Essentials for Data Science: Exam 2024/25 EXAMPLE (Part 1 of 2: quiz)

- Date: Friday, 13th June 2025
- Duration: 09:00-approx. 09:45

Overview

The real exam will have two parts: **quiz** (30p total) and **programming** (60p total). There will be 15 quiz questions addressing the course objectives:

- ✍️ Use Python collections (list, tuple, set, dict).

- ✍️ Use Python flow control statements (if, for, while, exceptions), context managers (with) and define user functions.

- ✍️ Use Python standard libraries (reading/writing files in different formats; math, statistics, random).

- ✍️ Use common data science libraries (NumPy, pandas, Matplotlib).

- ✍️ Use common machine learning libraries to apply simple regression, classification, clustering and dimensionality reduction methods.

- ✍️ Understand Python classes (instance variables, methods, inheritance).

- ✍️ Understand relational databases and elementary SQL.

- ✍️ Understand ideas behind project versioning with git and GitHub.

Below you may find a few examples of questions.

Quiz questions

Python collections: Dictionary Iteration with `items()`

In the following code, what does the `item` variable represent during each iteration of the loop?

```python
my_dict = {"name": "Alice", "age": 30, "city": "New York"}
for item in my_dict.items():
    # What is 'item' in each iteration?
    pass
```

- A) Tuples, where each tuple is a (key, value) pair from the dictionary.
- B) The keys of the dictionary one by one.
- C) The values of the dictionary one by one.
- D) A list of all keys, then a list of all values.

Python collections: List Comprehension

What is the output of the following Python code?

```python
numbers = [1, 2, 3, 4, 5]
other_numbers = [x*x for x in numbers if x % 2 == 0]
print(other_numbers)
```

- A) [4, 16]
- B) [1, 4, 9, 16, 25]
- C) []
- D) [1, 9, 25]

SQL: First Normal Form (1NF)

Which of the following statements is true regarding First Normal Form (1NF)?

- A) Each cell in a table must hold only a single (atomic) value.
- B) Every table must have a foreign key.
- C) All non-key attributes must be fully functionally dependent on the primary key.
- D) No database table should contain redundant data.

SQL: Aggregate Functions

Which of the following is NOT an SQL aggregate function?

- A) `MERGE()`
- B) `COUNT()`
- C) `SUM()`
- D) `AVG()`

Git: pull command

What does the `git pull` command do?

- A) It fetches changes from a remote repository and merges them into the current branch.
- B) It asks the remote repository to pull changes from your local repository.
- C) It shows the history of all pull operations.

- D) It shows the differences between your local repository and the remote repository.

Git: commit concept

Conceptually, what does a commit represent in a git repository?

- A) A snapshot of the project's tracked files at a specific point in time.
- B) A backup of the entire project.
- C) A command to share changes with team members.
- D) A marker for the latest version of a single file.