NOVO ENGINEERING®

NOVO Candidate Interview: Software Developer

Software Application Development

At NOVO we always strive to adhere to the SOLID principles of software development and design and apply those best practices in all our client's code. The purpose of this exercise is to ask the candidate to demonstrate working knowledge of those principles by implementing a toy example of a vehicle repair shop as described below.

Accel Auto Repair Shop

A vehicle repair shop called Accel Auto is looking for a solution to manage the vehicles in their shop for repairs. Accel Auto is a new repair shop trying to make a name for themselves in the highly competitive automotive repair shop industry. To do that, they have decided to focus solely on issues related to acceleration and deceleration (braking) of cars and motorcycles before expanding their service offering sometime in the future.

In order to be successful, Accel Auto needs to have an app that will help them manage the cars that come into the shop for repairs. The basic shop workflow is as follows:

1. A customer brings a vehicle to the shop.
2. The customer will indicate what inspections should be performed – acceleration, braking, or both.
3. The mechanic will add the vehicle to the inspection queue.
4. The mechanic will run the specified inspections on the vehicle.
    a. If all inspections pass, the vehicle is returned to the customer and removed from the shop.
    b. If any of the inspections fail, the vehicle should be moved to a repairs queue.
5. When the mechanic finishes the necessary repairs, the car will be added back to the inspections queue.

Application Requirements

1. The mechanic should be able to view both the inspection list and repairs list, including the following information:
    a. ID of the vehicle tested
    b. Make and model of the vehicle
2. The mechanic will always service the both the inspections list and repairs list on a first-come, first serve basis.

3. The mechanic needs a way to run the automated inspection(s) requested by the customer on the next vehicle in the inspections list.
    a. When the inspection(s) are complete, the vehicle information and test results should be shown, and the vehicle automatically either removed from the shop or moved to the repairs list.
4. The mechanic needs a way to mark a vehicle as repaired from the repairs list.
    a. When the repair(s) are marked complete, the vehicle should be moved to the inspection list.

Other Requirements

1. The inspection execution involves interfacing with the test equipment and vehicle hardware. Since the hardware is expensive to buy, we should be able to simulate the pass/fail status of the test equipment for testing and debugging purposes.

The Task

Describe the design and architecture of the application you would develop for Accel Auto. Please use any combination of the below artifacts to describe your design (or something else if you prefer):

- UML diagrams of classes/interfaces
- Block diagrams
- Workflows
- Wireframes
- Textual descriptions of the classes, interfaces, and overall architecture

Additionally, please note any further questions or clarifications you may have for Accel Auto.

Suggestions

- We are more interested in your development process and logical thought processes. Questions and discussion are an integral part of a collaborative design and development process.
- Use appropriate design patterns to achieve the goal of the shop.
- We are not looking for UI/UX mockups, we are primarily interested in the business logic and architecture of the application itself