Note: Solution for the exercises will be on GitHub.

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
```

Note: Solution for the exercises will be on GitHub.

```
# 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.