Hello World & Basics

```
print("Hello, World!")
```

Variables & Data Types

```
x = 10              # int
y = 3.14             # float
name = "Mayank"      # string
is_active = True     # boolean

print(type(x), type(y), type(name), type(is_active))
```

User Input

```
name = input("Enter your name: ")
print("Hello,", name)

age = int(input("Enter age: "))
print("You are", age, "years old")
```

Arithmetic Operations

```
a, b = 10, 3
print(a + b)
print(a - b)
print(a * b)
print(a / b)   # float division
print(a // b)  # integer division
print(a % b)
print(a ** b)  # power
```

Conditional Statements

```
num = 10
if num > 5:
    print("Greater than 5")
elif num == 5:
    print("Equal to 5")
else:
    print("Less than 5")
```

Loops

```
for i in range(1, 6):
    print("Iteration", i)

count = 1
while count <= 5:
    print("Count:", count)
    count += 1
for i in range(1, 6):
```

```
    if i == 3:
        continue
    if i == 5:
        break
    print(i)
```

Functions

```
def greet(name):
    print("Hello,", name)

greet("Mayank")

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

print(add(5, 7))
```

Lists (Arrays)

```
fruits = ["apple", "banana", "cherry"]
print(fruits[0])
print(fruits)
print(len(fruits))

fruits.append("mango")
fruits.remove("banana")
```

Tuples

```
coords = (10, 20)
print(coords[0])
# Tuples are immutable
```

Dictionaries

```
capitals = {"India": "New Delhi", "France": "Paris"}
print(capitals["India"])
capitals["USA"] = "Washington"
print(capitals.keys())
print(capitals.values())
```

Strings

```
s = "Hello World"
print(len(s))
print(s[0:5])
print(s.replace("World", "Python"))
print(s.lower())
print(s.upper())
print("World" in s)
```

File Handling

```
with open("test.txt", "w") as f:
    f.write("Hello File\n")

with open("test.txt", "a") as f:
    f.write("Append Line\n")

with open("test.txt", "r") as f:
    for line in f:
        print(line.strip())
```

Command Line Arguments

```
import sys
print("Script Name:", sys.argv[0])
print("Arguments:", sys.argv[1:])
```

Exception Handling

```
try:
    x = 10 / 0
except ZeroDivisionError as e:
    print("Error:", e)
finally:
    print("Done")
```

Classes & OOP

```
class Person:
    def __init__(self, name, age):
        self.name = name
        self.age = age

    def greet(self):
        print("Hello, my name is", self.name)

p = Person("Mayank", 30)
p.greet()
```

Modules & Imports

```
import math
print(math.sqrt(16))

from datetime import datetime
print(datetime.now())
```

List Comprehensions

```
nums = [1, 2, 3, 4, 5]
squares = [x**2 for x in nums]
```

```
print(squares)
```

Lambdas & Map/Filter/Reduce

```
nums = [1, 2, 3, 4, 5]
squares = list(map(lambda x: x**2, nums))
evens = list(filter(lambda x: x % 2 == 0, nums))

from functools import reduce
sum_all = reduce(lambda a, b: a + b, nums)

print(squares, evens, sum_all)
```

Decorators

```
def decorator(func):
    def wrapper():
        print("Before function")
        func()
        print("After function")
    return wrapper

@decorator
def hello():
    print("Hello")

hello()
```

Generators

```
def gen_numbers(n):
    for i in range(n):
        yield i

for num in gen_numbers(5):
    print(num)
```

Context Managers

```
with open("file.txt", "w") as f:
    f.write("Hello")
```

Regular Expressions

```
import re
pattern = r"^hello[0-9]+$"
s = "hello123"

if re.match(pattern, s):
    print("Pattern matched")
```