1. Python/SQL questions

1. What is Thread and Multithreading?

Thread It's a set of simultaneous tasks in a process. Multithreading is a process that have multiple thread.

2. What is Concurrency and Parallelism and what are the differences?

Concurrency is a non-ordered alternated multiple tasks running in overlying periods of time. Parallelism is when various tasks or several parts of a unique task run at the same time.

3. What is Garbage collector? How does it work?

Python Garbage Collector manages an application's allocation and release of memory automatically.

4. What is Transaction Management in a relational database (give an example)?

A transaction is a unit of work or a sequence of operations performed in a logical way

5. What is an endpoint and what are the most common methods to interact with the API data source?

Endpoints are the touchpoints of which an API uses to acces an application.

6. What is data normalization in SQL? Please provide an example (any) of a database restructuring using primary/foreign keys to maintain data integrity.

Normalization is the process of organizing data in a database to avoid redundancy and to make it more efficient.

2. Discuss Exception handing (4 pts) and debugging in Python (4 pts)

3. Write a function that takes in a non-empty array of integers that are sorted in ascending order and returns a new array of the same length with the squares of the original integers also sorted in ascending order.

(check py file)

4.Write tests for the newly created Sorted Squared Numbers function (in Q3). Provide a brief explanation for your test case options.

(check py file)

5.Agile methodology: name and describe any 2 of the main roles in a Scrum Agile team.

1. **Product owner** - the person responsible for creating the prioritised backlog according to the business goals.

2. **Scrum master** - conduct daily stand-ups, support the product owner by ensuring everyone understands and follow the scrum principles.

6. Discuss advantages and disadvantages of TDD (Test Driven Development):

Pros:
It helps to prevent erros.
Less debugging,
Easiear to maintain.
Cons:
It's time consuming

7. What is a Python DB cursor? Provide an example

The cursor is used to to communicate with the database to execute a query and to perform actions such as read, delete, write, update etc.

8. Given an example table below

- **Write a SQL query to find the maximum order (purchase) amount for each customer.**
- **The customer ID should be in the range 3002 and 3007 (begin and end values are included.).**
- **Filter the rows for maximum order (purchase) amount is higher than 1000.**
- **Return customer id and maximum purchase amount.**

(check py file)

9. TWO NUMBER SUM:

- Write a function that takes in a non-empty array of distinct integers and an integer representing a target sum. If any two numbers in the input array sum up to the target sum, the function should return them in an array, in any order. If no to numbers sum up to the target sum, the function should return an empty array.
- Note that the target sum has to be obtained by summing two different integers in the array. You cannot add a single integer to itself in order to obtain the target sum.
- You can assume that there will be at most one pair of numbers summing up to the target sum.

Sample Input: numbers = [3, 5, -4 ,8, 11, 1, -1, 6] target_sum = 10
Sample Output: [-1, 11] the numbers can be in any order, it does not matter.

(check py file)