**Day 6: Useful Libraries**

* datetime, random, math, os, sys
* itertools, functools
* Intro to pandas, numpy if interested in data work

**✅ Part 1: Built-in Standard Libraries**

**1. datetime – Work with Dates and Times**

import datetime

now = datetime.datetime.now()

print("Current date & time:", now)

today = datetime.date.today()

print("Today's date:", today)

# Create specific date

d = datetime.date(2023, 5, 21)

print("Custom date:", d)

**2. random – Generate Random Numbers**

import random

print(random.randint(1, 10)) # Random integer

print(random.choice(["A", "B", "C"])) # Random choice from list

random.shuffle([1, 2, 3, 4]) # Shuffle a list

**3. math – Math Functions**

import math

print(math.sqrt(16)) # 4.0

print(math.factorial(5)) # 120

print(math.pi) # 3.14159...

**4. os – Operating System Interaction**

import os

print(os.getcwd()) # Current working directory

os.mkdir("new\_folder") # Create new folder

os.rename("old.txt", "new.txt") # Rename files

**5. sys – System-Specific Parameters**

import sys

print(sys.version) # Python version

print(sys.argv) # Command-line arguments

**✅ Part 2: Functional Tools**

**6. itertools – Advanced Iteration Tools**

import itertools

for i in itertools.permutations([1, 2, 3]):

print(i) # All possible arrangements

# Infinite counting

from itertools import count

for i in count(10):

if i > 13:

break

print(i)

**7. functools – Functional Programming Tools**

from functools import reduce

# Sum of list

nums = [1, 2, 3, 4]

total = reduce(lambda x, y: x + y, nums)

print(total) # 10

from functools import lru\_cache

@lru\_cache

def fib(n):

if n < 2:

return n

return fib(n-1) + fib(n-2)

print(fib(10)) # Uses caching for faster results

**✅ Part 3: Popular External Libraries (Intro Only)**

**8. pandas – Data Manipulation (For Data Analysis)**

import pandas as pd

data = {'Name': ['A', 'B'], 'Age': [21, 22]}

df = pd.DataFrame(data)

print(df)

**9. numpy – Fast Numerical Computing**

import numpy as np

a = np.array([1, 2, 3])

print(a \* 2) # [2 4 6]

**🧠 Mini Practice:**

1. Print today’s date and time using datetime.
2. Generate 3 random integers between 5 and 15.
3. Use math to calculate the square root and factorial.
4. Use os to create a folder and list all files in it.
5. Use itertools to print combinations of [‘A’, ‘B’, ‘C’], 2 at a time.
6. Use functools.reduce to multiply all items in a list.