Python Programming

Lecture 2

Built-in Data Types

- **In programming, data type is an important concept.**

- **Variables can store data of different types, and different types can do different things.**

- **Python has the following data types built-in by default, in these categories:**

Text Type: `str`

Numeric Types: `int`, `float`, `complex`

Sequence Types: `list`, `tuple`, `range`

Mapping Type: `dict`

Set Types: `set`, `frozenset`

Boolean Type: `bool`

Binary Types: `bytes`, `bytearray`, `memoryview`

Getting the Data Type

You can get the data type of any object by using the type() function:

```python
x=2
print(type(x))

x="sam"
print(type(x))
```

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

Setting the Data Type

In Python, the data type is set when you assign a value to a variable:

Example	Data Type
x = "Hello World"	str
x = 20	int
x = 20.5	float
x = 1j	complex
x = ["apple", "banana", "cherry"]	list
x = ("apple", "banana", "cherry")	tuple
x = range(6)	range
x = {"name" : "John", "age" : 36}	dict
x = {"apple", "banana", "cherry"}	set
x = frozenset({"apple", "banana", "cherry"})	frozenset
x = True	bool
x = b"Hello"	bytes
x = bytearray(5)	bytearray
x = memoryview(bytes(5))	memoryview

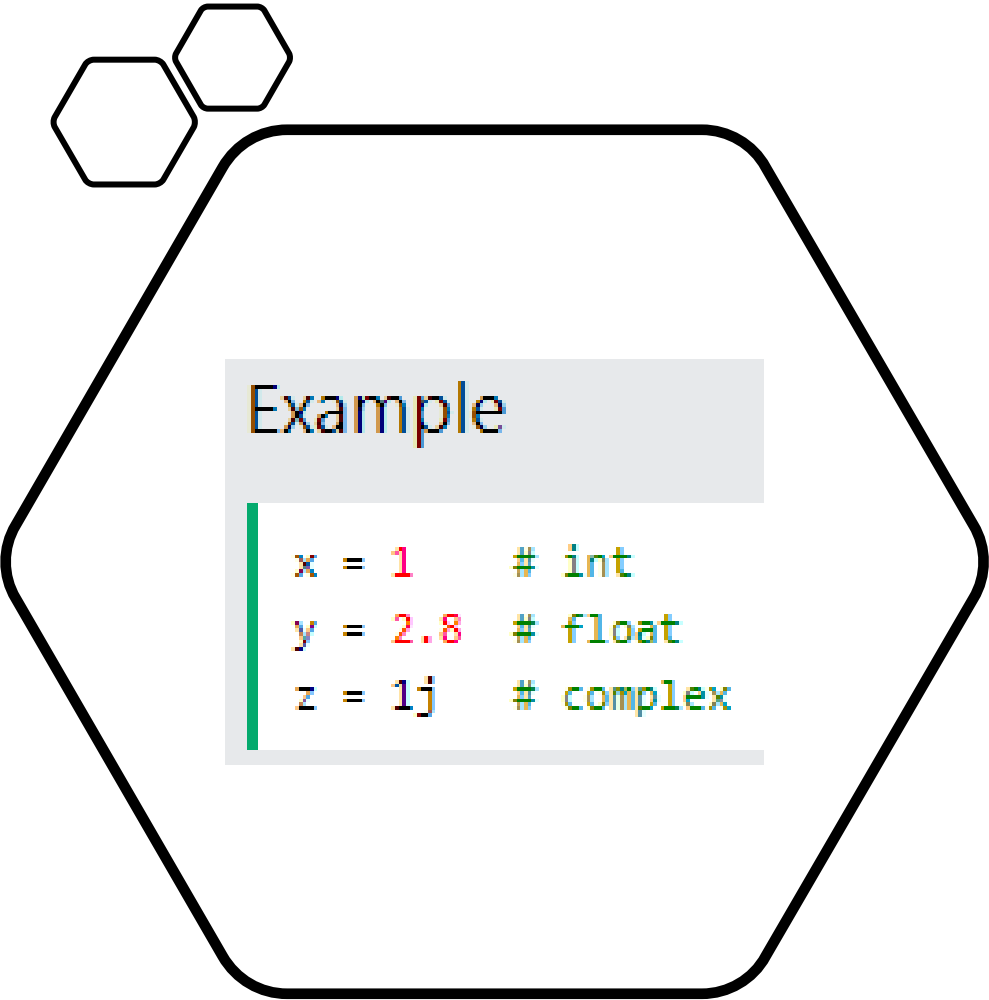If you want to specify the data type, you can use the following constructor functions:

Setting the Specific Data Type

Example	Data Type
x = str("Hello World")	str
x = int(20)	int
x = float(20.5)	float
x = complex(1j)	complex
x = list(("apple", "banana", "cherry"))	list
x = tuple(("apple", "banana", "cherry"))	tuple
x = range(6)	range
x = dict(name="John", age=36)	dict
x = set(("apple", "banana", "cherry"))	set
x = frozenset(("apple", "banana", "cherry"))	frozenset
x = bool(5)	bool
x = bytes(5)	bytes
x = bytearray(5)	bytearray
x = memoryview(bytes(5))	memoryview

Python Numbers

There are three numeric types in Python:

- int

- float

- complex

Example

```
x = 1     # int
y = 2.8   # float
z = 1j    # complex
```

Int

Int, or integer, is a whole number, positive or negative, without decimals, of unlimited length.

Example

Integers:

```
x = 1
y = 3565622554887711
z = -3255522
```

Float

Example

Floats:

```
x = 1.10
y = 1.0
z = -35.59
```

Example

Floats:

```
x = 35e3
y = 12E4
z = -87.7e100
```

- Float, or "floating point number" is a number, positive or negative, containing one or more decimals.
- Float can also be scientific numbers with an "e" to indicate the power of 10.

Complex

3+5j

Complex numbers are written with a "j" as the imaginary part:

Complex:

```
x = 3+5j
y = 5j
z = -5j
```

Type Conversion

You can convert from one type to another with the int(), float(), and complex() methods:

Note: You cannot convert complex numbers into another number type.

Example

Convert from one type to another:

```python
x = 1     # int
y = 2.8   # float
z = 1j    # complex

#convert from int to float:
a = float(x)

#convert from float to int:
b = int(y)

#convert from int to complex:
c = complex(x)
```