

Python Course Sample Exam WS 24/25

Instructions:

- The exam contains two types of questions: **Part A** and **Part B** contain eight questions each.
 - **Part A** contains questions that are to be answered with single words, at most in one sentence. You will receive one point for each correct answer.
 - **Part B** contains questions with multiple given answer options. At least one answer is correct and there can be more than one correct answer. Mark all correct answers in the boxes on the yellow answer sheet. If all crosses are correct (i.e. all correct answer options are marked and no incorrect answer option is marked), you will receive 2 points for the question. Each deviation (a wrongly placed cross or a cross that is not placed) means a deduction of 1 point. You will receive at least 0 points for each question. If you do not mark an answer, the question is considered unanswered and you will receive 0 points.
- **Important:** Please enter the answers to both parts within the red marked frame on the attached yellow answer sheet in the designated boxes; Part A on the front page and Part B on the back page.
- The processing time is 90 minutes.
- No aids are allowed except pens (no pencils) for writing.

Part A (4 points)

Answer the following questions:

A.1 What is the output of the last command in the following snippet?

```
>>> x = 1
>>> y = 2
>>> x = y
>>> y = x
>>> y
```

A.2 What is the name of the file where one specifies which files should not be tracked by Git?

A.3 What human mistake has caused the error in the following image?

Sample analysis of iris sepal lengths

Required packages

```
In [ ]: import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
from scipy import stats
%matplotlib inline
```

Data Import

```
In [1]: url_string = "https://raw.githubusercontent.com/mwaskom/seaborn-data/master/iris.csv"
df = pd.read_csv(url_string)
x = df.sepal_length
```

```
NameError                                 Traceback (most recent call last)
Cell In[1], line 2
      1 url_string = "https://raw.githubusercontent.com/mwaskom/seaborn-data/master/iris.csv"
----> 2 df = pd.read_csv(url_string)
      3 x = df.sepal_length

NameError: name 'pd' is not defined
```

A.4 Why does PyCharm warn about line 76?

```
70     print_mean_and_variance(**{stock1: values1, stock2: values2})
71     # plot the returns
72     plot_prices(**{stock1: values1, stock2: values2})
73     portfolio = (values1 + values2) / 2
74     plot_prices(**{stock1: values1, stock2: values2, "Portfolio": portfolio})
75
76     ## calculate variance and mean of portfolio
77     print_mean_and_variance(**{"Portfolio": portfolio})
78     print("Done!")
```

NOTE: In the actual exam, there will be more questions like this.

Part B (8 points)

B.1 Consider the following code snippet:

```
def mystery_function(x):
    if isinstance(x, str):
        return x[::-1]
    elif isinstance(x, list):
        return x[1]
    elif isinstance(x, int):
        return x ** 2
    else:
        return None
```

Which of the following prompt outputs are correct?

- (a) >>> mystery_function([1, 2, 3])
2
- (b) >>> mystery_function("Hello")
'Hell'
- (c) >>> mystery_function(4.0)
16
- (d) >>> mystery_function(True)
'eurT'

B.2 A database administrator creates a new database with the following schema:

```
CREATE TABLE users (
    id INTEGER PRIMARY KEY,
    name TEXT NOT NULL,
    age INTEGER NOT NULL
);

CREATE TABLE groups (
    id INTEGER PRIMARY KEY,
    name TEXT NOT NULL
);

CREATE TABLE memberships (
    user_id INTEGER NOT NULL,
    group_id INTEGER NOT NULL,
    sign_up_date DATE,
    role_name TEXT,
    role_description TEXT,
    PRIMARY KEY (user_id, group_id),
    FOREIGN KEY (user_id) REFERENCES users (id),
    FOREIGN KEY (group_id) REFERENCES groups (id)
);
```

Which of the following statements are correct?

- (a) The database is in the first normal form.
- (b) The database is in the second normal form.
- (c) The database is in the third normal form.
- (d) None of the above.

B.3 Consider the following Python class:

```
class Person:
    def __init__(self, name: str, age: int):
        self.name = name
        self.age = age
```

```
def __str__(self):
    return f"{self.name} is {self.age} years old."

def __repr__(self):
    return f"Person({self.name}, {self.age})"

def __lt__(self, other):
    return self.age < other.age

@classmethod
def from_dict(cls, d: dict):
    return cls(d["name"], d["age"])
```

Which of the following statements evaluate to True (and do not cause an exception)?

- (a) `>>> Person("John", 42) == Person("John", 42)`
- (b) `>>> Person("John", 42) < Person("John", 43)`
- (c) `>>> Person.from_dict({"name": "John", "age": 42}).age == 42`
- (d) `>>> Person.from_dict(**{"name": "John", "age": 42}).name == "John"`

B.4 What are advantages of using a local virtual environment for each of your projects on each of your devices?

- (a) It allows you to install packages without internet access.
- (b) It allows you to specify specific package versions for each project, without affecting other projects.
- (c) It ensures that the package versions you use for one project are the same across all your devices, so that the code will run the same everywhere.
- (d) It allows you to automatically update the dependencies to the latest versions.

NOTE: In the actual exam, there will be more questions like this.