PYTHON NOTES: VARIABLES & DATA TYPES

1. WHAT IS A VARIABLE?

A variable is a name given to store a value in memory.
It helps reuse and manage data easily.
You can change the value anytime.

EXAMPLE:

```
name = "Rahul"
age = 20
```

2. RULES FOR NAMING VARIABLES

- Must start with a letter or underscore (_)
- Cannot start with a number
- Cannot contain spaces or special characters
- Python variables are case-sensitive

VALID EXAMPLES:

```
name = "Aarav"
first_name = "Sana"
_age = 20
```

INVALID EXAMPLES:

```
1age
first-name
full name
```

3. ASSIGNING VALUES

Single Variable Assignment:

```
x = 10
```

Multiple Assignment:

```
a, b, c = 10, 20.5, "Hello"
```

Same Value to Multiple Variables:

```
x = y = z = 5
```

4. DATA TYPES IN PYTHON

Python automatically detects the data type.

Data Type	Example	Description
int	age = 21	Whole numbers
float	height = 5.8	Decimal numbers
string	name = "Aditi"	Text data
boolean	is_student = True	True/False values
complex	z = 3 + 4j	Numbers with imaginary part

5. CHECKING THE TYPE

Use type() function:

```
num = 10
print(type(num))
```

Output:

```
<class 'int'>
```

6. UPDATING VARIABLES

You can change the value anytime:

```
num = 10
num = 20
print(num)
```

Output:

```
20
```

7. CONSTANTS (NOT STRICT BUT CONVENTION)

Python doesn't have true constants, but by convention we use UPPERCASE:

```
PI = 3.14
GRAVITY = 9.8
```

8. TAKING USER INPUT

```
name = input("Enter your name: ")
age = input("Enter age: ")
```

⚠️ **Input is always taken as a string, so conversion is needed:**

```
age = int(input("Enter age: "))
height = float(input("Enter height: "))
```

9. COMBINING VARIABLES (CONCATENATION)

```
name = "Sara"
age = 19
print("My name is", name, "and I am", age, "years old.")
```

10. SUMMARY

- Variables help store and use data.
- Python supports multiple data types automatically.
- Use type() to check types.
- Input always returns a string unless converted.
- Follow naming rules for clean code.

✅ QUICK EXAMPLE PROGRAM

```
name = input("Enter your name: ")
age = int(input("Enter your age: "))
height = float(input("Enter your height: "))
is_student = True

print("---- Your Profile ----")
print("Name:", name)
print("Age:", age)
print("Height:", height)
print("Student:", is_student)
```