Python Basics: Escape Sequences, Raw & Formatted Strings, and Variables & Data Types

1. Escape Sequences

Escape sequences are special character combinations in strings that perform specific formatting actions.

Common Escape Sequences in Python:

Escape Sequence	Meaning
\n	New line
\t	Tab space
\\	Backslash (\)
\"	Double quote (")
\'	Single quote (')
\r	Carriage return
\b	Backspace
\f	Form feed
\v	Vertical tab

Example:

```python
print("Hello\nWorld")   # Output: Hello (new line) World
print("Name:\tJohn")    # Output: Name:    John
```

Link: https://youtu.be/4rBPrJfF-GM?si=7-sIWQTcWXyj3jEY

---

2. Raw & Formatted Strings

a) Raw Strings (r or R prefix)

Raw strings treat backslashes (\) as literal characters, preventing escape sequence interpretation.

Example:

```python
print(r"C:\Users\Sagar\Documents")   # Output: C:\Users\Sagar\Documents
```

b) Formatted Strings (f-strings)

Introduced in Python 3.6, f-strings allow embedding expressions inside string literals using `{}`.

Example:

```python
name = "Sagar"
age = 25
print(f"My name is {name} and I am {age} years old.")
# Output: My name is Sagar and I am 25 years old.
```

Link: https://youtu.be/IH284BmdME4?si=xfiagQ37yM-CbOfW

---

3. Variables & Data Types

a) Variables in Python

Variables store data and do not require explicit type declaration.

Example:

```python
x = 10          # Integer
name = "Sagar"  # String
is_active = True  # Boolean
```

b) Data Types in Python

Python has several built-in data types:

Data Type	Example
Integer (`int`)	`x = 10`
Floating-point (`float`)	`y = 3.14`
String (`str`)	`name = "John"`
Boolean (`bool`)	`is_active = True`
List (`list`)	`fruits = ["apple", "banana", "cherry"]`
Tuple (`tuple`)	`coordinates = (10, 20)`
Dictionary (`dict`)	`person = {"name": "John", "age": 25}`
Set (`set`)	`unique_numbers = {1, 2, 3, 4}`
NoneType (`None`)	`value = None`

Example:

```python
# Checking types
x = 5
print(type(x))  # Output: <class 'int'>
```

Link: https://youtu.be/LKFrQXaoSMQ?si=jrbdo523BHF-MTc4

Summary:

- **Escape sequences** allow special formatting in strings.
- **Raw strings** treat backslashes as normal characters.
- **Formatted strings (f-strings)** allow embedding variables in strings.
- **Python variables** do not require explicit declaration.
- **Python has multiple built-in data types** such as `int`, `float`, `str`, `bool`, `list`, etc.