to bottom.

Adding Space (Padding):

To prevent items from sticking together, we use space controls:

- pady=20 👉 Adds vertical spacing (top and bottom) in pixels.
- padx=10 👉 Adds horizontal spacing (left and right) in pixels.

```
# Places the text with some breathing room!
>>>my_label.pack(pady=20)
```

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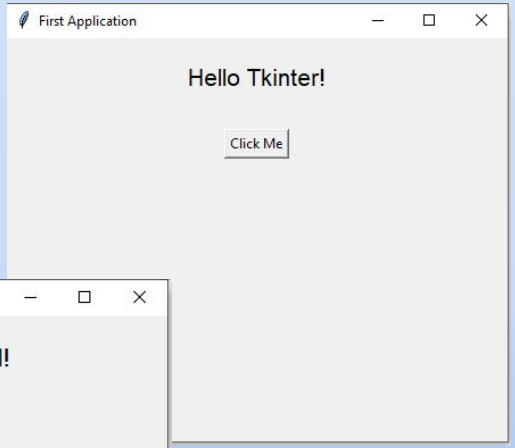
Lab Time: Make it Interactive!

Type this complete code and run it:

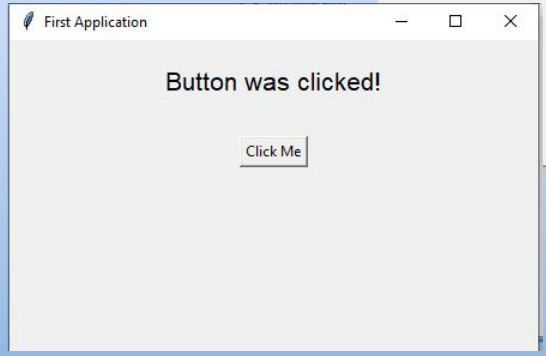
Copy this code into your Python editor:

```python
# 1. Setup Window
window = tk.Tk()
window.title("First Application")
window.geometry("800x600")

# 2. Create a Text Label
my_label = tk.Label(window, text="Hello Tkinter!", font=("Arial", 16))
my_label.pack(pady=20)

# 3. Define the Click Action (Function)
def say_hello():
    my_label.config(text="Button was clicked!") # Changes the text!

# 4. Create the Button
my_button = tk.Button(window, text="Click Me", command=say_hello)
my_button.pack(pady=10)

# 5. Run the Main Loop
window.mainloop()
```

Run the program:
What happens?



Click the button



🎯 **Goal:** Click the button and watch the text change from *"Hello Tkinter!"* to *"Button was clicked!"*!

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Getting Input: The Entry Widget

How to let users type text into your app

⌨️ The `tk.Entry` Component

Creates a single-line text box where users can type data.

```
entry_box = tk.Entry(window)
entry_box.pack()
```

🔮 The Magic Command: `.get()`

To read and use what the user typed, we use the `.get()` method inside our function:

```
# Grab the text from the box and save it in a variable
user_name = entry_box.get()
```

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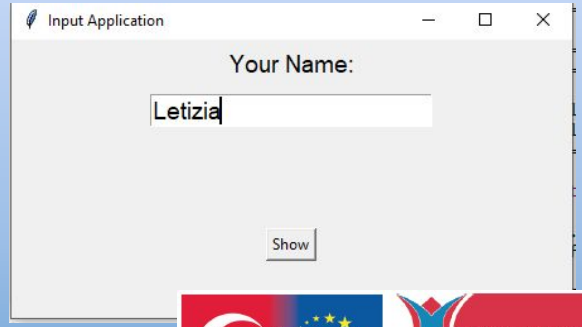
Lab Time: A Personalized App! 🧪

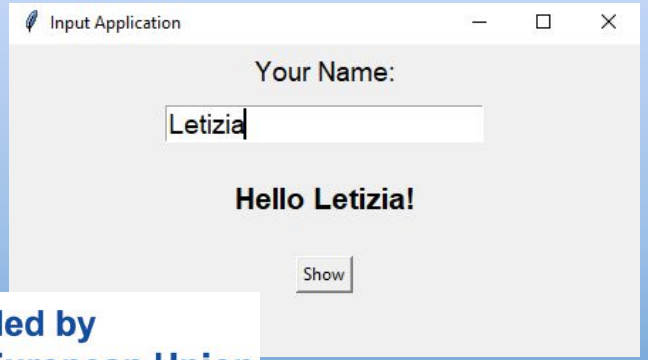
Type this code to create an interactive greeter:

Copy this code into your Python editor:

```python
import tkinter as tk

# 1. Setup Window
window = tk.Tk()
window.title("Input Application")
window.geometry("800x600")

# 2. Create Question Label
question_label = tk.Label(window, text="Your Name:", font=("Arial", 14))
question_label.pack(pady=5)

# 3. Create Entry Box
entry_box = tk.Entry(window, font=("Arial", 14))
entry_box.pack(pady=5)
```

```python
# 4. Create Empty Label for the Result
result_label = tk.Label(window, text="", font=("Arial", 16, "bold"))
result_label.pack(pady=20)

# 5. Define Action (Indentazione corretta: 4 spazi per riga)
def show_message():
    name = entry_box.get()
    result_label.config(text=f"Hello {name}!")

# 6. Create Button
my_button = tk.Button(window, text="Show", command=show_message)
my_button.pack(pady=5)

# 7. Run
window.mainloop()
```





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Advanced Inputs: Choosing Options
Radiobuttons and Checkbuttons

🔘 Radiobutton (Single Choice)

Used when the user must select **only one** option from a group. They share the same `variable`.

```
choice = tk.StringVar()
r1 = tk.Radiobutton(window, text="Option A", variable=choice, value="A")
r2 = tk.Radiobutton(window, text="Option B", variable=choice, value="B")
```

✅ Checkbutton (Multiple Choice)

Used for independent "tick boxes" where users can select multiple answers.

```
status = tk.IntVar()
check = tk.Checkbutton(window, text="I love Python", variable=status)
```

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Final Project: Login Screen 🚀

Putting it all together with style

We are going to build a realistic login system! Here are the new superpowers we will use:

🖼️ Adding Images (The Pillow Library)

We use `PIL` to load and resize images (like a school or company logo) inside our window.

🙈 Hiding Passwords

By adding `show="*"` to an Entry widget, the text turns into asterisks automatically!

💬 Popup Alerts (`messagebox`)

We can trigger standard system popups to tell the user if the login was successful or if they made a mistake.

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Lab Time: Build the Login Panel 🧪

Type this code (Part 1/3)

```
import tkinter as tk
from tkinter import messagebox
from PIL import Image, ImageTk    # Requires 'Pillow' library
```

👉**Imports & Libraries:** This block loads the required toolkits. We import **Tkinter** for the standard window, **messagebox** to create the popup alerts, and **Pillow (PIL)** to handle and resize our image files.

```
# 1. Login Logic Function
def login():
    username = entry_username.get()
    password = entry_password.get()

    if username == "admin" and password == "1234":
        messagebox.showinfo("Success", "Login successful!")
    else:
        messagebox.showerror("Error", "Invalid username or password!")
```

👉**The Login Logic:** This is the "brain" of the app. It reads what the user typed in the boxes. If the username is exactly `"admin"` AND the password is `"1234"`, it shows a green success popup. Otherwise, it shows a red error popup.

```
# 2. Window Setup
window = tk.Tk()
window.title("iVEBSIM+ Login Panel")
window.geometry("400x500")
window.resizable(False, False)
# Background color
window.configure(bg="white")
```

👉**Window Setup: t**his block builds the main window canvas. It sets the window title, defines the size (400 x 500 pixels), blocks the user from resizing it, and changes the background color to white.

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Lab Time: Build the Login Panel 🧪

Type this code (Part 2/3)

```
# 3. Load Logo Image (Make sure 'logo.png' is in the same folder)
image = Image.open("logo.png")
image = image.resize((200, 200))  # Logo size
logo = ImageTk.PhotoImage(image)

logo_label = tk.Label(window, image=logo, bg="white")
logo_label.pack(pady=20)
# 4. Title, Username and Password Fields
# ---------------- TITLE ----------------
title = tk.Label(window, text="iVEBSIM+ Login System",
                 font=("Arial", 16, "bold"),
                 bg="white",
                 fg="#1f4e5f")
title.pack(pady=10)

# ---------------- USERNAME ----------------
label_username = tk.Label(window, text="Username",
                          font=("Arial", 12),
                          bg="white")
label_username.pack(pady=5)
entry_username = tk.Entry(window, font=("Arial", 12), width=25)
entry_username.pack(pady=5)

# ---------------- PASSWORD ----------------
label_password = tk.Label(window, text="Password",
                          font=("Arial", 12),
                          bg="white")
label_password.pack(pady=5)
entry_password = tk.Entry(window, font=("Arial", 12), width=25, show="*")
entry_password.pack(pady=5)
```

👉**Loading the Logo Image:** This block displays the logo. It opens the image file, resizes it to a clean 200 x 200 size, puts it inside a standard Label component, and places it at the very top with some breathing room.

👉**The Interface Fields (Labels & Entries):** This block creates the text and the input fields. It adds a bold title, text prompts for Username and Password, and two entry boxes. The password box uses `show="*"` to hide the typed characters with asterisks.

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Lab Time: Build the Login Panel 🧪
Type this code (Part 3/3)

```
# 5. Login Button & Run
login_button = tk.Button(window,
                         text="Login",
                         font=("Arial", 12, "bold"),
                         bg="#0bb15d",
                         fg="white",
                         width=15,
                         command=login)
login_button.pack(pady=20)

window.mainloop()
```

👉**The Login Button & Main Loop:** This final block creates a green interactive button and starts the application. The button is connected to our `login` function. Finally, `window.mainloop()` turns the motor on and keeps the interface visible on the screen.

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Congratulations! Your App is Live! 🚀

You have successfully turned lines of code into a real, functional software interface. You are now a GUI Developer! 🎉

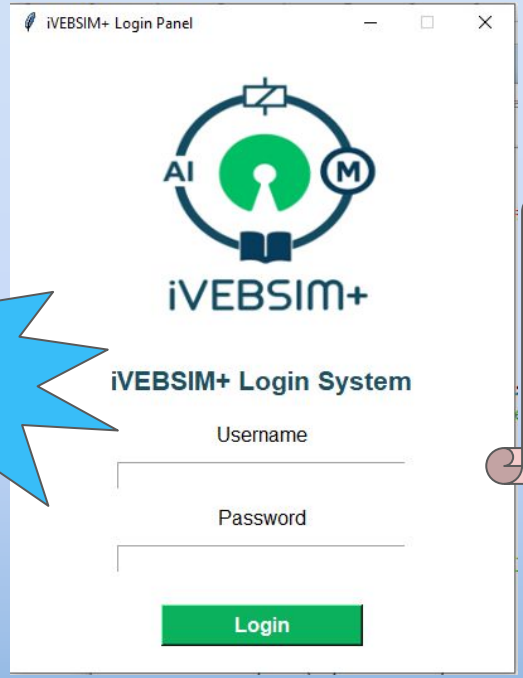
Logic_Panel.py.py - C:\Users\USER\Downloads\Logic_panel\Logic_Panel.py.py (3.12.10)

File Edit Format Run Options Window Help

Run Module F5
Run... Customized Shift+F5
Check Module Alt+X
Python Shell

```
import tkin
from tkinte
from PIL im                    # Requires 'Pillow' library

# 1. Login Logic Function
def login():
    username = entry_username.get()
    password = entry_password.get()

    if username == "admin" and password == "1234":
        messagebox.showinfo("Success", "Login successful!")
    else:
        messagebox.showerror("Error", "Invalid username or password!")

# 2. Window Setup
window = tk.Tk()
window.title("iVEBSIM+ Login Panel")
window.geometry("400x500")
window.resizable(False, False)
# Background color
window.configure(bg="white")

# 3. Load Logo Image (Make sure 'logo.png' is in the same folder)
image = Image.open("logo.png")
image = image.resize((200, 200))  # Logo size
logo = ImageTk.PhotoImage(image)

logo_label = tk.Label(window, image=logo, bg="white")
logo_label.pack(pady=20)
```

One click to bring your code to life...



...and here is your professional Result! ✨

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