

# Industrial Software Development (ISDe) – January 18, 2021

Name: ..... Surname: ..... Student ID: .....

## Exercise 2 (10 points) – 30 mins

A 'piggy bank' object has the **save()** and **retrieve()** methods to insert or withdraw money. The object is created with an initial amount in euro, and with a threshold value.

The method **retrieve()** withdraws the exact requested amount from the piggy bank, if possible, and returns **True**. Otherwise, it returns **False**, and the amount saved in the piggy bank does not change.

Various objects **obs\_1**, ..., **obs\_n** could be interested in the amounts contained in the piggy bank. In particular, they must send a "too low amount" message if the current amount is less than the threshold.

```
# MAIN

piggy_bank = PiggyBank(initial_amount=40, lower_threshold=20)

obs1 = Observer('Observer 1')
obs2 = Observer('Observer 2')
piggy_bank.register(obs1)
piggy_bank.register(obs2)

piggy_bank.retrieve(15)
piggy_bank.retrieve(15)
piggy_bank.unregister(obs2)
piggy_bank.retrieve(5)
```

The output is:

```
message from Observer 2
the amount is too low - it is only 10

message from Observer 1
the amount is too low - it is only 10

message from Observer 1
the amount is too low - it is only 5
```

Use the observer design pattern to implement the classes **Observer** and **PiggyBank**. The above 'main' code must run correctly, producing the showed output.