



# Basic Data Types



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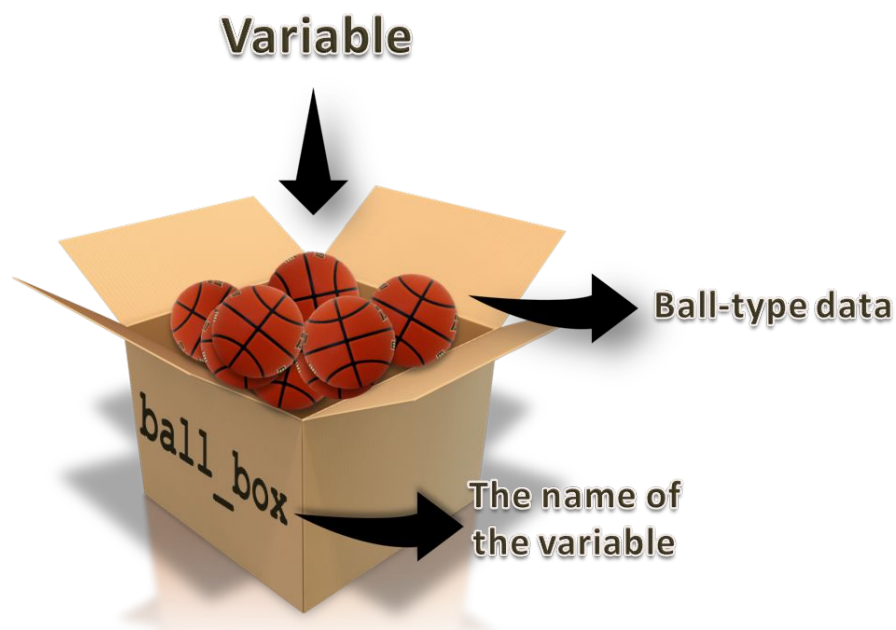
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# Variables



## Variables : refreshing





# Naming Variables



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## Table of Contents



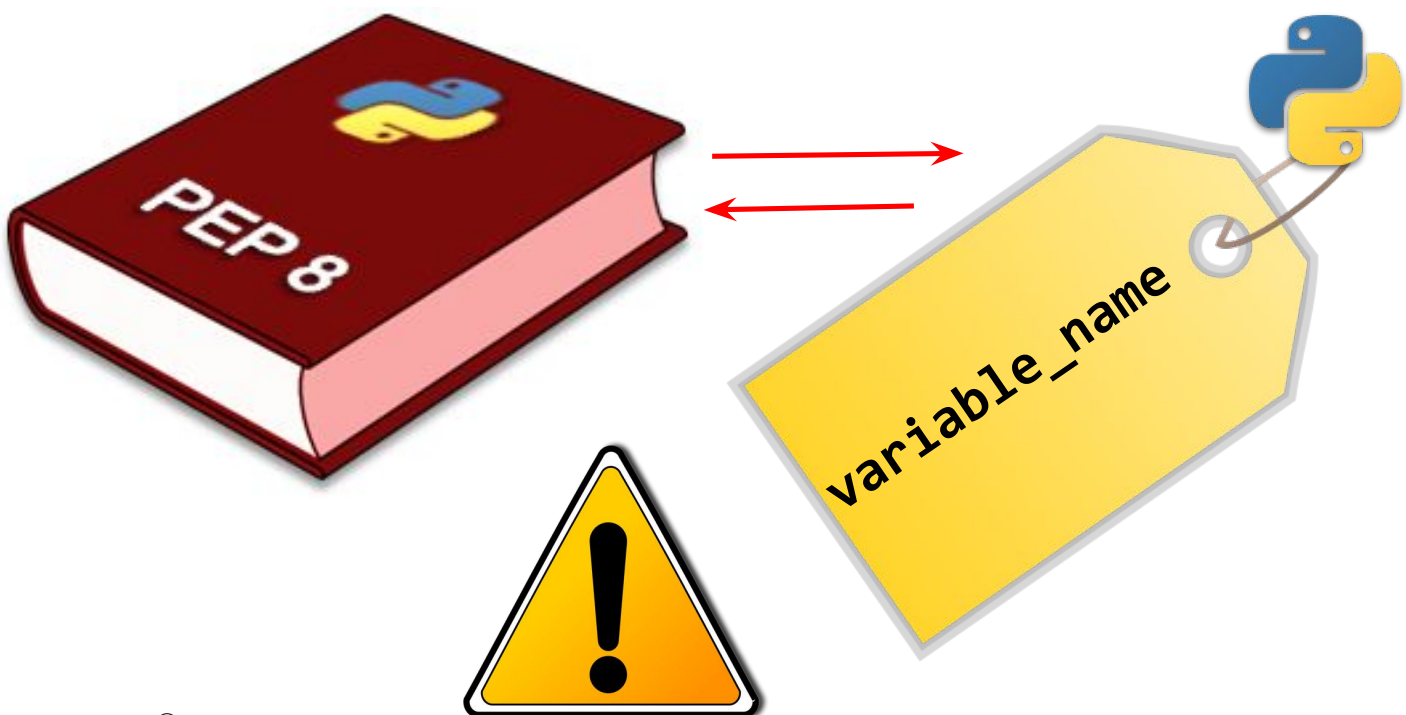
- ▶ General Description
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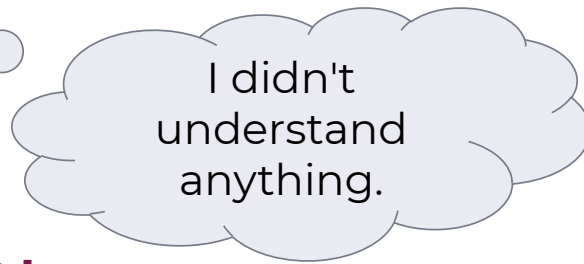
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# General Description

## General Description





Con\_PEP\_N\_RL



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Con\_PEP\_N\_RL



**bad example** of naming  
a variable

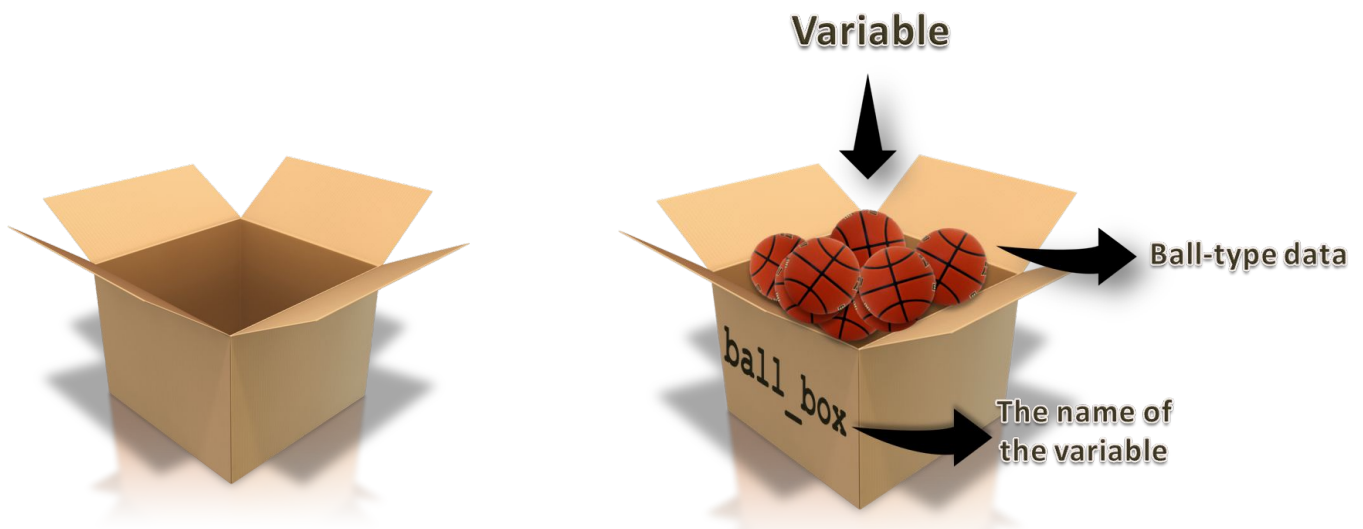


Conventional (PEP 8)  
Naming Rules

# Variables



# Variables



# Variables



variable name = value

```
planet = 'jupyter'  
price = 140  
pi_number = 3.14
```

The declaration happens automatically when you **assign** a value to a variable.

# Variables



## ▶ Task 🙋

- ▶ Create 3 variables and assign different values to them.
- ▶ Display each of them in Python Playground using `print()` function.

# Variables



```
my_age = 33
your_age = 30
my_age = your_age
print(my_age)
```

What is the output? Try to figure out in your mind...



Students, write your response!

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# Variables



```
my_age = 33
your_age = 30
my_age = your_age
print(my_age)
```

30



# Conventional (PEP 8) Naming Rules



## ► Some basic naming conventions

- Choose **lowercase** words and use underscore to split the words

```
variable = 3.14  
var_one = 'something'
```

# Conventional (PEP 8) Naming Rules



## ► Some basic naming conventions

- Do not use '1' (**lowercase letter “L”**) as single character variable.

```
l = 3.14 # This is lowercase letter el  
I = 3.14 # This is uppercase letter eye  
1 = 'something wrong' # This is number one.
```

# Conventional (PEP 8) Naming Rules

## ► Some basic naming conventions

- Do not use '0' (**uppercase letter “O”**) as single character variable.

```
time_0 = '3.14'    # This is uppercase letter “O”  
time_0 = '3.14'    # This is number zero
```

# Some Important PEP 8 Rules

## ► Some basic naming conventions (reserved words)

- Do not use specific Python keywords such as :

False	class	finally	is	return
None	continue	for	lambda	try
True	def	from	nonlocal	while
and	del	global	not	with
as	elif	if	or	yield
assert	else	import	pass	break
except	in	raise		

# Pythonic Rules



Examine these samples carefully

2me



data4me



Big boss



first!



big-boss



xy#@!v



last\_name



\$price



## Some Important PEP 8 Rules

### ► Some basic naming conventions

- The name of the variable must be legible, meaningful and relevant to the type of value

Good

```
students = ...
```

Bad

```
s = ... or st = ...
```

# Some Important PEP 8 Rules

## Some basic naming conventions

- The name of the variable must be legible, meaningful and relevant to the type of value

Good

```
students = ...
```

```
# Big Data  
big_data = ...
```

Bad

```
s = ... or st = ...
```

```
# Big Data  
b_dt = ...
```

# Some Important PEP 8 Rules

## Some basic naming conventions

- The name of the variable must be legible, meaningful and relevant to the type of value

Good

```
students = ...
```

```
# Big Data  
big_data = ...
```

```
# Average income of February  
avg_income_feb = ...
```

Bad

```
s = ... or st = ...
```

```
# Big Data  
b_dt = ...
```

```
# Average income of February  
average_income_february = ..
```



## ► Naming Variable

amount of rotten fruits

the list of prime numbers

the list of mathematics exam scores

What can be the **Name** of these sentences in terms of variables.



Students, write your response!

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## ► Naming variable



amount of rotten fruits

- **Good samples :**
  - `fruit_rotten = 33 # kg.`
  - `amount_rotten_fruits = 33 # kg.`



## Naming variable

the list of prime numbers

- **Good samples :**
  - prime\_list
  - prime\_no
  - list\_prime
  - num\_prime



## Naming variable


the list of mathematics exam scores

- **Good samples :**
  - math\_scores
  - score\_maths

# Variables : refreshing



Creating a variable is very simple in Python.

All you need to do is specify the variable name and then assign a value to it using  =

```
variable name = value
```

```
planet = 'jupyter'  
price = 140
```

**The declaration  
happens automatically  
when you assign a  
value to a variable.**

# Variables



Assigning a value to a variable.

```
x = y = z = "same"
```

```
print(x)  
print(y)  
print(z)
```

**What is the output?**



# Variables



The output

same  
same  
same

## Write a Python code on Playground :

Which months have **31** days and which have **30** or **28**? Let's assign the number of days (30 or 31 or 28) to the months (the variables will be the name of the months) in totally **three** code **lines** then print their number of days in order of the months as follows.

*Hint : Use int value of 30, 31, 28 only once.*



```
print(january, february, march, april, may, june, july, august, september, october, november, december)
```

31 28 31 30 31 30 31 31 30 31 30 31



Students, write your response!



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# Variables



A probable answer :

```
january = march = may = july = august = october = december = 31
# multi assignments in a single line

april = june = september = november = 30

february = 28

print(january, february, march, april, may, june, july, august, september, october,
november, december)
```

If we don't know the value of a variable, what can we assign to it? For example :

The ages of instructors :

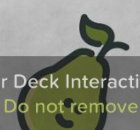
```
thomas = 33
marry = 28
walter = ?
isabella = 46
```



Students, write your response!



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# Variables



```
thomas = 33  
marry = 28  
walter = None  
isabella = 46
```



# Variables



Assigning a value to a variable.

```
website = "apple.com"  
print(website)  
  
# assigning a new variable to website  
website = "clarusway.com"  
  
print(website)
```

What is the output?

# Variables



The output

```
apple.com  
clarusway.com
```

# Variables



Assigning a value to a variable.

```
first_number = 100  
second_number = first_number  
print(second_number)
```

What is the output?



# Variables



The output

100

# Variables



Assigning a value to a variable.

```
x = 15
y = 33
z = x
x = y

print(x)
print(y)
print(z)
```

What is the output?

# Variables



The output

```
x = 33  
y = 33  
z = 15
```

# Variables



Assigning a value to a variable.

```
a, b, c = 5, 3.2, "Hello"
```

```
print(a)  
print(b)  
print(c)
```

What is the output?



# Variables



The output

```
5
3.2
Hello
```

# Variables



- Pay attention to the value of variables and how they change.

```
man = "andrew"
color = "green"
age = 32
pi = 3.14
color = "yellow"
age = 44
man = "joseph"

print(man, age, color)
```

Output

```
joseph 44 yellow
```



str

bool

# Introduction to Data Types

int

## ► Introduction to Data Types



- Each data has a type.
- This type of data defines how you store it in memory and it also describes which process can be applied to it.

# Introduction to Data Types



## Some simple data types commonly used in Python.

- ▶ String,
- ▶ Integer,
- ▶ Float,
- ▶ Boolean.



str

"2020"

## Strings

"string is the most used type"

"i have 3 lb. of apple"



# Strings

- ▶ If you want to work with any **textual** characters in your code, you have to work with strings.

```
my_text = 'being a good person'  
print(my_text)
```

String type is called **str**.



**type(variable)**



# Strings

- ▶ If you want to work with any **textual** characters in your code, you have to work with strings.

```
my_text = 'being a good person'  
print(my_text)
```

String type is called **str**.

being a good person

- ▶ Strings are identified as a set of characters represented in the **single** or **double** quotes.

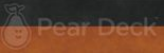
`type(variable)`

Write down the followings on your Playground as **str** type and then print them...

- joseph@clarusway.com
- 632
- It's okay!



Students, follow the instructions on the slide



## Strings



- **Let's** do some practices which cover string type.

```
1 str_number = '1923'
2 str_sign = '%(&*?-'
3
4
5 print(str_number)
6 print(str_sign)
7 print(type(str_number), type(str_sign))
8
9
```

# Strings

- ▶ **Let's** do some practices which cover string type.

```
1 str_number = '1923'
2 str_sign = '%(&*?-'
3
4
5 print(str_number)
6 print(str_sign)
7 print(type(str_number), type(str_sign))
8
9
```

## Output

```
1923
%(&*?-
<class 'str'> <class 'str'>
```

**int** Numeric Types **float**



# Numeric Types

- ▶ Three basic numeric types in Python :

- Integers
- Floats
- Complexes



# Numeric Types

- ▶ **Integer** types are whole numbers which don't contain decimal point.

```
my_integer = 40
negative_num = -18

print(my_integer)
print(negative_num)
```

Signed integer  
type is called  
**int**.

# Numeric Types

- **Integer** types are whole numbers which don't contain decimal point.

```
my_integer = 40
negative_num = -18

print(my_integer)
print(negative_num)
```

```
40
-18
```

Signed integer  
type is called  
**int**.

# Numeric Types

- **Float** types stand for real numbers with a decimal point.

```
my_float = 40.0
negative_float = -18.66

print(my_float)
print(negative_float)
```

Floating point  
type is called  
**float**.

# Numeric Types

- **Float** types stand for real numbers with a decimal point.

```
my_float = 40.0  
negative_float = -18.66
```

```
print(my_float)  
print(negative_float)
```

```
40.0  
-18.66
```

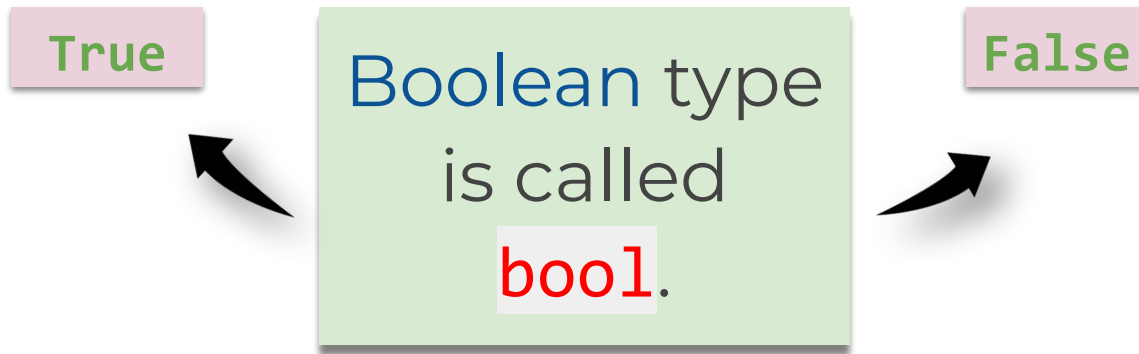
Floating point  
type is called  
**float**.

## Boolean



# Boolean

- ▶ Boolean types' values are the two constant objects **False** and **True**.



# Type Conversion

**int** ↔ **str**

# Stretch Break!

Let's take 1 minute to stretch

- **stretch your neck**



Students, follow the instructions on the slide

## Type Conversion



We can print the types of data using `type()` function

```
my_data = 'I am string'  
print(type(my_data))
```



# Type Conversion



We can print the types of data using `type()` function

```
my_data = 'I am string'
print(type(my_data))
```

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

# Type Conversion



Type conversion functions.

- `str()` converts to **string** type
- `int()` converts to **signed integer** type
- `float()` converts to **floating point** type

The value of any type in Python can be converted to a **str**.



Students choose an option

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## Type Conversion



Converting **float** to **str**

```
pi = 3.14
converted_pi = str(pi)
print(converted_pi)
print(type(converted_pi))
```



# Type Conversion



Converting **float** to **str**

```
pi = 3.14  
  
converted_pi = str(pi)  
print(converted_pi)  
print(type(converted_pi))
```

```
3.14  
<class 'str'>
```

# Type Conversion



Converting **float** to **int**

```
pi = 3.14  
  
converted_pi = int(pi)  
print(converted_pi)  
print(type(converted_pi))
```

What is the  
output?



# Type Conversion



Converting **float** to **int**

```
pi = 3.14  
converted_pi = int(pi)  
print(converted_pi)  
print(type(converted_pi))
```

```
3  
<class 'int'>
```

# Type Conversion



Converting **int** to **float**

```
no = 3  
converted_no = float(no)  
print(converted_no)  
print(type(converted_no))
```

# Type Conversion



Converting `int` to `float`

```
no = 3
```

```
converted_no = float(no)
print(converted_no)
print(type(converted_no))
```

```
3.0
<class 'float'>
```

# Type Conversion



input :

```
1 x = 39
2 v = "11"
3 y = "2.5"
4 z = "I am at_"
5
6 print(x-int(v))
7 print(x-float(y))
8 print(z+str(x))
9
```

output :

```
1 28
2 36.5
3 I am at_39
4
5
```



# Type Conversion

input :

```
1 x = 39
2 v = "11"
3 y = "2.5"
4 z = "I am at_"
5
6 print(x-int(v))
7 print(x-float(y))
8 print(z+str(x))
9
```

$x - \text{int}("11") = 39 - 11 = 28$

output :

```
1 28
2 36.5
3 I am at_39
4
5
```



# Type Conversion

input :

```
1 x = 39
2 v = "11"
3 y = "2.5"
4 z = "I am at_"
5
6 print(x-int(v))
7 print(x-float(y))
8 print(z+str(x))
9
```

$x - \text{int}("11") = 39 - 11 = 28$

$x - \text{float}("2.5") = 39 - 2.5 = 36.5$

output :

```
1 28
2 36.5
3 I am at_39
4
5
```

# Type Conversion

input :

```
1 x = 39
2 v = "11"
3 y = "2.5"
4 z = "I am at_"
5
6 print(x-int(v))
7 print(x-float(y))
8 print(z+str(x))
9
```

$x - \text{int}("11") = 39 - 11 = 28$

$x - \text{float}("2.5") = 39 - 2.5 = 36.5$

$z + \text{str}(39) = \text{"I am at\_"} + \text{"39"} = \text{I am at\_39}$

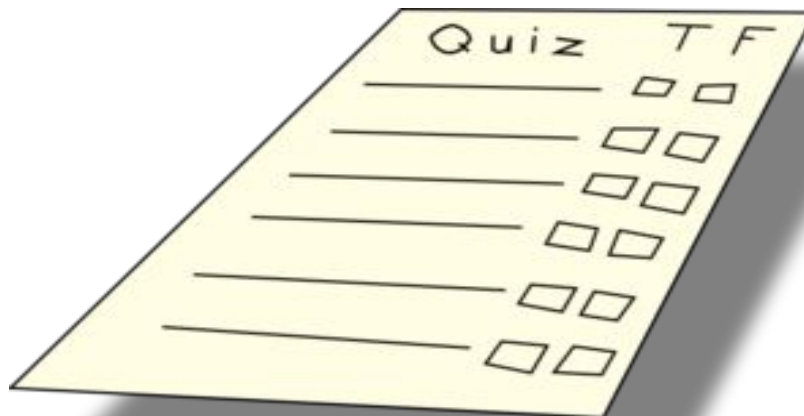
output :

```
1 28
2 36.5
3 I am at_39
4
5
```

# Type Conversion, Quiz

## ► Task

- First, Login to your LMS,
- Then, click [here](#) to complete and submit the task.



# Type Conversion, Quiz



Without using any Interpreter/IDLE, just try to guess the output.

```
number_int = 123  
number_float = 1.23
```

```
number_new = number_int + number_float
```

```
print("datatype of number_int:", type(number_int))  
print("datatype of number_float:", type(number_float))
```

```
print("Value of number_new:", number_new)  
print("datatype of number_new:", type(number_new))
```

**What is the output?**



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Students, write your response!

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# Type Conversion, Quiz



Without using any Interpreter/IDLE, just try to guess the output.

```
number_int = 123  
number_str = "456"
```

```
print("Data type of number_int:", type(number_int))  
print("Data type of number_str:", type(number_str))
```

```
print(number_int + number_str)
```

**What is the output?**



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Students, write your response!

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# Type Conversion, Quiz



💡 Without using any Interpreter/IDLE, just try to guess the output.

```
number_int = 123
number_str = "456"
```

**What is the output?**

```
print("Data type of number_int:", type(number_int))
print("Data type of number_str before Type Casting:", type(number_str))

number_str = int(number_str)
print("Data type of number_str after Type Casting:", type(number_str))

number_sum = number_int + number_str

print("Sum of number_int and number_str:", number_sum)
print("Data type of the sum:", type(number_sum))
```



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Students, write your response!

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