DIGITAL TECHNOLOGY

Academic Year 2023-24
Prof. Barbara PERNICI

Exam 6/2/2025
Total time 1.30 h

Last name	
First name	
Matricola/Person code	
Signature	

Please remember that:
- *The exam is closed books.*
- *The use of cellular phones or any other electronic devices 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.

Please write the answer for each question on a separate piece of paper.

Question 1 [11 points]

Explain how the approach of agile project management can be used to address the limitations of the approach of traditional project management and provide examples of how agile project management can help to improve project outcomes in certain environments.

Question 2 [11 points]

Illustrate the Dimensional Fact Model for designing datawarehouses and how it can be mapped to a relational model in a ROLAP database. Provide an example to support the answer.

Question 3 [11 points]

Consider the following fragment of Python code:

```
import pandas as pd

diz1 = {'student_id': [1, 2, 3, 4], 'age': [20, 23, 21, 22], 'exam': ['A', 'B', 'A',
'B']}

diz2 = {'enroll': [2024, 2025, 2024, 2025], 'student_id': [1, 2, 3, 4]}

price = {'grade': [10, 20, 40, 60]}

df1 = pd.DataFrame(diz1)
df2 = pd.DataFrame(diz2)

df_price = pd.DataFrame(price)

df3 = pd.concat([df2, df_price], axis=1)

df4 = df1.merge(df3, on='student_id')

print(df4)  # Which is the output?

for var, obj in df4.groupby(['exam', 'enroll']):
    print(sum(obj['grade']) / len(obj['grade']))
```

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

2. Explain the difference between the concat and the merge function in pandas

3. Explain the difference between a for and a while loop.

DT 6-2-2025 Solutions


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import pandas as pd

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```python
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```

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	student_id	age	exam	enroll	grade
0	1	20	A	2024	10
1	2	23	B	2025	20
2	3	21	A	2024	40
3	4	22	B	2025	60

25.0
40.0