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# BACKEND ENGINEERING

Technical test

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## I. Section 1: SQL

1. Student attendance data are kept in the following table:

attendance	
id	int
student_id	int
checkin_date	date
absent_flag	boolean

Write a query that selects **student\_id** and **number of absent dates** for each user who has more than **3 absent dates**. Check-in dates are distinct.

2. How many types of pagination in SQL?

## II. Section 2: Coding Challenge

1. Write code to solve the below problem:

A string is said to be beautiful if each letter in the string appears at most as many times as the previous letter in the alphabet within the string; I.e: b occurs no more times than a; c occurs no more times than b; etc. Note that letter a has no previous letter. Given a string, check whether it is beautiful.

Example 1:

- Input: `input_string = "bbbaacdafe"`
- Output: `is_beautiful_string(input_string) = True`
- Explanation: This string contains 3 a, 3 b, 1 c, 1 d, 1 e, and 1 f (and 0 of every other letter), so since there aren't any letters that appear more frequently than the previous letter, this string qualifies as beautiful.

Example 2:

- Input: `input_string = "aabbb"`
- Output: `is_beautiful_string(input_string) = False`
- Explanation: Since there are more bs than as, this string is not beautiful.

Example 3:

- Input: `input_string = "bbbbcbacdafe"`
- Output: `is_beautiful_string(input_string) = False`
- Explanation: Although there are more b than c, this string is not beautiful because there are no a, so therefore there are more b than a.

**Note:**

- A string of lowercase English letters.
- Guaranteed constraints:
  - $3 \leq \text{inputString.length} \leq 50$ .
  - [output] boolean: Return true if the string is beautiful, false otherwise.

### III. Section 3: Design Relational Database

#### 1. Problem:

Design a system to track where orders are shipped from. Know that an order can be obtained from multiple warehouses, then shipped by multiple shipping partners across multiple warehouses. Users can track where the order has gone and when they can receive the order. Prioritize product delivery asap

#### 2. Requirements:

Here are the requirements service:

- User should be able to see what order is delivering to them
- User should be able to see what product inside order
- User should be able to see their location order
- System could separate order into many parts and identify them, it's depends to Warehouse System, you should not care about that.
- Usually stores their data on relational Database, but other means of storage are fine
- You have the luxury of adding one killer feature in your app, to impress the management of the company

### IV. Deliverables:

- Code you can push every Git repository manager like Gitlab, Github
- With System design question, please have an assumption for system