

# Programming

## Academic Year: 2021/22

### Practical Case

### Phase 1: Introduction to Python

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## 2. Introduction

This document contains the statement of the practical case in relation to the topic: "Introduction to Python" and the use of conditional statements (phase 1).

The practice will be carried out in **groups of 3 people**.

### 2.1. Objective

Apply the knowledge acquired in theory and practical sessions, implementing a practical case in Python based on real use cases.

### 2.2. Evaluation

This phase 1 of the practical case will score **10% of the total grade** of this course.

The teacher will evaluate the deliverable and publish the grades at the end of the semester. The students can request a revision of the grade after its publication.

### 2.3. Delivery

The deliverable must be uploaded to Aula Global before **October 22nd**.

The deliverable consists of a single compressed file (.zip or .rar) with the following documents:

- **Report (2%)**: a report of the practical case, including the sections described below.  
**Important:** it is **not** necessary to include source code in the report, although students can include some code lines in order to explain a fragment of the project.
  - Cover: name of the practical case, phase, students' name, course number.
  - Introduction: brief description of the work, adding any specific comments about the practical case.
  - Implementation: for each task, include validation tests to verify that the program always works correctly.
  - Conclusions: description of the work made and how it solves the problem stated. Students may include personal comments about the practical case, difficulties and problems encountered during the implementation.
- **Source code (8%)**: one or more .py files with the source code that implements the practical case. The code must include program execution examples to confirm the validation tests, including exceptional cases.

### 2.4. Important

- It is not allowed the use of any kind of functions, complex data types and other elements besides those presented in class.
- It is recommended to save all the exercises in a dedicated folder to facilitate the delivery of the practical case.
- The created folder must be compressed (.zip or .rar) and then uploaded to Aula Global.

### 3. Phase 1 Statement

#### 3.1. Introduction

The company YOURCRANE.es is a leading company in the sector that provides lifting and special transport services. Its main activity is the rental of mobile cranes and crane trucks with operators. It has a wide range of modern equipment from the best brands and models on the market (all-terrain and industrial telescopic cranes, lattice cranes on chains and tires, conventional or all-terrain crane trucks, tractor heads with cranes, etc.)

Given the company's success in recent months, we have been asked to provide a solution to manage the rentals of their equipment, as well as the special transportation solution to their customers.

For that, we have signed a development agreement for creating a software application in three phases, divided into the following needs:

1. (10%) Phase 1: Main program menu and data entering
2. (10%) Phase 2: Structure of the program into functions and data verification
3. (20%) Phase 3: Products catalogue, sales and contracts

The current document shows the specifications to be developed in Phase 1 of the project.

#### 3.2. Tasks to implement in Phase 1

In the Phase 1 of the practical case, the main menu of the program will be displayed on screen. It will also be possible to enter new products into the catalog.

Therefore, the tasks to execute are the following:

##### 3.2.1. TASK 1: Print menu

The menu to print/display on screen when executing the program should be the following:

```
***** MAIN MENU *****  
1. New Lifting Equipment  
2. New client  
3. New Equipment Rental  
4. Exit  
  
Please, enter an option (1-4):
```

The user will then be asked to enter an option of the menu by asking: "Please, enter an option (1-4): "

- If the user enters an invalid option (a value different from the menu options), an error message will be displayed on screen: "Error: invalid option".
- If a valid option is selected, the following process will be executed:
  - Depending on the option selected by the user, a message showing the name of the function to execute will be displayed, followed by the execution of that function.
  - For example, if the user chooses option 1, it will be displayed on screen: "New Lifting Equipment", and the function from Task 2 (Section 3.2.2. below) will be executed.
  - If the user chooses any other option (2-4), as there are no related tasks in Phase 1, the program will only display the function name to execute. For

instance, if the user chooses option 3, the program will display on screen the message "New Equipment rental".

- Afterwards, the program will end its execution.

### 3.2.2. TASK 2: New Lifting Equipment

In this task, the user will be asked to enter all the data of a new lifting equipment recently acquired by the company, in order to add it to their equipment inventory. The data to enter by the user is the following:

- Identifier of the equipment: a unique numeric identifier assigned to the equipment
- Name
- Brand: Equipment brand
- Model: an alphanumeric string of characters
- Type of lifting equipment
- Rental Price without VAT: the rental price associated with the equipment
- Number of units available

For instance:

- ID: 512
- Name of the product: Polfinger Maxi Lifter
- Brand: POLFINGER
- Model: PCC 115.002
- Type: All-terrain crane
- Rental Price without VAT (€): 12500
- Number of units available: 4

All of the product data entered is going to be stored in variables of the program. In addition to this, some data validation must be performed:

- Price: if the price entered has a negative value, an error message will appear: "Error, a product cannot have a negative rental price".  
If the price is greater than or equal to zero and less than 1000, a message will be displayed: "Low price"; if the price is greater than 1000 and lower than 8000, a message will be displayed: "Medium price"; and finally, if the price is greater than or equal to 8000, a message will be displayed: "High price".
- Number of units: if the number of units available has a negative value, an error message will appear: "Error: the number of units must not be negative".
- The only brands allowed are "POLFINGER", "KONEG" and "SMALZ". If the user enters any other brand, an error message will be displayed: "Error, invalid brand entered" and a default value "unknown" will be assigned to the Brand.

Moreover, a total price including VAT will be calculated and stored in another variable, considering a VAT of 16% on the equipment rental price.

Once all the data has been entered by the user, the program will display on screen the information as shown in the next page:

```
*** LIFTING EQUIPMENT ***  
ID: 512  
Name: Polfinger Maxi Lifter  
Brand: POLFINGER  
Model: PCC 115.002  
Type: All-terrain crane  
Rental price (without VAT): 12500  
Rental price (with VAT): 14500  
Units available: 4
```

**NOTE:** In this first phase, data will be stored only on variables; however, it will serve as a base for next exercises or phases when we will learn about more advanced concepts.