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Assignment #4

Complete problem #1 on page 408 of the Text.

- 1. The ABC Car Service & Repair Centers are owned by the SILENT car dealer; ABC services and repairs only SILENT cars. Three ABC Car Service & Repair Centers provide service and repair for the entire state.**

Each of the three centers is independently managed and operated by a shop manager, a receptionist, and at least eight mechanics. Each center maintains a fully stocked parts inventory.

Each center also maintains a manual file system in which each car's maintenance history is kept: repairs made, parts used, costs, service dates, owner, and so on. Files are also kept to track inventory, purchasing, billing, employees' hours, and payroll.

You have been contacted by the manager of one of the centers to design and implement a computerized database system. Given the preceding information, do the following:

- a. Indicate the most appropriate sequence of activities by labeling each of the following steps in the correct order.**

1. Obtain a general description of company operations
2. Interview the shop manager
3. Interview the mechanics.
4. Create a description of each system process
5. Draw a data flow diagram and flowcharts.
6. Create a conceptual model using ER diagrams
7. Normalize the conceptual model
8. Create the file (table) structures.
9. Load the database
10. Create the application programs
11. Test the system

- b. Describe the various modules that you believe the system should include.**

Car Configuration: this module will contain the different types of cars SILENT services and their configurations. The cars will be uniquely identified with part of

a Vehicle Identification Number (VIN). Each car has a configuration of types of parts that make it up as well as recommended servicing.

Inventory: this module will track the SILENT shop's inventory of parts, which is tied into the car configuration module.

Customers: this module will contain the names and contact information of people who bring their vehicles to SILENT for servicing. There is a 1:M relationship between customers and the cars they own, which are identified with a full VIN. Each customer car will also have a 1:M relationship with the servicing performed on it and the parts replaced/maintained.

Employees: this module will contain timesheets, evaluations, skills, and payroll data for the employees at SILENT.

Maintenance: this module combines data elements maintained in the car configuration, customer, and human resource modules to log repairs, parts, and servicing made to specific customer's cars based on their configurations by specific employees at the organization.

Finances: tracks sales and inventory purchases. Ties into the car configurations, inventory, customers, employees, and maintenance modules to determine revenue and costs.

Security: this will allow the system administrator to manage system accounts and assign roles to users that will define what they may do in the system.

c. How will a data dictionary help you develop the system? Give Examples.

With several of the above modules connecting into one another, a data dictionary will help to keep naming conventions consistent across the system, making it easier to identify synonyms across modules. Secondly, a data dictionary can be useful in rapid application development, aiding in the development of user interfaces such as forms and menus. Finally, the data dictionary will be immensely helpful in documenting the system for future developers to maintain and understand the reasoning behind why certain design choices were made.

d. What general (system) recommendations might you make to the shop manager? (For example, if the system will be integrated, what modules will be integrated? What benefits would be derived from such an integrated system? Include several general recommendations.)

The shop manager needs to consider how the system will be integrated into SILENT's daily workflows. For instance, who will be responsible for administering the system from a business perspective? To leverage the task of entering data into the system, employees should be responsible for logging the

maintenance and service activities they perform for specific customer's cars during their daily routine. Personnel working the front desk will be responsible for entering customer and sales data. Inventory personnel will be responsible for submitting parts orders through the system.

The system should also be integrated with external systems, as much as system integrity allows, to interface with parts suppliers, new servicing recommendations, and customer relations management, so that the data between systems is easily transferred through XML or SOA with minimal transformations for data mapping.

e. What is the best approach to conceptual database design? Why?

The best approach to conceptual database design is to perform an intensive data analysis and requirements gathering, followed by ER modeling, normalization, and data model verification. By focusing on requirements first, the systems analyst ensures that all data needed is in the system. With ER modeling, we ensure that all data in the system is needed.

f. Name and describe at least four reports the system should have. Explain their use. Who will use those reports?

Part Failure Rate Report: this report will connect data gathered from the car configuration module and the maintenance modules to identify what parts that fail or require replacement the most. This report will be used by mechanics to educate themselves on common problems that occur on specific vehicle models. This report will also inform managers and engineers of potential design flaws in the vehicles to be corrected with future versions.

Customer Relations Management Reports: this set of reports will combine the customer module with their servicing history to identify when customers are due for servicing so that notices may be sent out to them. These reports will also be used by sales representatives and customer relations specialists to identify customer loyalty and gauge customer satisfaction.

Employee Skills Matrix: this report will identify what employees have which skills in order to identify who will be the best choice for performing new tasks or serving specific vehicle models. This report will also help management identify weakness in the organization for employee skill sets and ways to consolidate skill sets among employees through training programs and mentoring.

Financial Reports: a suit of reports for determining revenues and costs that will be used by managers to determine ways to save money, increase profits. These reports may also be customized for IRS reporting as well as posting updates to stockholders as required by law.