Week 4:
Operators, casting, keyboard and decision-making statements
Programming
2021 - 2022
Bachelor in Computer Science and Engineering

Exercise 1. Assignment operators

The only "real" assignment operator is the equal symbol (=), but Python has also some other assignment operators as the following example shows (copy it into a program and run it). How do these operators work?

```
a = 4
a += 2
print(a)
a -= 3
print(a)
a *= 3
print(a)
a /= 2
print(a)
a %= 4
print(a)
a == 0
print(a)
a //= 2
print(a)
```

Exercise 2. Operator precedence

Type the code below. What is the result of the program? Why?

```
a, b, c, d = 5, 3, 20, 20
c -= (a + 1) / b – 3 + a % b
d -= (a + 1) / (b + 3 - 4 * a) % b
print("c:", c)
print("d:", d)
```

Exercise 3. Relational operators

Type the code below. What is the result of the program? Why?

```
a = 3
b = 8
c = 3.0
r = a == 0
s = a != 0
t = a <= b
u = b >= a
v = b > a
w = b < a
x = c == 3.0
print("r:", r)
print("s:", s)
print("t:", t)
print("u:", u)
print("v:", v)
```

```
print("w:", w)
print("x:", x)
```

Exercise 4. Write a program that reads two integer numbers on the keyboard and shows the result of dividing the first by the second. If the second is zero, instead of performing the division it will print "`Cannot divide by zero`".

Exercise 5. Write a program that reads two names and two ages on the keyboard and prints who is older. Example: if we introduce `Pepe 23` and `Luisa 18`, it must print `Pepe is older than Luisa`. If they are the same age it must print `Pepe and Luisa are the same age`

Exercise 6. Write a program that prints on the screen the price of a cinema ticket according to the age of the customer. The program must read the user's age and calculate the price as follows: (a) Normal ticket: 9 Euros; (b) Children under 5: 60% discount; (c) People over 60: 55% discount; (d) Young people under 26: 20% discount.

Exercise 7. Create a program receiving by keyboard a number of seconds and converting it to its hours equivalent (for example 3680 seconds are 1 hour, 1 minute and 20 seconds and will be printed like `01:01:20`). Notice the leading zeros.

Exercise 8. Write a program that reads a single character on the keyboard and prints on the screen if "`It is a number`" or "`It is not a number`".

Exercise 9. Create a program asking to enter the coordinates of a point in a plane, i.e. two integer values, x and y, not equal to zero. The program must print the quadrant where this point lies (1st quadrant if x>0 and y>0, 2nd if x<0 and y>0, etc.) (Note: you can use the flow diagram of practice 2). For example for (1,1) it must print: `1st`. If x or y are zero it must print "`The values are not valid`" and finish.

Exercise 10. Create a program that calculates and shows the final salary of a worker depending on the base salary and seniority according to the following rules:

a. Ask the user about the base salary. If the base salary is bigger or equal than 1000 just show it as the final salary.

b. If the base salary is less than 1000, ask the user about the seniority (only ask about it in this case!)

- If seniority is at least 10 years, the salary will be increased by 20%.
- If seniority is less than 10 years, the salary will be increased by 5%.

Example of output:

```
Final salary of the worker is:
XXX Euros
```

Exercise 11. A year is leap-year if it is a multiple of 4, except if it is a multiple of 100. In this last case it will be leap-year only if it is also a multiple of 400. For example the year 1900 was not a leap-year, but the year 2000 was. Create a program that reads a number by keyboard and calculates if it is a leap year. (Note: you can use the flow diagram of week 2). Example of outputs (notice the use of past or future tense):

```
1901 was not a leap year
2016 was a leap year
2400 will be a leap year
2401 will be not a leap year
```

Exercise 12. Create a program that receives as input a positive number, which will correspond to a quantity of money, and calculates and prints the minimum number of notes and coins for it. If the quantity of any coin or note is zero it must not be printed.

- Notes: 500, 200, 100, 50, 20, 10 and 5€
- Coins: 2, 1, 0.5, 0.20, 0.10, 0.05, 0.02 and 0.01€

Example, if 348.07 is introduced it should print:

```
200€: 1
100€: 1
20€: 2
5€: 1
2€: 1
1€: 1
0.05€: 1
0.02€: 1
```

Exercise 13. Create a program to simulate a calculator. It must ask for two numbers and the operator (`+ - * / // **`) and show the result. If the operator is not a valid one, it must print the wrong `operator` and finish.

Delivery rules

The solutions to the previous exercises must be uploaded to Aula Global before 6th October 2021, 08:00 am. Upload a zip file containing a file for each exercise (name them `exercise1.py`, `exercise2.py`, etc). The name of the zip file must be "w4-name-initials.zip" (Lucía Pérez Gómez will name the file w4-lpg.zip).