

## Exercises\_wk2 (including solutions) ↗

**Q1:** Import the built-in random module, and use the randint() function to generate a random (integer) number between 1 and 10, and print it.

```
In [1]: import random

rand_num = random.randint(1, 10) # Note: randint(a, b) returns a random integer N such that a
                                # <= N <= b.
print(rand_num)
```

**Q2:** Write a program that imports the built-in math module, and then asks the user to input a (integer) number (= x) and uses the sqrt(x) function to compute the square root of x, and print it.

```
In [2]: import math

num = int(input('Please input a (integer) number: '))

sq_rt = math.sqrt(num)
print(sq_rt)
```

```
Please input a (integer) number: 25
5.0
```

**Q3:** Write a program that asks the user to input the net profit of a firm at t = 0 and at t = 1, then defines a function ('rel\_change') that calculates and returns the relative change (i.e., (num\_t1 - num\_t0) / num\_t0), and then (after printing the following statement: "Then the relative change in the firm's net profit between these two time periods was: ") calls the function to calculate and return the relative change in the firm's net profit.

```
In [3]: num_t0 = float(input("What was the firm's net profit at t = 0?: "))
num_t1 = float(input("What was the firm's net profit at t = 1?: "))

def rel_change(num_t0, num_t1):
    rel_change = (num_t1 - num_t0) / num_t0
    return rel_change
```

```
print("Then the relative change in the firm's net profit between these two time periods was: ")
rel_change(num_t0, num_t1)
```

```
What was the firm's net profit at t = 0?: 100000
What was the firm's net profit at t = 1?: 120000
Then the relative change in the firm's net profit between these two time periods was:
```

```
Out[3]: 0.2
```

**Q4:** Write a program that loops through all numbers between 1 and (up to and including) 50, and print all (integer) numbers that are divisible by 10 on a separate line. (Hint: Use conditionals and the range() function.)

```
In [4]: for num in range(1, 51):
    if num % 10 == 0:
        print(num)
```

```
10
20
30
40
50
```

**Q5:** Write a program that asks the user to input a word, and then uses a for loop to loop through the letters of the word and print all letters that are a vowel ('a', 'e', 'i', 'o', 'u'). (Hint: Use conditionals.)

```
In [5]: word = input("Please input a word: ")

for letter in word:
    if letter == 'a' or letter == 'e' or letter == 'i' or letter == 'o' or letter == 'u':
        print(letter)
```

```
Please input a word: accounting
a
o
u
i
```

**NOTE:** A string is a sequence of characters, which can be letters, numbers and special characters. Strings are immutable.

**Q6:** Define a variable ('word') containing the word 'accounting'. Then use indexing to respectively extract the characters at index positions 0 ('a') and 3 ('o'), and print them. Then do the same for the two characters at index positions 2 and 4 from the end of the string ('n' and 't'). Next use concatenation to combine these four characters into the word 'nota', and print it. (Hint: Be aware that Python uses zero-based indexing.)

```
In [6]: word = 'accounting'
print(word[0])
print(word[3])
print(word[-2])
print(word[-4])
print(word[-2] + word[3] + word[-4] + word[0])
```

```
a
o
n
t
nota
```

**Q7:** Define a variable ('word') containing the word 'accounting'. Then use slicing to respectively extract the following slices: (1) from the beginning of the string up to (but not including) the character at index position 3 ('acc'), (2) from the character at index position 2 up to (but not including) the character at index position 7 ('count'), (3) from the end to the beginning of the string (i.e., reversed)('gnitnuocca'), and (4) from the character at index position 9 up to (but not including) the character at index position 4 (i.e., again reversed) with steps of 2 ('gin'), and print these slices.

```
In [7]: word = 'accounting'
print(word[:3])
print(word[2:7])
print(word[::-1])
print(word[9:4:-2])
```

```
acc
count
gnitnuocca
gin
```

**Q8:** Define a variable ('word') containing the word 'Accounting'. Then, after manipulating the string so that all letters are lowercase, count the number of vowels ('a', 'e', 'i', 'o', 'u') that appear in this string, and print it.

```
In [8]: word = 'Accounting'
count = 0
for letter in word.lower():
    if letter == 'a' or letter == 'e' or letter == 'i' or letter == 'o' or letter == 'u':
        count = count + 1 # This can also be shortened to: count += 1.
print(count)
```

```
4
```

**NOTE:** The strip() method removes whitespace from the beginning and end of a string by default, whereas the lstrip() and rstrip() methods only remove whitespace from the beginning or end of the string. By adding a CHAR parameter (strip(char)), you can also specify the character(s) you want to strip. For example, 'abca'.strip('a') will remove the character 'a' from both sides of the string, whereas 'abca'.strip('ab') will remove all combinations of the characters 'a' and 'b' from both sides of the string.

**Q9:** Define a variable ('word') containing the following string: "##Analytics,". First, strip all the hash signs from the left side of this string. Try it with .lstrip() and .strip(). Next, strip both the hash signs from the left side of the string and the comma from the right side. Try it with combining .lstrip() and .rstrip() and with .strip().

```
In [9]: word = '##Analytics,'
print(word.lstrip('#'))
print(word.strip('#'))
print(word.lstrip('#').rstrip(','))
print(word.strip('#'))
```

```
Analytics,
```

```
Analytics,
```

```
Analytics
```

**NOTE:** String formatting allows you to embed variables inside a string. In addition to using the format operator (see Severance (2016, p. 72-73)), there are now two other ways of doing this (the format() method and so-called f-strings). For example, the following three print statements all provide the same result (try it!):

```
name = 'Martijn'
age = 50

print('%s is %d years old' % (name, age)) # using the format operator
print('{} is {} years old'.format(name, age)) # using the format() method
print(f'{name} is {age} years old') # using f-strings
```

**Q10:** Define three variables ('ratio', 'firm' and 'perc') containing respectively the following values ('ROI', 'Ramap' and 15). Then use the three ways of doing string formatting to print the following statement: "The ROI of Ramap was 15 percent."

```
In [10]: ratio = 'ROI'
firm = 'Ramap'
perc = 15

print('The %s of %s was %d percent.' % (ratio, firm, perc))
print('The {} of {} was {} percent.'.format(ratio, firm, perc))
print(f'The {ratio} of {firm} was {perc} percent.')
```

The ROI of Ramap was 15 percent.  
The ROI of Ramap was 15 percent.  
The ROI of Ramap was 15 percent.