DIGITAL TECHNOLOGY
Academic Year 2021-22
Prof. Barbara PERNICI

Exam 11/7/2022
Total time 1.30 h

Question 1 [11 points]

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 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 not sufficient to answer a question.

Question 1 [11 points]

Illustrate possible formats for exchanging data between organizations (XML, JSON, geoJSON), giving an example to illustrate the concepts.

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Question 2 [11 points]

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Question 2 [11 points]

Illustrate geolocation mechanisms for mobile applications, discussing which data are acquired data and how locations are derived.

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Question 3 – Python [11 points]

Last name	
First name	
Matricola/Person code	
Signature	

Consider the following fragment of Python code:

```
import pandas
from statistics import mean

a = {'A': [1, 2, 3], 'B': [4, 5, 6], 'C':  [7, 8, 9]}
b = {'B': [4, 3, 7], 'C': [4, 3, 1], 'A':  [2, 6, 9]}

def my_function(A, B):
    tmp = {}
    s1 = set(A.keys())
    s2 = set(B.keys())
    for k in s1.union(s2):
        if k in B and k in A:
            tmp[k] = A[k] + B[k]
        elif k in A:
            tmp[k] = A[k]
        else:
            tmp[k] = B[k]
    return tmp

DF_ = pandas.DataFrame(my_function(a, b))
tmp = ()

for c in df.columns:
    tmp.append(mean(df[c]))

print(tmp)
```

Then please answer the following questions:

1. In the code there are two errors. Identify them, explain why they are an error and provide a simple solution without changing the program logic.

2. Provide a qualitative description step by step, in simple terms, of the program workflow, pretending there are no errors or the errors have been adequately corrected.

3. Explain the differences between a 'for' and a 'while' loop.