DIGITAL TECHNOLOGY

Academic Year 2023-24
Prof. Barbara PERNICI

Exam 15/1/2025
Total time 1.30 h

Last name	
First name	
Matricola/Person code	
Signature	

Please remember that:
- *The exam is closed books.*
- *The use of watches, cellular phones or any other electronic device during the exam is forbidden.*

It is necessary to answer at least partially all the questions for a positive evaluation.
Given answers should be explained, lists of bullet items are insufficient to answer a question.

Question 1 [11 points]

Illustrate the data quality dimensions presented in the course and discuss the role of data profiling tasks to identify possible quality issues in a dataset.

Question 2 [11 points]

Illustrate and discuss the use of asymmetric cryptography in data security.

[please turn over]

Question 3 [11 points]

Consider the following fragment of Python code:

```
import pandas as pd


def my_function(val=10):
    if val % 2 == 0:
        return val * 2
    else:
        return val * 3


data = {'id': [i for i in range(4)], 'value': [2, 3, 4, 5]}
df = pd.DataFrame(data)

df['sq'] = df['value'] ** 2

df['db'] = df['value'].apply(my_function)

print(df)  # Write down the content of the dataframe at this point

res_df = df[(df['sq'] > 15) & (df['db'] < 10)]

print(res_df)  # Write down the content of the dataframe at this point
```

a) Explain step by step the workflow of this piece of python code, writing down when requested the output dataframe (see comments on the code)

b) Implement a function that takes a list of integers and returns a new list where each integer is replaced by the square of its value if it is even, and by the cube of its value if it is odd.

c) Which and why is the best combination of basic Python data structure to store the movies in which an actor has participated?

15-1-2025 Question 3 solutions

```
import pandas as pd


def my_function(val=10):
    if val % 2 == 0:
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data = {'id': [i for i in range(4)], 'value': [2, 3, 4, 5]}
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print(df)  # Write down the content of the dataframe at this point
```

res_df = df[(df['sq'] > 15) & (df['db'] < 10)]

print(res_df) *# Write down the content of the dataframe at this point*

Questions:

a) Explain step by step the workflow of this piece of python code, writing down when requested the output dataframe (see comments on the code)

b) Implement a function that takes a list of integers and returns a new list where each integer is replaced by the square of its value if it is even, and by the cube of its value if it is odd.

c) Which and why is the best combination of basic Python data structure to store the movies in which an actor has participated?

Solutions

Question a)

I due output dataframe richiesti sono

	id	value	sq	db
0	0	2	4	4
1	1	3	9	9
2	2	4	16	8
3	3	5	25	15

	id	value	sq	db
2	2	4	16	8

Question b)

```
def edit_list(my_list: list[int]) -> list[int]:
    return [a ** 3 if a % 2 else a ** 2 for a in my_list]
```

Question c)

Dictionary with key the name of the actor and value a set of strings containing the names of the films in which he has participated. Set is a plus compared to a list because it avoids duplicates.