# **🎬 Python Guide: Callback Functions**

## **✅ What is a Callback Function?**

A **callback function** is a function that you **pass as an argument to another function**,  
 so that it can be **called (executed) later**, usually **after some action is completed**.

🎯 Common in:

* UI actions (like button clicks)
* Async programming
* Threading
* Event handling

## **🔧 Step-by-Step Example 1: Simple Callback with print\_status()**

def process\_data(data, callback):

print("Processing:", data)

# Once processing is done, call the callback

callback()

def print\_status():

print("✅ Data processed successfully!")

process\_data("user-info", print\_status)

### **🎯 Explanation:**

* process\_data() accepts a function callback as a parameter
* After its job is done, it **calls** callback()
* print\_status() is **passed, not executed** (print\_status, not print\_status())

## **⚙️ Example 2: Callback in UI Simulation (Button Click)**

def on\_button\_click(callback):

print("🖱️ Button clicked")

callback()

def show\_message():

print("👋 Hello Gowtham, welcome!")

on\_button\_click(show\_message)

✅ Whenever the button is “clicked,” show\_message() is called through the callback.

## **⚙️ Example 3: Callback in Threading**

import threading

import time

def long\_task(callback):

print("🚀 Task started...")

time.sleep(2)

print("✅ Task finished")

callback()

def after\_done():

print("📢 Callback: Now update the UI!")

# Running long task in a separate thread

thread = threading.Thread(target=long\_task, args=(after\_done,))

thread.start()

🧠 After the background task is done, it **calls after\_done() automatically** 🎯 This is how many UI frameworks or APIs **update progress bars or show popups** after completion.

## **📦 Real-World Use Cases**

| **Use Case** | **What the Callback Does** |
| --- | --- |
| Button click | Run a function when user clicks |
| File upload | Call on\_success() after upload |
| Background thread | Call on\_complete() after processing |
| API request | Call on\_response(data) after fetch |

## **🧠 Why Use Callback Functions?**

| **Benefit** | **Explanation** |
| --- | --- |
| Decouples logic | Main function doesn’t need to know what happens next |
| Reusable | Can plug different callbacks for different actions |
| Required in async/threading | Wait → then call callback |
| Event-driven design | Perfect for UI & real-time systems |

## **⚠️ Common Mistake to Avoid**

# WRONG: You’re calling the function immediately

process\_data("info", print\_status()) # ❌ this executes the function, not passes it

# RIGHT

process\_data("info", print\_status) # ✅ this passes the function as callback

## **🔁 Callback vs HOF**

| **Feature** | **Callback Function** | **Higher-Order Function** |
| --- | --- | --- |
| Purpose | Execute after something | Compose logic dynamically |
| Who controls call | Main function | Caller function |
| Examples | on\_click, on\_done, etc | map(), filter(), decorators |

## **✅ TL;DR in 1 Line:**

A **callback** is a function you **pass to another function**, so it can be **called back later** — often after an event or async task.

### **About the Author**

**Gowtham SB** is a **Data Engineering expert, educator,** **and content creator** with a passion for **big data technologies, as well as cloud and Gen AI** . With years of experience in the field, he has worked extensively with **cloud platforms, distributed systems, and data pipelines**, helping professionals and aspiring engineers master the art of data engineering.

Beyond his technical expertise, Gowtham is a **renowned mentor and speaker**, sharing his insights through engaging content on **YouTube and LinkedIn**. He has built one of the **largest Tamil Data Engineering communities**, guiding thousands of learners to excel in their careers.

Through his deep industry knowledge and hands-on approach, Gowtham continues to **bridge the gap between learning and real-world implementation**, empowering individuals to build **scalable, high-performance data solutions**.

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