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🧠 What is Type Casting?

Type casting means converting one data type into another — like turning a string into an integer or a float into a string.

🔁 **Example:**

```
x = "123"
y = int(x)   # type casting string to integer
```

🏷️ Why Do We Need Type Casting?

Problem	Solution
Reading from input() gives strings	Convert to `int` or `float`
API or CSV returns strings	Need to cast to correct types
Combine strings and numbers	Use `str()` to convert numbers

🔤 Types of Type Casting

1. ✅ Explicit Type Casting (You decide)

You manually convert the type.

```
a = "10"
b = int(a)       # Converts string "10" to integer 10
```

Common Functions:

Function	Converts To
`int(x)`	Integer
`float(x)`	Float
`str(x)`	String
`bool(x)`	Boolean
`list(x)`	List

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2. ⚙️ Implicit Type Casting (Python decides)

Python automatically converts data types during operations.

```
x = 10      # int
y = 3.5     # float
z = x + y   # Python converts x to float → result is float
print(z)    # 13.5
```

🔍 Detailed Examples

📌 String to Int and Float

```
s = "100"
i = int(s)      # 100 (as int)
f = float(s)    # 100.0 (as float)
```

📌 Float to Int

```
f = 45.99
i = int(f)      # 45 (decimal part is removed)
```

📌 Int to String

```
a = 100
s = str(a)      # "100"
```

📌 Boolean Conversion

```
print(bool(0))      # False
print(bool(""))     # False
print(bool(123))    # True
print(bool("abc"))  # True
```

🧪 Real-Life Use Case: User Input

```
age = input("Enter your age: ")  # always string
age = int(age)                   # convert to int for calculation
print(age + 5)
```

⚠️ Errors in Type Casting

```
int("abc")    # ❌ ValueError
float("123.45.67")  # ❌ ValueError
```

✅ Always validate or try-except if unsure.

🧰 BONUS: Type Checking

```
x = "123"
print(type(x))      # <class 'str'>

y = int(x)
print(type(y))      # <class 'int'>
```

📜 Summary Table

From → To	Method	Example
str → int	`int(str)`	`int("10")`
str → float	`float(str)`	`float("3.14")`
int → str	`str(int)`	`str(100)`
float → int	`int(float)`	`int(3.99)` → 3
any → bool	`bool(x)`	`bool(0)` → False
list → str	`str(list)`	`str([1,2])`

💼 How to Add in Resume (Mini Project/Task)

Project: User Input Handling & Type Casting in Python

- Built a user input validation module using Python that handles conversion of user input into proper numeric types.

- Used both implicit and explicit type casting techniques to ensure safe arithmetic and string operations.
- Implemented error handling for type mismatch scenarios using try-except blocks.

💬 How to Explain in Interview

Q: What is type casting in Python and how have you used it?

🗣️ **Answer:**

> Type casting is converting one data type into another, like string to integer or float to string. I've used it in scenarios like reading user input or parsing data from APIs, where data often comes as strings. I use `int()`, `float()`, or `str()` to cast them based on context. I also understand implicit casting, where Python auto-converts during operations, like int + float becomes float.

About the Author

Gowtham SB is a **Data Engineering expert, educator, and content creator** with a passion for **big data technologies, as well as cloud and Gen AI** . With years of experience in the field, he has worked extensively with **cloud platforms, distributed systems, and data pipelines**, helping professionals and aspiring engineers master the art of data engineering.

Beyond his technical expertise, Gowtham is a **renowned mentor and speaker**, sharing his insights through engaging content on **YouTube and LinkedIn**. He has built one of the **largest Tamil Data Engineering communities**, guiding thousands of learners to excel in their careers.

Through his deep industry knowledge and hands-on approach, Gowtham continues to **bridge the gap between learning and real-world implementation**, empowering individuals to build **scalable, high-performance data solutions**.

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