Joe's Chops (2007)

Customizing cars is popular. Several TV shows even evolved to show how small firms can take a car and customize it with a larger engine, new suspension, fancy paint jobs, and plush interiors. In most cases, the car is stripped down to its frame, sanded, repainted, and rebuilt with new components from the ground up. Joe's Chops is one of those small garages, led by Joe, who has a vision of creating unique rides for people with the money (and sometimes courage) who want to drive something different from everyone else. Joe's has done well over the past few years, garnering several first-place awards at some of the regional and national competitions. The shop has built cars for several celebrities and gets considerable business through word-of-mouth. Even with only simple advertising, the company receives enough work to keep the shop busy through the year. A few customers have suggested that Joe expand or even open a second shop, but he feels it would be hard to manage and difficult to find the quality workers he needs, so he is content to stick with the single location. However, Joe routinely encounters two basic problems: (1) As his customer base move upscale, he finds they have almost no time to spend discussing options or making decisions; and (2) He hates doing paperwork, so his accountant keeps yelling at him about documenting expenses and the need to do a better job at pricing the jobs to make enough profit.

Choosing Options

Joe needs a better way to communicate with customers. In some cases, the customer drops off the vehicle and lets Joe and his team work their magic any way they want. Other customers want more control over options (and costs). Some-

Joe's Chops
Customization Plan

Customer
Address
City, State ZIPCode
Phone
Email

Employee
Title
Phone EMail

Vehicle

Make Model Year Engine Trim Interior Exterior
Body condition
Frame condition
Engine condition
Interior condition

Basic Customization Plan

Item	Days	Description	Parts	Labor	Employee

Estimated Price Deposit
Start Date
Estimated Delivery Date

Figure 1

times Joe encounters problems getting parts or comes up with a new idea in the middle of a renovation. In these situations, he wants to be able to show the choices to the customer and let them make a decision. But, he cannot afford to wait for several days or weeks for the customer to make the trip to the shop. Also, he wants to post daily photos on a Web site so the customer can check on the progress.

Figure 1 shows the basic information that is collected when a customer wants a vehicle customized. The initial plan can be relatively general, but sometimes the employee (or customer) lists very specific engines. For example, it is relatively common to list a particular engine—in part because some cars can handle only one or two engine types. Pricing is somewhat subjective. The employee writing up the initial order writes estimates for the cost of parts and labor when they are known. All orders are eventually examined by the business manager and by Joe. Highly specialized items or hard-to-find parts are often not priced until they are located and purchased from a vendor. With considerable experience, Joe is pretty good at estimating the overall time and arriving at an estimated price. However, he has suggested that it would be helpful to have a simple report that shows the actual costs incurred for similar vehicles.

Web Site Communications

After a little persuasion, Joe has agreed that a Web site would be a convenient way for customers to check on the progress of a conversion and to answer questions or provide feedback. He is willing to get a digital camera and upload photos. Most of the employees take pride in their work and he figures this is also a good way to motivate the employees who work on the earlier stages, such as sanding and painting. For the basic site structure, each customer will have a separate page. Once the customer logs in, the page will display the most recent photo for the day. As shown in Figure 2, critical questions will also be listed on the main page. When the customer clicks the question, the details will be provided along with a simple form for the customer to answer the question or provide additional details. E-mail addresses and phone numbers of the employees will also be provided in case the customer wants to call and discuss more of the details before making a decision. To make it easy to search the questions and answers, they should be stored in the database. Depending on the final DBMS chosen, the photos will probably be stored as digital files on the server, with the link stored as a filename in the database. Observe that one of the options is a slide show that lets the customer scroll

Customized Customer Web Site

Current Photo	Links to Other Photos Original Frame Body Engine Interior Photos by Day

Critical Questions

Q#	Date	Question	Answer

Figure 2

Joe's Chops
Itemized Billing

Finish Date

Vehicle VIN Overhaul description	Customer Delivery address City, State ZIP

Items

Stage	Part ID	Manuf	Price	Quantity	Total

Parts Total

Labor

Stage	Task	Employee	Time	Cost

Labor Total

Overhead

Total Price Tax
Amount Due (Price + Tax minus deposit)

Payment Method Payment Date

Figure 3

through the photos sequentially. This slideshow should be handled by assigning a date and sequence to the photos when they are uploaded. Similarly, be sure to include dates for any answers or questions added by employees or customers.

Itemized Billing

When the vehicle rebuild is completed, the customer is given a detailed bill that itemizes the various parts. For total overhauls, this list could be lengthy. However, major subsystems are often contracted to outside partners and the bill will show only the total cost charged by the contractor. For instance, Joe rarely rebuilds engines. Instead, he prefers to buy them from a custom engine shop across town. They make most of the components and will customize them to fit specific vehicles and then bill a single price for the work. Items are usually purchased from manufacturers. Ultimately, the accountant records the cost as well as the price charged to the customer, but the cost is not listed on the billing form. Joe usually bills the labor costs at the prices that he pays the workers. He then covers his fixed costs (utilities and so on) and profit by adding an overhead charge to the bill. He figures this method is fairer and more accurate than pretending that his employees receive $150 an hour and pocketing the difference. Figure 3 shows the basic billing form. It lists parts and labor separately. This approach results in some duplication. It would be possible to display the labor needed to install a part on the same line as the part itself. However, Joe likes to keep the parts and labor values

separate. Partly because it highlights the importance of the labor that is a critical factor in his shop, and partly because he likes to see the separate totals when he looks back over old projects when estimating costs of new jobs. Notice that both the parts and labor are identified by phases of the project. For complete overhauls, these phases are relatively standard, including dismantling, work on the frame, body work, painting, interior, engine, exhaust, and electrical. The phases are used as categories that he uses to compare time and cost values across projects. For instance, he wants to be able to run a query that tells him the average time spent on building interiors.

Exercises

1. Create the feasibility study (initial proposal).
2. Create a list of all of the forms and reports that the company might use.
3. Create a normalized list of tables for each form and report.
4. Create an integrated list of normalized tables for the entire application. Draw the corresponding class diagram.
5. Create the basic tables in a DBMS along with all necessary relationships and integrity constraints. Enter sample data into the tables to test your design.
6. Evaluate the normalized tables and estimate the size of the database—both current size and estimated size in 3 years.
7. List the initial security conditions for the data tables. Create a list of user groups and identify their basic access needs.
8. Design the overall structure of the application. Outline the overall structure and the primary forms. Select a design scheme, including layouts, effects, and colors.
9. Build three initial input forms.
10. Build three initial reports.
11. Improve the forms and reports to make them easier to use.
12. Test your forms and reports with sample users.
13. Build additional forms and reports. Improve all of them. Test all of them.
14. Connect all of the forms and reports into an application. Add help files. Test all the links. Test the forms and reports. Check for consistency.
15. Add security, backup and recovery, and other management features to the application.
16. Move the data tables to a centralized server, leaving the application to run on a client. Build the necessary links and retest the application.
17. Move the entire application to a Web server. Build the forms so that they run on a Web browser.
18. Create an OLAP evaluation query and graphs. Build in a way to create the links so new annual data can be generated automatically. Link the data so that the spreadsheet is updated automatically.