



Software Engineer - Assignment

Overview

This assignment tests your development skills in Python as well as your knowledge of data science libraries.

The assignment should not take you more than 2 hours.

Good luck and we look forward to checking out your work!

What will you be judged on?

- Logical and analytical reasoning
- Code quality – syntax + optimisation
- Submission quality

Part 1

General Instructions -

- Use Python to solve the following problems.
- Make sure that your program does not print anything except the content in the **'Expected Output'** section.
- Example input files are attached.
- Please create a zip archive if there are multiple files.
- Please do **NOT** upload your solution to any public code-sharing websites like Github, Gitlab, Bitbucket etc.

Challenge

There is a Venture Capital firm called Cueball Capital. Having lost a lot of money



in the last few years, they have decided to regulate their investment by following a strict budget. Their budget consists of several rules which are applicable on time period or type of investment or both.

An example rule: Limit investment to 25 million USD per quarter on Big Data startups.

The assignment will test your proficiency in **Python** and **SQL** by requiring you to:

1. **Load and store data:**

- a. Read the provided CSV files containing budget rules and investment opportunities.
- b. Write this data into SQL tables. Use **SQLite** as the database since it can be easily attached to the submission. If you use another SQL database, provide clear steps to set up and configure the database.
- c. Provide steps to load / insert data into the database.
- d. Add the configuration steps as a README.
- e. Add API documentation for all the APIs.

2. **Create APIs:**

- a. Develop APIs to interact with the database and process the data. All APIs must fetch data directly from the database, not the CSV files.

3. **Required APIs:**

- a. **API to fetch all budget rules**
 - i. Endpoint to list all budget rules from the database.
- b. **API to view all investments**
 - i. This API should list all the available investments.
 - ii. This API should also allow users to pass query arguments to sort investments by date.
- c. **API to fetch investments that pass budget rules**
 - i. Return a list of investments that do **not violate** the budget rules.



d. **API to fetch investments that violate budget rules**

- i. Return a list of investments that **violate** the budget rules.

Expected Output:

The submission should include a fully functional Python application with the following deliverables:

1. Correct Working of All APIs

- a. APIs should successfully fetch data as described and validate investments against budget rules.

2. SQLite Database

- a. Attach the SQLite database with the submission. If another SQL database is used, provide clear setup instructions.

3. Code and Documentation

- a. Submit the complete Python application code.
b. Include documentation detailing the endpoints, their functionality, and how to set up and run the application.

Bonus Points: If you use libraries like Pandas and Numpy to work with the data in the application.

Example

[budget.csv](#)

ID	Amount	Time Period	Sector
1	75	Month	
2	30		FinTech



3	25	Quarter	BigData
4	70	Year	E-Commerce
5	350	Year	

[investments.csv](#) (with date in the format dd/mm/yyyy)

ID	Date	Amount	Sector
1	06/01/2020	10	BigData
2	23/01/2020	20	E-Commerce
3	02/02/2020	35	FinTech
4	10/02/2020	65	SaaS
5	14/02/2020	15	BigData
6	17/02/2020	5	SaaS
7	29/02/2020	5	FinTech
8	18/03/2020	15	BigData
9	03/05/2020	30	E-Commerce
10	18/05/2020	50	E-Commerce

In the above example, the following investments will not go through because of budget violations:



- Investment 3, because it violates Rule 2
- Investment 5, because it violates Rule 1 (having already made an investment of 65 in Feb 2020)
- Investment 10, because it violates both Rules 1 and 4 (having already made an investment of 30 in May 2020 in E-Commerce)

Note:

- Time Period can only be one of: 'Month', 'Quarter' or 'Year'
- Sector can be arbitrary
- The time period starts on the 1st of the relevant month. For example: the 1st Quarter of the year starts on 1st January and ends on 31st March.
- At least one of Time Period and Sector will be present in a budget rule.
- All amounts are in millions of USD.