Chapter 9 – Project Planning and Project Management

Solutions to End-of-Chapter Problems

Review Questions

1. List the six major reasons that projects fail.

1. Undefined project management practices
2. Poor IT management and procedures
3. Inadequate executive support
4. Inexperienced project managers
5. Unclear business objectives
6. Inadequate user involvement

2. List six critical factors that contribute to project success.

Oops. Only a summary of these critical factors was included in this edition. However, the success factors are basically the reverse of the failure reasons. Here is a list of a few:

- Clear system requirement definitions
- Substantial user involvement
- Support from upper management
- Thorough and detailed project plans
- Realistic work schedules and milestones

3. Define project management.

Project management is the organizing and directing of other people to achieve a planned result within a predetermined schedule and budget.

4. List five internal responsibilities of a project manager.

- Developing the project schedule
- Recruiting and training team members
- Assigning work to teams and team members
- Assessing project risks
- Monitoring and controlling project deliverables and milestones

5. What is the difference between the client and the user?

The user is the person that actually will use the new system. The client is the person or group that is paying for the development of the new system. In some cases they can be the same person, but they do not need to be.

6. What is meant by an organic approach?

The way a plant or animal grows is an organic approach. It starts small and increases in size. But even when it is small it still has all the essential components and is fully functional. As it grows it develops more capability and expands its scope. Developing a piece of software "organically" attempts to take a similar approach. It starts small, but is functional, and grows piece by piece adding more capability.

7. What is the importance of "ceremony"?

Another word for ceremony is formality. Instead of letting the ceremony of the project happen by default without any thought, the project ceremony should be a conscious and deliberate decision. Without define level of ceremony, the project stakeholders and team members will not know what is expected of them and how to work together.

8. List the nine areas of the PMBOK.

1. Scope Management
2. Time Management
3. Cost Management
4. Quality Management
5. Human Resource Management
6. Communications Management
7. Risk Management
8. Procurement Management
9. Integration Management

9. What is meant by Agile project management?

Agile project management is an approach to project management that includes the Agile philosophies in managing the project and the team of people. Basically Agile project management focuses on being flexible in project procedures, working relationships, and working software. Chapter 8 described the four basic values of Agile development.

10. How is scope management accomplished with Agile project management?

Since Agile projects are more flexible, frequently there are more requests for additional functionality to be added. To control these requests a prioritized list of functions is maintained. In order for new functions or requirements to be added, they must go through a review process and be added to the prioritized list.

11. What are the four activities of Core Process 1?

Identify the problem
Quantify the project approval factors

Perform risk and feasibility analysis
Review the approval factors with the client to obtain approval

12. What are three reasons that projects are initiated?

To respond to an opportunity
To resolve a business problem or need
To respond to an external (such as legal) mandate

13. What is the difference between system capabilities and business benefits?

The business benefits are measured in the dollars that are brought to the organization, either as increased revenue or reduced costs. (Intangible benefits are those where a dollar amount cannot be easily assigned, but still will add value to the organization.) The system capabilities are the functions that support the business procedures. The system capabilities are those things that enable or lead to the business benefits.

14. What factors are usually considered when approving a project?

How long will the project take?
How much will it cost?
What are the anticipated benefits to the organization?

15. List 10 types of benefits that may be considered when approving a project.

- Opening up new markets with new services, products, or locations
- Increasing market share in existing markets
- Enhancing cross-sales capabilities with existing customers
- Reducing staff by automating manual functions or increasing efficiency
- Decreasing operating expenses, such as shipping charges for "emergency shipments"
- Reducing error rates through automated editing or validation
- Reducing bad accounts or bad credit losses
- Reducing inventory or merchandise losses through tighter controls
- Collecting receivables (accounts receivable) more rapidly

16. Explain how net present value (NPV) is calculated.

Net present value is the net, i.e. the difference between costs and benefits, brought back to present value dollars. First the cost of development is considered as being done in year 0. The for each future year, up to some number of years, the costs, which are negative dollars, and the benefits, which are positive dollars, are netted together. Then that amount for each year is brought back to present value using the discount factor for the percentage rate and the number of years in the future.

17. What is the difference between tangible benefits and intangible benefits?

A tangible benefit is one that can be estimated or measured in terms of dollars. An intangible benefit may be just as important, but the client is not able to quantify it by assigning a dollar value to it.

18. What are some factors to consider when assessing organizational feasibility?

Organizational feasibility is a consideration of the risks within the organization itself – these risks are usually people risks, i.e. that they will be unable to accept or utilize the new system. Such things as computer phobia, fear of losing a job, political impacts on people's importance or position, or difficulty of changing work procedures.

19. What are the five activities of Core Process 2?

- Establish the project environment.
- Schedule the work.
- Staff and allocate resources.
- Evaluate work processes.
- Monitor progress and make corrections.

20. List seven types of information that should be captured during a project.

- Project plans and schedules
- Analysis documentation
- Design specifications
- Test cases and test results
- Outstanding issues and problems
- Screen and report definitions
- Program code

21. What is the difference between the project iteration schedule and the detailed work schedule?

The project iteration schedule is a broad, overview schedule that identifies the iterations and the use cases or functions assigned to each iteration. Generally this schedule is not detailed enough to assign work. The detailed work schedule is a shorter view and more detailed schedule, such as for each iteration, from which work assignments can be made and progress can be measured.

22. What is a work breakdown structure used for?

The work breakdown structure is the first step in building a detailed work schedule. It identifies all of the pieces of work that must be done to complete a certain milestone or that covers a period of the project. Along with identifying the work, it can be used to organize the work by noting which tasks are dependent on other tasks. It also describes how much effort is estimated for each task.

23. What is the benefit of an iteration review and retrospective?

The purpose of a retrospective is to improve the project management and work processes within the project. Since most iterative projects have many iterations, by taking the time to review the processes at the end of each iteration, the project team can improve how it works. The purpose of a retrospective is to ask "How are we doing as a project team?"

Problems and Exercises

1. Read this description and then make a list of expected business benefits that the company might derive from a new system:

Especially for You Jewelers is a small jewelry company in a college town. Over the last couple of years, it has experienced a tremendous increase in its business. However, its financial performance hasn't kept pace with its growth. The current system, which is partly manual and partly automated, doesn't track accounts receivables sufficiently, and the company is finding it difficult to determine why the receivables are so high. It runs frequent specials to attract customers, but it has no idea whether these are profitable or if the benefit—if there is one—comes from associated sales. Especially for You wants to increase repeat sales to its existing customers, thus it needs to develop a customer database. It also wants to install a new direct sales and accounting system to help solve these problems.

- Reduce the level of accounts receivables.
- Determine which type of specials and promotions increased sales.
- Increase repeat sales to existing customers.
- Closely track financial performance of the store.

2. Read this narrative and then make a list of system capabilities for the company:

The new direct sales and accounting system for Especially for You Jewelers will be an important element in the growth and success of the jewelry company. The direct sales portion needs to track every sale and be able to link to the inventory system for cost data to provide a daily profit and loss report. The customer database needs to be able to produce purchase histories to assist management in preparing special mailings and special sales to existing customers. Detailed credit balances and aged accounts for each customer would help solve the problem with the high balance of accounts receivables. Special notice letters and credit history reports would help management reduce accounts receivable.

- Track individual sales.
- Report on cost data for inventory items.
- Produce daily profit and loss reports.

- Track purchase histories of individual customers.
- Produce special mailings.
- Maintain accounts aging with reporting.

3. Develop a System Vision Document for Especially for You Jewelers based on the work you did for Problem 1 and Problem 2.

Answers will vary. See Figure 9-5 on page 244 for an example of a project charter.

Students should create a system scope document similar to Figure 9-5. The business benefits and system capabilities from problems 1 and 2 can also be included. A brief description of the problem should be taken from the case description.

4. Develop a work breakdown structure (WBS) based on the following narrative. It should cover all aspects of the move—from the beginning of the project (now) to the end, when all employees are moved into their new offices. Format your solution in tabular form with the following column headings: Task ID No, Task Description, Estimated Effort, Predecessor Task ID. For your solution, follow these guidelines:

- **Include dependencies.**
- **Include effort (work) estimates.**
- **Have 30 to 40 detailed tasks.**
- **Cover a period of at least two months to a maximum of six months.**

You are an employee of a small company that has outgrown its facility. It is a Web development and hosting company, so you have technical network administrators, developers, and a couple people handling marketing and sales. There are 10 employees.

The president of your company has purchased a nearby single-story building, and the company is going to move into it. The building will need some internal modifications to make it suitable. The president has asked you to take charge of the move. Your assignment is to (1) get the building ready, (2) arrange for the move, and (3) carry out the move.

The building is nearly finished, so the job shouldn't be too difficult (no construction is necessary—just some refurbishing). The building has several offices as well as a larger area that needs to be set up with cubicles.

You and the president are walking through the building, and he tells you what he wants: "Let's use the offices as they are," she says. "We will need a reception desk for visiting customers. The office in the back corner should be okay for our computer servers. Let's put the salespeople in these offices along the east wall. We are short a few offices, so let's put up a few cubicles in the large room for our junior developers.

"Of course, we will need to get everybody connected to our system, and I think Ethernet would be faster than wireless for us. And we all need to have phones.

"Let's plan the move for a long weekend, like a Thursday, Friday, and Saturday. Of course, we need to be careful not to shut down the clients we are already hosting.

"Will you put together a schedule for the move for our employees and set up instructions for all the employees so they know how they are supposed to get ready for the move? "

Answers will vary. Here is one group's solution.

ID	Task_Name	Predecessor	Effort
1	**Prepare the Building**		
2	**Design refurbish work**		
3	Research Designers	none	4 hrs
4	Choose Top 3	3	4 hrs
5	Write/Send Request for Proposal	4	16 hrs
6	Review Proposals	5	8 hrs
7	Select Designer	6	5 hrs
8	Develop Draft Plan (Designer)	7	16 hrs
9	Review Plan and Give Feedback	8	12 hrs
10	Develop Final Plan (Designer)	9	8 hrs
11	Approve Plan	10	2 hrs
12	**Setup Network/Phones**		
13	Plan wiring and cabling	11	25 hrs
14	Install Network Jacks	13	34 hrs
15	Install Phones	14	34 hrs
16	Test Network Jacks and Phones	15	16 hrs
17	**Refurbish Building**		
18	Paint walls	16	40 hrs
19	Install New Carpet	18	25 hrs
20	Purchase Furniture	11	16 hrs
21	Place Furniture in Cubicles	20	25 hrs
22	Decorate	18, 21	25 hrs
23	Inspect building	22	8 hrs
24	**Organize the Move**		
25	Review Calendar for Long Weekends	11	4 hrs
26	Select Moving Date	25	4 hrs
27	Notify Employees About the Move	26	10 hrs
28	Plan Employee Moving Meeting	27	8 hrs
29	Create Moving Agenda for Employees	28	8 hrs
30	Conduct Meeting/Distribute Agenda	29	3 hrs
31	Gather Boxes and Moving Equipment	30	5 hrs
32	Arrange for Moving Trucks	31	3 hrs
33	Notify Clients of New Address and Phone	32	16 hrs
34	**Plan for Client Services Continuity**		
35	Review Outsourcing Provider Options	11	4 hrs

36	Select Outsourcing Provider	35	3 hrs
37	Make Arrangements During Transition	36	4 hrs
38	**Carry Out the Move**		
39	**Pack and Move Employee Office Supplies**		
40	Provide Boxes and Start Packing	23, 33, 37	12 hrs
41	Load onto Trucks	40	8 hrs
42	Move to New Office	41	3 hrs
43	Unload into New Office Space	42	16 hrs
44	**Pack and Move Servers and Equipment**		
45	Outsourcing Vendor Temporarily Takes Over	23, 33, 37	2 hrs
46	Disconnect Servers	45	2 hrs
47	Test Outsourcing Vendor Service	46	2 hrs
48	Pack Equipment	47	6 hrs
49	Move Equipment	48	2 hrs
50	Set up Equipment in New Location	49	10 hrs
51	Test Equipment in New Location	50	3 hrs
52	Turn off Outsourcing Service	51	3 hrs
53	Re-test Equipment	52	4 hrs

5. Enter your WBS from Problem 4 into MS Project. First, enter the tasks, dependencies, and durations. Write a paragraph on your experience using MS Project.

Answers will vary. Students can take a snapshot of their schedule to turn in.

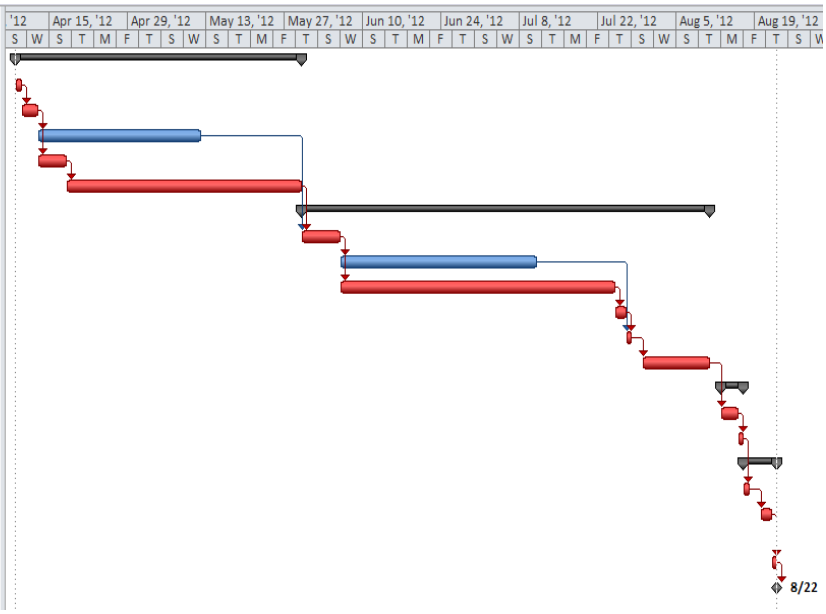
6. Develop a six-year NPV spreadsheet similar to the one shown in Figure 9-10. Use the following table of benefits, costs, and discount factors (see Figure 9-20). The development costs for the system were $225,000.

1							
2	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	Year 6
3		$55,000	$60,000	$70,000	$80,000	$80,000	$80,000
4	-$225,000						
5		-$5,000	-$5,000	-$5,000	-$5,000	-$5,000	-$5,000
6	-$225,000	$50,000	$55,000	$65,000	$75,000	$75,000	$75,000
7	1.0000	0.9524	0.9070	0.8638	0.8227	0.7835	0.7462
8	-$225,000	$47,620	$49,885	$56,147	$61,703	$58,763	$55,965
9	-$225,000	-$177,380	-$127,495	-$71,348	-$9,646	$49,117	$105,082
10	4 years +	9,646 / (9,646 + 49,117) =		.164	4 years + 60	days (.164*365)	

7. Build a Gantt chart by using MS Project based on the table shown in Figure 9-21. Enter the tasks, dependencies, and durations. Print out the PERT chart (Network chart) and the Gantt chart.

Figure 9-21 presents a list of tasks for a student who wants to have an international experience by attending a university abroad. Assume that all predecessor tasks must finish before the succeeding task can begin (the simplest version). Also, insert a few overview tasks, such as Application tasks, Preparation tasks, Travel tasks, and Arrival tasks. Be sure to state your assumption.

	Task Name	Duration	Start	Predec
1	**Application tasks**	**37 days**	**Mon 4/9/12**	
2	Obtain forms from IE office	1 day	Mon 4/9/12	
3	Fill out and send applications	3 days	Tue 4/10/12	2
4	Receive approval	21 days	Fri 4/13/12	3
5	Apply for scholarship	3 days	Fri 4/13/12	3
6	Receive approval notice	30 days	Wed 4/18/12	5
7	**Preparation tasks**	**53 days**	**Wed 5/30/12**	
8	Arrange financing	5 days	Wed 5/30/12	4,6
9	Arrange for housing in dorm	25 days	Wed 6/6/12	8
10	Obtain passport and visa	35 days	Wed 6/6/12	8
11	Send preregistration to Univ	2 days	Wed 7/25/12	10
12	Make travel arrangements	1 day	Fri 7/27/12	9,11
13	Determing clothing and shop	10 days	Mon 7/30/12	12
14	**Travel tasks**	**4 days**	**Mon 8/13/12**	
15	Pack and final arrangements	3 days	Mon 8/13/12	13
16	Travel	1 day	Thu 8/16/12	15
17	**Arrival tasks**	**4 days**	**Fri 8/17/12**	
18	Move into dormatory	1 day	Fri 8/17/12	16
19	Finalize registration and paperwork	2 days	Mon 8/20/12	18
20	Begin classes	1 day	Wed 8/22/12	19
21	End	0 days	Wed 8/22/12	20



8. The state university wants to implement a better system to keep track of all the computer equipment it owns and needs to maintain. The university purchases a tremendous number of computers and software that are distributed throughout the campus and are used by faculty, staff, departments, and colleges. Currently, the university has very sparse records of its equipment and almost no records about maintenance or the software that has been purchased. A list of use cases has been defined; it will serve as the starting point to develop this system.

Take the following list of use cases to create a project iteration schedule. You should try to arrange the use cases so similar ones are developed together. Also, the most important use cases should be developed first. State your assumptions, and explain your reasons for your solution.

Note: For brevity, we use the word *computer* to refer to any type of computing equipment, such as a desktop computer, laptop computer, server computer, printer, monitor, projector, wireless access point, and so forth.

1. **Buy a computer.**
2. **Sell a computer.**

3. **Put a computer in service.**
4. **Take a computer out of service (surplus).**
5. **Assign a computer to a person.**
6. **Record the location of a computer.**
7. **Repair a computer (in house).**
8. **Return a computer for repair.**
9. **Identify computers ready for replacement.**
10. **Search for a specific computer by various options.**
11. **Buy a software license.**
12. **Renew a software license.**
13. **Install software on a computer.**
14. **Remove software from a computer.**
15. **Record a warranty for a computer.**
16. **Purchase a warranty for a computer.**
17. **Search for multiple computers by various options.**
18. **Search for software on computers by various options.**
19. **Assign a computer to a department or college.**

Answers will vary. Here is one possible solution.

Iteration	Use Cases
#1	Buy a computer. Put a computer in service. Assign a computer to a person. Assign a computer to a department or college.
#2	Record the location of a computer. Purchase a warranty for a computer. Record a warranty for a computer.
#3	Buy a software license. Renew a software license. Install software on a computer.
#4	Identify computers ready for replacement. Take a computer out of service (surplus). Sell a computer.
#5	Search for a specific computer by various options. Search for multiple computers by various options. Search for software on computers by various options.
#6	Remove software from a computer. Repair a computer (in house). Return a computer for repair.

Solutions to Chapter 9 Cases (found at the end of the textbook)

Case Study: Custom Load Trucking

1. Do you think the decision by CLT to build project managers from its existing employee base is a good one? What advice would you give CLT to make sure it has strong project management skills in the company?

Answers will vary. Generally students will respond that it is a good idea to promote from within. Two points however. First the set of skills to be a project manager is not the same as those skills required to be a good programmer or analyst. So not every programmer or analyst will make a good project manager. Second, good mentoring and training is necessary to ensure good project managers.

2. What kind of criteria would you develop for Monica to use to measure whether Stewart (or any other potential project manager) is ready for project management responsibility?

Answers will vary. The case gives some good insight. Stewart has shown aptitude in leading people (as a team leader), and in building the schedule, etc. Having a list of project management skills and aptitudes and then observing if Stewart has an aptitude to develop those skills will indicate if he is ready and able to become a project manager.

3. How would you structure the job for new project managers to ensure or at least increase the possibility of a high level of success?

Answers will vary. A few points might be to start with smaller, less complex projects. Also projects that are not high risk in all the areas that were discussed. Projects with a similar deployment environment as the existing environment. Also assign a mentor project manager to watch and coach his project.

4. If you were Monica, what kind of advice would you give Stewart about managing his career and attaining his immediate goal of becoming a project manager?

Answers will vary. Project management is a career of advancement. There is always a need for good project managers, so it can be a highly beneficial career with substantial income. However, it tends to be a high-stress position trying to meet deadlines in the face of many problems and unknowns. It requires extensive people skills. Project managers often drop out of the details of technology and programming. So if the employment satisfaction is from getting one's fingers into the code, a project management career might not be satisfying.

Running Cases: Community Board of Realtors

1. Given the total vision of this system, develop a System Vision Document. Focus primarily on finding the benefits to the community board, the real estate agents, and home buyers.

Community Board of Realtors
System Vision Document

Problem Description

In any community or metropolitan area there are normally many different real estate offices, each with many different real estate agents. Each of the offices will have a clientèle of sellers who list their properties with the real estate office. Each office will also have a clientèle of buyers who are looking to buy a property. Since these real estate offices are independent there is a need to have a common database of all properties available for sale within the entire metropolitan area. This service is usually provided by a centralized organization, often called the Community Board of Realtors.

Centralized information is required of all properties with detailed descriptions. This information needs to be available to all real estate offices and agents, as well as to buyers. The system needs to support adding and updating property information by the offices and agents. The system also must keep track of information about the real estate offices and the agents.

System Capabilities

The following functional areas must be supported in the new system:

- Maintain listing information
- Maintain real estate office information
- Maintain real estate agent information
- Provide listing data in book form
- Provide search and view of property details
- Support requests for property visits
- Centralized database of all property listing information

Business Benefits

Benefits apply to the centralized board, real estate offices and agents, the sellers and the buyers.

Board benefits:

- Easy to maintain information. Small staff

Offices and agents:

- Current information on all listings
- Automated updates and changes to listing information
- Listing books for perusing listings and for advertising
- Better able to serve clientèle

Sellers:

- Broad listing of property listing
- Wide advertising of property listing

Buyers:

- Availability of listing information throughout the area
- Detailed information and images available
- Easily able to schedule property visits

2. Including the uses cases and functions identified in Chapters 3 and 8, make a list of all the uses cases that must be developed. Divide them into subsystems as appropriate. You should have at least two subsystems: one for viewing data and one for updating data. Add any additional use cases (and subsystems) that might be important to the Community Board of Realtors itself. [Hint: Think about user goals and CRUD.]

Answers will vary

Subsystem	Use Cases
Update Data	Add new listing Record listing change Delete listing Add real estate office Update real estate office info Delete real estate office Add new real estate agent Update real estate agent Delete real estate agent
View Data	Obtain listing data (View listings) Produce ML book Produce list of RE offices and agents View statistics on RE office (History, Open, Sold) View statistics on RE agents (History, Open, Sold) View histories of sold properties View statistics of open properties

3. Decide on a work sequence, and develop a project iteration schedule.

Answers will vary

Iteration	Use Cases
#1	Add real estate office Update real estate office info Delete real estate office Add new real estate agent Update real estate agent Delete real estate agent
#2	Add new listing Record listing change Delete listing Obtain listing data (View listings) Produce ML book
#3	Produce list of RE offices and agents View statistics on RE office (History, Open, Sold) View statistics on RE agents (History, Open, Sold) View histories of sold properties View statistics of open properties
#4	Cleanup and acceptance test

4. Estimate the development cost and the time required.

Answers will vary

Subsystem	Function Requirements	Iterations	Estimated time
Update Data	9	2	8 weeks
View/Report Data	7	2 (some overlap)	6 weeks
Final Cleanup		1	2 weeks
Total			16 weeks

Expense Category	Amount
Salaries (2 person team @ $1500/week)	$46,000.00
Equipment/Install (1 server + network)	$5,000.00
Training (1 person 1 week)	$1,500.00
Facilities	$5,000.00
Total	**$59,500.00**

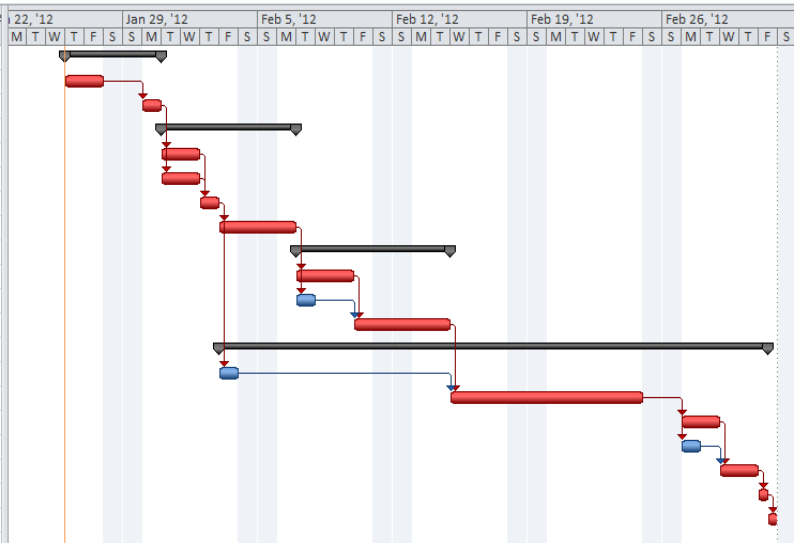
5. Develop a work breakdown structure (WBS) for the project's first iteration.

Discipline	Activity	Effort	Dependency
Planning	Set up work environment	2 days	
	Develop WBS and plan work	1 day	
Analysis Activities	Meet with Community Board users	2 days	
	Meet with several agents	2 days	
	Define data	1 day	
	Model use cases	2 days	
Design Activities	Design screen layouts	3 days	
	Design Database	1 day	
	Design use case processing	3 days	
Build Activities	Build database	1 days	
	Write program code	8 days	
	Build test data	2 days	
	Set up for user test	1 day	
	Conduct acceptance test	2 days	
	Release first use cases	1/2 day	
	Do retrospective	1/2 day	
Total Days		**32 days = 6.5 weeks**	

6. Enter your WBS into MS Project to create a detailed work schedule. (Instructions on how to use MS Project are given in Online Chapter C, which you can find on the Cengage Web site.)

Answers will vary.

	Tas Mo	Task Name	Duration	Start	Predeces
1		**Planning**	**3 days**	**Thu 1/26/12**	
2		Set up work environment	2 days	Thu 1/26/12	
3		Develop WBS and plan wo	1 day	Mon 1/30/12	2
4		**Analysis Activities**	**5 days**	**Tue 1/31/12**	
5		Meet with Board users	2 days	Tue 1/31/12	3
6		Meet with agents	2 days	Tue 1/31/12	3
7		Define data	1 day	Thu 2/2/12	5,6
8		Model use cases	2 days	Fri 2/3/12	7
9		**Design Activities**	**6 days**	**Tue 2/7/12**	
10		Design screen layouts	3 days	Tue 2/7/12	8
11		Design database	1 day	Tue 2/7/12	8
12		Design use case processin	3 days	Fri 2/10/12	10,11
13		**Build Activities**	**20.5 days**	**Fri 2/3/12**	
14		Build database	1 day	Fri 2/3/12	7
15		Write program code	8 days	Wed 2/15/12	12,14
16		Build test data	2 days	Mon 2/27/12	15
17		Set up for user test	1 day	Mon 2/27/12	15
18		Conduct acceptance test	2 days	Wed 2/29/12	16,17
19		Release first iteration	4 hrs	Fri 3/2/12	18
20		Do retrospective	4 hrs	Fri 3/2/12	19



Running Cases: The Spring Breaks 'R' Us Travel Service

1. Based on the answers you gave to the Chapter 2 running case questions, develop a System Vision Document.

Spring Breaks 'R' Us Travel Service
System Vision Document

Problem Description

Spring Breaks arranges with travel resorts for spring break vacation packages and markets those packages to students. Historically it has done its business using campus sales persons and printed fliers. However, students now prefer to do their own browsing and vacation scheduling using the Internet. Hence Spring Breaks needs to build an entirely new Web based system that allows resorts to self-publish their vacation packages, and supports student desires to browse and schedule their vacations. Additional features are to be added to the system to enhance utility for students. One popular feature is a social networking component to the system.

System Capabilities

Resort Relations:

- Create/enter resort information
- Post availability and prices of rooms/facilities
- Retrieve completed reservations

Student Booking:

- View resort information and availability of rooms/facilities
- Make a reservation (book a room/facility)

Accounting and Finance:

- Process student payments
- Process payouts to resorts

Social Networking:

- Link up and chat with “friends”
- Post comments and pictures

Business Benefits

For Spring Breaks:

- Increased student use (increase sales)
- Social media marketing of Spring Breaks services
- Better support for resorts will help to recruit additional resorts
- Reduce costs of 'on-campus' sales representatives

For Resorts:

- Easier to add vacation packages
- Faster payments for reservation
- Closer, more rapid communication with Spring Breaks

For Students:

- Easier to browse vacation packages
- More detailed information about vacation packages
- Mobile access to resorts, packages, friends
- Easier to reserve and change packages
- Easier to form vacation 'groups' with friends
- Locating and connecting with friends via social networking capability

2. Based on the functional descriptions you provided for the Chapter 2 running case and the use cases you defined in Chapter 3, finish identifying a complete list of use cases for each of the four subsystems. One important decision you will have to make is which subsystems to develop first. In other words, can the subsystems be deployed independently and, if so, which should be deployed first? Defend your answer.

Answers will vary. Probably the best order to deploy the system is

1. Resort relations – so they can start entering vacation packages
2. Student booking – so students can start using the system
3. Accounting and finance – about as important as student booking. Need to process payments
4. Social networking – Some portions will need to be done early (individual and group accounts that book rooms together) Other portions are not required until students begin taking vacations

Resort Relations:

- Sign up with SBRU (get an account)
- Edit account information
- Create/enter resort information for SBRU website
- Post availability and prices of rooms/facilities
- View/edit room availability
- Retrieve completed reservations (View, report, or system interface)
- Submit damage report

Student Booking:

- Join SBRU/enter personal and financial information
- View resort information and availability of rooms/facilities
- Make a reservation (book a room/facility)
- Make a payment for reservation
- Cancel a reservation

Accounting and Finance:

- Process student payments
- Make refunds/correct payment errors
- Process payouts to resorts
- Edit/update/correct payouts

Social Networking:

- Create an individual account (join)
- Set preferences on account
- Create a group account
- Assign admin rights to account
- Search for a person or group
- Link up with a person or group
- Send a private message to a friend
- Chat with friend(s)
- Post a comment to a friend/group/photo
- Upload photo or video
- Tag photo
- Write/update vacation experience

3. A related decision is whether to organize your programmers into one larger team or multiple smaller teams and how many programmers you can use on this project. Make that decision and then defend your answer.

Answers will vary. One way would be to have a "Student functions" team, and a "Resort functions and finance" team.

4. Once those decisions are made, develop a project iteration plan. If you have multiple independent teams, your project iteration plan will have parallel paths.

Answers will vary. This solution is for a two team project.
Note due to dependencies, the database for the resorts will need to be developed first. It is important for both teams. Immediately thereafter student reservation information is required for both teams. Both teams will coordinate together on database development.

Student Function Team		**Resort Function Team**	
Iteration	**Use cases**	**Iteration**	**Use cases**
#1	Join / Enter account info Create an individual account Create group account	#1	Sign up with SBRU Create/enter resort information Post room and package info
#2	View resort information View vacation package options Make a reservation Change/Cancel a reservation	#2	Edit account information View/edit rooms/packages Retrieve reservations Submit damage report
#3	Set preferences on individual account Set admin rights to group Make a payment	#3	Process payments Make corrections on payments Process payouts Correct payouts
#4	Search for person/group Link up with person Send message Post comment	#4	Write vacation experience Upload photo/video Tag photo/video

5. Based on your previous answers, develop an estimate for the total project cost and the time required to complete the project.

Student Function Team			Resort Function Team		
Iter	**No. Use cases**	**Estimate**	**Iter**	**No. Use cases**	**Estimate**
#1	3	6 weeks	#1	3	6 weeks
#2	4	5 weeks	#2	4	5 weeks
#3	3	4 weeks	#3	4	4 weeks
#4	4	4 weeks	#4	4	4 weeks
#5	Cleanup/Test	4 weeks	#5	Cleanup/test	4 weeks

Expense Category	Amount
Salaries (2 person teams @ $1500/week+ PM @ $2000/week + support staff @ $1200/week)	$208,400
Equipment/Install (2 servers + network)	$25,000
Training	$15,000
Facilities	$20,000
Licenses	$10,000
Travel/miscellaneous	$20,000
Total	**$298,400**

6. Assuming an annual revenue increase of $250,000 per year (benefit) and an annual operating cost of $75,000, develop a five-year NPV worksheet by using your estimates for developing the system. Use a 6 percent discount factor.

The following answer uses a constant $250,000 for the benefit and constant $75,000 for the costs. In reality, the benefit would increase gradually, and costs would also increase over time. For consistency we provide this simple solution.

	A	B	C	D	E	F	G
1							
2	**Category**	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
3	Value of benefits		$250,000	$250,000	$250,000	$250,000	$250,000
4	Development costs	-$298,400					
5	Annual Expenses		-$75,000	-$75,000	-$75,000	-$75,000	-$75,000
6	Net benefit/costs	-$298,400	$175,000	$175,000	$175,000	$175,000	$175,000
7	Discount Factor (6%)	1.0000	0.9524	0.9070	0.8638	0.8227	0.7835
8	Net Present Value	-$298,400	$166,670	$158,725	$151,165	$143,973	$137,113
9	Cumulative NPV	-$298,400	-$131,730	$26,995	$178,160	$322,133	$459,245
10	Payback Period	1 year +	26,995 / (158,725) = .17			1 year + 62 days (.17*365)	

Running Cases: On the Spot Courier Services

1. Create a System Vision Document.

On The Spot Courier Services
System Vision Document

Problem Definition

Currently information about requests for pickup, package pickups and deliveries is maintain manually on spreadsheets and paper forms. A new system is needed to allow regular customers to use the Web to request pickups and enter information about their packages. The system needs to also track the movement of packages from pickup, through the warehouse, and on to delivery. Finally, the system should also support real time communication with the delivery trucks to facilitate rapid pickup from recent requests. In order for this business to handle the day to day processes, as well as prepare for future growth, it is mandatory that the system be built and deployed as soon as possible.

System Capabilities

The system should support the following functions:

- All customers able to request pickups through the Internet
- Support call in requests for package pickups
- Track all movements of packages from pickup, through warehouse, until delivery
- Provide tracking information over the Internet
- Support customer accounts for regular customers
- Provide delivery trip information about what to deliver and what to pick up
- Send out invoices and accept payments

Business Benefits

First, of course, the new system will enable On the Spot to support the current level of business. Additionally the benefits include:

- Provide support for growth and increased volumes
- Support customer requests for Web access and tracking of packages
- Increase customer service through Web capabilities and tracking information
- Improve speed of pickup and delivery by real time communication with delivery trucks

2. Review all the use cases that you identified in Chapter 2 and then enhance the list to achieve a complete solution. Assign each use case to one of these four subsystems from Chapter 8:

- **Customer account subsystem (like customer account)**
- **Pickup request subsystem (like sales)**
- **Package delivery subsystem (like order fulfillment)**
- **Routing and scheduling subsystem**

Note: After doing a CRUD analysis based on the class diagram from Chapter 4, another subsystem called "Administration" will need to be added to support purely management use cases. CRUD analysis showed that we need use cases to maintain the Employee table. Also to 'R'eport data, we need new use cases. Students will probably not identify this new subsystem, nor the use cases. This will provide a good learning opportunity to illustrate that as the project progresses that it is normal to find new use cases.

Subsystem	Use Cases
Customer account subsystem	Add/update a customer Delete a customer View customer account information Print invoices Enter payment information
Pickup request subsystem	Enter/update request for pickup information Cancel request for pickup Enter package pickup information (scan) Update package pickup information Print label
Package delivery subsystem	Enter package delivery information (scan) Enter customer signature (delivery) Get package tracking information
Routing and scheduling subsystem	Enter package event information (scan) Create trip manifest Update trip manifest Print trip manifest (packages to be delivered) Display trip manifest (real time) Assign package to trip (truck route)
Administration subsystem	Adjust customer account information Add/update employee information Delete employee information View employee information Report statistics on package activity (on time, late, volumes, etc) Report statistics on revenues Report statistics on Customer accounts (receivables)

3. Create a project iteration schedule for each subsystem. The project consultant is planning to assign one team of two people to this project, and the subsystems will be built consecutively. Based on the answers you provided in Chapter 8, combine your four individual schedules into a total project iteration schedule.

Answers will vary. We show only the final combined answer.

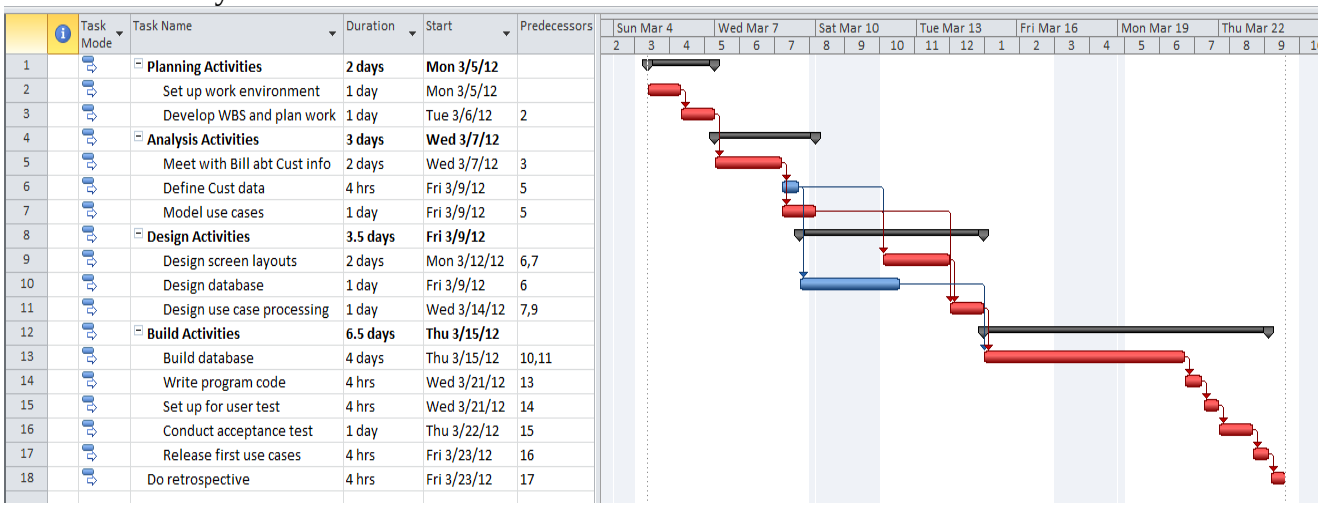
Iteration	Subsystem	Use case
#1	Customer account	Add/update a customer Delete a customer View customer account information
#2	Customer account	Print invoices Enter payment information
#3	Pickup request	Enter/update request for pickup information Cancel request for pickup Enter package pickup information (scan) Update package pickup information Print label
#4	Package delivery/ Routing	Enter package delivery information (scan) Enter customer signature (delivery) Get package tracking information Enter package event information (scan)
#5	Routing and scheduling	Create trip manifest Update trip manifest Print trip manifest (packages to be delivered) Display trip manifest (real time) Assign package to trip (truck route)
#6	Administration	Adjust customer account information Add/update employee information Delete employee information View employee information
#7	Administration	Report statistics on package activity (on time, late, volumes, etc) Report statistics on revenues Report statistics on Customer accounts (receivables)

4. Create a work breakdown structure (WBS) for the first iteration of the project as you have outlined it. Estimate the effort required for each task in the WBS.

Discipline	Activity	Effort	Dependency
Planning	Set up work environment	1 day	
	Develop WBS and plan work	1 day	
Analysis Activities	Meet with Bill about customer info	2 days	
	Define data	1/2 day	
	Model use cases	1 day	
Design Activities	Design screen layouts	2 days	
	Design Database	1 day	
	Design use case processing	1 day	
Build Activities	Build database	1/2 day	
	Write program code	4 days	
	Build test data	1/2 day	
	Set up for user test	1/2 day	
	Conduct acceptance test	1 day	
	Release first use cases	1/2 day	
	Do retrospective	1/2 day	
Total Days		**17 days**	

5. Enter the WBS into MS Project to create a detailed work schedule. (Instructions on how to use MS Project are given in Online Chapter C on the Cengage Web site.)

Answers will vary.



	Task Mode	Task Name	Duration	Start	Predecessors
1		**Planning Activities**	**2 days**	**Mon 3/5/12**	
2		Set up work environment	1 day	Mon 3/5/12	
3		Develop WBS and plan work	1 day	Tue 3/6/12	2
4		**Analysis Activities**	**3 days**	**Wed 3/7/12**	
5		Meet with Bill abt Cust info	2 days	Wed 3/7/12	3
6		Define Cust data	4 hrs	Fri 3/9/12	5
7		Model use cases	1 day	Fri 3/9/12	5
8		**Design Activities**	**3.5 days**	**Fri 3/9/12**	
9		Design screen layouts	2 days	Mon 3/12/12	6,7
10		Design database	1 day	Fri 3/9/12	6
11		Design use case processing	1 day	Wed 3/14/12	7,9
12		**Build Activities**	**6.5 days**	**Thu 3/15/12**	
13		Build database	4 days	Thu 3/15/12	10,11
14		Write program code	4 hrs	Wed 3/21/12	13
15		Set up for user test	4 hrs	Wed 3/21/12	14
16		Conduct acceptance test	1 day	Thu 3/22/12	15
17		Release first use cases	4 hrs	Fri 3/23/12	16
18		Do retrospective	4 hrs	Fri 3/23/12	17

Running Cases: Sandia Medical Devices

1. Based on the use case diagram and other project information, develop a list of software components (subsystems) that must be acquired or developed. Describe the function(s) of each component in detail. Be sure to consider components that aren't directly tied to use cases, such as the software interface between the glucose monitoring wristband and the cell phone.

Subsystem	Use cases
Patient alert subsystem	View/respond to alert View history Annotate history Phone system receive monitor data (internal use case) Phone system send data to server (internal use case)
Patient message subsystem	Send message to physician View/hear message from physician
Physician alert subsystem	View/respond to alert View history (monitor data) Set alert conditions Server receive data from phone (internal use case)
Physician message subsystem	Send message to patient View/hear message from patient

2. Prioritize the list of software components based on risk.

Answers will vary. Students should justify their answers.

Technological risk would indicate the following use cases are highest risk:

1. Phone system receive monitor data (internal use case)
2. Phone system send data to server (internal use case)
3. Server receive data from phone (internal use case)
4. View/respond to alert (patient)
5. View history (patient)
6. Annotate history (patient)

3. Prepare a project iteration schedule based on iterations that last between two and four weeks. The schedule should include all the tasks needed to develop a complete version of the system, which will then be subjected to live testing and evaluation by real users for three months.

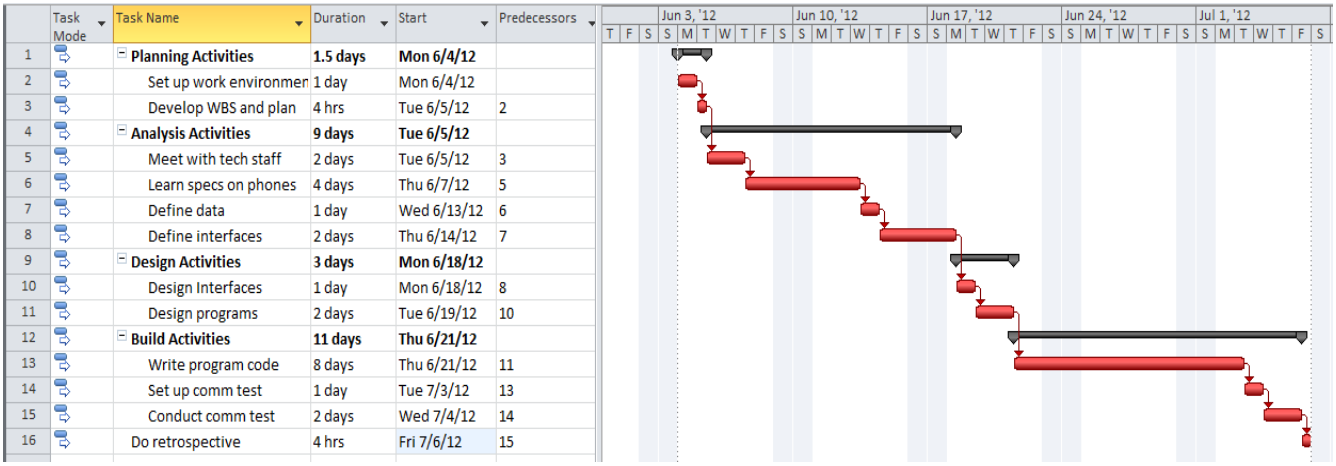
Answers will vary.

Iteration	Subsystem	Use case
#1	Patient alert	Phone system receive monitor data (internal use case) (note: this is complex due to multiple mobile devices)
#2		Phone system send data to server (internal use case) (note: this is complex due to multiple mobile devices)
#3	Patient alert	View/respond to alert (note: this is complex due to multiple mobile devices)
#4		View history Annotate history (note: this is complex due to multiple mobile devices)
#5	Physician alert	Server receive data from phone (internal use case) View/respond to alert View history (monitor data) (note: this is medium complex due to multiple sending devices)
#6	Physician message	Send message to patient View/hear message from patient
#7	Patient message	Send message to physician View/hear message from physician
#8	Integration test	(3 weeks)
#9	Acceptance test	(3 months)

4. Prepare a detailed work schedule for the first iteration. If you have access to project management software, prepare the schedule and a Gantt chart by using the software.

Answers will vary. This project is highly technical, and especially this iteration requires little user involvement. It addresses technical areas.

Discipline	Activity	Effort	Dependency
Planning	Set up work environment	1 day	
	Develop WBS and plan work	1/2 day	
Analysis Activities	Meet with tech staff on specs of monitoring device	2 days	
	Learn specs on selected phone devices	4 days	
	Define data	1 days	
	Define interface requirements	2 days	
Design Activities	Design detailed interfaces	1 days	
	Design program structure	2 days	
Build Activities	Write program code	8 days	
	Set up for communication/integration test	1 day	
	Conduct communication & integration test	2 days	
	Do retrospective	1/2 day	
Total Days		**25 days = 5 wks**	



	Task Mode	Task Name	Duration	Start	Predecessors
1		**Planning Activities**	**1.5 days**	**Mon 6/4/12**	
2		Set up work environmen	1 day	Mon 6/4/12	
3		Develop WBS and plan	4 hrs	Tue 6/5/12	2
4		**Analysis Activities**	**9 days**	**Tue 6/5/12**	
5		Meet with tech staff	2 days	Tue 6/5/12	3
6		Learn specs on phones	4 days	Thu 6/7/12	5
7		Define data	1 day	Wed 6/13/12	6
8		Define interfaces	2 days	Thu 6/14/12	7
9		**Design Activities**	**3 days**	**Mon 6/18/12**	
10		Design Interfaces	1 day	Mon 6/18/12	8
11		Design programs	2 days	Tue 6/19/12	10
12		**Build Activities**	**11 days**	**Thu 6/21/12**	
13		Write program code	8 days	Thu 6/21/12	11
14		Set up comm test	1 day	Tue 7/3/12	13
15		Conduct comm test	2 days	Wed 7/4/12	14
16		Do retrospective	4 hrs	Fri 7/6/12	15