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Python Programming

Session Objective

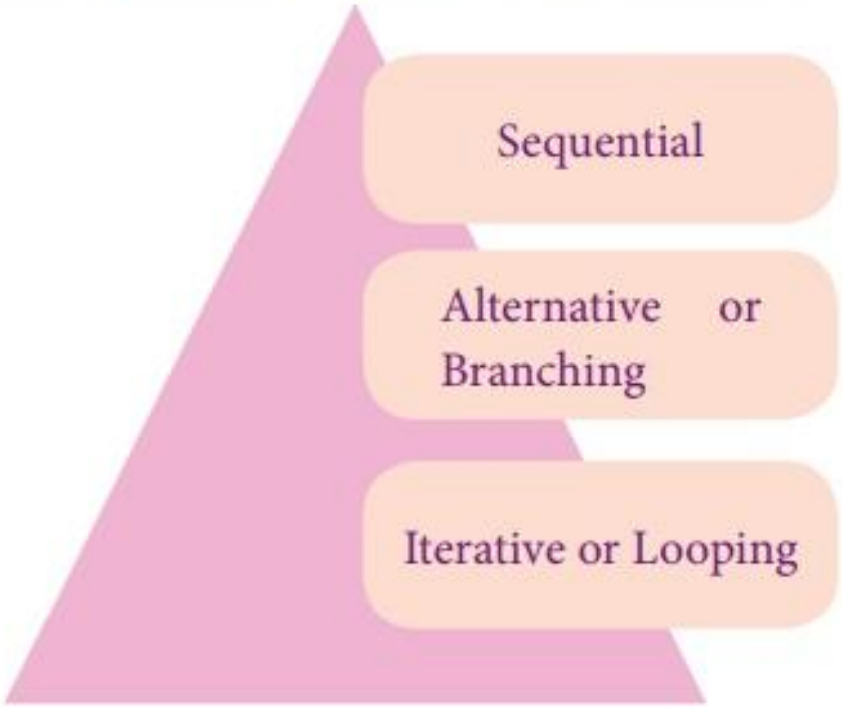
To understand the basic concepts of Python,

- Control Structures
  - If statement
  - If-else statement
  - If-elif-else statement
  - For Loop
  - While Loop
  - Break, Continue & Pass
- Input and Output
- String Function
- Number Function
- Date and Time Function

Control Structures

Control Structures

There are three important control structures

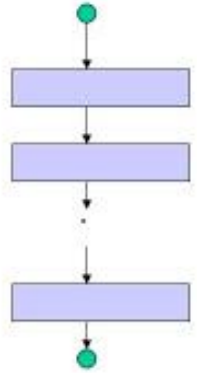


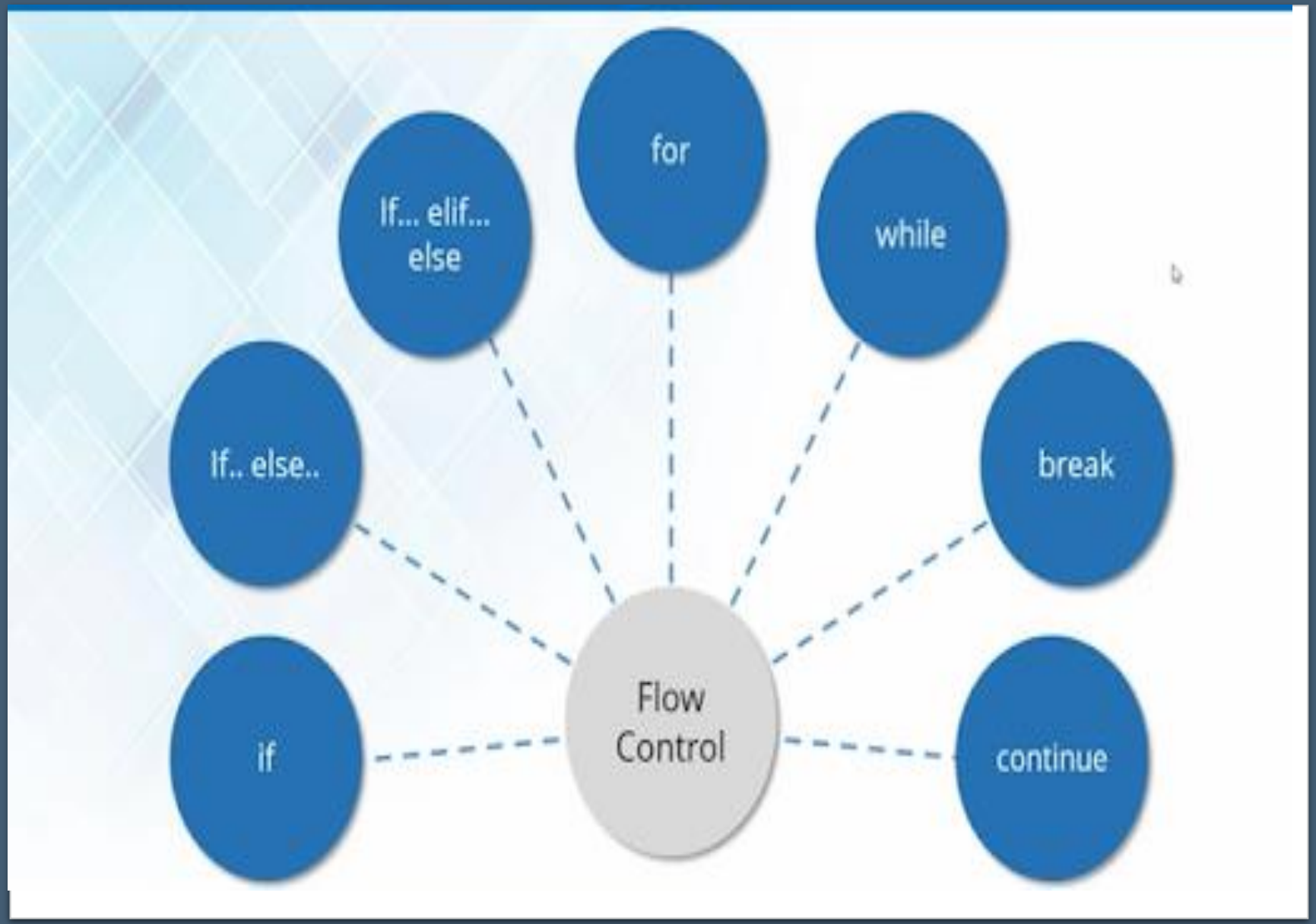
Control Structures

- Control structures control the flow of program execution.
- 3 types of control structures: sequence, selection repetition
- A sequence control structure uses compound statements (blocks) to specify sequential flow.
- A compound statement, a block of codes, is used to specify sequential flow.

```
{
  statement1;
  statement2;
  statement3;
}
```

Sequence





Control Structures

Contd...

IF and IF-ELSE Statement

- Decision making is used to execute a code only if a certain condition is satisfied.
- Python uses indentation for grouping statements.

IF	IF-ELSE
num = 45 # only if if num > 25: print("Hurray! {} is greater than 25".format(num))	x=8 r=x % 2 **if** r==0: print(**"Even"**) print(**"good"**) **else**: print(**"Odd"**)

Control Structures Contd…

Nesting of IF

- Block of code for functions, control structures, etc are distinguished by indented code
- 4-space indentation is recommended
- A common syntax error is leaving out : at end of control structure statements
- Using () around conditions is optional
- Indented block can have any number of statements, including blank lines

```
x=8
r=x % 2
if r==0:
   print("Even")
   print("good")
   if True:
      print("Great")
else:
   print("Odd")
```

Control Structures

Contd…

IF-ELSE-IF Statement

- The keyword ‘elif’ is short for ‘else if’ and is useful to avoid excessive indentation.
- An if … elif … elif … sequence is a substitute for the switch or case statements found in other languages.

```
a=2
b=15
c=8
if a>b:
   print("a:",a)
elif a>c:
   print("a with c:",a)
elif b>c:
   print("b with c:",b)
else:
   print(c)
```


Control Structures

Contd…

For Loop

For Loop Syntax	For Loop Example	Output
for iterator_var in sequence: statements(s)	words = ['**mac**', '**window**', '**linux**'] **for** w **in** words: print(w, len(w))	mac 3 window 6 linux 5

	number = 9
	for i **in** range(1, 5):
	  mul_table = number * i
	  print("{} * {} = {}".format(number, i, mul_table))
		9 * 1 = 9
		9 * 2 = 18
		9 * 3 = 27
		9 * 4 = 36

Control Structures

Contd…

While Loop

While Loop Syntax	While Loop Example	Output

while expression:
statement(s)
	count = 0
	while count < 5:
	  print(count)
	  count += 1
		0
		1
		2
		3
		4

Control Structures

Contd…

Break Statement

Break brings control out of the loop

Break	Output

for letter **in 'Python'**:
  if letter == **'t'**:
  break
 	
print(**'Current Letter :'**, letter)
	Current Letter : t

Control Structures

Contd…

Pass Statement

- Pass statement are used to write empty loops.
- Pass is also used for empty control statement, function and classes.

Pass	Output
for letter **in 'Python'**: **pass** print(**'Last Letter :'**, letter)	Last Letter : n

Control Structures

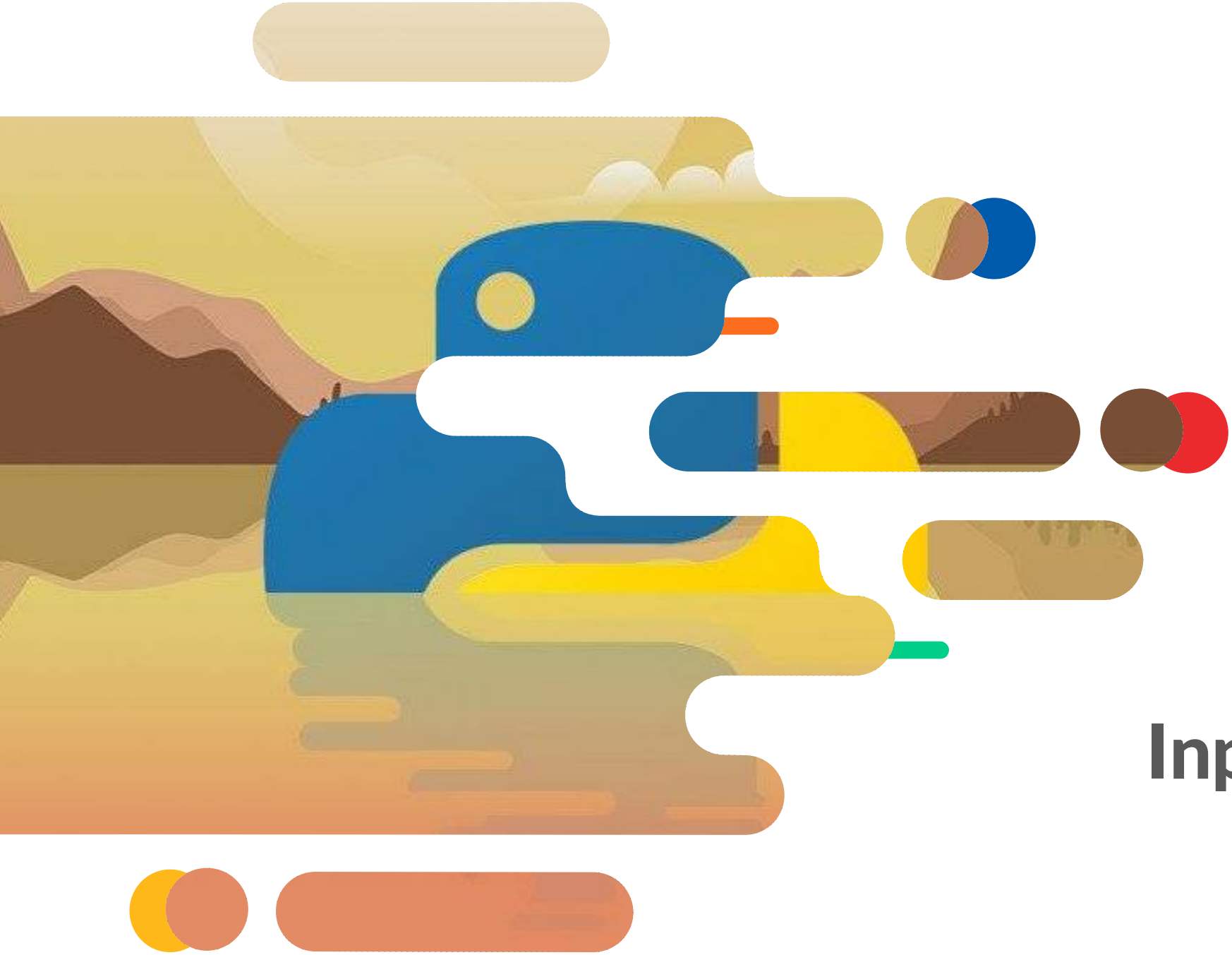
Contd…

Continue Statement

It returns the control to the beginning of the loop.

Continue	Output

for letter **in 'Python'**:
  if letter == **'o'**:
  continue
  print(**'Current Letter :'**, letter)
	Current Letter : P
	Current Letter : y
	Current Letter : t
	Current Letter : h
	Current Letter : n



Input and Output

Input and Output

Input from console

Console is also called Shell; this is basically a command line interpreter that takes input from the user i.e one command at a time and interprets it

STEP 1:

Create a file First.py

STEP 2:

Enter the following code

```
x=input("Enter 1st num:")
a=int(x)
y=input("Enter 2nd num:")
b=int(y)
z=a+b
print(z)
```

Input and Output

Contd…

STEP 3.A:

- ✓ Open the Command prompt
- ✓ Execute the command in the Python's file path

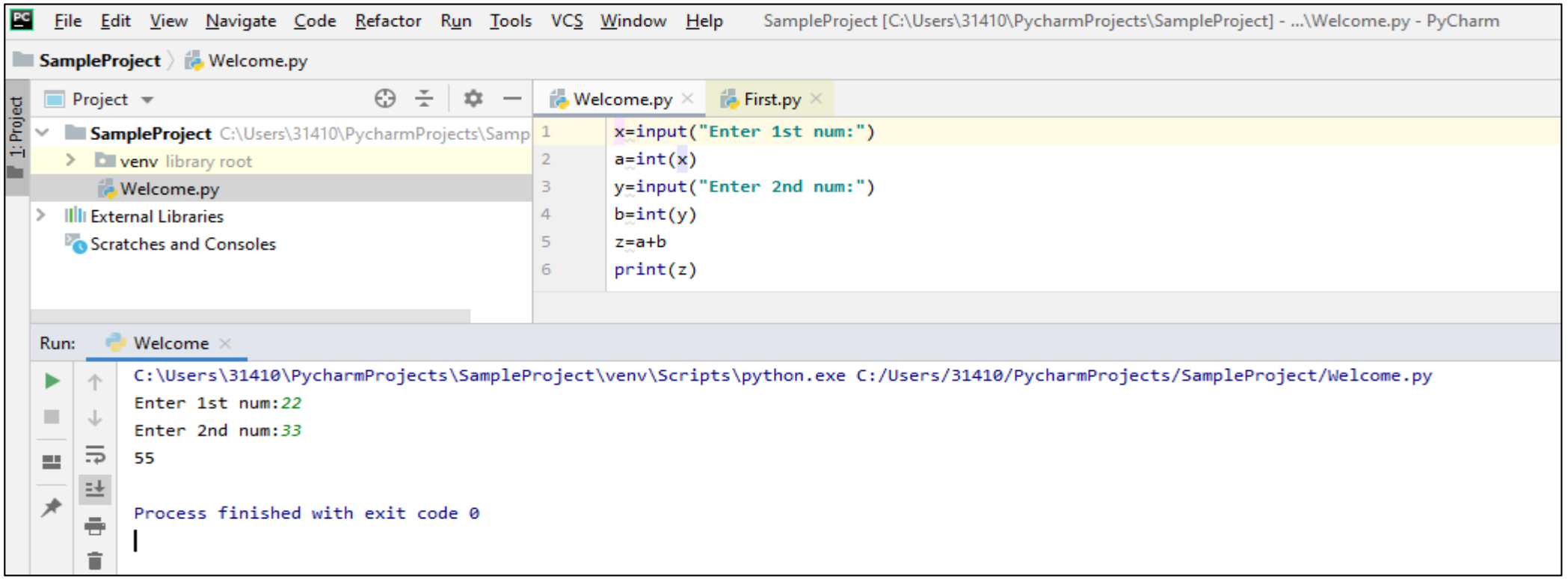
```
C:\Users\31410\Desktop\Python_Demo>python First.py
Enter 1st num:33
Enter 2nd num:44
77
```

Input and Output

Contd…

Input from PyCharm IDE

- ✓ To execute in IDE, open PyCharm
- ✓ Run the file



String Functions

String Function

String

- Strings are sequences of characters and are immutable.
- Python string is the collection of the characters surrounded by single quotes, double quotes, or triple quotes.

Creating String in Python

- String can be created by enclosing the characters in single-quotes or double- quotes.

```
#Using single quotes
str1 = 'Hello Python'
print(str1)

#Using double quotes
str2 = "Hello Python"
print(str2)
```

String Function Contd…

- Python also provides triple-quotes to represent the string, but it is generally used for multiline string or docstrings.

```
#Using triple quotes
str3 = """Triple quotes are generally used for
   represent the multiline or
   docstring'''
print(str3)
```

String Function

Contd…

- String can also be created with the str() function.

```
>>> str(123)
'123'

>>> str('programming')
'programming'

>>> str(programming)
```

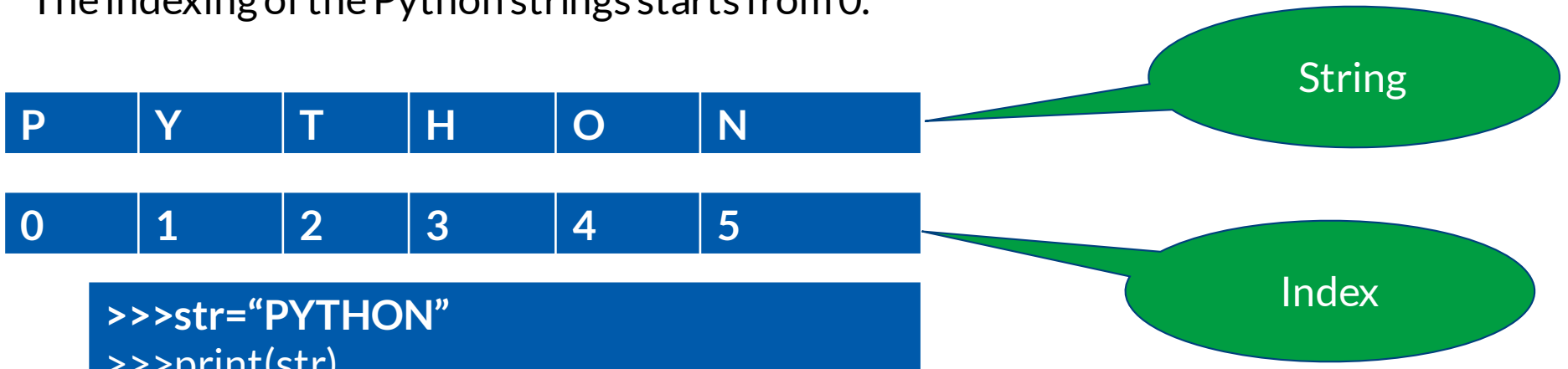
```
Traceback (most recent call last):
  File "<pyshell#1>", line 1, in <module>
    str(programming)
NameError: name 'programming' is not
defined
```

String Function

Contd…

String Indexing:

The indexing of the Python strings starts from 0.




```
>>>str="PYTHON"
>>>print(str)
PYTHON

>>>print(str[1])
Y
>>>print(str[7])
IndexError: string index out of range
```

String Function Contd…

String Slicing

Parts of strings can be retrieved at one time by slicing it with the slicing operator [:]

```
Str="programming language"
>>> str="PYTHON"
>>> print(str[2:5])
Output
THO


>>> print(str[:])
Output
PYTHON
```

[2:5] is a slice that gives us the characters from index 2 to index 4, index 5 is not included.

Prints the entire String

String Function

Contd…

String Slicing

```
>>> print(str[2:])
THON

>>> print(str[-2:])
ON

>>> print(str[-4:-2])
TH
```

Executes from 2nd index to the end of the string

Negative index will start from the end of the string

Executes 2 character from 4th index tracing from the end of the string

String Function Contd…

Concatenation:

Concatenation is joining two strings with the “+” operator.

```
>>> 'python'+'  '+'program'
'python  program’

>>> 'python  '*3
'python  python  python  '
```

```
>>> 'python'+3
```

cannot concatenate a string with an integer.

```
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
TypeError: can only concatenate str
(not "int") to str
```

String Function Contd…

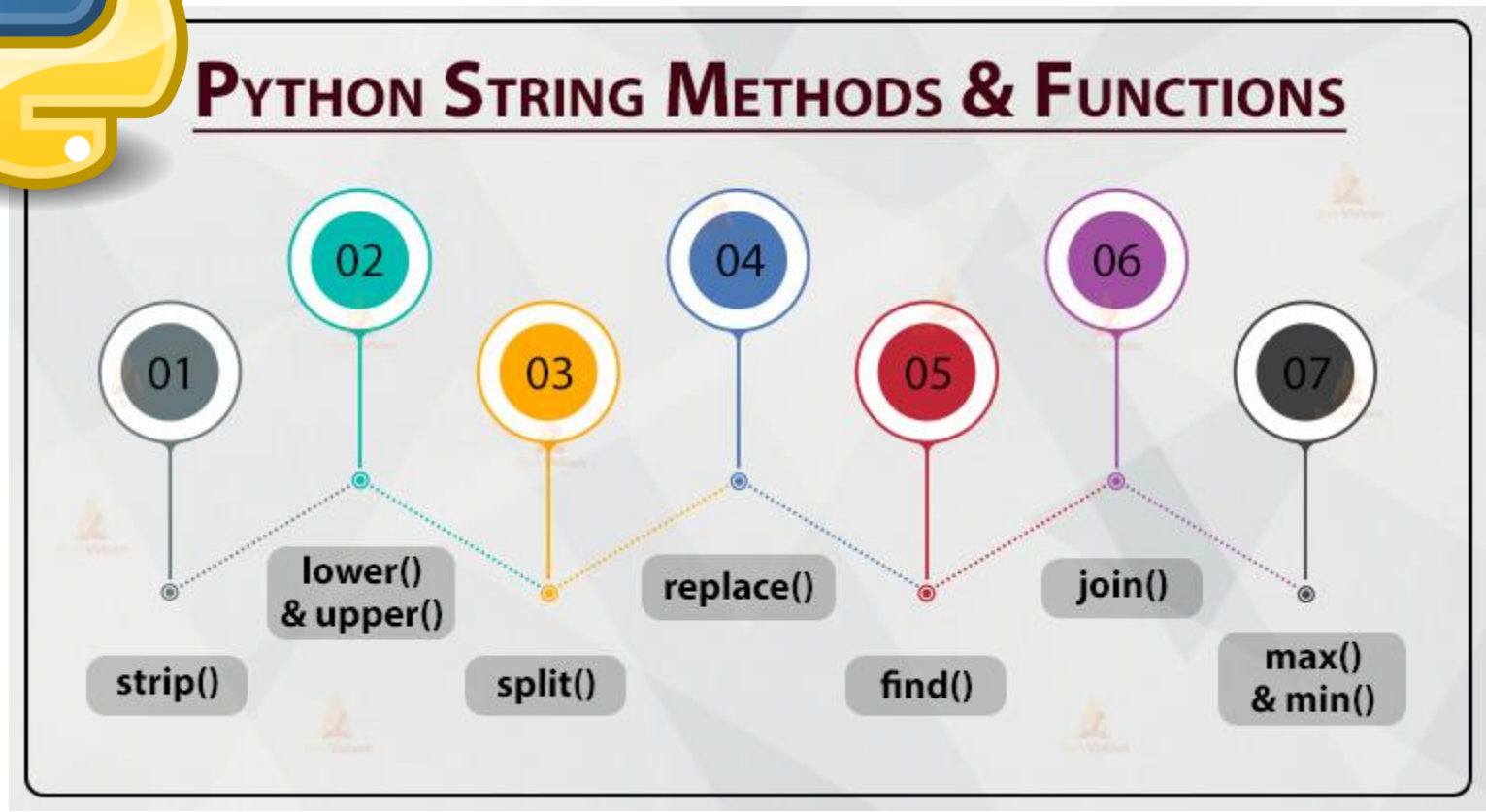
String Length

To find the length of the string, len() function is used

```
>>> str="Python is a Programming Language"
>>> len(str)
32
```

String Function

Contd…



String Function Contd…

Strip()

The strip() method removes whitespace around the string and returns the rest.

```
>>> str="  String Functions  "
>>> print(str)
 String Functions


>>> print(str.strip())
String Functions
```

String Function Contd…

Upper(), Lower() & Replace()

```
>>> str="String function"
>>> print(str.upper())
STRING FUNCTION

>>> print(str.lower())
string function

>>> print(str.replace('function','methods'))
String methods
```

Executes the given string in upper case

Executes the given string in lower case

Replace the 1st argument by 2nd argument

String Function Contd…

Split() & Find()

- split() method returns a list of strings after breaking the given string by the specified separator.
- The find() method returns the first index where it finds a character.

```
>>>str="String function"

>>> print(str.split(' '))
['String', 'function']

>>> print(str.find('m'))
-1
>>> print(str.find('t'))
1
```

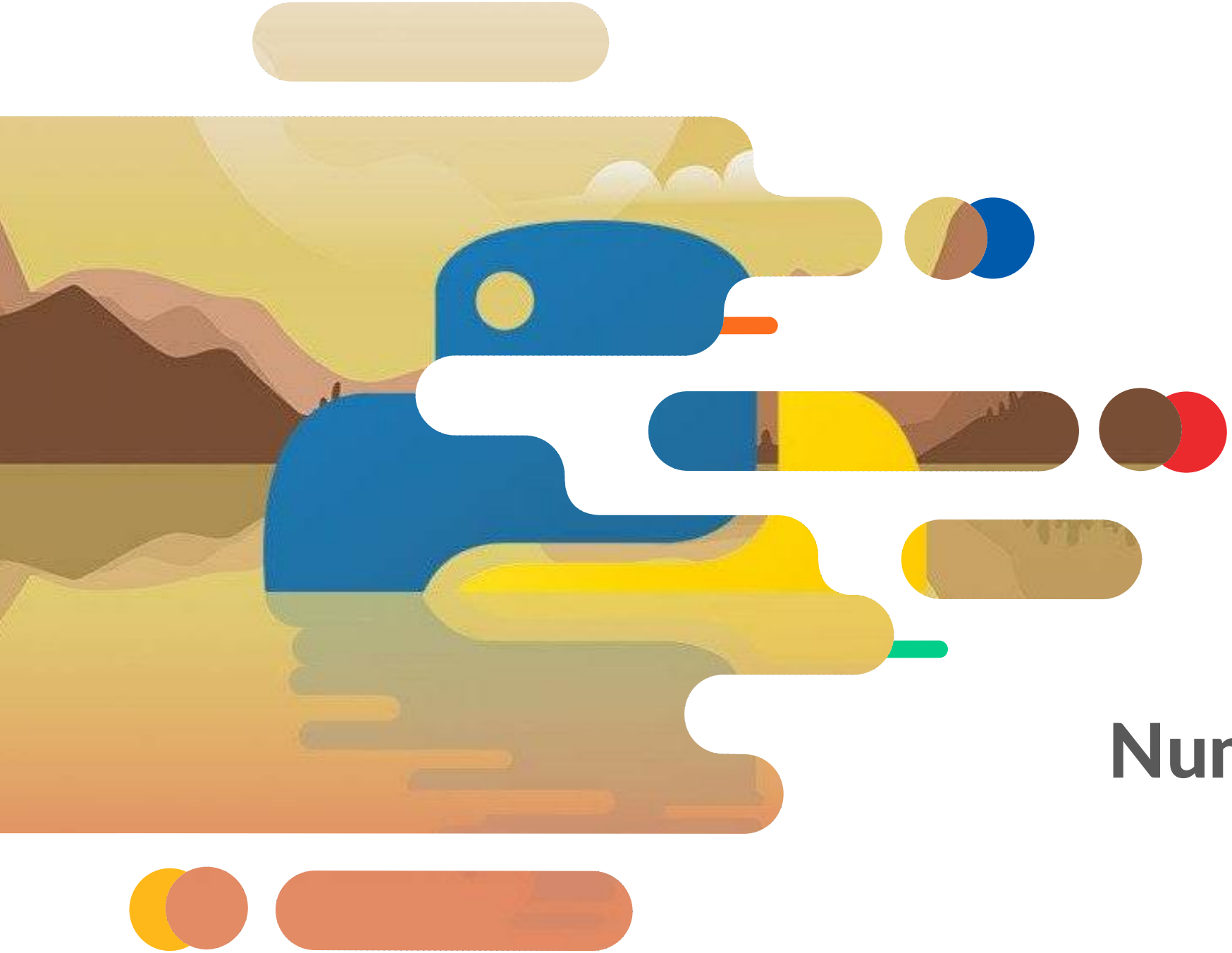
- If it does not find the character, it returns -1.

String Function Contd…

Max() and Min()

The max() and min() methods gives the characters with the highest and lowest values.

```
>>> str="pyz“

>>> print(max(str))
z

>>> print(min(str))
P
```



Number Functions

Number Function

Number Type Conversion

Python converts numbers internally in an expression containing mixed types to a common type for evaluation

- Type int(x) to convert x to a plain integer.
- Type long(x) to convert x to a long integer.
- Type float(x) to convert x to a floating-point number.
- Type complex(x) to convert x to a complex number with real part x and imaginary part zero.

Number Function

Contd…

Mathematical Functions

- The math module is a standard module in Python.
- To use mathematical functions import the module using import math.

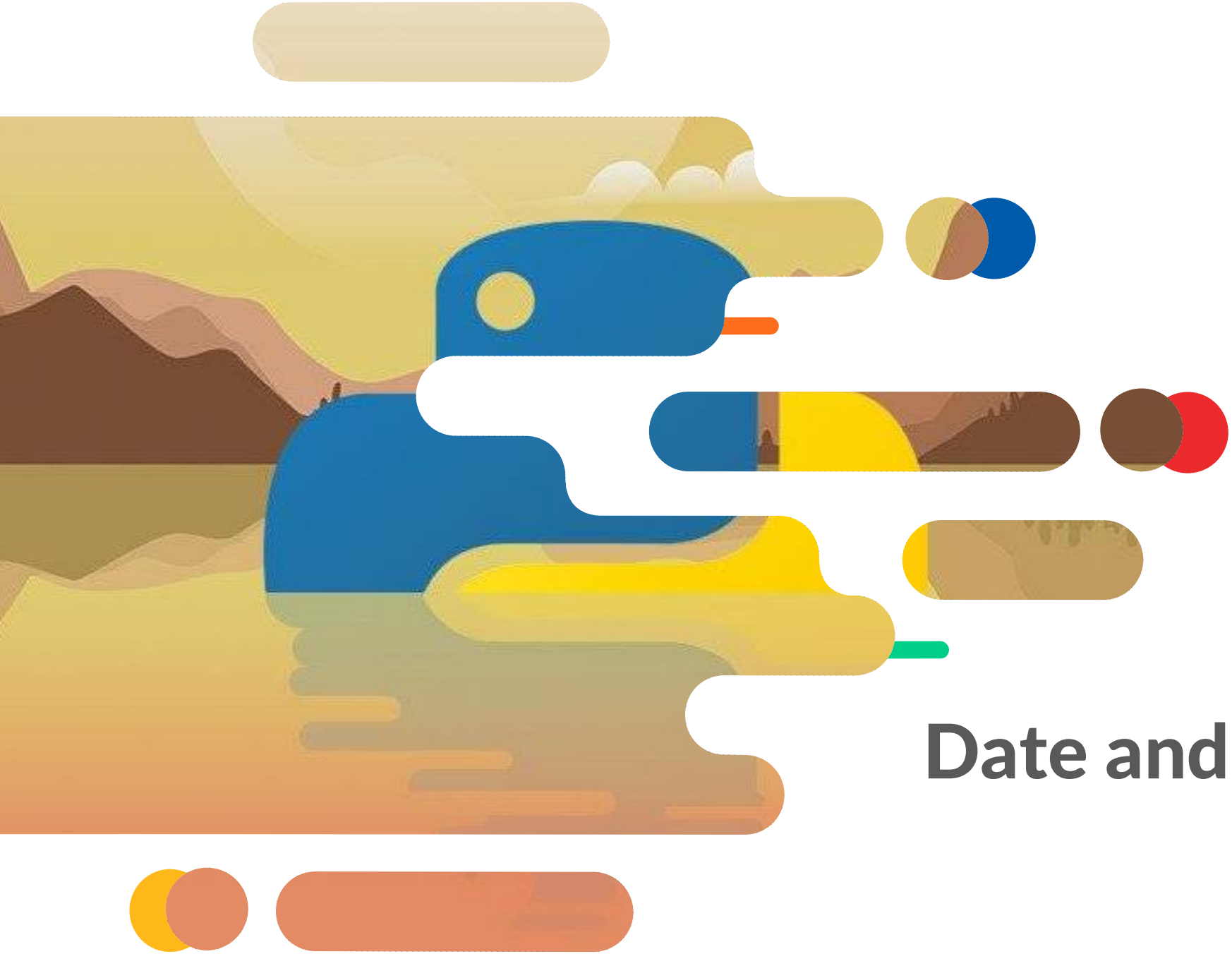
```
>>> import math

>>> x=math.sqrt(25)
>>> x
5.0

>>> x=math.sqrt(15)
>>> x
3.872983346207417
```

Number Function

Contd…

Mathematical Functions

```
>>> print(math.floor(2.9))
2
>>> print(math.floor(2.2)) [least value]
2
>>> print(math.ceil(2.2)) [highest value]
3
>>> 3**2
9
>>> print(math.pow(3,2))
9.0
>>> print(math.pi)
3.141592653589793
```

Date and Time Function

Date and Time Function

Time

- ✓ Python's time and calendar modules help to track dates and times.
- ✓ The function time.time() returns the current system time in ticks since 12:00am, January 1, 1970(epoch).
- ✓ Import the time module

```
>>> import time;

>>> print(time.time())
1594894062.8836365

>>> print(time.localtime())
time.struct_time(tm_year=2020, tm_mon=7, tm_mday=16, tm_hour=15,
tm_min=41, tm_sec=16, tm_wday=3, tm_yday=198, tm_isdst=0)
```

Date and Time Function Contd…

Current Time

To translate a time instant from seconds since the epoch floating-point value into a timetuple, pass the floating-point value to a function (e.g., localtime) that returns a time-tuple with all valid nine items.

```
import time

>>> currentTime=time.localtime(time.time())

>>> print("Local current time is:",currentTime)

Local current time is: time.struct_time(tm_year=2020, tm_mon=7,
tm_mday=16, tm_hour=16, tm_min=28, tm_sec=36, tm_wday=3,
tm_yday=198, tm_isdst=0)
```

Date and Time Function Contd…

Formatted Time

Time can be formatted as per our requirement, but a simple method to get time in a readable format is asctime()

```
>>> currentTime=time.asctime(time.localtime(time.time()))

>>> print("Local time:",currentTime)

Local time: Thu Jul 16 16:33:46 2020
```

Date and Time Function Contd…

Calendar

- To print a calendar for a given month
- Import the Calendar module

```
>>> import calendar

>>> cal=calendar.month(2020,7)

>>> print(cal)
    July 2020
Mo Tu We Th Fr Sa Su
      1  2  3  4  5
 6  7  8  9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31
```

Think and Answer

1. What is the output of the following code?
print(int(2.999))

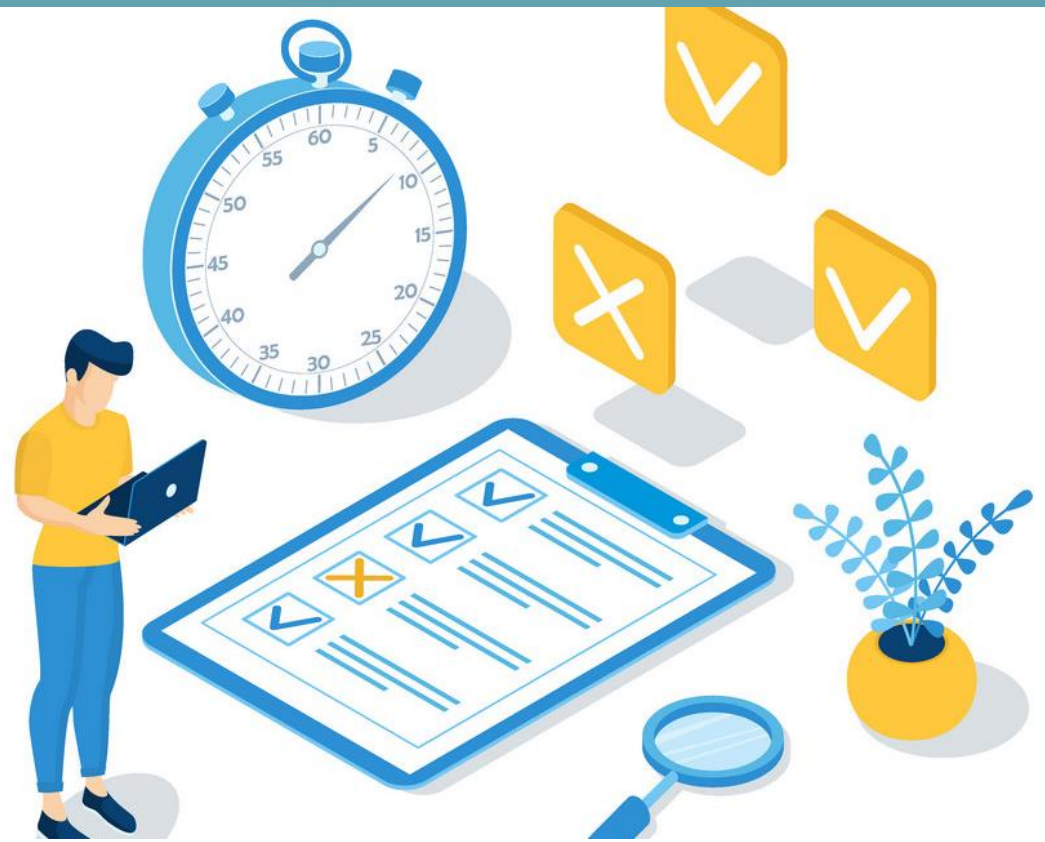
2. What is the output of “hello”+1+2+3?

3. Which function return date and time in particular format?

4. Which function is used to pause the code for the specified number of seconds?

5. String is Mutable or immutable?

Think and Answer



1. 2
2. Error
3. asctime()
4. Sleep()
5. immutable

Thank you

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