Day 1

Google Collab Link:

https://colab.research.google.com/drive/1zF1PEgWcVPDtWpOtbOHaLotcCJOnqQ9n?usp=sharing

Topics To Be Covered:

1. Variables & Data Types
2. Operators
3. Control Structures
4. Functions
5. Basic I/O

Variables & Data Types:

Data Types	Declaration	Printing	Output
String	`name = "Ali"`	`print(name)`	Ali
Integers	`age = 20`	`print(age)`	20
Float	`grade = 1.67`	`print(grade)`	1.67
Boolean	`isStudent = True`	`print(isStudent)`	True
List (Array)	`subjects = ["math","english","urdu"]`	`print(subjects[0])`	math

Dictionary (Map)	`person = {"name":"Ali","age":20}`
	 or
	 `person = {}`
	 `person["name"] = "Ali"`
		`print(person["name"])`	Ali

Operators:

Addition: +

Subtraction: -

Multiplication: *

Division: /

Modulus: %

Example:

`answer = 10+(45-20)*4/2`

`print(answer)`

output: 60

`answer%= 2` (answer = answer % 2)

`print(answer)`

output: 0

not in python:

`answer++` or `answer--`

Comparison Operators and Logical:

`result = 5==5` (True)

`isGreater = 3>10` (False)

`isLess = 2<10` (True)

`canVote = (age>=18) and (isCitizen)`

`canGetDiscount = (age<=8) or (hasVoucher)`

`canNotVote = not((age>=18) and (isCitizen))`

not in python:

`&&`

`||`

`!`

Control Structures:

If Else Statements

note: parenthesis are not important if no logical operator else `(age>=18) and (isCitizen)`

```
if age>=18:
    print("can vote")
elif age>=16:
    print("can drive")
else:
    print("too young")
```

For Loops

1. **Loop over a range**

   ```
   for i in range(5):
   print(i)
   ```

   output: 0
   1
   2
   3
   4

2. **Loop over a list**

   ```
   subjects = ["math", "english", "urdu"]
   for i in subjects:
       print(i)
   ```

   output: math
   english
   urdu

3. **Loop over a dictionary**

```python
person = {"name": "Ali", "age": 20}
```

```python
for key in person:
    print(key, person[key])
```

or

```python
for key, value in person.items():
    print(key, value)
```

output: name Ali

age 20

4. **Nested loop**

```python
for i in range(2):
    for j in range(3):
        print(i, j)
```

output: 00
01
02
10
11
12

While Loops

```python
count = 0
while count < 5:
    print(count)
    count+=1
```

output: 0
1
2
3
4

Functions:

```python
def greet(name,age):
    print(f"Hello {name}, you are {age} years old")


greet("ali",20)
```

output: Hello ali, you are 20 years old

```python
def average(numbers):
    return sum(numbers)/len(numbers)


nums = [1,2,3,4,5]
average(nums)
```

output: 3

lambda function

```python
add = lambda a, b: a + b
```

this is same as, but shorter:

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

```python
print(add(2, 3))
```

output: 5

Basic I/O:

```python
name = input("enter your name: ")
age = input()
```

```python
print(f"welcome {name}, your age is {age}")
```

or

```python
print("welcome " + name + " your age is " + str(age))
```

or

```python
print("welcome",name,"your age is",age)
```

(no need to convert to str and this one adds spaces)

output: welcome ali your age is 20

File operators

Writing:

```python
with open("data.txt", "w") as file:
    file.write("Hello World")
```

Reading:

```python
with open("data.txt", "r") as file:
    print(file.read())
```

Reading Line by Line:

```python
file = open("example.txt", "r")
    for line in file:
        print(line.strip())   (strip removes \n)
    file.close()
```

Appending:

```python
with open("data.txt", "a") as file:
    file.write("\nline 2")
```

Mini Project:

Student Report Card Generator

- Take Input from the User (name and age)
- Take Input For 3 Subjects in a dictionary `subject:marks` (english, math, urdu)
- Define a Function to Calculate Average of all subjects together

- Grade Assignment using if/elif/else

Average Score	Grade
80 or above	A
60 to 79	B
40 to 59	C
Below 40	F

- Bonus give using lambda function (Ask the user: Add 5 bonus marks to all subjects? (yes/no))
- Write the Report to a File

`Name: Ali`

`Age: 20`

`Math: 90`

`English: 83`

`Urdu: 95`

`Average: 89.33`

`Grade: A`

- Read and Display the Report Card