



## DIGITAL TECHNOLOGY

Academic Year 2022-23

Prof. Barbara PERNICI

**Exam 27/6/2023 – Question 1 [11 points]**

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 device during the exam is forbidden.*

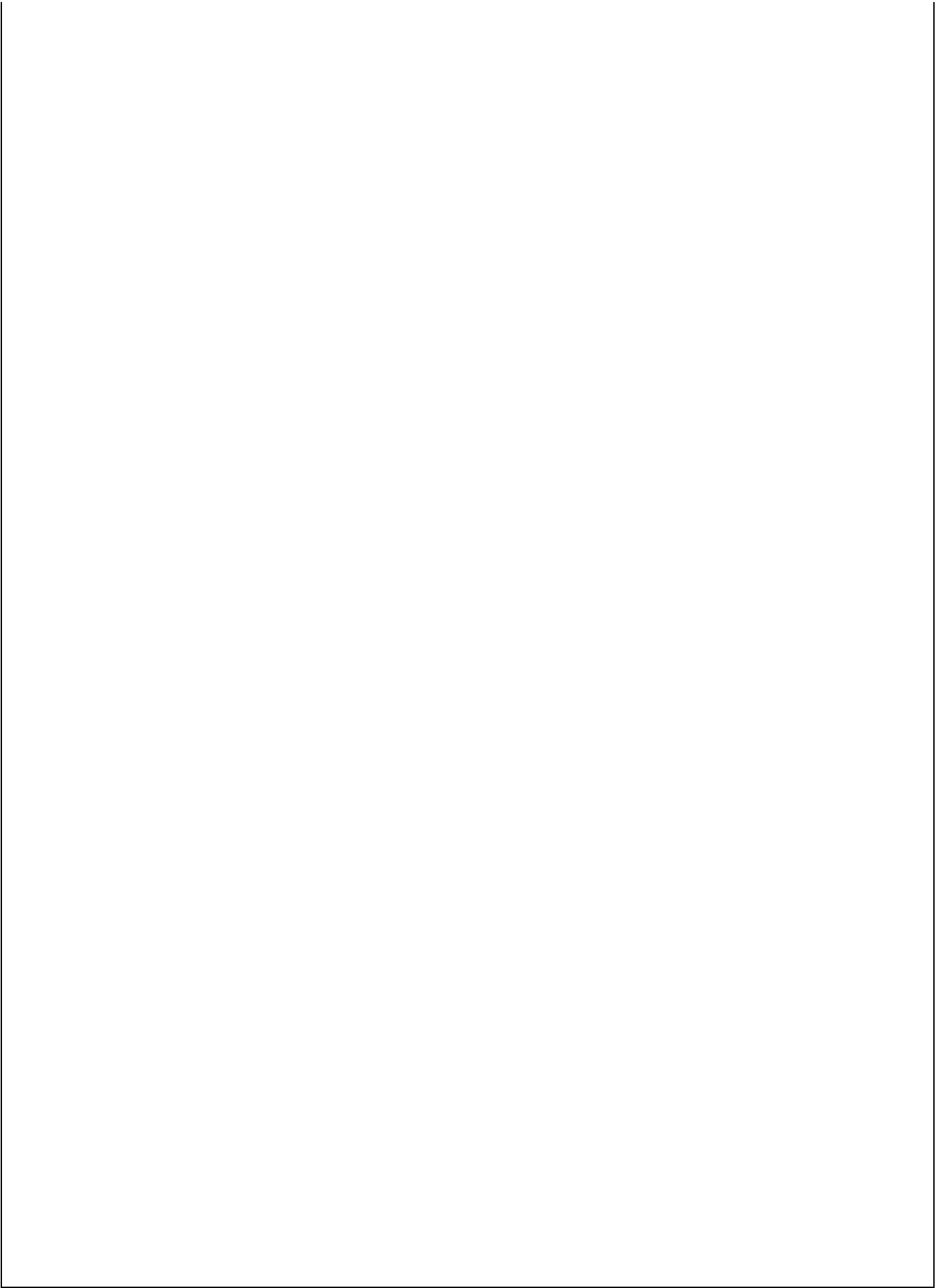
*It is necessary to answer at least partially all the questions for a positive evaluation.*

*Given answers should be explained, lists of bullet items are not sufficient to answer a question.*

### **Question 1 [11 points]**

Illustrate briefly the technological approaches illustrated in the course that can be used to track the location of objects and compare their characteristics.

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### Exam 27/6/2023– Question 2 [11 points]

Last name

First name

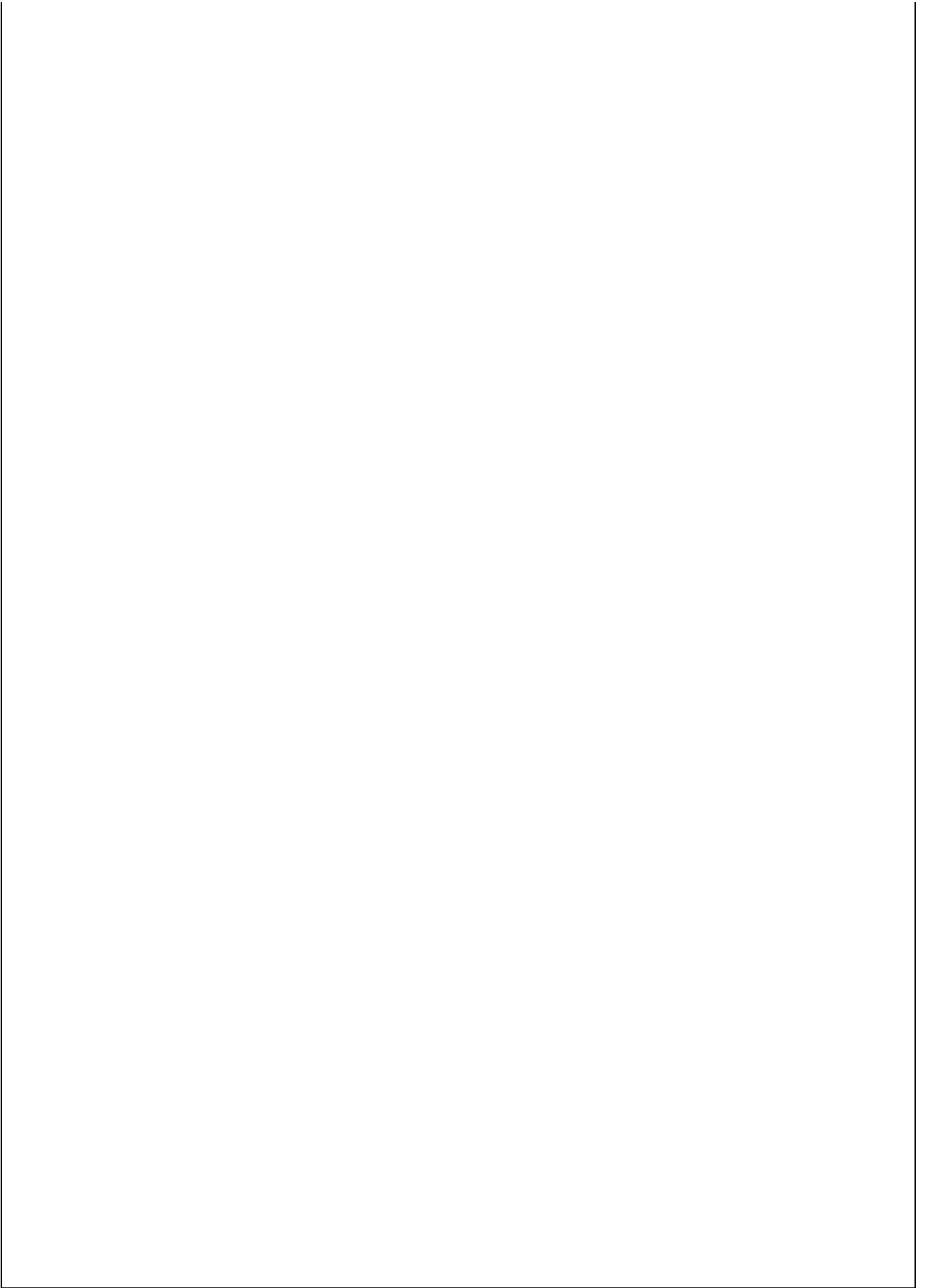
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### Question 2 [11 points]

Explain the main benefits related to Agile methodologies focusing on how uncertainty is managed compared with the traditional project management methodology.

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### Exam 27/6/2023– Question 3 – Python [11 points]

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Consider the following fragment of Python code:

```
import pandas as pd

column_names = ["col1", "col2", "col3"]
values = [("a", 0, 1),
          ("a", 1, 1),
          ("b", 0, 0)]

d = pd.DataFrame(values, columns=column_names)

def mysterious_function(val):
    if val == 0: return val * 7 + 1
    return val * 2

d["col4"] = d["col3"].apply(mysterious_function)

d.groupby("col1").col4.sum()
```

1. Qualitatively explain what the program does and describe the expected output.
2. Implement an alternative `mysterious_function` that returns a list of all the integers from 0 to `val` included.
3. Choose a pure Python data structure to store the output of the code execution, and motivate your choice

