SYSTEMS ANALYSIS and DESIGN
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Case Study: CarOps Garage

You are a small, new consulting and software development company. Until now you have been undertaking small projects as subcontractors of large business consulting companies in Thessaloniki. Until now, you developed software based on clear specifications given to you by your customers in Java, without using any software development method internally and without having any contact with the end user of your systems before delivery. For the first time, you have been approached by CarOps, a vehicle repair shop, to undertake the development of an Information System for the business. After contacting the property, you have recorded what you know in the text below.

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Project: CarOps

CarOps is a vehicle repair shop with a large increase in employees and turnover. CarOps accepts vehicles for a free estimate of repair costs and when there is an agreement proceeds to repair the damage for a fee. The business employs 10 car mechanics in shifts who in the current situation do all the work required except for payments which are only made to one of the two owners who also do technical work. CarOps management (i.e. the two owners) wishes to improve business processes and better serve its customers by introducing an appropriate information system (IS). They have heard that such systems can bring a financial benefit of up to 20% to the turnover of the business. The following is a description of the main tasks of the workshop.

CarOps is a vehicle repair shop that services three types of vehicles: cars, two-wheelers, and vans.

The process of importing a vehicle for repair begins with the customer's arrival at the workshop. In the current situation, customers come in without a scheduled appointment and wait for one of the available mechanics to run a diagnostic on their vehicle. In case all the mechanics are busy, customers crowd the entrance of the workshop waiting to be served. In fact, some of them enter the workshop and pose their problem to any mechanic they can approach. The first available mechanic selects one of the waiting vehicles for diagnostic testing. This way often creates irritation for customers.

Upon introduction of the PS, clients should make an appointment by phone or in person with the secretary who will be employed. When closing the appointment, only if the customer so wishes, a new customer record and a new vehicle record can be created if they are not already registered. The client's record contains his complete details (name, surname, landline, address and email). The tab

of the vehicle contains the license plate number, make, model, and year of manufacture. For two-wheelers it also contains the cubic capacity, while for vans the payload. Appointment details include customer and vehicle unique identifiers (eg codes) as well as the day and time of the appointment.

The creation of a customer record and a vehicle record should be possible at any time from the secretariat and not necessarily only when making an appointment.

As part of the diagnostic check, an assessment is made of the damage, the cost and the duration of the vehicle's repair. In the present situation, the duration and cost of repair is done by any available engineer resulting in eventual deviations and customer dissatisfaction.

The management of the workshop wishes to assign an experienced engineer to carry out diagnostic checks during the scheduled arrival of customers. This engineer will have the role of Reception Engineer and will mainly deal with diagnostic checks. However, when there is no work, he will normally also perform the duties of any engineer.

Specifically, as part of the diagnostic check, the vehicle's data will be recorded initially. The reception engineer will fill in the vehicle's license plate number in the PS and, if the vehicle is already registered, its type (car, two-wheeler, van) and its details will be displayed on the screen. If for some reason the vehicle is not registered, the reception engineer will proceed to register the vehicle. The receiving engineer will then visually inspect and test the vehicle, and then record the work estimated to be needed to repair it on the OM. To facilitate repair cost estimation, the SP will maintain a record of supported repair jobs and the cost of each. Upon completion of recording the repair work, the SO will calculate the repair cost and the receiving engineer will fill in the estimated repair duration based on his experience and submit the repair file.

While the reception engineer is doing the checks, the customer should go to the front desk and give their full details if they are not already registered. The secretariat should create the client record if it does not already exist in the system.

The process of entering a vehicle for repair only continues when the reception engineer has submitted the repair file and the secretariat has completed the customer record. The secretariat then delivers a printout of the repair file to the customer (and/or emails it via Google gmail server) and asks if they will proceed with the vehicle repair. If the customer has any objection to the cost or duration of the repair, they pick up their vehicle and the secretariat informs the system that the repair is not progressing. If the customer agrees, the secretariat informs the system.

The system is also expected to improve the vehicle repair process through proper scheduling of human resources and tasks

are required for its processing. In the present situation, the vehicle is brought into the repair shop and the mechanics receive verbal instructions from an experienced mechanic on the required repair work. As part of their work, the mechanics use spare parts, the empty packaging of which they place inside the vehicle, as a reminder of their charge upon completion of the repair.

The workshop management wants to improve the repair process by better coordinating the work and facilitating the correct calculation of the repair cost with the help of the PS. In particular, the repair of each vehicle will be undertaken for supervision and coordination by an experienced workshop engineer, who will have the role of Supervising Engineer for the particular repair. The supervising engineer will assign the required repair work to specific engineers based on their experience. The task assignment will be recorded in the OM so that the engineers have easy access to the tasks they need to complete. Each mechanic will perform the tasks assigned to him using the necessary spare parts. Upon completion of each job, the engineer will record in the system the duration of the job, as well as the type and quantity of parts used, so as to facilitate the costing of the repair. Superintending engineers, when they have no other work, should also be able to undertake the work of engineers. When all work is completed, the supervising engineer marks the repair as complete.

After the repair is completed the supervising engineer records the types of parts used during the repair. For each type of spare part, the number of parts used in the repair is also recorded.

The customer receives the vehicle after receiving the vehicle keys from the secretariat. A condition for receiving the keys is the payment of the repair cost in cash or using a credit/debit card. In the current situation, one of the owners issues a receipt using a cash register, while the card payment is made using a POS. After entering the PB, the secretariat will issue a receipt of payment using the PB. Payment by card will also be made using the PS. As the workshop management does not wish to keep credit card details for security reasons, the MS will have to work with the VISA payment system in order to carry out the transactions. In case of unavailability of the payment system, the system will operate normally allowing only cash payments. After payment, the secretariat hands over the keys to the customer and the vehicle leaves the workshop.

Owners want to be able to see a range of reports and data on all of the above, eg list of customers and vehicles, revenue per month, repair items, spare parts etc. These reports should be automatically prepared by the MS every first of the month.