Case Study – The Pampered Pet

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INSPIRING FUTURES

User needs and requirements

Building Data Model

Extracting Business Rules

Normalisation and Refinement

User Needs and Requirements

- First step in designing and building a data model and database is gather user requirements.
- We will look at identifying user requirements
- Determining what database main entities are
- Defining use cases to verify that requirements have been met

Meet the Customers

- Requirements gathering for this project begins with a series of meetings in The Pampered Pet's back room (where they hold pet training courses, so it smells a bit funny).
- The initial meetings with The Pampered Pet are mostly to introduce you and the customers so you can get to know each other. For this example, four key players attend the first meeting

Bill Wye

- Bill Wye “The Pet Store Guy,” the founder and owner of The Pampered Pet.
- Bill is the one who decided the company needed a complete database. He’s the Executive Champion.
- Because this is a fairly small company and he’s at the very top of the food chain, there will be no serious disputes over whether the project should go forward, although his help might be needed to keep unenthusiastic participants pulling in the right direction.

Alicia Myth

- Alicia Myth, the store’s manager.
- Alicia has been working at the store since it was opened and knows just about everything there is to know about the business.
- She spends more time keeping things organized and running than anyone else at the store and knows more about the day-to-day business than anyone else, even Bill.

- Charlie “Ice” Walker is a trainer specializing in aggressive dogs.
- He also works shifts at the store and knows a lot about day-to-day operations.
- He doesn’t care as much about selling as he does about training.
- He has a very “whatever” attitude about the new database system

Charlie “Ice” Walker

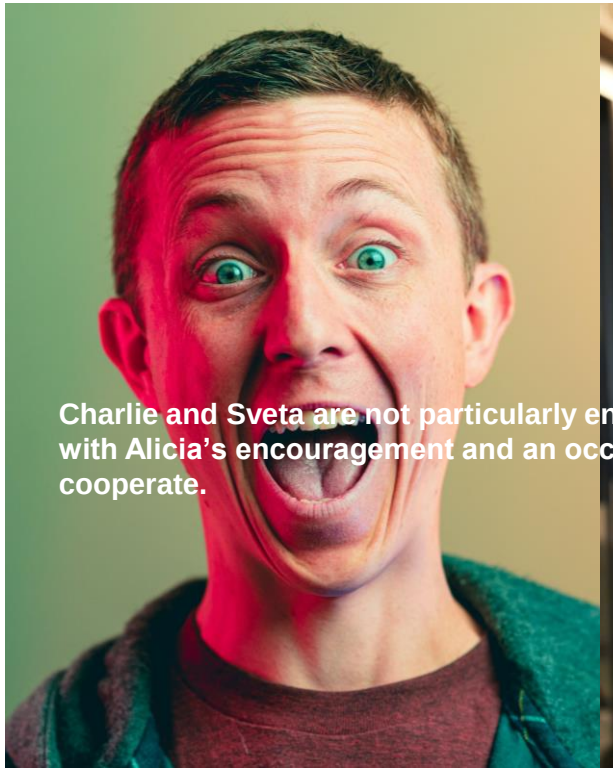
Sveta Clark

- Sveta Clark is a dog and exotic bird trainer who also works at the store about half the time.
- Sveta isn’t convinced that the store needs a new computerized system and just wants to be left alone to do her job the way she always has.
- She’s definitely more comfortable with animals than people.

The purpose of the initial meeting is mostly to let you and the customers meet and get comfortable with each other. There's a chance that you'll get some serious work done, but it's more likely that this meeting will stay at a fairly high level.

During the first meeting, you realize that Bill isn't going to play much of a role in this project. He's the one who initiated the whole thing, and he can help keep things moving if they get bogged down, but he's not going to be directly involved on a daily basis. (He's too busy with his classic car collection.)

Unfortunately Alicia's time will be largely taken up by running the store, so Charlie and Sveta will be your Customer Representatives. Alicia will be around to make critical decisions, break ties, and generally look menacing if Charlie and Sveta become difficult.



Charlie and Sveta are not particularly enthusiastic about the whole thing, but with Alicia's encouragement and an occasional nudge from Bill, they'll cooperate.

A couple of questions that you should try to address right away are:

- ❑ **What do the customers expect to get from the new system?**
- ❑ **Why do they think they need a new database system?**
- ❑ **Does this system enhance or replace an existing system?**
- ❑ **Are there other systems with which this one must interact?**

These are big-picture executive-level questions that Bill can answer and because he probably won’t be present at the more detailed meetings still to come, he should answer them now.

In the ensuing discussion, during which Alicia talks more than anyone else, you realize that Bill doesn’t really know what he’ll get out of the database.

Though Bill made the final decision, it was Alicia who thought a new database system would help.

Alicia thinks the new system can help better track inventory (there have been times when they've run out of products without realizing it).

She also hopes it can streamline payroll (it currently takes quite a while for her to track everyone's hours) and she believes that it can help the company figure out how to reach new customers and better market their training courses.

There is no existing system and no other systems with which this one must interact. The current process is manual and uses paper order forms, paper shift assignments, and paper timesheets.

WHAT CAN YOU DO AS THE ANALYST

You should address these issues as soon as possible to give the customers the right expectations.

A new database can help with inventory tracking and streamline payroll.

It will also help identify which customers take which courses, but it's not really a marketing tool.

It will tell you about existing customers but not about people who have never interacted with the company.

Alicia seems a little disappointed, but she still sees some worthwhile benefits and is ready to get started.

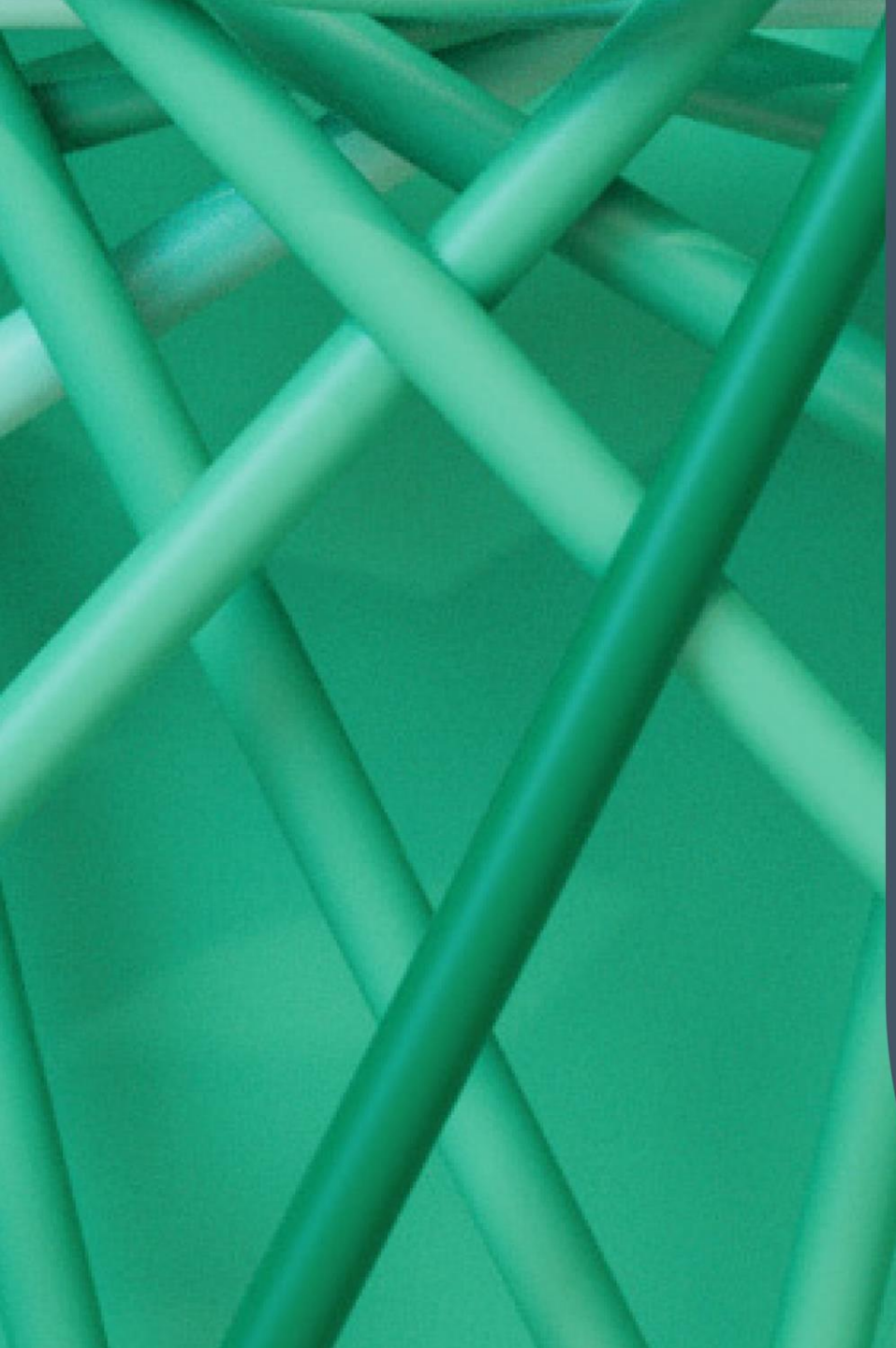
PICK THE CUSTOMERS' BRAINS

After the initial meeting, where you and the key players get to know each other a bit, you begin a series of meetings where you try to pick Charlie's and Sveta's brains to define the project's requirements.

Sometimes customers have already prepared requirements documents before they bring in database designer and other developers, but often gather requirements is part of the development process

What does this mean for this project?

That means locking Charlie and Sveta in a room and picking their brains.



Determining what the system should do?

Charlie says he doesn’t know what the system should do and Sveta doesn’t care. For goals, they basically repeat what Bill and Alicia said during the kick off meeting.

This could be a problem. If these two really won’t join the team, they won’t be much help and right now they’re all you’ve got. You could ask Alicia to have a word with them, but it would be better if they enlist semi-voluntarily.

Rather than making waves right away, you decide to make some educated guesses and see if you can get Charlie and Sveta more interested in the project.

Instead of starting with basic system features, you decide to jump to something that Charlie and Sveta might find more interesting: **training course information.**

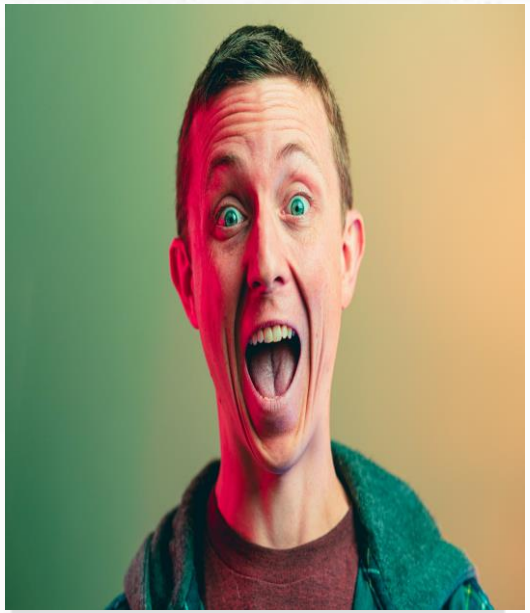
You **quickly sketch out a form that displays course information** including the general description, dates, locations, and the instructor.

You draw a little smiley face picture for the guide's picture and write Charlie's name beneath.

Training is the real reason why Charlie and Sveta work here and it's what they love, so this gets their attention. They start giving you useful information about what's involved in defining a course: general description (which includes the type of animal: dog, cat, bird, fish), locations, times, dates, price, and maximum number of participants.

Class Information

Description | Dates & Times | Trainer



Charlie "Ice" Walker

Charlie "Ice" Walker is a certified Canine Companion trainer who specializes in agressive behavior in dogs. He believes that every dog deserves a fair chance, even poodles. With patience, love, and treats, even old dogs can learn new tricks.

Through a unique combination of taking dogs to movies and buying them popcorn, Charlie achieves remarkable results in very little time. He can often break a dog of stranger, food, and tax aggression within the first two sessions.

OK

- Decide what tool you want to use.
- Put an image or graphic on the form.
- Add details that will be meaningful to the customer.

- In later sessions with Charlie and Sveta, you can start defining what the finished project will look like.
- Sketch out screens or let them do it for you.
- These don’t need to be perfect.
- The goal is to figure out what data the system must contain to provide those screens, not to do the user interface designer’s job.

- **Login:** Log in with username and password.
- **Orders:** Write up sales orders for customers.
- **Inventory:** View inventory levels.
- **Courses:** Create and edit courses.
- **Employees:** Enter and edit employee information. Employees include salespeople and trainers.
- **Shifts:** Assign work shifts.
- **Customers:** Information about customers, particularly courses they’re taking.

The program also needs the following reports:

- **Weekly Work Schedule:** Displays the work shifts for the week.
- **Course Schedule:** Displays courses scheduled during a user-entered period.
- **Course Roster:** Prints a course roster for a trainer to use during a course.
- **Reorder Items:** Lists items that need to be reordered.
- **Sales Stats:** Lists employees sorted by number of sales.
- **Item Sales:** Lists high and low selling items.
- **List Customers:** Displays a list of customers selected by yet unknown criteria. (This sort of feature is very useful to customers. Fortunately, most databases will allow the user to perform ad hoc queries so they can invent new reports long after the application has been built.)

Data

Determining What Data Is Needed for

Review the form sketches and figure out where the data should come from for the forms.

Customer Order 4/1/10

Sold By: Sveta Clark

Items:

Description	Price Each	Quantity	Total Price
Doggy Diet food, senior	$34.95	1	$34.95
Squeaky toy	$2.99	3	$8.97
Misc. mouse, small	$1.99	4	$7.96
Class: Mouse Socialization, 4/1/10 – 4/29/10	$79.50	1	$79.50

Subtotal	$131.38
Tax	$6.57
Shipping	$0.00
Grand Total	$137.95

Purchased By:

Name: Robert Terwilliger
Street: 1265 Petlover Ln
Apt. 12
City: Menagerie
State: WI ZIP: 72827

Email: Phone:

Ship To:

☑ Same As Above
Name:
Street:
City:
State: ZIP:

The following list shows the **main types of data needed** for each of the forms identified in the previous slide.

- **Login:** Username and password. The program will use the database's integrated security, so this data doesn't need to be stored in the database.
- **Order:** Customer data (name, address), order data (date, shipping address), order items (item, quantity), employees (sold by).
- **Inventory:** Inventory item data (UPC, description, buy price, sell price, quantity in stock, quantity to require reorder, reorder amount, vendor information).
- **Course:** Course information (description, trainer, price, dates, times, location, animal type), customer information.
- **Employee:** Employee information (name, address, Social Security number, skills).
- **Shift:** Employee, work shifts (date, time).
- **Customer:** Customer data (name, address, shipping address, orders, courses, email for newsletter).

Determining How the Pieces of Data Are Related

Customer Order 4/1/10

Sold By: Sveta Clark

Items:

Description	Price Each	Quantity	Total Price
Doggy Diet food, senior	$34.95	1	$34.95
Squeaky toy	$2.99	3	$8.97
Misc. mouse, small	$1.99	4	$7.96
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Email: _____ Phone: _____

Ship To:

☑ Same As Above
Name: _____
Street: _____
_____
City: _____
State: _____ ZIP: _____

For now, you can assume there will be entity sets corresponding to the forms listed.

The initial list of entities includes Order, Inventory, Course, Employee, Shift, and Customer.

Think about how these entities are related. The forms sketched out show relationships among pieces of data so they can help. For example, the order form contains information about the customer, the order, and the order items, so those entities must be related

Determining How the Pieces of Data Are Related

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Think about how these entities are related.

The following list describes relationships defined by the initial forms:

Order: Relates customer data, order data, order items, and employees. Some order items may be training courses, so it also relates course data.
Inventory: This entity is fairly self-contained. Other entities such as Order refer to it but it doesn't need to refer to others.
Course: Relates basic course information, trainer information, and customer information.
Employee: This entity is fairly self-contained. Other entities such as Course refer to it but it doesn't refer to others.
Shift: Relates work shifts and employee data
Customer: This entity is fairly self-contained. Other entities such as Order and Course refer to it but it doesn't refer to others.

Reports also define relationships among pieces of data. The following list shows where data comes from for the previously defined reports:

- **Weekly Work Schedule:** Relates employees and shifts.
- **Course Schedule:** Relates basic course information and trainers. This report doesn't need to list customer information.
- **Course Roster:** Relates basic course information, trainers, and customers.
- **Reorder Items:** This report only uses inventory data.
- **Sales Stats:** Relates inventory and employees.
- **Item Sales:** This report only uses inventory data.
- **List Customers:** Because the selection criteria for these reports are not yet defined, you can't know exactly which entities might be involved. However, you can make some guesses. Users will probably want to search for customers based on the items they purchased and courses they took. It's conceivable that they would want to search for customers who purchased items from a particular employee (perhaps so they can apologize) but most of the reports seem to relate customer, order, inventory, and course data.

Where’s the Data

Having a general idea of what data is required to build a report is very different from actually building the report. Often when you try to identify the fields needed to build a report, you will find holes in your understanding of the project. To fill in some of those holes, follow these steps for the Sales Stats and Item Sales reports:

1. Determine exactly where the data comes from.
2. Decide whether it seems likely that the database can build these reports quickly enough to satisfy the users.

How It Works

1. Determine exactly where the data comes from.

   To generate the Sales Stats report, you need to figure out how much each employee sold during a certain period of time. For each employee in the Employees table, you need to find the corresponding Orders items with dates within the desired time period. You will then need to look up the corresponding order items, calculate their total prices, and add up the results.

   To generate the Item Sales report, you need to figure out how many of each type of item was sold during a particular time period. To get at this data by date, you'll need to search the Orders table for orders placed during the time period. For each order, you'll look up the order's items and add up the number of each item sold.

1. Decide whether it seems likely that the database can build these reports quickly enough to satisfy the users.

   If a user wants to look at Sales Stats or Item Sales figures for the past month, these queries shouldn't be a problem. They will probably involve a reasonable number of records so the report will run quickly.

   If the user wants to look at data for the last year, this might take slightly longer but should still be reasonable for The Pampered Pet. If the store were a large chain, these reports could take much longer. (Tesco would have huge amounts of employees in UK and Ireland, but they probably keep their data spread out on a bunch of different databases and only look at summaries on a global scale.)

Determining Data Integrity Needs

To really address this issue, you need to start making a list of the fields that belong to each of the database entities. For example, the following table gives the data types and constraints for the fields in the Order entity

Field	Req'd?	Data Type	Domain
Date	Yes	String	Any date.
FirstName	Note 1	String	Any first name. Not validated.
LastName	Note 1	String	Any first name. Not validated.
Street	Note 1	String	Any street name and number. Not validated.
City	Note 1	String	Any city name. Not validated?
State	Note 1	String	Foreign key to States table.
Zip	Note 1	String	Valid ZIP Code. Not validated?

Field	Req'd?	Data Type	Domain
Email	No	String	Valid email address. If provided, send the customer a monthly email newsletter.
HomePhone	Note 2	String	Valid 10-digit phone number.
CellPhone	Note 2	String	Valid 10-digit phone number.
SameAsAbove	Yes	Boolean	If unchecked, and we're shipping, then the Ship To fields are required.
ShipToFirstName	Note 3	String	Any first name. Not validated.
ShipToLastName	Note 3	String	Any first name. Not validated.
ShipToStreet	Note 3	String	Any street name and number. Not validated.
ShipToCity	Note 3	String	Any city name. Not validated?
ShipToState	Note 3	String	Foreign key to States table.
ShipToZip	Note 3	String	Valid ZIP Code. Not validated?
SoldBy	Yes	Reference	Reference to employee information.
Description	Yes	String	Foreign key to Inventory table.
PriceEach	Yes	Currency	Taken from Inventory table.
Quantity	Yes	Integer	> 0.
TotalPrice	Yes	Currency	Calculated from PriceEach and Quantity.
Subtotal	Yes	Currency	Calculated from the Items.
Tax	Yes	Currency	Calculated from the Subtotal.
Shipping	Yes	Currency	>= 0.
GrandTotal	Yes	Currency	Subtotal + Tax + Shipping.

Build a table similar to the previous one for the Inventory Item entity.

1. List the fields.
2. Determine which are required.
3. Determine their data types.
4. Determine their domain requirements.

Build a table similar to the previous one for the Inventory Item entity.

SOLUTION

Field	Req'd?	Data Type	Domain
UPC	Yes	String	Valid UPC values.
Description	Yes	String	Any description.
BuyPrice	No	Currency	> 0.
SellPrice	Yes	Currency	> 0.
QuantityInStock	Yes	Integer	>= 0.
StockLocation	Yes	String	Where the item is stored when not on display.
ShelfLocation	Yes	String	Where the item is stored when on display.
ReorderWhen	No	Integer	> 0. If null, don't reorder automatically.
ReorderAmount	No	Integer	>= 0. If null, someone must specify the amount.
Vendor	No	Reference	Vendor information (name, address, and so on).

The Pampered Pet Database will allow management to better:

Track customer orders and fulfilment

Identify customers with particular purchasing histories.

Identify customers with a history of taking training courses.

Streamline work shift assignment.

Identify products that are hot.

Identify products that are under-performing.

Identify salespeople who are over- or under-performing.

It’s important to get feedback at every stage of development. Remember, the longer a mistake is in the system, the harder it is to fix. Mistakes made during requirements gathering can throw the whole effort out of whack.
Unfortunately, customers, particularly those who know the most about their business, are often very busy and may not feel they have time to look over the requirements documents thoroughly and provide feedback. Because this feedback is so important, you may need to push on them a bit. In this example, that means pestering Alicia mercilessly until she makes time to review the plan so far. When she has a chance to look things over thoroughly, she finds the following mistakes:

❑	**Some inventory items such as live food (crickets, mealworms, feeder guppies) and pet feed have expiration dates. That means:** **❑ The InventoryItem entity needs a new ExpirationDate field.** **❑ The system needs a new Expiring Inventory report.**
❑	Employees don’t always show up for their shifts on time and sometimes leave early, particularly if business is slow. That means the work shift data is not enough to determine the hours that an employee actually worked. That in turn means the database needs a new TimeEntry entity.
❑	The system should have a report that shows how much money each employee earned for the store during a particular week, month, quarter, or year.
❑	The system should print payroll checks and record the date on which they were printed.
❑	Alicia mentions that they may want to provide direct deposit at some point.