

Tutorial 2 (Week 1 + 2)

OBJECTIVES

- Able to create, access and manipulate list objects

1) Question 1.

I. Write one line of code to create a list containing 1, 2, 3, 4, 1, 2, 3, 4.

II. Write one line of code to change the list to 1, 2, 3, 4, 1, 2, 3, 4, 2000.

II. Write one line of code to change the list to 2, 3, 4, 1, 2, 3, 4, 2000.

IV. Write one line of code to change the list to 2, 3, 4, 1, 2, 3, 4, 0.

V. Write one line of code to change the list to 1, 2, 3, 4, 1, 2, 3, 4, 0.

VI. Write two lines of code using a loop to change the list to

11, 12, 13, 14, 11, 12, 13, 14, 10.

VII. Write two lines of code using a loop to change the list to

10, 10, 10, 10, 10, 10, 10, 10, 10.

VIII. Write two lines of code using a loop to change the list to

10, 11, 12, 13, 14, 15, 16, 17, 18.

IX. Write one line of code to change the list to an empty list.

- 2) Write a program to generate a list of square numbers. The program asks the user how many square numbers to be generated, and then displays the generated list of squares. The program should work as the following example:

```
How many square numbers to generate? 7
```

```
Here is a list of generated squares: [0, 1, 4, 9, 16, 25, 36]
```

- 3) Write a program to generate a list of Fibonacci numbers. The program asks the user how many numbers to be generated, and then displays the generated list of numbers. The program should work as the following example:

```
How many Fibonacci numbers to generate? 6
```

```
Here is a list of generated Fibonacci numbers: [0, 1, 1, 2, 3, 5]
```

- 4) Write a program to repeatedly ask the user to enter an integer number, until the user enters "QUIT". Then display the list of all the entered numbers. The program should work as the following example:

```
Enter an integer (enter QUIT to quit): 10
Enter an integer (enter QUIT to quit): 5
Enter an integer (enter QUIT to quit): 1 Enter an integer (enter
QUIT to quit): 2
Enter an integer (enter QUIT to quit): QUIT
You have entered: 10, 5, 1, 2.
```

Dictionary

OBJECTIVES

- Able to create, access and manipulate dictionary objects

- 5) Given the following code, write a Python script to print out the variable that prints out the states Queensland and Victoria from the following variable

```
state_abb = {
    "NSW": "New South Wales",
    "ACT": "Australian Capital Territory",
    "NT": "Northern Territory",
    "QLD": "Queensland",
    "SA": "South Australia",
    "TAS": "Tasmania",
    "VIC": "Victoria",
    "WA": "Western Australia"
}
```

- 6) Given the following code, write a Python script to

- Print out user's first name
- Change user's last name to Harrison
- Add user's email a.harrison@gmail.com
- Delete user's age

```
user_info = {
    "first_name": "Amanda",
    "last_name": "Smith",
    "age": 20
}
```

```
}
```

7) Use a dictionary to write a program that works like the following example.

```
Enter state NSW/ACT/NT/QLD/SA/TAS/VIC/WA: NT
```

```
You have entered Northern Territory
```

8) Write a Python script to add a key to a dictionary.

```
Enter a key (string): NT
```

```
Enter value: 932
```

```
Enter a key (string): AU
```

```
Enter value: 9321
```

```
We have a dictionary: {'NT': '932', 'AU': '9321'}
```

9) Write a Python script to combine the following dictionaries into a new one.

```
Sample Dictionary :
```

```
dic1={12:144, 13:169}
```

```
dic2={3:33, 4:44}
```

```
dic3={5:510,6:632}
```

```
Expected Result: {12: 144, 13: 169, 3: 33, 4: 44, 5: 510, 6: 632}
```

10) Given the following code, access the value with the key 'communications' and print it out.

```
school = {  
    "classA": {  
        "student": {  
            "name": "Merlion Tan",  
            "subjects": {  
                "phython": 70,  
                "communications": 80  
            }  
        }  
    }  
}
```

11) Rename the key 'town' to 'district' in the following dictionary

```
sampleDict = {  
    "name": "Kelly",  
    "interest": 'badminton',  
    "age": 32,  
    "town": "Ang Mo Kio" }
```

12) Given the following code, write a Python script to

- Add a key to inventory called 'equipped'.
- Set the value of 'equipped' to be a list consisting of the str objects 'ruby', 'red potion', and 'apple'.
- `.sort()` the items in the list stored under the 'haversack' key.
- Then `.remove('dagger')` from the list of items stored under the 'haversack' key.
- Add 50 to the number stored under the 'gold' key.

```
inventory = {  
    'coins' : 500,  
    'pouch' : ['flint', 'twine', 'gemstone'],  
    'haversack' : ['wooden spear', 'dagger', 'fish', 'drumstick']}
```

13) Given the following code, write a Python script that retrieves a list of available items for sale. Next compute the total checkout price for everything in the store, and add 7% g.s.t. to it.

```
stock = {  
    "sunblock" 25,  
    "swimming cap": 2,  
    "ear plugs": 4,  
    "goggles": 15  
}  
  
unit_price = {  
    "sunblock": 16,  
    "swimming cap": 10,  
    "ear plugs": 1.5,  
    "goggles": 9.9  
}
```

Function

- Able to define and call functions

14) Write a **function** based on the following specification:

Function name:	triple
Input arguments:	1 input argument: <ul style="list-style-type: none">• sentence: a string
Return values:	1 return value: the function returns a new string where each character of the input string gets repeated 3 times. For example, if the input argument sentence is Uni then the function returns the string UUUnnniii

15) Using the function in Question 50, write a program that works **exactly** like the following example (the text in **bold** indicates the user input):

Enter a sentence: **little fish**

Triple effect: llliiittttttllleee fffiiissshhh

16) Consider the following rule to generate a sequence from an initial integer:

- If the number X is even then the next number is $3X + 1$
- If the number X is odd then the next

number is $2X + 2$ Write a **function** based on the following specification:

Function name:	next_number
Input arguments:	1 input argument: <ul style="list-style-type: none">• number: an integer
Return values:	1 return value: if the input argument number = X is even then the function returns $3X + 1$, if X is odd then return $2X + 2$.

17) Using the function in Question 3, write a program that works **exactly** like the following example (the text in **bold** indicates the user input):

Enter the initial number: **1**

Sequence:

Step 0: 1

Step 1: 4

Step 2: 13

Step 3: 28

... this goes until the number becomes greater than 1 million then stops...

18) Write a function based on the following specifications:

Function name:	Function name: <code>filter_digit</code>
Function arguments	1 argument: i. <code>data: list[str, int]</code> The argument will be a list of <code>str</code> and <code>int</code> objects
Return values:	2 return values. The function returns a string that contains only the digits that appear in the list argument and the sum of those digits. For example, if the input argument is <code>[0, "egg", 1, "egg", 5, "cat", 77]</code> , then the function returns 2 values: the first one is the string of digits <code>"01577"</code> , the second one is the sum of those digits, which is 20. If the input sentence has no digit, then an empty string is returned and the returned sum is 0.

19) Implement a function that meets the following specifications

Function name	<code>compute_hypothense</code>
Argument	1. 2 float
Return value	1. a float
Detailed information	The two float arguments are the two perpendicular sides of a Pythagoras triangle. Compute and return the length of the hypotenuse.

20) Implement a function that meets the following specifications

Function name	get_area_of_circle
Argument	1. a float, with a default value of 1.0
Return value	1. a float
Detailed information	Let the argument be the radius of a circle, compute and return the area of the circle.

21) Implement a function that meets the following specifications

Function name	get_volume_of_cylinder
Argument	1. a float, 2. a float with a default value of 10.0
Return value	1. a float
Detailed information	Let the first argument be the radius of the cross-section of a cylinder, and the second argument be the length of the cylinder. Using the function in question 14, compute and return the volume of the cylinder.

22) Implement a function that meets the following specifications

Function name	is_prime_number
Argument	1. an int
Return value	1. a bool
Detailed information	If the integer argument is prime return True, else return False

23) Implement a function that meets the following specifications

Function name	get_next_prime_number
Argument	1. an int
Return value	1. an int
Detailed information	Using the integer argument and the function in question 10, get the next prime number that comes after the argument