Modern Systems Analysis and Design

8th Edition

Joseph S. Valacich
University of Arizona

Joey F. George
Iowa State University

PEARSON

Boston Columbus Indianapolis New York San Francisco
Amsterdam Cape Town Dubai London Madrid Milan Munich Paris Montréal Toronto
Delhi Mexico City São Paulo Sydney Hong Kong Seoul Singapore Taipei Tokyo

PETRIE ELECTRONICS

Chapter 2: The Origins of Software

Jim Watanabe looked around his new office. He couldn't believe that he was the assistant director of information technology at Petrie Electronics, his favorite consumer electronics retail store. He always bought his new DVDs and video games for his Xbox 360 at Petrie. In fact, he bought his Blu-ray player and his Xbox 360 at Petrie, along with his surround sound system and his 40-inch flat-screen HD LED TV. And now he worked there, too. The employee discount was a nice perk[1] of his new job, but he was also glad that his technical and people skills were finally recognized by the people at Petrie. He worked for five years at Broadway Entertainment Company as a senior systems analyst, and it was clear that he was not going to be promoted there. He was really glad he posted his résumé on Monster.com and that now he had a bigger salary and a great job with more responsibility at Petrie.

Petrie Electronics started as a single electronics store in 1984 in San Diego, California. The store was started by Jacob Rosenstein in a strip mall. It was named after Rob Petrie, the TV writer played by Dick Van Dyke in the TV show of the same name. Rosenstein always liked that show. When he had grown the store to a chain of 13 locations in the Southern California area, the business became too much for Rosenstein to handle. He sold out in 1992, for a handsome profit, to the Matsutoya Corporation, a huge Japanese conglomerate that saw the chain of stores as a place to sell its many consumer electronics goods in the United States.

Matsutoya aggressively expanded the chain to 218 stores nationwide by the time they sold it in 2002, for a handsome profit, to Sam and Harry's, a maker and seller of ice cream. Sam and Harry's was looking for a way to diversify and invest the considerable cash they made creating and selling ice cream, with flavors named after actors and actresses, like their best-selling Lime Neeson and Jim Carrey-mel. Sam and Harry's brought in professional management to run the chain, and since they bought it, they had added 15 more stores, including 1 in Mexico and 3 in Canada. Even though they originally wanted to move the headquarters to their home-base state of Delaware, Sam and Harry decided to keep Petrie headquartered in San Diego.

The company had made some smart moves and had done well, Jim knew, but he also knew that competition was fierce. Petrie competitors included big electronics retail chains like BestBuy. In California, Fry's was a ferocious competitor. Other major players in the arena included the electronics departments of huge chains like Walmart and Target and online vendors like Amazon.com. Jim knew that part of his job in IT was to help the company grow and prosper and beat the competition—or at least survive.

[1] perquisite

Just then, as Jim was trying to decide if he needed a bigger TV, Ella Whinston, the CEO at Petrie, walked into his office. "How's it going, Jim? Joe keeping you busy?" Joe was Joe Swanson, Jim's boss, the director of IT. Joe was away for the week, at a meeting in Tucson, Arizona. Jim quickly pulled his feet off his desk.

"Hi, Ella. Oh, yeah, Joe keeps me busy. I've got to get through the entire corporate strategic IT plan before he gets back—he's going to quiz me—and then there's the new help desk training we're going to start next week."

"I didn't know we had a strategic IT plan," Ella teased. "Anyway, what I came in here for is to give you some good news. I want you to be the project manager for a project that's crucial to our corporate survival."

"Me?" Jim said, "But I just got here."

"Who better than you? You have a different perspective, new ideas. You aren't chained down by the past and by the Petrie way of doing things, like the rest of us. Not that it matters, since you don't have a choice. Joe and I both agree that you're the best person for the job."

"So," Jim asked, "what's the project about?"

"Well," Ella began, "the executive team has decided that the number one priority we have right now is to not only survive but to thrive and prosper, and the way to do that is to develop closer relationships with our customers. The person on the executive team who's even more excited about this than me is John Smith, head of marketing. We want to attract new customers, like all of our competitors. But also like our competitors, we want to keep our customers for life, kind of like a frequent-flier program, but better. Better for us and for our loyal customers. And we want to reward most the customers who spend the most. We're calling the project 'No Customer Escapes.'"

"I hope that's only an internal name," Jim joked. "Seriously, I can see how something like this would be good for Petrie, and I can see how IT would play an important, no, crucial role in making something like this happen. So, what's the next step in getting the project approved?"

Case Questions

2.20 How do information systems projects get started in organizations?

2.21 How are organizational information systems related to company strategy? How does strategy affect the information systems a company develops and uses?

2.22 Research customer loyalty programs in retail firms. How common are they? What are their primary features?

2.23 What do you think Jim's next step would be? Why?

2.24 Why would a systems analyst new to a company be a good choice to lead an important systems development effort?

PETRIE ELECTRONICS

Chapter 3: Managing the Information Systems Project

Jim Watanabe, assistant director of information technology at Petrie Electronics, a Southern California–based electronics retail store, walked into his building's conference room. It was early in the morning for Jim, but the meeting was important. Ella Whinston, the COO, had called the meeting. On the agenda was the proposed customer relationship project Ella told Jim about earlier in the week. She had asked Jim to be the project manager. If the project was approved by Petrie IS steering committee, it would be Jim's first big project to manage at Petrie. He was excited about getting started.

"Hi Jim," said Ella Whinston. With Ella was a man Jim did not know. "Jim, this is Bob Petroski. I know that the customer loyalty project has not been officially approved yet, but I am certain it will be. I'd like for Bob to be on your team, to represent me."

Jim and Bob shook hands. "Nice to meet you, Jim. I'm looking forward to working with you."

"And Bob knows how important this project is to me," Ella said, "so I expect him to keep me informed about your progress." Ella smiled.

Great, Jim thought, more pressure. That's all I need.

Just then, John Smith, the head of marketing, walked into the conference room. With him was a young woman Jim recognized, but he wasn't sure from where.

"Jim," John said, "Let me introduce you to Sally Fukuyama. She is the assistant director of marketing. She will be representing marketing, and me, on your 'No Employee Escapes' project. Assuming it gets official approval, of course."

"Hi, Jim," Sally said, "I have a lot of ideas about what we can do. Even though I still have my regular job to worry about, I'm excited about working on this project."

"Who else do you think should be on your team?" Ella asked.

"I'd like to bring in Sanjay Agarwal from IT," Jim said. "He is in charge of systems integration in the IT department and reports to me. In addition to me and Sanjay and Sally and Bob, I think we should also have a store manager on the team. I'd like to suggest Juanita Lopez, the manager of the store in Irvine, California. She is really busy, but I think we have to have a store manager on the team."

"Irvine?" Ella asked. "That's one of our top stores. Juanita should have a lot of insight into the issues related to keeping customers, if she is managing the Irvine store. And you are right, she is going to be very busy."

Case Questions

3.63 What qualities might Jim possess that would make him a successful project manager?

3.64 How do you think Jim should respond to Ella's implied pressure about the importance of the project to her?

3.65 What strategies might Jim employ to deal with a very busy team member such as Juanita Lopez?

3.66 What should Jim do next to complete the project initiation?

3.67 List five team communication methods that Jim might use throughout this project. What are some pros and cons of each?

PETRIE ELECTRONICS

Chapter 4: Identifying and Selecting Systems Development Projects

J. K. Choi, chief financial officer for Petrie Electronics, came early to the quarterly IS Steering Committee meeting. Choi, who was the chair of the committee, took his seat at the head of the big table in the corporate conference room. He opened the cover on his tablet PC and looked at the agenda for the day's meeting. There were only a few proposed systems projects to consider today. He was familiar with the details of most of them. He briefly looked over the paperwork for each request. He didn't really think there was anything too controversial to be considered today. Most of the requests were pretty routine and involved upgrades to existing systems. The one totally new system being proposed for development was a customer loyalty system, referred to internally as "No Customer Escapes."

Choi chuckled at the name as he read through the proposal documents. "This is something we have needed for some time," he thought.

After about 15 minutes, his administrative assistant, Julie, came in. "Am I late or are you early?" she asked.

"No, you're not late," Choi said. "I wanted to come in a little early and look over the proposals. I wasn't able to spend as much time on these yesterday as I wanted."

As Julie was about to respond, the other members of the committee started to arrive. First was Ella Whinston, the chief operating officer. Choi knew that Ella was the champion for the customer loyalty project. She had talked about it for years now, it seemed to Choi. One of her people would make the presentation in support of the system. Choi knew she had buy-in on the project from most of the other members of the c-suite. He also knew that Joe Swanson, Petrie director of IT, supported the project. Joe was away, but his assistant director, Jim Watanabe, would attend the meeting in his place. Ella had already let it be known that she expected Jim to be the project manager for the customer loyalty system project. Jim had just joined the company, but he had five years of experience at Broadway Entertainment Company before its spectacular collapse. "Good thing I unloaded all that BEC stock I owned before the company went under," Choi thought. That reminded him of the meeting he had later today to plan the annual stockholders' meeting. "Better not let the steering committee meeting run too long," he thought. "I've got more important things to do today."

Next to arrive was John Smith, the head of marketing. John, who was also a member of the steering committee, had been with Petrie for most of his career. He had been with the company longer than anyone else on the steering committee.

Just then, Jim Watanabe came speeding into the conference room. He almost ran into John Smith as he sailed into the room. It looked like he was about to drop his tablet and spill his coffee on Smith. Choi chuckled again.

"Welcome, everyone," Choi said. "I think we are all here. You all have copies of the agenda for this morning's meeting. Let's get started."

"Sorry to interrupt, JK," Ella said. "Bob Petroski is not here yet. He will be presenting the proposal on the customer loyalty system project. I don't know where he is. Maybe he got held up in traffic."

"The customer loyalty system discussion is the last item we will discuss today, so we can go ahead with the rest of the agenda. Bob does not need to be here for anything except that discussion," Choi explained.

Choi looked around the table once more. "OK, then, let's get started. Let's try to keep to the agenda as much as possible. And let's watch the clock. I know we are all busy, but I have a very important meeting this afternoon. Julie, see if you can locate Bob."

Case Questions

4.44 What is an IS steering committee? What are its major functions? Typically, who serves on such a committee? Why do these committees exist?

4.45 Where do ideas for new information systems originate in organizations?

4.46 What criteria are typically used to determine which new information systems projects to develop? What arguments might Bob Petroski make for developing the proposed customer loyalty system?

4.47 Look at Figure 4-4. What kind of information would you need to put together a table like Figure 4-4 to present to the steering committee? How much of that information is objective? Subjective? Justify your answer.

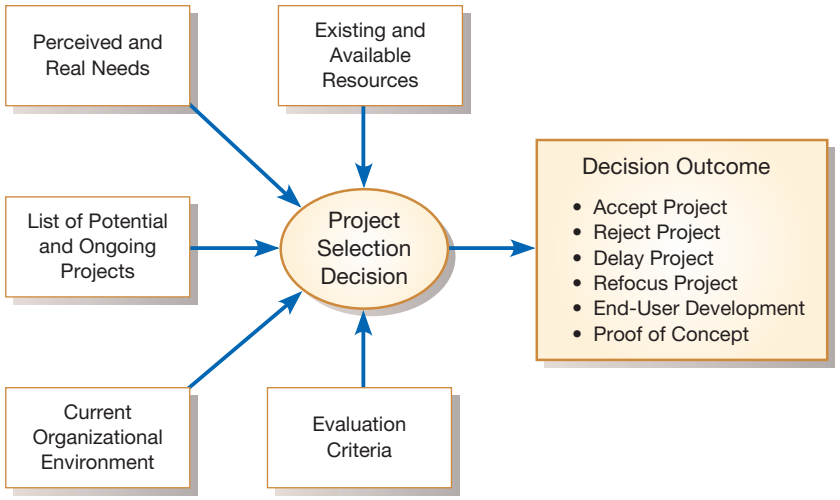


FIGURE 4-3
Project selection decisions must consider numerous factors and can have numerous outcomes

availability of needed resources or the demonstration that a particularly difficult aspect of the system can be developed. Projects may also be returned to the original requesters, who are told to develop or purchase the requested system. Finally, the requesters of a project may be asked to modify and resubmit their request after making suggested changes or clarifications.

One method for deciding among different projects, or when considering alternative designs for a given system, is illustrated in Figure 4-4. For example, suppose that, for a given system that has been identified and selected, there are three alternative designs that could be pursued—A, B, or C. Let's also suppose that early planning meetings identified three key system requirements and four key constraints that could be used to help make a decision on which alternative to pursue. In the left column of Figure 4-4, three system requirements and four constraints are listed. Because not all requirements and constraints are of equal importance, they are weighted based on their relative importance. In other words, you do not have to weight requirements and constraints equally; it is certainly possible to make requirements more or less important than constraints. Weights are arrived at in discussions among the analysis team, users, and sometimes managers. Weights tend to be fairly subjective and, for

Criteria	Weight	Alternative A		Alternative B		Alternative C	
		Rating	Score	Rating	Score	Rating	Score
Requirements							
Real-time data entry	18	5	90	5	90	5	90
Automatic reorder	18	1	18	5	90	5	90
Real-time data query	14	1	14	5	70	5	70
	50		122		250		250
Constraints							
Developer costs	15	4	60	5	75	3	45
Hardware costs	15	4	60	4	60	3	45
Operating costs	15	5	75	1	15	5	75
Ease of training	5	5	25	3	15	3	15
	50		220		165		180
Total	100		342		415		430

FIGURE 4-4
Alternative projects and system design decisions can be assisted using weighted multicriteria analysis

PETRIE ELECTRONICS

Chapter 5: Initiating and Planning Systems Development Projects

Now that the "No Customer Escapes" project team has been formed and a plan has been developed for distributing project information, Jim can begin working on the project's scope statement, workbook, and Baseline Project Plan. He first drafted the project's scope statement and posted it on the project's intranet (see PE Figure 5-1). Once posted on the intranet, he sent a short e-mail message to all team members requesting feedback.

Minutes after posting the project charter, Jim's office phone rang.

"Jim, it's Sally. I just looked over the scope statement and have a few comments."

"Great," replied Jim, "It's just a draft. What do you think?"

"Well, I think that we need to explain more about how the system will work and why we think this new system will more than pay for itself."

"Those are good suggestions; I am sure many others will also want to know that information. However, the scope statement is a pretty high-level document and doesn't get into too much detail. Basically, its purpose is to just formally announce the project, providing a very high-level description as well as briefly listing the objectives, key assumptions, and stakeholders. The other documents that I am working on, the workbook and the Baseline Project Plan, are intended to provide more details on specific deliverables, costs, benefits, and so on. So, anyway, that type of more detailed information will be coming next."

"Oh, OK, that makes sense. I have never been on a project like this, so this is all new to me," said Sally.

"Don't worry," replied Jim, "Getting that kind of feedback from you and the rest of the team will be key for us doing a thorough feasibility analysis. I am going to need a lot of your help in identifying possible costs and benefits of the system. When we develop the Baseline Project Plan, we do a very thorough feasibility analysis—we examine financial, technical, operational, schedule, legal and contractual feasibility, as well as potential political issues arising through the development of the system."

"Wow, we have to do all that? Why can't we just build the system? I think we all know what we want," replied Sally.

"That is another great question," replied Jim. "I used to think exactly the same way, but what I learned in my last job was that there are great benefits to following a fairly formal project management process with a new system. By moving forward with care, we are much more likely to have the right system, on time and on budget."

"So," asked Sally, "what is the next step?"

"Well, we need to do the feasibility analysis I just mentioned, which becomes part of the project's Baseline Project Plan. Once this is completed, we will have a walk-through presentation to management to make sure they agree with and understand the scope, risks, and costs associated with making 'No Customer Escapes' a reality," said Jim.

"This is going to be a lot of work, but I am sure I am going to learn a lot," replied Sally.

"So, let me get to work on the feasibility analyses," said Jim. "I will be sending requests out to all the team members to get their ideas. I should have this e-mail ready within an hour or so."

"Great, I'll look for it and respond as soon as I can," answered Sally.

"Thanks, the faster we get this background work done, the sooner we will be able to move on to what the system will do," replied Jim.

"Sounds good, talk to you later. Bye," Sally said.

"Bye, Sally, and thanks for your quick feedback," answered Jim.

Case Questions

5.57 Look over the scope statement (PE Figure 5-1). If you were an employee at Petrie Electronics, would you want to work on this project? Why or why not?

5.58 If you were part of the management team at Petrie Electronics, would you approve the project outlined in the scope statement in PE Figure 5-1? What changes, if any, need to be made to the document?

5.59 Identify a preliminary set of tangible and intangible costs you think would occur for this project and the system it describes. What intangible benefits do you anticipate for the system?

5.60 What do you consider to be the risks of the project as you currently understand it? Is this a low-, medium-, or high-risk project? Justify your answer. Assuming you were part of Jim's team, would you have any particular risks?

5.61 If you were assigned to help Jim with this project, how would you utilize the concept of incremental commitment in the design of the Baseline Project Plan?

5.62 If you were assigned to Jim's team for this project, when in the project schedule (in what phase or after which activities are completed) do you think you could develop an economic analysis of the proposed system? What economic feasibility factors do you think would be relevant?

5.63 If you were assigned to Jim's team for this project, what activities would you conduct in order to prepare the details for the Baseline Project Plan? Explain the purpose of each activity and show a timeline or schedule for these activities.

5.64 In Case Question 5-59, you analyze the risks associated with this project. Once deployed, what are the potential operational risks of the proposed system? How do you factor operational risks into a systems development plan?

Petrie Electronics

Prepared: February 6, 2017

Scope Statement

Project Name: No Customer Escapes
Project Manager: Jim Watanabe (jwatanabe@petries.com)

Customer: Operations
Project Sponsor: Ella Whinston (ewhinston@petries.com)
Project Start/End (projected): 2/5/17 – 7/30/18

Project Overview:

This project will design and implement a customer relationship management system in order to provide superior customer service by rewarding our most loyal customers. Specifically, the system will track customer purchases, assign points for cumulative purchases, and allow points to be redeemed for "rewards" at local stores. This goal of this system is to provide an incentive to customers to choose Petrie Electronics as their first and only choice for making electronic purchases. The system will provide Petrie management with improved information on the purchase behavior of our most loyal customers.

Objectives:

- Track customer purchases
- Accumulate redeemable points
- Reward customer loyalty and provide incentives to remain loyal customers
- Provide improved management information

Key Assumptions:

- System development will be outsourced
- Interface will be a web browser
- System will access existing customer sales databases

Stakeholders and Responsibilities:

Stakeholder	Role	Responsibility	Signatures
Ella Whinston	Chief Operating Officer	Project Vision, Executive Sponsor	*Ella Whinston*
Bob Petroski	Senior Operations Manager	Monitoring, Resources	*Bob Petroski*
Jim Watanabe	Project Manager	Plan, Monitor, Execute Project	*Jim Watanabe*
Sally Fukuyama	Assistant Director, Marketing	System Functionality	*Sally Fukuyama*
Sanjay Agarwal	Lead Analyst	Technical Architect	*Sanjay Agarwal*

PE FIGURE 5-1
A Scope Statement for Petrie's Customer Relationship Management System

PETRIE ELECTRONICS

Chapter 6: Determining System Requirements

Jim Watanabe, the project manager, thought that although the customer loyalty project at Petrie Electronics had gone slowly at first, the past few weeks had been fast-paced and busy. He spent much of his time planning and conducting interviews with key stakeholders inside the company. He also worked with the marketing group to put together some focus groups made up of loyal customers, to get some ideas about what they would value in a customer loyalty program. Jim had also spent some time studying customer loyalty programs at other big retail chains and those in other industries as well, such as the airlines, which are known for their extensive customer loyalty programs. As project manager, he also supervised the efforts of his team members. Together, they collected a great deal of data. Jim had just finished creating a high-level summary of the information into a table he could send to his team members (PE Table 6-1).

PE TABLE 6-1 Requirements and Constraints for Petrie's Customer Loyalty Project

Requirements:

- Effective customer incentives – System should be able to effectively store customer activity and convert to rewards and other incentives
- Easy for customers to use – Interface should be intuitive for customer use
- Proven performance – System as proposed should have been used successfully by other clients
- Easy to implement – Implementation should not require outside consultants or extraordinary skills on the part of our staff or require specialized hardware
- Scalable – System should be easily expandable as number of participating customers grows
- Vendor support – Vendor should have proven track record of reliable support and infrastructure in place to provide it

Constraints:

- Cost to buy – Licenses for one year should be under $500,000
- Cost to operate – Total operating costs should be no more than $1 million per year
- Time to implement – Duration of implementation should not exceed three months
- Staff to implement – Implementation should be successful with the staff we have and with the skills they already possess

From the list of requirements, it was clear that he and his team did not favor building a system from scratch in-house. Jim was glad that the team felt that way. Not only was building a system like this in-house an antiquated practice, it was expensive and time consuming. As nice as it might have been to develop a unique system just for Petrie, there was little point in reinventing the wheel. The IT staff would customize the system interface, and there would be lots of work for Sanjay's staff in integrating the new system and its related components with Petrie's existing systems, but the core of the system would have already been developed by someone else.

Just as he was finishing the e-mail he would send to his team about the new system's requirements and constraints, he received a new message from Sanjay. He had asked Sanjay to take the lead in scouting out existing customer loyalty systems that Petrie could license. Sanjay conducted a preliminary investigation that was now complete. His e-mail contained the descriptions of three of the systems he found and studied (PE Table 6-2). Obviously, Jim and his team would need to have a lot more information about these alternatives, but Jim was intrigued by the possibilities. He sent a reply to Sanjay, asking him to pass the alternatives on to the team and to prepare a briefing for the team that would include more detailed information about each alternative.

PE TABLE 6-2 Alternatives for Petrie's Customer Loyalty Project

Alternative A:

Data warehousing-centered system designed and licensed by Standard Basic Systems Inc. (SBSI). The data warehousing tools at the heart of the system were designed and developed by SBSI and work with standard relational DBMS and relational/OO hybrid DBMS. The SBSI tools and approach have been used for many years and are well known in the industry, but SBSI-certified staff are essential for implementation, operation, and maintenance. The license is relatively expensive. The customer loyalty application using the SBSI data warehousing tools is an established application, used by many retail businesses in other industries.

Alternative B:

Customer Relationship Management-centered system designed and licensed by XRA Corporation. XRA is a pioneer in CRM systems, so its CRM is widely recognized as an industry leader. The system includes tools that support customer loyalty programs. The CRM system itself is large and complex, but pricing in this proposal is based only on modules used for the customer loyalty application.

Alternative C:

Proprietary system designed and licensed by Nova Innovation Group, Inc. The system is relatively new and leading edge, so it has only been implemented in a few sites. The vendor is truly innovative but small and inexperienced. The customer interface, designed for a standard web browser, is stunning in its design and is extremely easy for customers to use to check on their loyalty program status. The software runs remotely, in the "cloud," and data related to the customer loyalty program would be stored in the cloud too.

Case Questions

6.41 What do you think are the sources of the information Jim and his team collected? How do you think they collected all of that information?

6.42 Examine PE Table 6-1. Are there any requirements or constraints that you can think of that were overlooked? List them.

6.43 If you were looking for alternative approaches for Petrie's customer loyalty program, where would you look for information? Where would you start? How would you know when you were done?

6.44 Using the web, find three customizable customer loyalty program systems being sold by vendors. Create a table like PE Table 6-2 that compares them.

6.45 Why shouldn't Petrie's staff build their own unique system in-house?

PETRIE ELECTRONICS

Chapter 7: Structuring System Process Requirements

Jim and Sanjay chatted in Jim's office while they waited for Sally to arrive.

"Good work on researching those alternatives," Jim said.

"Thanks," replied Sanjay. "There are a lot of alternatives out there. I think we found the best three, considering what we are able to pay."

Just then Sally walked in. "Sorry I'm late. Things are getting really busy in Marketing right now. I've been putting out fires all morning."

Sally sat down at the table across from Jim.

"I understand," Jim said. "But to stay on schedule, we need to start focusing on the specifics of what we want our system to do. Remember when you wanted more details on what the system would do? Well, now we start to spend some serious energy on getting that done."

"Awesome," replied Sally, as she pulled a Red Bull out of her oversized bag and popped it open.

"I've got a list here of four core functions the system must perform," said Sanjay, pulling copies of a list from a folder on the table (PE Table 7-1). "Let's look at these."

After reviewing the list Sanjay had given them, Jim said, "Nice job, Sanjay. But we need to put this in graphical format, so that everyone can see what the inputs and outputs are for each function and how they are related to each other. We also need to see how the new system fits in with our existing data sources. We need …"

"Some data flow diagrams," Sanjay interrupted.

"Exactly," said Jim.

"They are already done," replied Sanjay, handing diagrams to both Jim and Sally. "I've already created a first draft of the context diagram (PE Figure 7-1) and a level-1 diagram (PE Figure 7-2). You can see how I've defined the boundaries of our system, and I've included our existing product and marketing databases."

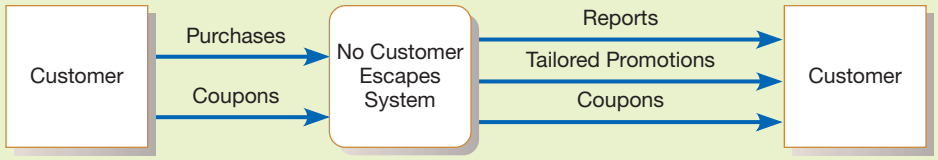
"What can I say?" Jim said. "Again, a nice job on your part. These diagrams are both good places for us to start. Let's get copies of all of this to the team."

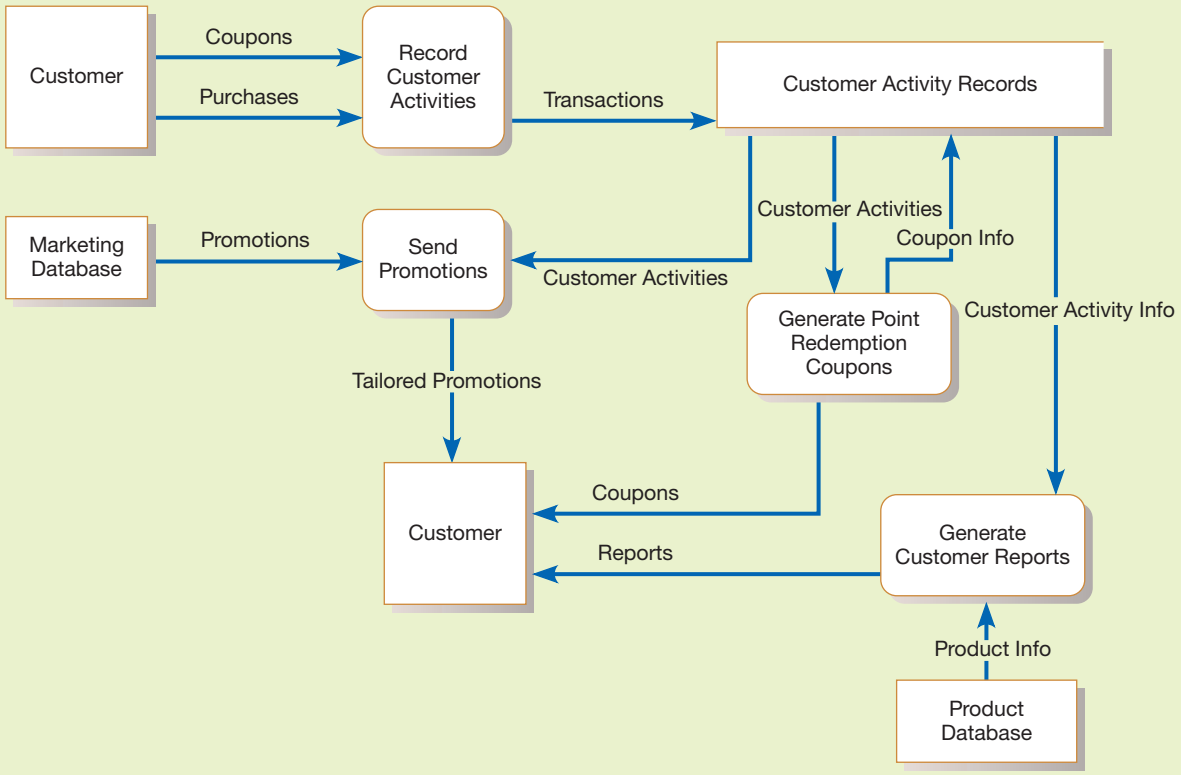
"I'll be right back," Sally said, standing up. "I need to get some coffee."

PE TABLE 7-1 Four Core Functions of Petrie's Customer Loyalty System

Function	Description
Record customer activities	When a customer makes a purchase, the transaction must be recorded in the customer loyalty system, as the rewards the system generates are driven by purchases. Similarly, when a customer uses a coupon generated by the system, it must also be recorded, so that the customer activity records can be updated to show that the coupon has been used and is now invalid.
Send promotions	Data about customer activities provide information about what types of products customers tend to buy and in what quantities. This information helps determine what sales promotion materials are best targeted at what customers. Customers who buy lots of video games should receive promotions about games, game platforms, and HD TVs, for example.
Generate point redemption coupons	Data about customer activities is used to generate coupons for future purchases. Those coupons must be made available to customers, either as paper coupons sent in the mail or online, in the customer's private account area. Once created, the customer activity database needs to be updated to show the creation of the coupon. The loyalty points needed to create the coupon must be deducted from the customer's total points.
Generate customer reports	From time to time, either in the mail or electronically, customers need to be sent account reports that show their recent purchases, the coupons they have been issued that have not yet been redeemed, and the total points they have amassed from their purchases.

PE FIGURE 7-1
Context diagram





PE FIGURE 7-2
Level-1 DFD

Case Questions

7.58 Are the DFDs in PE Figures 7-1 and 7-2 balanced? Show that they are or are not. If they are not balanced, how can they be fixed?

7.59 Decompose each of the core processes in PE Figure 7-2 and draw a new DFD for each core process.

7.60 Has the team overlooked any core processes in the system that should be in PE Table 7-1 and PE Figure 7-2? What would they be? Add them to PE Table 7-1 and PE Figure 7-2.

7.61 Redesign PE Figures 7-1 and 7-2 so that they are easier to understand, more efficient, and more comprehensive.

7.62 Why is it important for the team to create DFDs if they are not going to write the actual system code themselves?

PETRIE ELECTRONICS

Chapter 8: Structuring System Data Requirements

Jim Watanabe, manager of the "No Customer Escapes" project, and assistant director of IT for Petrie Electronics, was sitting in the company cafeteria. He had just finished his house salad and was about to go back to his office when Stephanie Welch sat down at his table. Jim had met Stephanie once, back when he started work at Petrie. He remembered she worked for the database administrator.

"Hi, Jim, remember me?" she asked.

"Sure, Stephanie, how are you? How are things in database land?"

"Can't complain. Sanjay asked me to talk to you about the database needs for your new customer loyalty system." Stephanie's phone beeped. She pulled it out of her oversize bag and looked at it. She started to text as she continued to talk to Jim. "How far along are you on your database requirements?"

That's kind of rude, Jim thought. Oh well. "We are still in the early stages. I can send you a very preliminary E-R diagram we have (PE Figure 8-1), along with a description of the major entities."

"OK, that will help. I suspect that you won't have too many new entities to add to what's already in the system," Stephanie responded, still looking at her phone and still texting. She briefly looked up at Jim and smiled slightly before going back to texting. "Just send the E-R to me, and I'll let you know if I have any questions." She stood up, still looking at her phone. "Gotta go," she said, and she walked away.

OK, Jim thought, I need to remember to send Stephanie the preliminary E-R we have. I should probably send her the entity descriptions too (PE Table 8-1), just in case. Jim stood up, carried his tray over to the recycling area of the cafeteria, and went back to his office.

When Jim got back to his office, Sanjay was waiting for him.

"I've got more information on those alternatives we talked about earlier," Sanjay said. "I had one of my employees gather some data on how the alternatives might satisfy our needs." (See the descriptions of the alternatives at the end of Chapter 6.) Sanjay handed Jim a short report. "The matrix shows the requirements and constraints for each alternative and makes it relatively easy to compare them." (See PE Figure 8-2.)

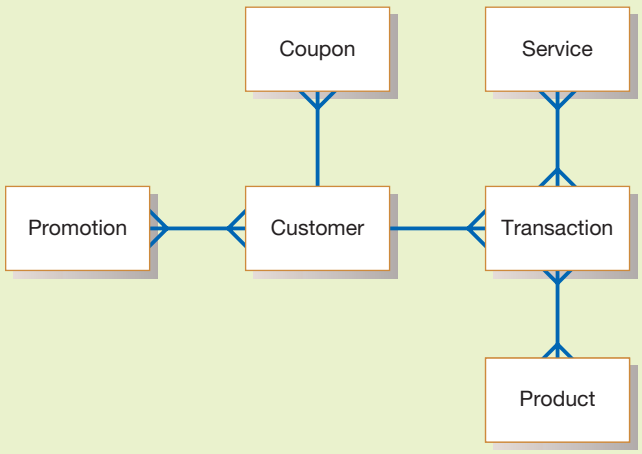
"The matrix favors the XRA CRM system," Jim said, after looking over the report. "It looks like their proposal meets our requirements the best, but the Nova group's proposal does the best job with the constraints."

"Yes, but just barely," Sanjay said. "There is only a five point difference between XRA and Nova, so they are pretty comparable when it comes to constraints. But I think the XRA system has a pretty clear advantage in meeting our requirements."

"XRA seems to be pretty highly rated in your matrix in terms of all of the requirements. You have them ranked better than the other two proposals for implementation, scalability, and vendor support," Jim said. "The '5' you gave them for proven performance is one of the few '5's you have in your whole matrix."

"That's because they are one of the best companies in the industry to work with," Sanjay responded. "Their reputation is stellar."

"This looks really promising," Jim said. "Let's see if reality matches what we have here. It's time to put together the formal request for proposal. I'll get that work started today. I hope that all three of these companies decide to bid."



PE FIGURE 8-1
Initial E-R diagram for Petrie's customer loyalty program

PE TABLE 8-1 Entity Descriptions for the preliminary E-R diagram for Petrie's customer loyalty system

Entity	Description
Coupon	A coupon is a special promotion created specifically for an individual customer. A coupon is for a set dollar amount, for example, $10. The customer may use it like cash or like a dollars-off promotion when purchasing products or services. Coupons can only be created for an individual customer based on the points in his or her customer loyalty account. For each dollar value of a coupon, a certain number of points must be redeemed. Coupons must be accounted for when created and when redeemed.
Customer	A customer is someone who buys products and/or services from Petrie Electronics. Customers include both online customers and those who shop in Petrie's brick-and-mortar stores.
Product	An item made available for sale to a Petrie customer. For example, a product is a 40" Sony LCD HD television. Products can be purchased online or in brick-and-mortar stores.
Promotion	A promotion is a special incentive provided to a customer to entice the customer into buying a specific product or service. For example, a promotion intended to sell Blu-ray discs may involve 2-for-1 coupons. Promotions are targeted to all customers, or to subsets of customers, not just to individual customers.
Service	A job performed by one of Petrie's associates for a customer. For example, upgrading the memory in a computer by installing new memory cards is a service that Petrie provides for a fee. Services may only be ordered and performed in brick-and-mortar stores, not online.
Transaction	A record that a particular product or service was sold to a specified customer on a particular date. A transaction may involve more than one product or service, and it may involve more than one of a particular kind of product or service. For example, one transaction may involve blank DVDs and pre-recorded DVDs, and the pre-recorded DVDs may all be of the same movie. For members of the loyalty program, each transaction is worth a number of points, depending on the dollar value of the transaction.

Criteria	Weight	Alt A: Rating	SBSI Score	Alt B Rating	XRA Score	Alt C Rating	Nova Score
Requirements							
Effective customer incentives	15	5	75	4	60	4	60
Easy for customers to use	10	3	30	4	40	5	50
Proven performance	10	4	40	5	50	3	30
Easy to implement	5	3	15	4	20	3	15
Scalable	10	3	30	4	40	3	30
Vendor support	10	3	30	4	40	3	30
	60		**220**		**250**		**215**
Constraints							
Cost to buy	15	3	45	4	60	5	75
Cost to operate	10	3	30	4	40	4	40
Time to implement	5	3	15	3	15	3	15
Staff to implement	10	3	30	4	40	3	30
	40		**120**		**155**		**160**
TOTAL	**100**		**340**		**405**		**375**

PE FIGURE 8-2
Evaluation matrix for customer loyalty proposals

Case Questions

8.103 Review the data flow diagrams you developed for questions in the Petrie Electronics case at the end of Chapter 7 (or diagrams given to you by your instructor). Study the data flows and data stored on these diagrams and decide whether you agree with the team's conclusion that the only six entity types needed are listed in the case and in PE Figure 8-1. If you disagree, define additional entity types, explain why they are necessary, and modify PE Figure 8-1 accordingly.

8.104 Again, review the DFDs you developed for the Petrie Electronics case (or those given to you by your instructor). Use these DFDs to identify the attributes of each of the six entities listed in this case plus any additional entities identified in your answer to Case Question 8-103. Write an unambiguous definition for each attribute. Then, redraw PE Figure 8-1 by placing the six (and additional) entities in this case on the diagram along with their associated attributes.

8.105 Using your answer to Case Question 8.104, designate which attribute or attributes form the identifier for each entity type. Explain why you chose each identifier.

8.106 Using your answer to Case Question 8.105, draw the relationships between entity types needed by the system. Remember, a relationship is needed only if the system wants data about associated entity instances. Give a meaningful name to each relationship. Specify cardinalities for each relationship and explain how you decided on each minimum and maximum cardinality on each end of each relationship. State any assumptions you made if the Petrie Electronics cases you have read so far and the answers to questions in these cases do not provide the evidence to justify the cardinalities you chose. Redraw your final E-R diagram in Microsoft Visio.

8.107 Now that you have developed in your answer to Case Question 8.106 a complete E-R diagram for the Petrie Electronics database, what are the consequences of not having an employee entity type in this diagram? Assuming only the attributes you show on the E-R diagram, would any attribute be moved from the entity it is currently associated with to an employee entity type if it were in the diagram? Why or why not?

8.108 Write project dictionary entries (using standards given to you by your instructor) for all the entities, attributes, and relationships shown in the E-R diagram in your answer to Case Question 8.106. How detailed are these entries at this point? What other details still must be filled in? Are any of the entities on the E-R diagram in your answer to Case Question 8.106 weak entities? Why? In particular, is the SERVICE entity type a weak entity? If so, why? If not, why not?

8.109 What date-related attributes did you identify in each of the entity types in your answer to Case Question 8.106? Why are each of these needed? Can you make some general observations about why date attributes must be kept in a database based on your analysis of this database?

PETRIE ELECTRONICS

Chapter 9: Designing Databases

Jim Watanabe, assistant director of IT for Petrie Electronics, and the manager of the "No Customer Escapes" customer loyalty system project, was walking down the hall from his office to the cafeteria. It was 4 p.m., but Jim was nowhere close to going home yet. The deadlines he had imposed for the project were fast approaching. His team was running behind, and he had a lot of work to do over the next week to try to get things back on track. He needed to get some coffee for what was going to be a late night.

As Jim approached the cafeteria, he saw Sanjay Agarwal and Sam Waterston walking toward him. Sanjay was in charge of systems integration for Petrie, and Sam was one of the company's top interface designers. They were both on the customer loyalty program team. They were having an intense conversation as Jim approached.

"Hi guys," Jim said.

"Oh, hi, Jim," Sanjay replied. "Glad I ran into you—we are moving ahead on the preliminary database designs. We're translating the earlier conceptual designs into physical designs."

"Who's working on that? Stephanie?" Jim asked. Stephanie Welch worked for Petrie's database administrator.

"Yes," Sanjay replied. "But she is supervising a couple of interns who have been assigned to her for this task."

"So how is that going? Has she approved their work?"

"Yeah, I guess so. It all seems to be under control."

"I don't want to second-guess Stephanie, but I'm curious about what they've done."

"Do you really have time to review interns' work?" Sanjay asked. "OK, let me send you the memo Stephanie sent me (PE Figure 9-1)."

MEMO

To: Stephanie Welch
From: Xin Zhu & Anton Washington
Re: Preliminary physical database design for "No Customer Escapes"
Date: June 1, 2013

We were charged with converting the conceptual database designs for the customer loyalty system to physical database designs. We started with one of the initial ERDs (see PE Figure 8-1), designed at a very high level. The ERD identified six entities: Customer, Product, Service, Promotion, Transaction, and Coupon. We discovered that all of these entities are already defined in Petrie's existing systems. The only entity not already defined is Coupon. Product and Service are defined as part of the product database. Promotion is defined as part of the marketing database. Customer and Transaction are defined as part of the core database.

However, after considerable consideration, we are not sure if some of these already identified and defined entities are the same as those identified in the preliminary ERD we were given. Specifically, we have questions about Customer, Transaction and Promotion.

Customer: The Customer entity is more complex than it appears. There are several ways to think about the instances of this entity. For example, we can divide Customers into those who shop online and those who shop in the brick-and-mortar stores. And there is of course some overlap. The biggest distinction between these two groups is that we know the names of (and other information about) the Customers who shop online, but we may have very little identifying information about those who shop only in the stores. For example, if an individual shops only at a store and pays only with cash, that individual meets the definition of Customer (see PE Table 8-1), but we collect no data on that individual at all. We raise these issues to call attention to the relationship between Customers and members of the customer loyalty program: All members are Customers, but not all Customers are members. We suggest that the entity called Customer in the preliminary ERD be renamed 'Member,' as we think that is a better name for this entity. We are prepared to map out the table design when this change is approved.

Transaction: Petrie already has a relational table called Transaction, but that applies to all transactions in all stores and online. The customer loyalty program focuses on the transactions of its Members, so the program involves only a subset of Transactions. We suggest that the ERD be redesigned to take this fact into account, and that what is now called Transaction be renamed 'Member Transaction.' The relational tables should then be designed accordingly.

Promotion: Petrie already has a relational table called Promotion. Again, the customer loyalty program, while having some interest in general promotions, focuses primarily on promotions created specifically for Members of the program. What is called Promotion in the ERD is really a subset of all of Petrie's promotions. We recommend a name change to 'Member Promotion' with the associated relational table design.

Finally, for the Coupon entity, which is new, we note from the ERD that Coupon only has one relationship, and that is with Customer. As it is a one-to-many relationship, the PK from Customer will be an FK in Coupon. We recommend the following table design: COUPON (Coupon ID,Customer ID, Creation Date, Expiration Date, Value)

PE FIGURE 9-1
Memo on issues related to physical database design for Petrie Electronic's customer loyalty program

"You're right, I don't have time," Jim said. "But I'm curious. It won't take long to read the memo, right?"

"OK, I'll send it as soon as I get back to my desk."

"OK, thanks." Jim walked on to the cafeteria, and he poured himself a big cup of coffee.

Case Questions

9.60 In the questions associated with the Petrie Electronics case at the end of Chapter 8, you were asked to modify the E-R diagram given in PE Figure 8-1 to include any other entities and the attributes you identified from the Petrie cases. Review your answers to these questions, and add any additional needed relations to the document in PE Figure 9-1.

9.61 Study your answer to Case Question 9-60. Verify that the relations you say represent the Petrie Electronics database are in third normal form. If they are, explain why. If they are not, change them so that they are.

9.62 The E-R diagram you developed in questions in the Petrie Electronics case at the end of Chapter 8 should have shown minimum cardinalities on both ends of each relationship. Are minimum cardinalities represented in some way in the relations in your answer to Case Question 9-61? If not, how are minimum cardinalities enforced in the database?

9.63 Using your answer to Case Question 9-61, select data types, formats, and lengths for each attribute of each relation. Use the data types and formats supported by Microsoft Access. What data type should be used for nonintelligent primary keys?

9.64 Complete all table and field definitions for the Petrie Electronics case database using Microsoft Access. Besides the decisions you have made in answers to the preceding questions, fill in all other field definition parameters for each field of each table.

9.65 The one decision for a relational database that usually influences efficiency the most is index definition. What indexes do you recommend for this database? Justify your selection of each index.

9.66 Using Microsoft Visio, develop an E-R diagram with all the supporting database properties for decisions you made in Case Questions 9-60–65. Can all the database design decisions you made be documented in Visio? Finally, use Visio to generate Microsoft Access table definitions. Did the table generation create the table definitions you would create manually?

PETRIE ELECTRONICS

Chapter 10: Designing Forms and Reports

It was late. Sally Fukuyama, assistant director of marketing, knocked on the slightly open door of Jim Watanabe's office. Jim was the project director for the "No Customer Escapes" customer loyalty system for Petrie Electronics.

"Yeah, come in," Jim called.

"Hi, Jim," Sally said, pushing the door open further. "Are you getting ready to leave?"

"Well, I was thinking about it, but something tells me that I'm probably not leaving any time soon. What's up?"

"I just got an e-mail from John [John Smith, the head of marketing at Petrie]. He has a whole bunch of reports he wants this system to generate," Sally replied. She took the stuffed manila folder in her hand and dropped it on Jim's desk.

"What is all this?" he moaned.

"John says all of these reports are absolutely essential. He says you should be able to generate all of the necessary data from the new customer loyalty system."

"It will take forever to work out the specific designs on all of these reports," Jim said. "I'm going to need a lot of help on this." Jim dropped the folder on his desk.

"Sorry, Jim," Sally said. "I'll help you tomorrow, but I really need to go."

"OK, bye," Jim said, as Sally left his office.

He opened the folder and started to look at what was there. Some of the report requirements were more complete than others. One of the reports near the top of the heap focused on listing the best customers, based on how much they had spent in a particular month. "I'll start with this one," Jim thought. "I think I'll do a quick design in Excel."

Jim worked on the report design for 15 minutes. His first cut is featured in PE Figures 10-1 and 10-2. PE Figure 10-1 shows the high-level summary report, which lists only the names of the customers, where they are from, and the total they spent during a given month. PE Figure 10-2 shows the details of what each customer bought.

"Well," Jim thought, "these are certainly practical designs for the reports. They show what John says he wants, but they sure are ugly. I wonder how I can make them look better. No time for that now. I have to start work on all of these other report designs. How many are there? A hundred? Sure seems like it. Maybe I can get the interns to work on some of this. It would be good for them."

Jim looked over the next suggestion for a report from John's stack of requests.

Case Questions

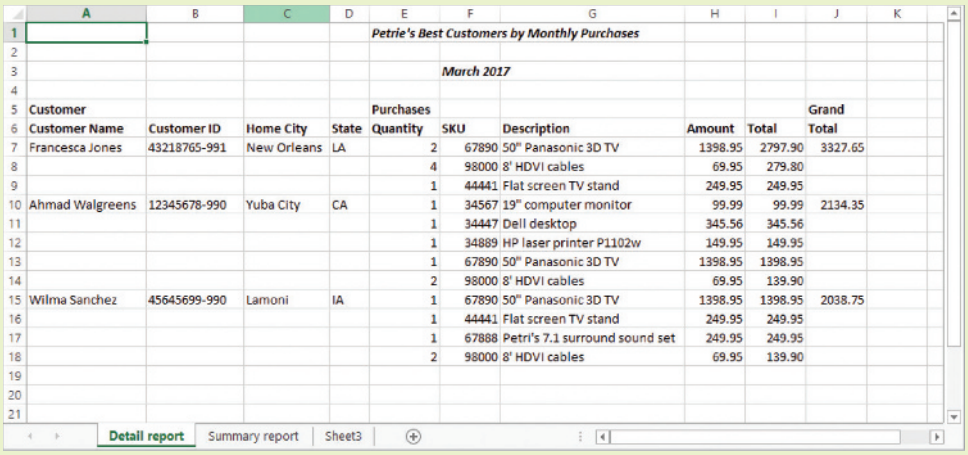
10.43 How would you make the reports in PE Figures 10-1 and 10-2 "look better"? After you improve the design of the reports, explain why you make the changes you did.

10.44 What other reports do you think John would ask for, based on the data that would be available from Petrie's customer loyalty system? Make a list. Then take the first two reports on your list and design how they would look.

	A	B	C	D	E	F	G	H	I
1		*Petrie's Best Customers by Monthly Purchases*							
2									
3			*March 2017*						
4									
5	**Customer**				**Grand**				
6	**Customer Name**	**Customer ID**	**Home City**	**State**	**Total**				
7	Francesca Jones	43218765-991	New Orleans	LA	3327.65				
8	Ahmad Walgreens	12345678-990	Yuba City	CA	2134.35				
9	Wilma Sanchez	45645699-990	Lamoni	IA	2038.75				
10	Sylvia Pollock		Los Angeles	CA	1988.94				
11	William Peace		Tampa	FL	1645.87				
12	Jose Gonzalez		Atlanta	GA	1543.34				
13	D'Andre Martinez		New York	NY	1109.15				
14	John Smith		Las Vegas	NV	1065.34				
15									

Detail report | Summary report | Sheet3

PE FIGURE 10-1
Initial design for Best Customers Monthly Summary Report
(*Source:* Microsoft Corporation.)



Petrie's Best Customers by Monthly Purchases

March 2017

Customer				Purchases					Grand
Customer Name	Customer ID	Home City	State	Quantity	SKU	Description	Amount	Total	Total
Francesca Jones	43218765-991	New Orleans	LA	2	67890	50" Panasonic 3D TV	1398.95	2797.90	3327.65
				4	98000	8' HDVI cables	69.95	279.80	
				1	44441	Flat screen TV stand	249.95	249.95	
Ahmad Walgreens	12345678-990	Yuba City	CA	1	34567	19" computer monitor	99.99	99.99	2134.35
				1	34447	Dell desktop	345.56	345.56	
				1	34889	HP laser printer P1102w	149.95	149.95	
				1	67890	50" Panasonic 3D TV	1398.95	1398.95	
				2	98000	8' HDVI cables	69.95	139.90	
Wilma Sanchez	45645699-990	Lamoni	IA	1	67890	50" Panasonic 3D TV	1398.95	1398.95	2038.75
				1	44441	Flat screen TV stand	249.95	249.95	
				1	67888	Petri's 7.1 surround sound set	249.95	249.95	
				2	98000	8' HDVI cables	69.95	139.90	

Detail report | Summary report | Sheet3

PE FIGURE 10-2
Initial design for Best Customers Monthly Detail Report
(*Source:* Microsoft Corporation.)

10.45 Using the text as one source and what you can find on the Internet as another source, make a list of the 10 most important things to consider when designing reports.

10.46 Do you belong to any customer loyalty programs such as an airline's frequent flyer program or a program at a national retailer? If not, maybe your parents or other relatives do. Take the monthly report that a loyalty program sends to customers. Identify all of the data elements needed to create the report and use that information to create an E-R diagram.

PETRIE ELECTRONICS

Chapter 11: Designing Interfaces and Dialogues

Jim Watanabe, project director for the "No Customer Escapes" customer loyalty system for Petrie Electronics, walked into the conference room. Sally Fukuyama, from marketing, and Sanjay Agarwal, from IT, were already there. Also at the meeting was Sam Waterston, one of Petrie's key interface designers.

"Good morning," Jim said. "I'm glad everyone could be here today. I know you are all busy, but we need to make some real progress on the customer account area for 'No Customer Escapes.' We have just awarded the development of the system to XRA, and once all the documents are signed, they will be coming over to brief us on the implementation process and our role in it."

"I'm sorry," Sally said, "I don't understand. If we are licensing their system, what's left for us to do? Don't we just install the system and we're done?" Sally took a big gulp of coffee from her cup.

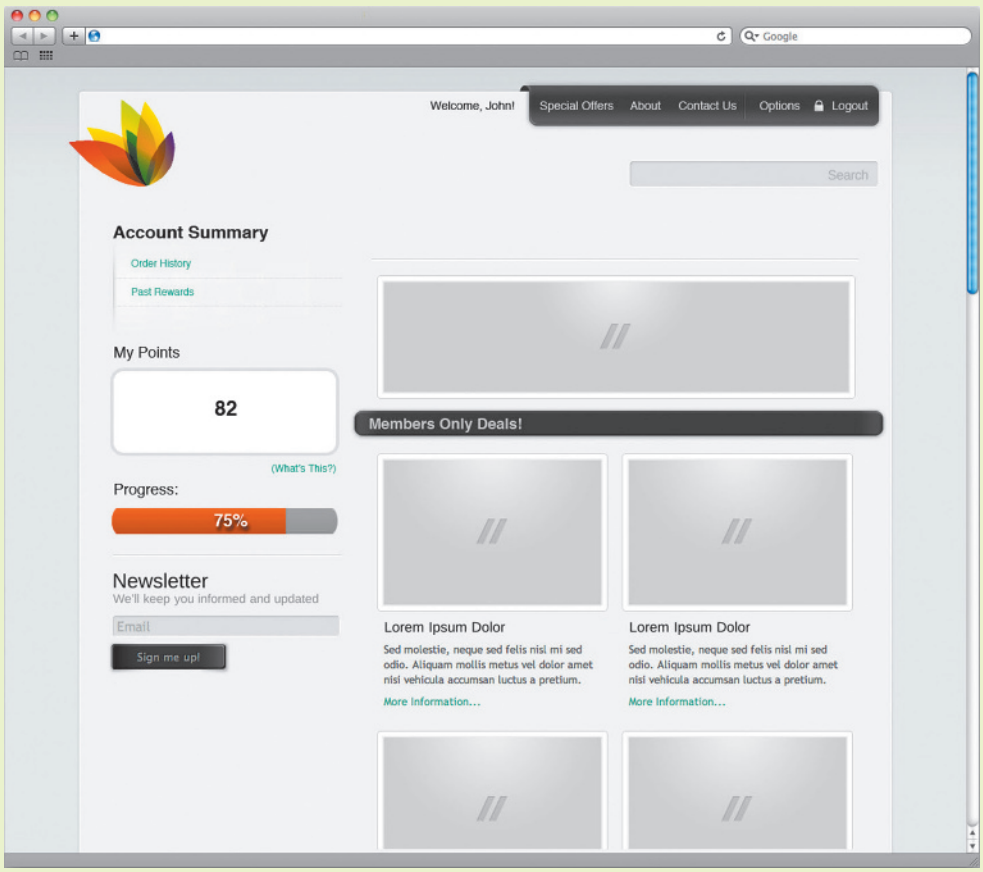
"I wish it were that easy," Jim said. "While it is true that we are licensing their system, there are many parts of it that we need to customize for our own particular needs. One obvious area we need to customize is all of the human interfaces. We don't want the system to look generic to our loyal customers—we need to make it unique to Petrie."

"And we have to integrate the XRA system with our own operations," added Sanjay. "For example, we have to integrate our existing marketing and product databases with the XRA CRM (see PE Figure 7-2). That's just one piece of all the technical work we have to do."

"We've already done some preliminary work on system functionality and the conceptual database," Jim said. "I want to start working on interface issues now. That's why Sam is here. What we want to do today is start work on how the customer account area should look and operate. And, Sally, the customer loyalty site is a great opportunity for marketing. We can advertise specials and other promotions to our best customers on this site. Maybe we could use it to show offers that are only good for members of our loyalty program."

"Oh yeah," Sally replied. "That's a great idea. How would that look?"

"I have ideas," said Sam. Using a drawing program on a tablet PC, he started to draw different zones that would be part of the interface. "Here at the top we would have a simple banner that says 'Petrie's' and the name of the program."



PE FIGURE 11-1
Preliminary design for the customer account area
(*Source:* Microsoft Corporation.)

"It's not really going to be called 'No Customer Escapes,' is it?" asked Sally.

"No, that's an internal name," replied Jim, "but I don't know what the real name will be yet."

"OK, so the real name of the program will go in the banner, after 'Petrie's.' Then on the left side, we'll have a sidebar that has overview information about the customer account, things like name and points balance," said Sam, drawing in a sidebar on the left of the screen. "There will also be links to more detailed information about the account, so the customer can see more details on past transactions and on his or her profile."

"So the rest of the screen is open. That would be a perfect place for marketing information," suggested Sally. "Would we want just one big window for marketing? Maybe we could divide it up into additional windows, so we could use one to focus on general promotions and one to advertise 'member only' promotions?"

"Yeah, we can do that," said Sam.

Just then Jim's phone beeped. Jim looked at it. Uh-oh, it was an urgent message from his boss, the director of IT. "Sorry, I need to take care of this immediately," he told the group. "Can you guys work on this some more and then send me some of the screen designs you come up with?"

Later that afternoon, after the crisis was over, Jim sat back down at his desk for the first time in what seemed like a very long time. He glanced over his e-mail and noticed there was a message from Sam. Attached was a preliminary design for the customer account area. Jim opened it and looked it over (PE Figure 11-1). Hmmm, not bad, he thought. This is a good place for us to start.

Case Questions

11.45 Using the guidelines from this chapter and other sources, evaluate the usability of the page design depicted in PE Figure 11-1.

11.46 Chapter 11 encourages the design of a help system early in the design of the human interface. How would you incorporate help into the interface shown in PE Figure 11-1?

11.47 Describe how cookie crumbs could be used in this system. Are cookie crumbs a desirable navigation aid for this system? Why or why not?

11.48 The page design depicted in PE Figure 11-1 links to an Order History page. Sketch a similar layout for the Order History page, following guidelines from Chapter 11.

11.49 Describe how the use of template-based HTML might be leveraged in the design of the "No Customer Escapes" system.

PETRIE ELECTRONICS

Chapter 12: Designing Distributed and Internet Systems

Stephanie Welsh worked for Petrie's database administrator. She had been overseeing two interns who were helping her translate conceptual database designs into physical designs. As they were finishing up the task she had assigned to them, she realized that they would soon need something else to do.

She called Sanjay Agarwal, one of the most talented interface designers in Petrie's IT shop.

"Hi Sanjay, this is Stephanie. Got a minute?"

"For you, I can make the time," Sanjay replied.

"Well, this is not about me, this is about my two interns. They are about done with the database work I assigned them. They need something else to do, and I thought of you. Aren't you starting work on some of the customized Web designs for 'No Customer Escapes?'"

"Yep," Sanjay said. "That's next on my list of two thousand things I have to do this week."

"So I can send them over? That will be great. They are both good workers and very bright, so I think you will get a lot out of them."

"How much do they know about Web interface design?" Sanjay asked.

"Not much, I don't think."

"Well, that's not the answer I wanted. OK, I know what I'll do. I'll have them derive a list of guiding principles for good Web interface design. They can start by looking at the website design principles listed on Jakob Nielsen's site [www.nngroup.com]. His site is extensive, with many short articles of helpful hints for making websites usable."

After visiting Nielsen's site, the interns came up with the list of guidelines featured in PE Figure 12-1.

Case Questions

12.66 Visit the Nielsen website and update PE Figure 12-1 based on guidelines and articles posted since this list was compiled. Add only elements you believe are essential and relevant to the design of "No Customer Escapes."

12.67 Review Chapters 10 and 11. Combine into your answer to Case Question 12-66 guidelines from these chapters. How unique do you consider the human interface design guidelines for a website to be from general application design guidelines? Justify your answer.

12.68 Search for other Web-based resources, besides the Nielsen website, for website design. (Hint: Look at the references at the end of this and prior chapters.) In what ways do the design guidelines you find contradict your answer to Case Question 12-67? Explain the differences.

12.69 This chapter introduced the concepts of loyalty and trustworthiness as necessary for customers to interact with a website. What elements could be added to a customer loyalty site such as "No Customer Escapes" to improve the levels of loyalty and trustworthiness of Petrie's customers?

Feature	Guideline
Interacting menus–avoid	When users select something on one menu, options change in other menus on the same page. These changing options confuse users. It's hard to make a preferred option visible when it depends on a selection in another menu.
Very long menus–avoid	Long menus require users to scroll through them, and they can't see all of their options at once. It's better to break up the menu as a series of submenus or to represent some of the choices as hypertext links.
Menus of abbreviations–avoid	It is usually faster for users to simply type the abbreviation (e.g., a two-character state code) than to select it from a drop-down menu. Free-form input requires validation by a code on the web page or on the server.

PE FIGURE 12-1
Guidelines for design of Petrie's "No Customer Escapes"

(*Source:* Adapted from the following sources: Jakob Nielsen website *www.nngroup.com, specifically pages: www.nngroup.com/articles/drop-down-menus-use-sparingly/, www.nngroup.com/articles/top-10-mistakes-web-design/, www.nngroup.com/articles/ten-usability-heuristics/, www.nngroup.com/articles/reset-and-cancel-buttons/, and www.nngroup.com/articles/top-ten-mistakes-revisited-three-years-later/.*)

PE FIGURE 12-1 (continued)

Menus of well-known data– avoid	Selecting well-known data, such as month, city, or country, often breaks the flow of typing for users and creates other data entry problems.
Frames– use sparingly	Frames can be confusing when a user tries to print a page or when trying to link to another site. Frames can prevent a user from e-mailing a URL to other users and can be more clumsy for inexperienced users.
Moving page elements – use sparingly	Moving images have an overpowering effect on the human peripheral vision and can distract a user from productive use of other page content. Moving text may be difficult to read.
Scrollings – minimize	Some users will not scroll beyond the information that is visible on the screen. Thus, critical content and navigation elements should be obvious (on the top of the page, possibly in a frame on the top of the page so that these elements never leave the page).
Context – emphasize	You know more about your site than users do. They have difficulty finding information, so the site should be designed to provide them the structure and sense of place they need. Try to design your site from the user's perspective and relay this structure explicitly to users.
System status – make visible	The system should always provide information to users about what the system is doing. Reasonable feedback should be provided within a reasonable time frame.
Language– use user's terms	Your site's language should be natural and logical. It should be based on the users' language, not system language. The site should feature words and concepts familiar to the user, following real-world conventions.
Fixing mistakes– make it easy	Users make mistakes and make bad choices. They need a way to exit from their mistakes without going through an extended dialogue. Your site should support undo, redo, and default settings. But a good design that minimizes errors is always better than a good design message.
Actions– make them obvious	Make objects, actions, and options visible. Every part of the dialogue should be clear and independent of any other part. Instructions should be visible or easily accessible when appropriate.
Customize– for flexibility and efficiency	Design the system for both novice and experienced users. Allow users to tailor the system to their frequent actions.
Content– make it relevant	Every part of a dialogue should be relevant. Irrelevant information competes with necessary information and hence diminishes its visibility.
Cancel button – use sparingly	Users have come to rely on the *Back* button to get out of unintended or unpleasant situations. Using the *Back* button is not always the best way out. Include a *Cancel* button as well. *Cancel* provides an explicit way to quit, which allows a feeling of safety that goes beyond simply leaving a site.

PETRIE ELECTRONICS

Chapter 13: System Implementation

Jim Watanabe was in his new car, driving down I-5, on his way to work. He dreaded the phone call he knew he was going to have to make.

The original go-live date for a pilot implementation of Petrie Electronics' new customer relationship management (CRM) system was July 31. That was only six weeks away, and Jim knew there was no way they were going to be ready. The XRA CRM they were licensing turned out to be a lot more complex than they had thought. They were behind schedule in implementing it. Sanjay Agarwal, who was a member of Jim's team and who was in charge of systems integration for Petrie, wanted Jim to hire some consultants with XRA experience to help with implementation. So far, Jim had been able to stay under budget, but missing his deadlines and hiring some consultants would push him over his budget limit.

It didn't help that John Smith, head of marketing, kept submitting requests for changes to the original specifications for the customer loyalty program. As specified in the project charter, the new system was supposed to track customer purchases, assign points for cumulative purchases, and allow points to be redeemed for "rewards" at local stores. The team had determined that those rewards would take the form of dollars-off coupons. Customers who enrolled in the program would be given accounts which they could access from Petrie's website. When they signed on, they could check their account activity to see how many points they had accumulated. If they had earned enough points, they were rewarded with a coupon. If they wanted to use the coupon, they would have to print it out on their home printers and bring it in to a store to use on a purchase. The team had decided long ago that keeping everything electronic saved Petrie the considerable costs of printing and mailing coupons to customers.

But now marketing had put in a change request that would give customers a choice of having coupons mailed to them automatically or printing them from the website at home. This option, although nice for customers, added complexity to the XRA system implementation, and it added to the costs of operation. Jim had also learned yesterday from the marketing representative on his team, Sally Fukuyama, that now Smith wanted another change. Now he wanted customers to be able to use the coupons for online purchases from Petrie's website. This change added a whole new layer of complexity, affecting Petrie's existing systems for ordering online, in addition to altering yet again the implementation of the XRA CRM.

As if that wasn't enough, Juanita Lopez was now telling Jim that she would not be ready to let the team pilot the system in her Irvine store. Juanita was saying her store would not be ready by the end of July. Maybe that wouldn't matter, since they were going to miss the go-live date for the pilot. But Juanita was hinting she would not be ready for months after that. It seemed as if she didn't want her store to be used for the pilot at all. Jim didn't understand it. But maybe he should try to find another store to use as the pilot site.

Jim was almost at his exit. Soon he would be at the office, and he would have to call Ella Whinston and tell her the status of the project. He would have to tell her that they would miss the go-live date, but in a way it didn't matter since he didn't have a pilot location to go live at. In addition to going over schedule, he was going to have to go over budget, too. He didn't see any way they would be ready for the pilot anywhere close to when they had scheduled, unless he hired the consultants Sanjay wanted. And he would have to stop the latest change request filed by marketing. Even more important, he would have to keep the rumored change request, about using coupons for online purchases, from being submitted in the first place.

Maybe, just maybe, if he could hire the consultants, fight off the change requests, and get Juanita to cooperate, they might be ready to go live with a pilot in Irvine on October 15. That gave him four months to complete the project. He and the team were going to have to work hard to make that happen.

Jim realized he had missed his exit. Great, he thought, I hope it gets better from here.

Case Questions

13.58 Why don't information systems projects work out as planned? What causes the differences between the plan and reality?

13.59 Why is it important to document change requests? What happens if a development team doesn't?

13.60 When a project is late, do you think that adding more people to do the work helps or not? Justify your answer.

13.61 What is the role of a pilot project in information systems analysis? Why do you think Petrie's team decided to do a pilot project before rolling out the customer loyalty system for everyone?

13.62 Information systems development projects are said to fail if they are late, go over budget, or do not contain all of the functionality they were designed to have. Is the customer loyalty program a failure? Justify your answer. If not, how can failure be prevented? Is it important to avert failure? Why or why not?