

# Chapter: Strings

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## ✓ 1. What is a String?

- A **string** is a sequence of **Unicode characters** in Python.
- Strings are **immutable** — cannot be changed after creation.
- Created using:
  - `'single quotes'`
  - `"double quotes"`
  - `'''triple quotes'''` or `"""triple quotes"""` for multi-line strings

```
s1 = 'hello'
s2 = "world"
s3 = '''multi
line'''
```

## ✓ 2. String Indexing & Slicing

- **Indexing:** `s[index]` — zero-based, negative index from end
- **Slicing:** `s[start:end:step]` — end is **exclusive**

```
s = "Deepak"
print(s[0])    # D
print(s[-1])   # k
print(s[1:4])  # eep
print(s[::-1]) # kapeeD (reversed)
```

## ✓ 3. String Immutability

- Strings can't be modified directly

```
s = "deepak"
# s[0] = 'D'   ✗ Error
s = "D" + s[1:] # ✓ Correct
```

## ✓ 4. Useful String Methods

- ◊ Case Conversion

```
s.lower()      # all lowercase
s.upper()      # all uppercase
s.title()      # Title Case
s.capitalize() # First letter uppercase
s.swapcase()   # Swap upper/lower
```

#### ◇ Search & Check

```
s.find('a')      # index or -1
s.index('a')     # like find() but raises error
s.startswith('De') # True
s.endswith('ak')  # True
```

#### ◇ Validation (Boolean)

```
s.isalpha()      # letters only
s.isdigit()      # digits only
s.isalnum()      # letters + digits
s.isspace()      # whitespace only
s.islower()      # all lowercase
s.isupper()      # all uppercase
```

#### ◇ Modification

```
s.replace('a', 'x') # replaces 'a' with 'x'
s.strip()           # removes both-side spaces
s.lstrip(), s.rstrip() # left/right strip
s.split(' ')        # split into list
' '.join(list)      # join list into string
```

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## ☑ 5. String Formatting

#### ◇ f-Strings (Recommended)

```
name = "Deepak"
age = 24
print(f"My name is {name} and I am {age} years old.")
```

#### ◇ format()

```
print("My name is {} and I am {} years old.".format(name, age))
```

#### ◇ % Formatting (Old Style)

```
print("My name is %s and I am %d years old." % (name, age))
```

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## ☑ 6. String Comparisons

```
'apple' < 'banana'    # True  
'abc' == 'ABC'       # False
```

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## ☑ 7. Escape Characters

Escape	Meaning
<code>\n</code>	New Line
<code>\t</code>	Tab
<code>\\</code>	Backslash
<code>\'</code>	Single quote
<code>\"</code>	Double quote

```
print("Hello\nWorld")  
print("He said, \"Hi\"")
```

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## ☑ 8. Iteration & Membership

```
for char in "Deepak":  
    print(char)  
  
'd' in "Deepak"      # True  
'z' not in "Deepak"  # True
```

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## ☑ 9. ASCII Conversion

```
ord('A')    # 65  
chr(65)     # 'A'
```

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