

# Chapter 3

## Project Management

### Key Points and Objectives

1. A systems analyst must be able to handle project initiation; evaluate hardware and software; determine project feasibility; manage a project by preparing a budget, creating a work breakdown structure, scheduling activities, and controlling the schedule and costs; manage systems analysis team members; and write the systems proposal.
2. The analyst should define the problem.
3. Issues are major parts of the problem and are identified by:
  - A. An issue, topic, or theme that is repeated several times, sometimes by different people in several interviews.
  - B. Users may communicate using the same metaphors.
  - C. Users speaking at length on a topic.
  - D. Users may say something like "This is a major problem."
  - E. Users may show importance by body language or may speak emphatically on an issue.
  - F. The problem may be the first thing mentioned by the user.
4. Issues are matched by objectives, along with a weight that indicates the importance of each objective.
5. Each requirement may be used to create a preliminary test plan.
6. Five important criteria for project selection are:
  - A. The requested project is backed by management.
  - B. It is timed appropriately for commitment of resources.
  - C. It moves the business toward attainment of its goals.
  - D. It is practicable.
  - E. It is important enough to be considered over other projects.
7. A feasibility study assesses the operational, technical, and economic merits of the proposed project.
8. There are many possible objectives including:
  - A. Speeding up a process
  - B. Streamlining a process
  - C. Combining processes
  - D. Reducing errors in input
  - E. Reducing redundant storage
  - F. Reducing redundant output
  - G. Improving integration of systems and subsystems

9. Technical feasibility assesses whether the current technical resources are sufficient for the new system and if not, can they be upgraded to provide the level of technology necessary for the new system.
10. Economic feasibility determines whether the time and money are available to develop the system, including the purchase of new equipment, hardware, and software.
11. Operational feasibility determines if the human resources are available to operate the system once it has been installed.
12. The analyst needs to determine hardware and software needs using the following steps:
  - A. Inventory computer hardware currently available
  - B. Estimate current and future system workloads
  - C. Evaluate available hardware and software
  - D. Choose to use cloud services
  - E. Choose the vendor
  - F. Acquire the computer equipment
  - G. Choose to create software, use COTS software or use SaaS provider
13. The analyst should inventory computer hardware, including the:
  - A. Type of equipment
  - B. Operation status of the equipment
  - C. Estimated age of equipment
  - D. Projected life of equipment
  - E. Physical location of equipment
  - F. Department or person responsible for equipment
  - G. Financial arrangement for equipment
14. Evaluate the performance of different systems hardware including the following:
  - A. Time required for average transactions
  - B. Total volume capacity of the system
  - C. Idle time of the CPU or network
  - D. Size of memory provided
15. Companies may purchase their own computer or rent space in the cloud using cloud services.
16. Some of the cloud services available are:
  - A. Web hosting
  - B. Email hosting
  - C. Application hosting
  - D. Backup
  - E. Storage and processing of databases
  - F. Archiving
  - G. Ecommerce
17. Three main categories of cloud computing are:

- A. Software as a Service (SaaS)
  - B. Infrastructure as a Service (IaaS)
  - C. Platform as a Service (PaaS)
18. Decisions on cloud computing can first be addressed on a strategic level. Business should focus on:
- A. Defining a high-level business case that focuses on high-level benefits
  - B. Defining core requirements
  - C. Defining core technologies for the enterprise
19. BYOD is bring your own device and BYOT is bring your own technology. Employees use their own device access corporate networks, data, and services remotely.
20. Analysts may need to weigh the options for building custom software, purchasing COTS (commercial off-the-shelf) software, or using Software as a Service (SaaS).
21. Systems analysts may forecast costs and benefits of a prospective system through analysis of time series data including linear trend, seasonal trend, and cyclical trend, and estimation of trends using graphical judgment, the method of least squares, and the moving average method.
22. Systems analysts should take tangible costs, intangible costs, tangible benefits, and intangible benefits into consideration to identify cost and benefits of a prospective system.
23. To select the best alternative, systems analysts should compare costs and benefits of the prospective alternatives. Break-even analysis and payback are the most popular techniques for this purpose.
24. To select the best method for comparing alternatives, systems analysts may refer to the following guidelines:
- A. Use break-even analysis if the project needs to be justified in terms of cost, not benefits.
  - B. Use payback when a business is growing and volume is a key variable in costs.
25. Often a project needs to be broken down into smaller tasks or activities which together make up a work breakdown structure (WBS).
26. Work breakdown structure properties are:
- A. Each task or activity contains one deliverable, or tangible outcome, from the activity
  - B. Each task can be assigned to a single individual or a single group
  - C. Each task has a responsible person monitoring and controlling performance
27. Developing a WBS, either
- A. Decomposition, starting with large ideas, then breaking them down into manageable activities
  - B. Product oriented, building a website can be broken down into many parts
  - C. Process-oriented, emphasizes the importance of each phase
28. Time Estimation Techniques

- A. Relying on experience
  - B. Using analogies
  - C. Using three-point estimation
  - D. Identifying function points
  - E. Using time estimation software
29. Function point analysis takes the five main components of a computer system and rates them in terms of complexity:
- A. External inputs
  - B. External outputs
  - C. External queries
  - D. Internal logical files
  - E. External interface files
30. Two tools for project planning and control are Gantt charts and PERT diagrams.
31. A Gantt chart is easy to construct and use, and shows activities over a period of time.
32. PERT diagrams show precedence, the activities that must be completed before the next activities may be started. It is used to calculate the critical path, the longest path through the activities. This is the shortest time to complete the project.
33. Using a work breakdown structure:
- A. Estimate costs for each activity in the work breakdown structure
  - B. Prepare a budget for the project and have it approved by the organization or client
  - C. Manage and control the costs throughout the project
34. Approaches to cost estimation:
- A. Basing estimates on similar projects, also called the top-down approach
  - B. Building bottom-up estimates
  - C. Using parametric modeling
35. Project risk may be prevented by training, experience, and learning why other projects have failed.
36. A fishbone diagram systematically lists all of the possible problems that can occur.
37. Speeding up a process is called expediting. Expediting can help reduce the time it takes to complete an entire project but the expedited activities have to be on the critical path.
38. Earned value management (EVM) is a technique used to help determine progress (or setbacks) on a project. It involves:
- A. The project cost
  - B. The project schedule
  - C. The performance of the project team

39. The four key measures in earned value management are:
- A. Budget at completion (BAC) is the total budget for the project.
  - B. Planned value (PV) is the value of the work that is to be completed on the project.
  - C. Actual Cost (AC) is the total incurred in completing the work on the project.
  - D. Earned value (EV) is an estimate of the value of the work performed thus far.
40. A project manager needs to understand:
- A. How to determine what is needed
  - B. How to initiate a project
  - C. How to develop a problem definition
  - D. How to examine feasibility of completing the project
  - E. How to reduce risk
  - F. How to identify and manage activities
  - G. How to hire, manage, and motivate other team members
41. Project managers need to break complex projects down into smaller projects to increase their probability of success.
42. A project team should consist of high quality team members with a variety of skills necessary to complete the project.
43. The systems analyst must manage team members, their activities, time, and resources.
44. Successful projects require that reasonable productivity goals for tangible outputs and process activities be set. Goal setting helps to motivate team members.
45. Ecommerce project management has some significant differences compared to traditional software projects:
- A. The data used by ecommerce systems is scattered across the organization.
  - B. Ecommerce systems need a staff with a wide variety of skills.
  - C. Partnerships must be built externally and internally well ahead of implementation.
  - D. Security is of utmost importance.
46. The project charter is a written narrative that is a contract between the chief analyst or project manager, the analysis team, and the users. It clarifies the following questions:
- A. What does the user expect of the project, the objectives, and what will the system do to achieve the objectives?
  - B. What is the scope or boundaries of the project?
  - C. What analysis methods will the analyst use to interact with users in gathering data, developing, and testing the system?
  - D. Who are the key participants and how much time are users willing and able to commit to participating?
  - E. What are the project deliverables?
  - F. Who will evaluate the system and how will they evaluate it?
  - G. What is the estimated project timeline? How often are the project milestones reported?
  - H. Who will train the users?

- I. Who will maintain the system?
47. When preparing a systems proposal, systems analysts should arrange the following items in order:
- A. Cover letter
  - B. Title page of project
  - C. Table of contents
  - D. Executive summary (including recommendation)
  - E. Outline of systems study with appropriate documentation
  - F. Detailed results of the systems study
  - G. Systems alternatives (three or four possible solutions)
  - H. Systems analysts' recommendations
  - I. Summary
  - J. Appendices (assorted documentation, summary of phases, correspondence, etc.)
48. Some guidelines to use tables effectively are:
- A. Integrate the table into the body of the proposal.
  - B. Try to fit the entire table vertically on a single page if possible.
  - C. Number and title the table at the top of the page. Make the title descriptive and meaningful.
  - D. Label each row and column.
  - E. Use a boxed table if room permits.
  - F. Use a footnote if necessary to explain detailed information contained in the table.
49. Some guidelines to use graphs effectively are:
- A. Choose a style that communicates your intended meaning well.
  - B. Integrate the graph into the body of the proposal.
  - C. Give the graph a sequential figure number and a meaningful title.
  - D. Label each axis, and any lines, columns, bars, and pieces of the pie on the graph.
  - E. Include a key to indicate differently colored lines, shaded bars, or crosshatched areas.

## Consulting Opportunity 3.1 (p. 50)

### The Sweetest Sound I've Ever Sipped

Some of the problems are:

1. Production and subsequent shipment is based on orders placed 9 to 15 weeks ago. The current system is unresponsive to current demand for products.
2. Production cannot be easily modified for exceptional conditions.
3. The communication between the United States and England is not effective. Order processing is slow and cumbersome.
4. There is no seasonal forecasting or trend analysis in place.

A system could be installed to perform seasonal forecasting and trend analysis, with updates to the system

as long-range weather forecasting data becomes available. A second system needs to be implemented that would allow the U.S. distributors to quickly place orders or emergency orders, which might have a requirement that, after orders are received, they are shipped within two days. This could be done over the Internet.

## Consulting Opportunity 3.2 (p. 62)

### Veni, Vidi, Vendi or I Came, I Saw, I Sold

Vendor	Advantages
Data Coliseum	Brochure Good Sales Pitch
Vesta System	Ease of Use Free On-Site Training
Mars, Inc.	Screen Design Functional Software Ease of use Price
Jupiter Unlimited	Documentation Functional Software

There is an apparent bias in Roman's software and vendor evaluation. That is, he is putting too much emphasis on the ease of use, value of sales pitches, advertising brochures, and quality of documentation even though there are more important criteria for the software and vendor evaluation such as performance effectiveness, performance efficiency, flexibility, and maintenance support.

The further information that is required from each company and its software:

- A. The performance effectiveness. Does the software perform all the required tasks? Are display screens well designed? Does the software have adequate capacity?
- B. The performance efficiency. Does the software have a fast response time? Does it have efficient input, output, storage, and backup?
- C. Ease of use. Is the user interface satisfactory? Are there help menus and files containing last minute changes? Is the interface flexible? Is there adequate feedback? Is there good error recovery?
- D. Flexibility. Are there options for input and output? Is the software usable with other software?
- E. Quality of documentation. Does the documentation have good organization? Is there an online tutorial? Is there website support with FAQs, a forum, and so on.
- F. Manufacturer support. Is there a technical support hotline? Is there a newsletter or email newsletter? Does the website have downloadable product updates?

## Consulting Opportunity 3.3 (p. 66)

### We're off to See the Wizards

The analysis of Elphaba and Glinda's software requirements is summarized below.

### Creating custom software

#### Pros

Software that is particular for their business.

#### Cons

They would have to hire a development team since they do not know how to develop systems.

The cost would be significantly higher.

### Purchasing a COTS package

#### Pros of using QuickBooks Pro

The software is customizable.

It is easy to use.

There may be a version of the software for their industry group.

#### Cons of using QuickBooks Pro

They would have to enter all the data, including codes that are already used by suppliers.

They would have to learn how to use the software.

They would have to learn how to customize the software.

### Subscribe to an online plan such as QuickBooks Online

#### Pros of subscribing to QuickBooks Pro

Low technology overhead. There will be no need to purchase extra equipment and hire additional personnel to maintain it.

The software is scalable.

Allows the organization to focus on its strategic mission instead.

#### Cons of subscribing QuickBooks Pro

Would not be able to customize software and take advantage of innovativeness by using the application as a potential strategic advantage.

APIs may be proprietary.

Not able to control the data.

If the software provider requires website maintenance downtime, subscribed customers may not be able to use it temporarily.

Security and privacy concerns.

Releases of new features and functionality are controlled and scheduled by the software service provider.

### Outsourcing to Lawn Wizards

#### Pros of using Lawn Wizards

The software is well-tested and developed.

The codes used by the software are recognized by suppliers.

The software is specific for the industry.

#### Cons of using Lawn Wizards

The Lawn Wizards' end user license agreement states that Lawn Wizards owns the data. This is a loss of control, and this could hurt Emerald City Beautyscapes. If Lawn Wizards decided to



contact Emerald City Beautyscapes customers, it could mean a loss of business.

If Lawn Wizards got busy, Emerald City Beautyscapes may not get timely service.

The recommendation that seems best is to use QuickBooks Pro and maintain control of their data. If Lawn Wizards was only a software company, it would seem a better choice, but they are also a business competitor.

## Consulting Opportunity 3.4 (p. 71)

### Food for Thought

No. Malcolm Warner's proposal, like any other systems proposal, must be assessed in three principal ways. It has to demonstrate technical, economic, and operational feasibility.

Technically, the project is feasible. The people in the system have the expertise and the system can be overhauled or updated to meet specifications. Although there may be some long-term gains for the new system, there neither is an immediate reduction in operating costs, nor is there a pressing need for it. Benefits are intangible, and appear unlikely to support the organization under these circumstances. Moreover, the costs of conducting a full systems study and other estimated costs of hardware and software do not justify the need. Therefore, it is not economically feasible.

Operational feasibility is a function of the human resources for the project. It is a projection of how the system will operate, and how the users will accept it once it is installed. Based on the information collected by Kim about the managers and systems people, resistance to the new system will probably be very high because all the users have expressed satisfaction with the existing one. People are always afraid of changes, therefore chances for the new system to be operational are slim, especially because the existing system is operating satisfactorily.

From the above discussion, it is apparent that the new project does not justify a full-blown systems study. Although it is technically feasible, it has to be economically as well as operationally feasible to justify a major effort.

## Consulting Opportunity 3.5 (p. 88)

### Goal Tending

Hy would improve his approach to goal formation and presentation if he tries a contributory approach rather than directive. Members should all agree upon the goals; the goals should be difficult enough to be challenging, but attainable or achievable. If goals are too difficult, all the members will not be motivated. Fiona is a typical example. The rest of the group would likely agree with her.

Management may be pleased with a team for being able to complete a project in the most efficient time. However, in the long run, management will realize that the goals are overly optimistic and the probability of achievement is low. This outcome will give the team a bad reputation, and management will not trust them with crucial projects.

## HyperCase Experience 3.1

1. *What criteria does the Training unit use to judge the feasibility of a new project (list them)? Would you suggest any changes or modifications of these?*

Hint: See the interview with John Sherman. The Client Feasibility and Requirements Statement is on his desk.

*Model Solution:*

- A. The project must have senior management commitment.
  - B. The project must make reasonable use of MRE resources.
  - C. The project must be shown to be worthwhile compared to other ways the organization could apply MRE resources.
  - D. The project must use the latest educational technology available.
2. *List any changes or modifications to these criteria that you would recommend.*

Possible modifications to criteria:

- A. Does the Training unit have the expertise in the field of training desired by the client?
  - B. Does the Training unit have the resources (time, staff, etc.) to commit to the project in order to finish the project within the desired time and cost parameters of the client?
  - C. Where applicable, projects should attempt to use, or at least explore the possibility of using the latest educational tools or methodologies.
3. *Snowden Evans has suggested a proposal for a new project tracking system for the Training Unit. Briefly discuss the technical, economic, and operational feasibility of each alternative for a proposed project tracking system for the Training unit.*

*Model Solution:*

There are two alternative solutions for the proposed project tracking system.

Solution A. Replace all the present Shiroma machines in the Training unit with COMTEX computers and develop the GEMS system using personal computer software. Have all training personnel enter data project work data into it.

Solution B. Place the GEMS system on the mainframe or the Internet and keep the Shiroma computers in the Training unit.

## **ANALYSIS**

### **TECHNICAL FEASIBILITY:**

There should be no major problems developing the GEMS project reporting system using COMTEX computers (Solution A), because Systems already has one; however, duplicate software would have to be written for the Shiromas or the Shiromas (a Macintosh clone) would have to be upgraded with an IBM compatible emulator. Solution B is more technically feasible because it's reasonable to expect that it will be possible to link Training unit Shiromas to the GEMS system in Management Information Systems. The GEMS system would be implemented via the Internet or by mainframe terminal emulators. Therefore both options are technically feasible.

**ECONOMIC FEASIBILITY:**

Hint: See Ketchum's office. On the desk is the Computer Equipment List for the Training Unit.

The estimated cost of replacing the Shiromas with COMTEX machines is approximately \$100,000, just under the budget figure suggested by Hyatt (see interview, note that this also does not include the cost of developing the GEMS system). The cost of the LAN and linking the two systems together is significantly lower, and the expected cost in dollars and man-hours of developing the GEMS system would not be so great as to be a point of contention.

In summary, Option B appears to be more economically feasible.

**OPERATIONAL FEASIBILITY:**

Given the survey results (Hint: see Snowden Evans office, the top file cabinet drawer), it's clear that the Training staff favors an improved system for tracking projects. It is also clear from interviews that the Training staff is hostile to the idea of giving up their Shiromas (Macintosh clones). There is a strong possibility that this hostility will lead to problems in getting the Training staff to adopt and use the new system if they are forced to switch to COMTEX machines. Therefore, option B appears to be more operationally feasible.

4. *Which option would you recommend? Use evidence from the case to support your decision.*

**RECOMMENDATION:**

Option B appears to be more economically and operationally efficient than Option A. Economic efficiency is important to Hill (he wants justification for expenditures) and Hyatt. The chances that the new system will be accepted by the Training staff appear to be much greater with option B also. Technically, it is probable that option B can be implemented without complication, and it could be argued that any small risks are outweighed by the greater economic and operational efficiencies. Therefore the recommendation is for option B.

## HyperCase Experience 3.2

1. *Complete a computer equipment inventory for the Training and Management Systems Unit, describing all of the systems you find. Hint: create an inventory form to simplify your task.*

When filling out the equipment inventory form, information is not provided on the following points:

- A. What the estimated age of the equipment is.
- B. The projected life of the equipment.
- C. The name of the individual responsible for equipment purchase, operation, and maintenance.

Thomas Ketcham has a Computer Equipment List for the Training Department. It includes the Workstations (all Shiroma), the quantity, the cost per unit, and the total cost.

Each office has a computer listed. You may want to have students examine each office and

complete the Equipment inventory form. They should be aware that they cannot view all the offices, because many of the persons that they want to interview are not available, so the inventory list will not be one hundred percent accurate.

A sample inventory form is included below:

	First Computer	Second Computer	Third Computer
1. Equipment			
A. CPU/type/manufacturer/model			
B. Storage/type/manufacturer/model			
C. Input/type/manufacturer/model			
D. Output/type/manufacturer/model			
E. Communications/type/manufacturer/model			
2. Status			
On order			
Fully operational			
In need of repair			
In storage			
3. Estimated age of equipment			
4. Projected life			
5. Located			
6. Name of individual or department responsible for equipment			
Purchase			
Operation			
Maintenance			
7. Financial agreement			
Owned			
Rented			
Leased			

2. *Using the software evaluation guidelines given in the text, do a brief evaluation of GEMS, a software package used by the Management Systems employees. In a paragraph, briefly critique this custom software by comparing it with commercial off-the-shelf software such as Microsoft Project.*

An evaluation of the Global Engineering Management System (GEMS) is:

- A. Performance effectiveness:
  - Has an adequate capacity.
  - Seems able to perform all tasks.
  - The screens lack good captions.
  - The appropriate use of color should be included.
- B. Performance efficiency: no complaints so it is assumed efficient.
- C. Ease of use:
  - The interface is not flexible.

You can't tell what kind of feedback is available from the screens.

It is impossible to determine the type of error recovery.

- D. Flexibility: seems flexible but not usable with other software.
- E. Documentation: on a system level is very good but user documentation is not apparent.
- F. Manufacturer support does not apply.
- G. Has a high level of security.
- H. Designed to use over the corporate network with a Web interface.

The GEMS seems not as good as a Graphic User Interface (GUI)-based product such as Lotus' Organizer or Microsoft's Project for the following reasons:

- A. It does not have customizable toolbars.
- B. Graphical representation of the data is minimal in GEMS (it only displays a Gantt chart).
- C. It does not include pull-down menus.

A disadvantage of the packaged software products is that they may not be custom tailored to the organization whereas the GEMS is designed for the user's needs.

3. *List the intangible costs and benefits of GEMS as reported by employees of MRE.*

The intangible costs are:

Learning a new computer system (Ketcham interview/Ketcham probe)  
Pressure to adopt new methods (Ketcham interview)

The intangible benefits are:

Online access rather than just reports at the touch of a button (Evans)  
Access to the GEMS at any time (Evans)  
Leads to effective project management (Evans)  
Fast, on-time reports (Evans)  
Better project management and coordination (Taylor)  
Client access to their project information (Evans)

4. *Briefly describe the two alternatives Snowden is considering for the proposed project tracking and reporting system.*

The two alternatives Snowden is considering for the proposed project tracking and reporting system are:

OPTION A: Implement GEMS as an Intranet solution  
OPTION B: Implement GEMS on a Local Area Network

5. *What organizational and political factors should Snowden consider in proposing his new system at MRE? (In a brief paragraph, discuss three central conflicts.)*

Here are a few things that need to be considered:

- 1) The Training staff is hostile to the idea of using a unified project management system.

- 2) The Training unit manager Ketcham is politically at odds with Evans and the Systems staff because of his demotion to a unit manager. This may affect his willingness to cooperate in developing a new system, which may hinder progress and success.
- 3) Training staff members use computers in different ways than the Systems staff. They are mostly writers and graphic artists, or specialists who are likely not willing to spend a significant amount of time learning a computer system. Therefore, the system has to be relatively simple to use, and not require extensive training, to have a fair chance of success.

## Answers to Review Questions

1. *What are the five major project fundamentals?*

The five major project fundamentals are:

- A. Project initiation
- B. Determining project feasibility
- C. Scheduling of the project
- D. Managing activities
- E. Managing team members

2. *List three ways to find out about problems or opportunities that might call for a systems solution.*

Three ways to find out about problems or opportunities are:

- A. Checking output
- B. Observing or researching employee behavior
- C. Listening to feedback from external sources

3. *List the five criteria for systems project selection.*

The five criteria for systems project selection are:

- A. Management backing
- B. Adequate time frame
- C. Alignment with organizational goals
- D. Adequate resources on the part of the analyst and the organization
- E. The worthiness of the project

4. *Define technical feasibility.*

A project is technically feasible if the technology is available and capable of meeting users' requests.

5. *Define economic feasibility.*

A project is economically feasible if costs do not overshadow benefits.

6. *Define operational feasibility.*

A project is operationally feasible if the proposed system will operate and be used once it is installed.

7. *List four criteria for evaluating system hardware.*

They are time required for average transactions, total volume capacity of the system, idle time of the central processing unit, and size of memory provided.

8. *What two main options do organizations have for acquiring or using computer hardware?*

They are buying hardware, and using cloud services.

9. *What does COTS stand for?*

COTS is an acronym for commercial off-the-shelf.

10. *List five of the many benefits of cloud computing for organizations.*

The benefits of cloud computing for organizations are: less time spent maintaining legacy systems or performing routine tasks such as maintenance or upgrading of present systems; possibly making it simpler to acquire IT services and making it easier and quicker to separate from or discontinue services that are no longer necessary; making your applications scalable; and providing consistency across multiple platforms perhaps previously disjointed or difficult to integrate. Also, no capital is tied up, and no financing is required.

11. *List three of the many drawbacks of cloud computing for organizations.*

The drawbacks of cloud computing are: the loss of control of data stored in the cloud; if the cloud services provider ceased to exist, it is unclear what would happen to the organization's data; potential security threats to data that is not stored on premises or even on the organization's own computers; reliability of the Internet as a platform; the prospect that the company could get stuck using application programming interfaces (APIs) that are proprietary with the cloud provider.

12. *What does BYOD stand for?*

BYOD stands for "bring your own device."

13. *What are the benefits of BYOD to an organization?*

The benefits of BYOD to an organization are a potential for lowering the initial cost of organizational IT hardware purchase, and facilitating remote 'round-the-clock access to corporate computer networks regardless of location.

14. *What are the benefits of BYOD to an employee?*

The benefits of BYOD to an employee are building employee morale and building on a familiar user interface to access corporate computing services, applications, databases, and storage. Employees also do not need to carry a personal and a work-issued device.

15. *What is the biggest drawback of BYOD for an organization?*

The biggest drawback of BYOD for an organization is the security risks posed by untrained users.

16. *What are three main categories of cloud computing?*

The three main categories of cloud computing are Software as a Service (SaaS), Infrastructure as a Service (IaaS), and Platform as a Service (PaaS).

17. *Define tangible costs and benefits. Give an example of each one.*

Tangible costs are those that can be accurately projected by systems analysts and the business' accounting personnel; for example, the cost of equipment, costs of resources, and cost of systems analysts' time. Next, tangible benefits are advantages measurable in dollars that accrue to the organization through use of the information system; for example, increase in speed of processing, and getting information on a timelier basis than before.

18. *Define intangible costs and benefits. Give an example of each one.*

Intangible costs are those that are difficult to estimate, and may not be known; for example, the cost of losing a competitive edge, and declining company image. Next, intangible benefits are advantages from the use of the information system that are difficult to measure; for example, improved effectiveness of decision-making processes and maintaining a good business image.

19. *List four techniques for comparing the costs and benefits of a proposed system.*

They are break-even analysis, payback, cash-flow analysis, and present value methods.

20. *When is calculating the payback period useful?*

Payback period is useful when a business is growing and volume is a key variable in costs.

21. *What are the three drawbacks of using the payback method?*

The three drawbacks of the payback method are: (a) it is strictly a short-term approach to investment and replacement decision, (b) it does not consider the importance of how repayments are timed, and (c) it does not consider total returns from the proposed systems project that may go well beyond the payback year.

22. *What is work breakdown structure (WBS), and when should it be used?*

A work breakdown structure (WBS) are the tasks or activities that a project is broken down into. Each task has a deliverable and is assigned to an individual or team, and has a responsible person monitoring and controlling performance.

23. *What is a Gantt chart?*

A Gantt chart is a chart on which bars represent each task or activity. The length of each bar represents the relative length of the task.

24. *When is a PERT diagram useful for systems projects?*



PERT charts are useful when activities can be done in parallel rather than in sequence.

25. *List three advantages of a PERT diagram over a Gantt chart for scheduling systems projects.*

Three advantages of a PERT chart over a Gantt chart are:

- A. Easier identification of the order of precedence
- B. Easier identification of the critical path and critical activities
- C. Easier determination of slack time

26. *Define the term critical path.*

The critical path is the path that will cause the whole project to fall behind schedule if one day's delay is encountered on it.

27. *How does a project manager assess the risk of things going wrong and take that into consideration of the time needed to complete the project?*

The project manager must look at the size of the project. If it is large, it should be broken down into smaller projects. Another factor is team members may take longer on their current project or that key managers would not be able to interview during the needs requirement phase. The project manager must add some additional time as a buffer.

28. *What costs need to be estimated to prepare a budget?*

The costs that need to be estimated to prepare a budget are the hours worked and the rates of pay for each of the internal or outsourced workers, the hardware and software costs and how much of each type of equipment is needed and the costs involved with training.

29. *Why is preparing a budget so important for a systems analyst who is managing a project?*

Preparing a budget is a critical deliverable and is important for a systems analyst who is managing a project because every client wants to see a detailed budget early in the process.

30. *What three instances call for expediting a systems project?*

The three instances that call for expediting a systems project are getting a bonus if you finish sooner, project team resources and team members can be used for some other project, reducing the time it takes to complete an entire project.

31. *What does crash time mean when expediting a project?*

When expediting a project, crash time means the absolute minimum time in which an activity can be completed if additional money is funneled to that activity.

32. *What is earned value management (EVM)?*

Earned value management (EVM) is a technique used to help determine progress or setbacks on a project.

33. *What are the four key measures in earned value management?*

The four key measures in earned value management are budget at completion (BAC), planned value (PV), actual Cost (AC), and earned value (EV).

34. *For what purposes can a systems analyst use earned value management?*

The purposes that a systems analyst can use earned value management are to be aware of cost and address the budgetary implications when unexpected delays or cost overruns occur.

35. *List the two types of team leaders.*

Two types of team leaders are (a) task leaders and (b) socioemotional leaders.

36. *What is meant by dysfunctional team norm?*

A dysfunctional team norm is a norm that hinders team progress.

37. *What is meant by team process?*

“Team process” is the interaction that occurs among team members.

38. *What are three reasons that goal setting seems to motivate systems analysis team members?*

Three reasons that goal setting motivates team members are: (a) the very act of setting challenging and achievable goals and periodically measuring performance against the goal seems to motivate individuals, (b) team members know exactly what is expected of them and are afforded some autonomy in achieving the goal, and (c) the setting of goals clarifies what must be done in order to get results.

39. *What are four ways in which ecommerce project management differs from traditional project management?*

The four ways that ecommerce project management differs from traditional project management are:

- A. The data used by ecommerce systems is scattered across the organization.
- B. Ecommerce systems need a staff with a wide variety of skills.
- C. Partnerships must be built externally and internally well ahead of implementation.
- D. Security is of utmost importance.

40. *What elements are contained in a project charter?*

The project charter contains the following elements:

- A. User expectations or objectives and how the system will achieve the objectives.
- B. The scope or boundaries of the project.
- C. The analysis methods used to interact with users in gathering data, developing, and testing the system.
- D. The key participants and how much time users are willing and able to commit to participating.

- E. The project deliverables.
- F. The people that will evaluate the system and how they will evaluate it.
- G. The estimated project timeline and how often the project milestones are reported.
- H. The people that will train the users.
- I. The people that will maintain the system.

41. *What is a fishbone diagram used for?*

A fishbone diagram (also called a cause-and-effect diagram or an Ishikawa diagram) is used to illustrate what can go wrong in a project. It systematically lists all of the possible problems that can occur.

42. *What are the three steps the systems analyst must follow to put together an effective systems proposal?*

They are effectively organizing the content, writing in a professional style, and orally presenting the proposal in an informative way.

43. *List the 10 main sections of the systems proposal.*

The 10 main sections of the system proposal are:

- A. Cover letter
- B. Title page of project
- C. Table of contents
- D. Executive summary (including recommendations)
- E. Outline of systems study with appropriate documentation
- F. Detailed results of systems study
- G. Systems alternatives (three or four possible solutions)
- H. Systems analysts' recommendations
- I. Summary
- J. Appendices (assorted documentation, summary of phases, correspondence, etc.)

## Problems

1. *Williwonk's Chocolates of St. Louis makes an assortment of chocolate candy and candy novelties. The company has six in-city stores, five stores in major metropolitan airports, and a small mail order branch. Williwonk's has a small, computerized information system that tracks inventory in its plant, helps schedule production, and so on, but this system is not tied directly into any of its retail outlets. The mail order system is handled manually, and any emailed order forms received through the website are answered via email by clerical personnel, with orders being forwarded to the appropriate department.*

*Recently, several Williwonk's stores experienced a rash of complaints from mail order customers that the candy was spoiled upon arrival, that it did not come when promised, or that it never arrived; the company also received several letters complaining that candy in various airports tasted stale. Williwonk's has been selling a new, low-carb, dietetic form of chocolate made with sugar-free, artificial sweetener. Sales have been brisk, but there have been problems shipping the wrong type of chocolate to an address with a diabetic person. There were a number of complaints and Williwonk's sent a number of free boxes of chocolate to ease the situation.*

*Management would like to sell products online but only has a basic website with information about the company and an order form that can be downloaded, printed, filled out by the customer, and returned via email. Web ordering does not exist. One of the senior executives would like to sell customized chocolates with the name of a person on each piece. Although the production area has assured management that this could be easily done, there is no method to order customized chocolates.*

*Another senior executive has mentioned that Williwonk's has partnered with several European chocolate manufacturers and will be importing chocolate from a variety of countries. At present, this must be done over the phone, with email, or by mail. The executive wants an internal website that will enable employees to order directly from the partner companies. All this has led a number of managers to request trend analysis. Too much inventory results in stale chocolate, whereas at other times there is a shortage of a certain kind of chocolate.*

*Seasonal and holiday variation trends would help Williwonk's maintain an adequate inventory. The inventory control manager has insisted that all changes must be implemented before the next holiday season. "The time for this to be complete is an absolute due date," remarked Candy, a senior manager. "Make sure that everything works perfectly before the site goes public," she continued, "I don't want any customers receiving the wrong orders!" In addition, the order processing manager has mentioned that the system must be secure.*

*You had been working for two weeks with Williwonk's on some minor modifications for its inventory information system when you overheard two managers discussing these occurrences. List the possible opportunities or problems among them that might lend themselves to systems projects.*

#### Problems are

Too many complaints from mail order customers  
 Candy is spoiled on arrival  
 Candy did not come when promised, or never arrived  
 Candy in airports is stale  
 Shipping the wrong type of candy to customers  
 Only contact with European suppliers is by telephone  
 Too much inventory leads to stale candy

#### Opportunities are

Web-based sales operation  
 Sell personalized candy to customers  
 Provide trend analysis  
 Provide seasonal variation trends

2. *Where is most of the feedback on problems with Williwonk's products coming from in Problem 1? How reliable are the sources? Explain in a paragraph.*

Most of the feedback is from mail order and airport customers. Feedback also comes from senior management. The sources are probably reliable because they are apparently getting the same feedback from a number of sources. All the problems are symptoms of a more serious problem, inefficient distribution, which leads to delays and poor quality of product.

3. *After getting to know them better, you have approached Williwonk's management people with your ideas on possible systems improvements that could address some of the problems or opportunities given in Problem 1.*
- a. *In two paragraphs, provide your suggestions for systems projects. Make any realistic assumptions necessary.*
  - b. *Are there any problems or opportunities discussed in Problem 1 that are not suitable? Explain your response.*
- a. Some of the systems projects are:
- An inventory tracking system
  - An improved order processing and shipping system
  - A Web-based order system
  - A personalized ordering system
  - A Web-based system for obtaining products from European suppliers
  - A seasonal variation trend analysis system
  - A trend analysis system
- b. It may not be feasible to track every box with a bar code to determine stale products.
4. *Create a problem definition for the Williwonk's, as described in Problem 1. Estimate the weights of importance. Include at least one requirement and one constraint.*

The problem definition may vary widely in how students define issues and assign weights. A sample problem definition is included below.

### **Problem Definition**

Williwonk's Chocolates has problems maintaining an adequate fresh supply of candy. Problems also occur when shipping products. There is no method for customers to directly order products or to communicate electronically with European partners. Trend analysis does not exist.

#### Issues

1. There is no means to identify short-dated candy that should be removed from inventory.
2. Shipments are incorrect or not made at all.
3. There is no means for ordering candy using the Web, or for ordering personalized candy.
4. There is no method for orders to be sent directly to European partners.
5. There is currently no trend analysis of products.

#### Objectives

1. Provide a means to identify short-dated candy and notify stores and the inventory control department. Weight = 10
2. Develop methods for accurate, timely shipping of all orders. Weight = 9
3. Create a website for customers to order candy, with options for personalization of candy. Weight = 8
4. Provide trend and seasonal variation analysis. Weight = 7
5. Create a method for directly ordering products from European suppliers. Weight = 6

### Requirements

1. All changes must be implemented before the next holiday season.
2. The system must be secure.

### Constraints

1. There must not be any defects in the Web-ordering software.
5. *Create a list of user requirements for the problem definition created in Problem 4.*

The user requirements are:

1. Identify candy by batch number and the date of manufacture.
2. Send notification to all stores and the inventory department to sell candy approaching the expiration date at a discount.
3. Provide a method for verifying order addresses.
4. Improving the shipping process to quickly ship all customer and store orders.
5. Create a secure website for new customers to add themselves to the customer database.
6. Create a secure website for customers to order candy.
7. Place an option on the order website for customers to order personalized candy.
8. Send customer an order received and order shipped email.
9. Write and display a privacy policy.
10. Create an intranet site for employees to order candy from European suppliers, including sending an order electronically.
11. Create a secure website for customers to logon.
12. Create a secure website for customers to change their name and address.
13. Provide trend analysis for each product.
14. Provide seasonal variation trend analysis for each product.
6. *Delicato, Inc., a manufacturer of precise measuring instruments for scientific purposes, has presented you with a list of attributes that its managers think are probably important in selecting a vendor for computer hardware and software.*

*The criteria are not listed in order of importance.*

1. *Low price.*
2. *Precisely written software for engineering applications.*
3. *Vendor performs routine maintenance on hardware.*
4. *Training for Delicato employees.*
- a. *Critique the list of attributes in a paragraph.*
- b. *Using its initial input, help Delicato, Inc. draw up a more suitable list of criteria for selecting computer hardware and software vendors to purchase from.*
- c. *Using its initial input, help Delicato, Inc., draw up a more suitable list of criteria for selecting cloud vendors who could provide HaaS and SaaS.*
- d. *In a paragraph, state how the list of attributes for selecting a computer hardware vendor to purchase from should differ from the list of attributes for selecting a cloud provider for HaaS.*
- e. *In a paragraph, state how the list of attributes for selecting a computer software vendor to purchase applications from should differ from the list of attributes for selecting a cloud provider for SaaS.*

- a. Low price may mean poor quality, but Delicato, Inc. is a manufacturer of precise measuring instruments for scientific purposes. Low price isn't, therefore, its main concern.
  - b. A more suitable list of criteria for selecting computer hardware and software vendors to purchase from would be:
    - 1) Quality products
    - 2) Warranty
    - 3) Precisely written software
    - 4) In-house training
    - 5) Routine maintenance on hardware
  - c. A list of criteria for selecting cloud vendors who could provide HaaS and SaaS would be:
    - 1) Security of the data
    - 2) Company control of its data
    - 3) Proprietary APIs and software
    - 4) Routine backup
    - 5) Reliability of the hardware
  - d. The list of attributes for selecting a computer hardware vendor to purchase from is different from the list of attributes for selecting a cloud provider for HaaS in that the warranty and the cost of the equipment, as well as preventative maintenance and repair of hardware are not applicable with HaaS.
  - e. The list of attributes for selecting a computer software vendor to purchase applications from is different from the list of attributes for selecting a cloud provider for SaaS in that when using SaaS the emphasis is on security, privacy, control of data, stability of the SaaS provider and the potential loss of innovativeness.
7. *SoftWear Silhouettes is a rapidly growing mail-order house specializing in all-cotton clothing. Management would like to expand sales to the Web with the creation of an ecommerce site. The company has two full-time system analysts and one programmer. Company offices are located in a small, isolated New England town, and the employees who handle the traditional mail-order business have little computer training.*
- a. *Considering the company's situation, draw up a list of software attributes that SoftWear Silhouettes should emphasize in its choice of software to create a website and integrate the mail-order business with business from the website.*
  - b. *Would you recommend COTS software, custom software, or outsourcing to a SaaS? State your choice and defend it in a paragraph.*
  - c. *List the variables that contributed to your response in part b.*
- a.
    - 1) Ease of use
    - 2) Performance effectiveness
    - 3) Performance efficiency
    - 4) Flexibility
    - 5) Quality of documentation

- 6) Software that will maintain operational consistency for picking, packing, shipping, and so on
  - 7) Web pages that at a minimum capture the same data as the mail-order business
- b. The recommended solution is to either use COTS software, such as a customized online ordering system, or to use a SaaS. The advantages of using a SaaS are that the online ordering will be done by the SaaS, which can send order details to SoftWear (typically using an XML document). SoftWear can update their databases with the information received, merging it with the mail-order business transactions.
- c.
- 1) Satisfactory user interface
  - 2) Adequate capacity of computers
  - 3) Efficient storage of data
  - 4) Useable with other software
  - 5) Adequate tutorial
  - 6) Need for an integrated system
8. *Below is 12 years' demand for Viking Village, a game now available for tablet and smartphones.*

<i>Year</i>	<i>Demand</i>
2006	20,123
2007	18,999
2008	20,900
2009	31,200
2010	38,000
2011	41,200
2012	49,700
2013	46,400
2014	50,200
2015	52,300
2016	49,200
2017	57,600

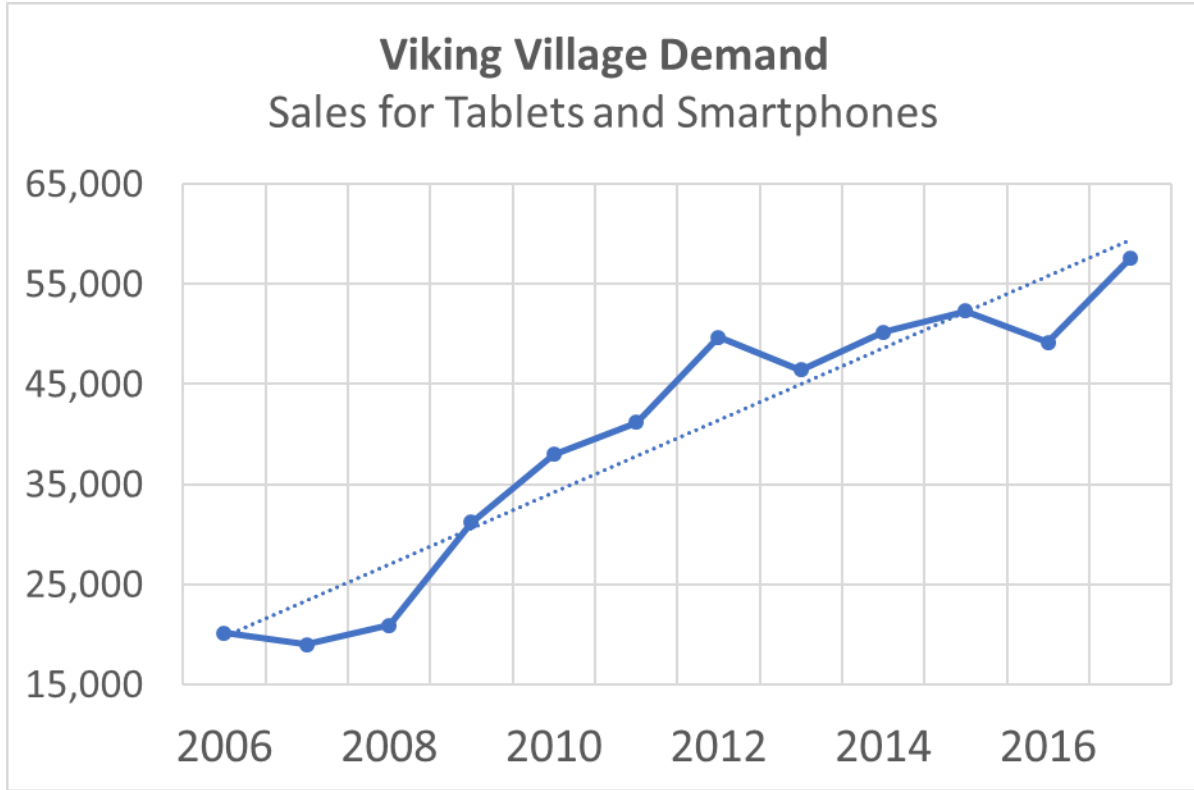
- a. *Graph the demand data for Viking Village.*
- b. *Determine the linear trend for Viking Village using a three-year moving average.*

a. The graph follows.

b. Year      Forecasted Demand

2018	63,750
2019	67,500
2020	71,250
2021	75,000
2022	78,750





9. Do the data for Viking Village appear to have a cyclical variation? Explain.

According to the solution in part 8a, it appears to have a cyclical variation.

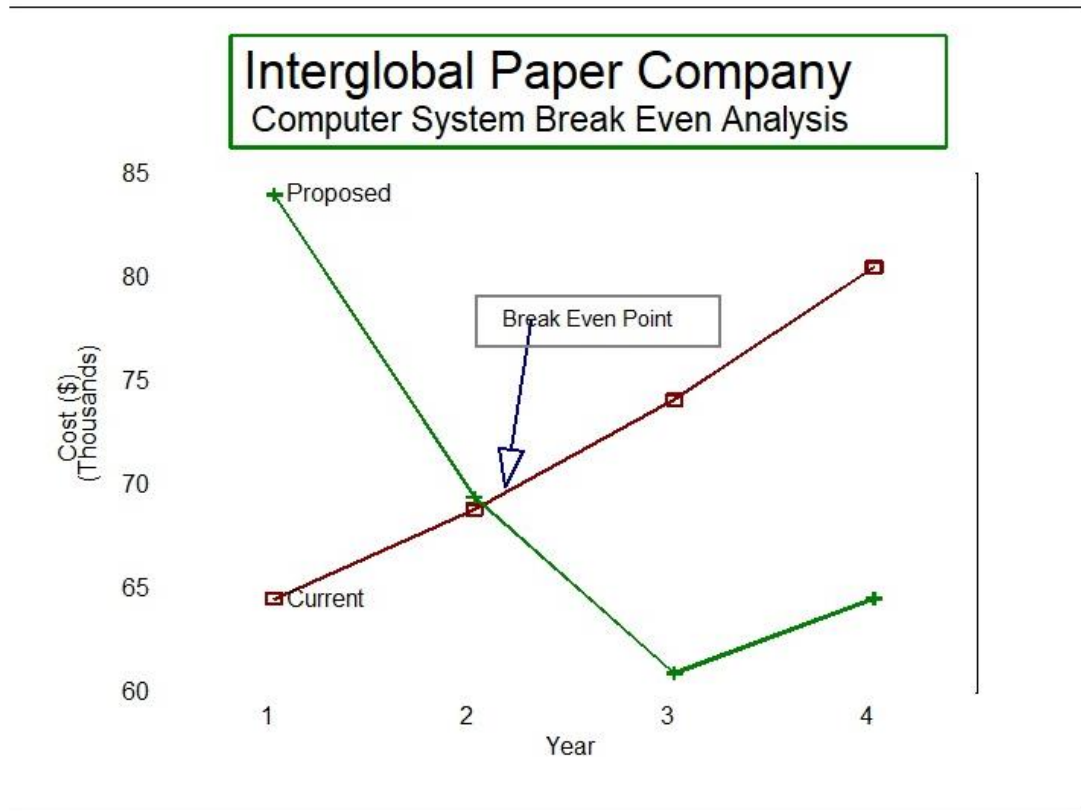
a.	Year	Demand	$D = (D + D + D) / 3$	$\bar{X} - X$	$\bar{Y} - Y$
	2006	20,123	$(20,123 + 18,999 + 20,900 / 3)$		
	2007	18,999	20,007.3	-4.5	-20,164.7
	2008	20,900	23,699.7	-3.5	-16,472.3
	2009	31,200	30033.3	-2.5	-10,138.7
	2010	38,000	36800.0	-1.5	-3,372.0
	2011	41,200	42966.7	-0.5	2,794.7
	2012	49,700	45766.7	0.5	5,594.7
	2013	46,400	48766.7	1.5	8,594.7
	2014	50,200	49633.3	2.5	9,461.3
	2015	52,300	50566.7	3.5	10,394.7
	2016	49,200	53033.3	4.5	12,861.3
	2017	57,600			

10. Interglobal Health Consultants has asked for your help in comparing its present computer system with a new one its board of directors would like to see implemented. Proposed system and present system costs are as follows:

Year	Proposed System Costs	Present System Costs
Year 1		

<i>Equipment Lease</i>	\$20,000	\$11,500
<i>Salaries</i>	30,000	50,000
<i>Overhead</i>	4,000	3,000
<i>Development</i>	30,000	—
<i>Year 2</i>		
<i>Equipment Lease</i>	\$20,000	\$10,500
<i>Salaries</i>	33,000	55,000
<i>Overhead</i>	4,400	3,300
<i>Development</i>	12,000	—
<i>Year 3</i>		
<i>Equipment Lease</i>	\$20,000	\$10,500
<i>Salaries</i>	36,000	60,000
<i>Overhead</i>	4,900	3,600
<i>Development</i>	—	—
<i>Year 4</i>		
<i>Equipment Lease</i>	\$20,000	\$10,500
<i>Salaries</i>	39,000	66,000
<i>Overhead</i>	5,500	4,000
<i>Development</i>	—	—

- a. Using break-even analysis, determine the year in which Interglobal Health Consultants will break even.
  - b. Graph the costs and show the break-even point.
- a. In the third year.
  - b. The graph follows.



11. Below are system benefits for Interglobal Health Consultants (from Problem 10):

Year	Benefits
1	\$55,000
2	75,000
3	80,000
4	85,000

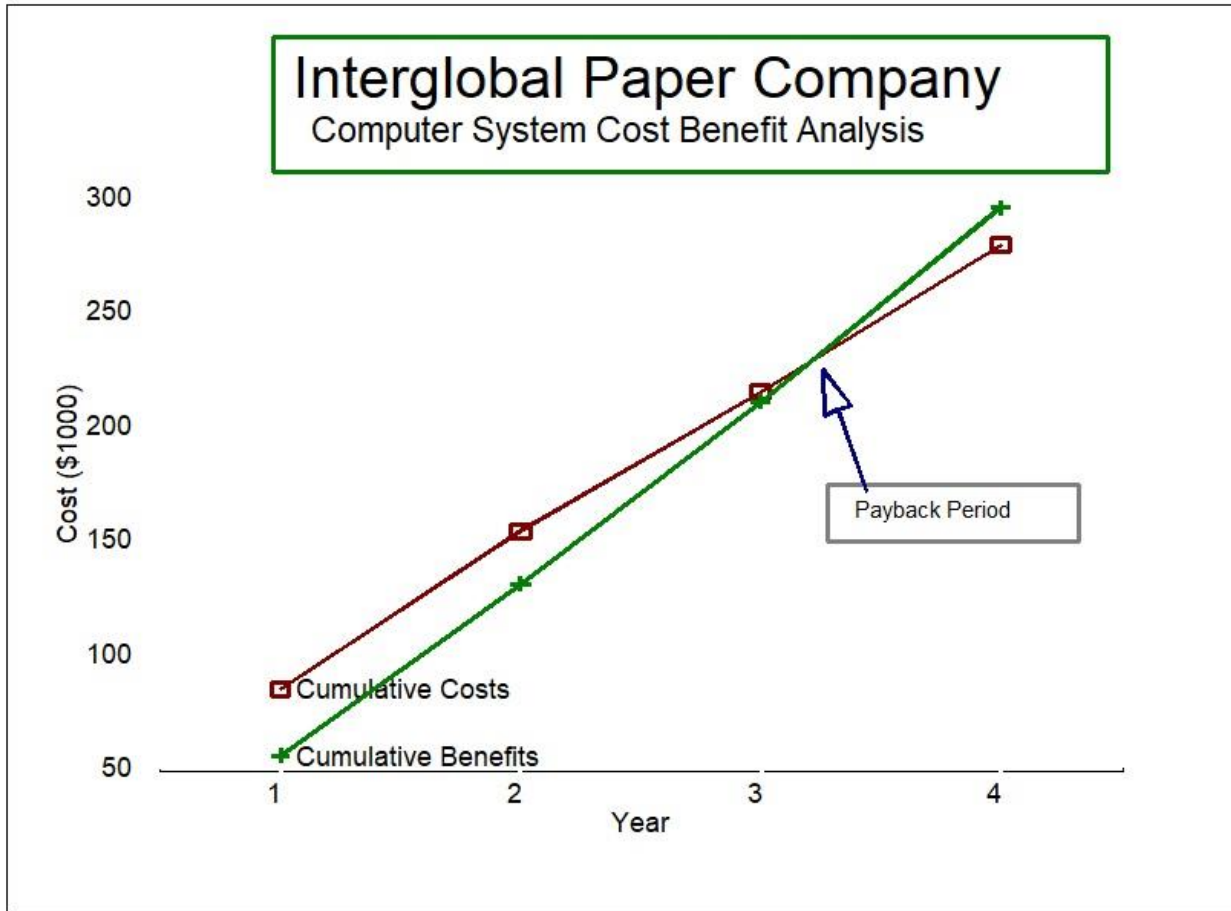
- Use the costs of Interglobal Paper's proposed system from Problem 10 to determine the payback period (use the payback method).
- Graph the benefits versus the costs and indicate the payback period.

a.

Year	Costs	Cumulative costs	Benefits	Cumulative benefits
1	84,000	84,000	55,000	55,000
2	69,400	153,400	75,000	130,000
3	60,900	214,300	80,000	210,000
4	64,500	278,800	85,000	295,000

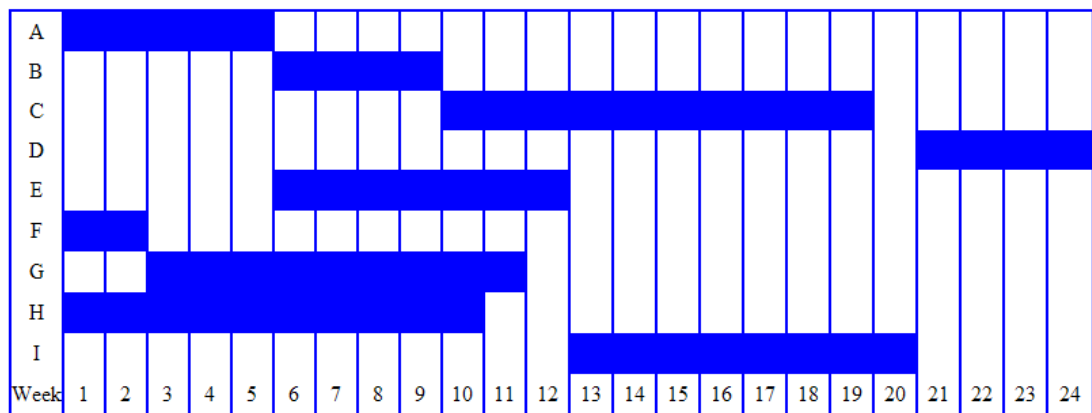
In the fourth year.

- (The graph is below.)



12. Brian F. O’Byrne (“F,” he says, stands for “frozen.”) owns a frozen food company and wants to develop an information system for tracking shipments to warehouses.
- Using the data from the table in Figure 3.EX1, draw a Gantt chart to help Brian organize his design project.
  - When is it appropriate to use a Gantt chart? What are the disadvantages? Explain in a paragraph.

a.



- b. It is most appropriate to use a Gantt chart when planning activities that are done in sequence. The charts are useful as communication tools and for control purposes. They have the advantage of being easy to understand. The disadvantages of using a Gantt chart are that it is difficult to identify the critical path and determine slack time.
13. In addition to a Gantt chart, you've drawn Brian a PERT diagram so that you can communicate the necessity to keep an eye on the critical path. Consult Figure 3.EX2, which was derived from the data from Problem 4. List all paths, and calculate and identify the critical path.

The paths are:

ABCD: 23 weeks

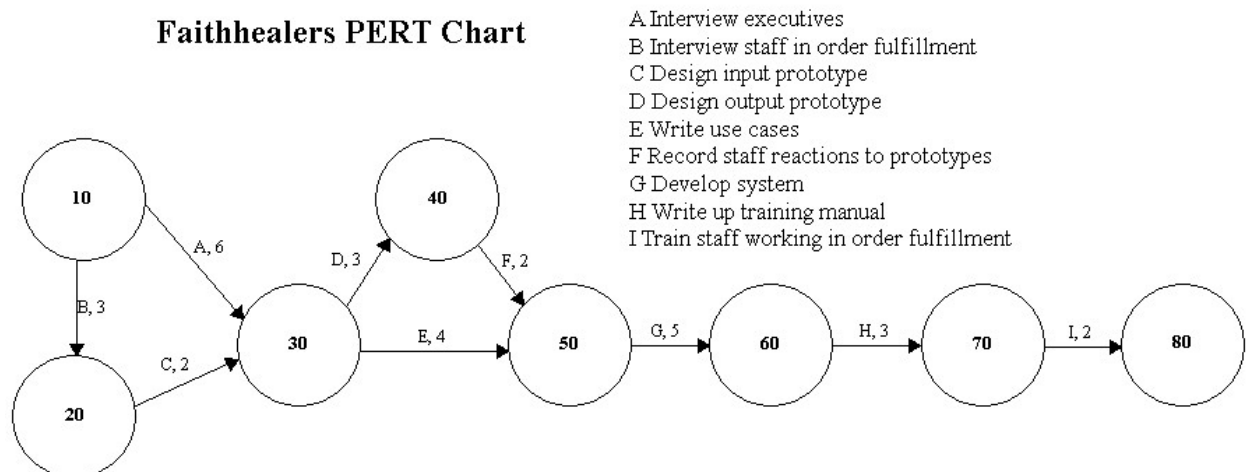
AEID: 24 weeks (critical path)

HID: 22 weeks

FGID: 23 weeks

14. Cherry Jones owns a homeopathic medicine company called Faithhealers. She sells vitamins and other relatively nonperishable products for those who want choices regarding alternative medicine. Cherry is developing a new system that would require her staff to be retrained. Given the information in Figure 3.EX3, make a PERT diagram for her and identify the critical path. If Cherry could find a way to save time on the "write use cases" phase, would it help? Why or why not?

The PERT diagram is shown below.



It would not help if Cherry could find time to save on the write use cases activity (activity E). The time for activity E is four weeks and is precedent to activity G. Activity F is also precedent to activity G, and Activity D is precedent to Activity F. The total time for Activity D and activity F is five weeks, which is greater than activity E (four weeks).

15. Using the PERT diagram in Figure 3.EX2 to determine answers:
- a. What activities can you expedite to complete the project a week ahead of schedule?
  - b. Suppose Activity E is the least costly activity to expedite. What happens if you try to expedite the project by more than one week? Explain.

The activities can you expedite to complete the project a week ahead of schedule are determined by the critical path, A-E-I-D (refer to the solution for Problem 19).

Activity E is the least costly activity to expedite but since activity A-E is 12 weeks and F-G is 11 weeks, if you try to expedite the project by more than one week A-E-I-D will no longer be the critical path.

16. You can help Cherry finish her project faster by expediting. Here are the costs.

Activity	Estimated Duration	Crash Time	Cost per Week
A	6	3	600
B	3	2	100
C	2	2	400
D	3	2	400
E	4	2	200
F	2	2	200
G	5	3	300
H	3	2	400
I	2	2	300

If Cherry can keep her expediting expenses to \$325 per week, then she would benefit from expediting because she can start a new project earlier than planned. If she goes over the \$325 per week limit, it would not be worthwhile.

**NOTE: The first printing of this edition contained an error in Problem 16. The problem mentions keeping her expediting expenses to \$325 per day and in the same sentence a \$325 per day limit. The correction should read keeping her expediting expenses to \$325 per week and in the same sentence a \$325 per week limit. Also, in part b. “daily limit” should be “week limit.” This should appear correctly in later printings.**

- Which three activities cannot be expedited at all because they are at their crash times already?
  - Which two activities cannot be expedited because their expediting cost exceeds the weekly limit?
  - Which two activities are unlikely candidates for expediting because they are not on the critical path?
  - Set up a table and show step-by-step which activities should be expedited to shorten the project time. What is the minimum time the project will take if Cherry expedites the project as much as she can and stays within her limits?
  - Why is Cherry’s limit exceeded if you try to shorten the project by one day more?
- The three activities that cannot be expedited at all because they are already at their crash times are C, F, and I.
  - The two activities that cannot be expedited because their expediting cost already exceeds the weekly limit are A, D and H (three activities).
  - The two activities that are unlikely candidates for expediting because they are not on the critical path are B, C and E (three activities).
  - The table showing step-by-step the activities that should be expedited to shorten the project time is shown below.

Eligible Activities	Activity Chosen	Time for Each Path 21 20 19	Cost	Cumulative Cost
G	G	20 19 18	300	300
G	G	19 18 17	300	300

The minimum time the project will take if Cherry expedites the project as much as she can and stays within her limits is 19 weeks.

- e. Why is Cherry's limit exceeded if you try to shorten the project by one day more?

Cherry's limit is exceeded if you try to shorten the project by one day more because activity G is at its crash time and the other activities are not on the critical path.

17. *Robyn Cucurullo is developing a social networking app for tablet computers. She has the following stages completed so far:*

Week or Stage	Estimated Cost of Stage	Stage Completed	Actual Cost of Stage to Date
Week 1	\$500	100%	500
Week 2	400	100%	500
Week 3	600	100%	700
Week 4	500	50%	50
Week 5	400	0	Not yet begun

- Create a table similar to the one in Figure 3.27.
- For Week 3, calculate the budget at completion (BAC), planned value (PV), actual cost (AC), and earned value (EV) at Week 3.
- For Week 3, calculate the performance measures of cost variance (CV), schedule variance (SV), the cost performance index (CPI), and the schedule performance index (SPI).
- What can you tell about the budget in Week 3 by using these performance measures?
- What can you tell about the schedule in Week 3 by using these performance measures?
- For Week 3, calculate the estimated time to complete (ETC) and estimate at completion (EAC).

- a. The table is shown below.

Week or Stage	Estimated Cost of Stage	Cumulative Estimate	Estimated Duration	Stage Completed	Actual Cost of Stage to Date	Actual Cost of Project to Date
Week 1	\$500	\$500	1 week	100%	500	\$500
Week 2	400	900	1 week	100%	500	1000
Week 3	600	1500	1 week	100%	700	1700
Week 4	500	2000	1 week	50%	50	1750
Week 5	400	2400	1 week	0	Not yet begun	Not yet begun

- b. For Week 3, the results are:

The budget at completion (BAC) is \$2400.  
 The planned value (PV) is \$1500.  
 The actual cost (AC) is \$1700.  
 The earned value (EV) is \$1500 ( $EV = PV * p$ ).

- c. For Week 3, the results are:  
 The performance measures of cost variance (CV) is \$0.  
 The schedule variance (SV) is \$200.  
 The cost performance index (CPI) is 1.  
 The schedule performance index (SPI) is 1.13.
- d. Using these performance measures, the project is over budget.
- e. Using these performance measures, the project is on schedule.
- f. For Week 3, the estimated time to complete ( $ETC = (BAC - EV) / CPI$ ) is 700 and estimate at completion ( $EAC = AC + ETC$ ) is \$2400.
18. *Using the data in the table from the previous problem:*
- a. *Create a table similar to the one in Figure 3.24 if you haven't done so already.*
- b. *For Week 4, calculate the budget at completion (BAC), planned value (PV), actual cost (AC), and earned value (EV) at Week 4.*
- c. *For Week 4, calculate the performance measures of cost variance (CV), schedule variance (SV), the cost performance index (CPI), and the schedule performance index (SPI).*
- d. *What can you say about the budget in Week 4 by using these performance measures?*
- e. *What can you say about the schedule in Week 4 by using these performance measures?*
- f. *For Week 4, calculate the estimated time to complete (ETC) and estimate at completion (EAC).*
- a. The table is shown above.
- b. For Week 4, the budget at completion (BAC) is \$2400.  
 The planned value (PV) is \$2000.  
 The actual cost (AC) is \$1750.  
 The earned value (EV) at week 4 is  $\$2000 \times .875 = \$1750$ .
- c. For Week 4, the performance measures of cost variance (CV) is \$0.  
 The schedule variance (SV) is \$-250.  
 The cost performance index (CPI) is 1.  
 The schedule performance index (SPI) is .875
- d. For Week 4, using these performance measures, the project is on budget.
- e. For Week 4, using these performance measures, the project is behind schedule.
- f. For Week 4, the estimated time to complete (ETC) is 650 and estimate at completion (EAC) is \$2400.
19. *Angus McIndoe wants to modernize his popular restaurant by adapting it more closely to the preferences of his repeat customers. Keeping track of his customers' likes and dislikes. Information such as where they like to sit, what they like to eat, when they normally arrive at the restaurant are all items of interest to him, because he believes that in this way he can better serve his customers. Angus has asked you to develop a system for him that will help make his customers happy while increasing his business.*
- You have heard what Angus had to say about his customers. There are certainly more preferences that he can keep track of.*



*Develop a problem definition for Angus, similar to one developed for Catherine's Catering in this chapter.*

The problem definition for Angus is:

### **Problem Definition**

There is currently no method for keeping track of customers and their preferences at the restaurant.

### Issues

1. There is no means of keeping track of what customers like to eat.
2. There is no way to keep track of seating preferences of customers.
3. There is no method to provide metrics on when a customer frequents the restaurant.

### Objectives

1. Provide a method for wait staff to suggest menu items and specials based on previous customer preferences. Weight = 10
2. Provide a means of displaying seating preferences when a customer arrives at the restaurant. Weight = 9
3. Create a method to provide historical information on customer arrival times. Weight = 7

### Requirements

1. Customer data must be kept private.
2. The system must be secure.

### Constraints

1. The development cost must not exceed \$5,000.
20. *Recently, two analysts just out of college have joined your systems analyst group at the newly formed company, Mega Phone. When talking to you about the group, they mention that some things strike them as odd. One is that group members seem to look up to two group leaders, Bill and Penny, not just one.*

*Their observation is that Bill seems pretty relaxed, whereas Penny is always planning and scheduling activities. They have also observed that everyone "just seems to know what to do" when they get into a meeting, even though no instructions are given. Finally, they have remarked on the openness of the group in addressing problems as they arise, instead of letting things get out of hand.*

- a. *By way of explanation to the new team members, label the types of leaders Bill and Penny appear to be, respectively.*
- b. *Explain the statement that "everyone just seems to know what to do." What is guiding their behavior?*
- c. *What concept best describes the openness of the group that the new team members commented on?*

- a. Penny is the task leader. She leads members to accomplish tasks, whereas Bill is the socioemotional leader who is concerned with social relationships between group members.
  - b. There is an openness in the group and no tension is present. Everyone acts according to group norms.
  - c. Group norms can be implied or expressed. This situation portrays implicit, functional group norms.
21. *“I think it’s only fair to write up all the alternatives you’ve considered,” says Lou Cite, a personnel supervisor for DayGlow Paints. “After all, you’ve been working on this systems thing for a while now, and I think my boss and everyone else would be interested to see what you’ve found out.” You are talking with Lou as you prepare to put together the final systems proposal that your team will be presenting to upper management.*
- a. *In a paragraph, explain to Lou why your proposal will not (and should not) contain all the alternatives that your team has considered.*
  - b. *In a paragraph, discuss the sorts of alternatives that should appear in the final systems proposal.*
- a. Because there are many constraints: money, hardware, software available, and so on, my proposal will not contain all the alternatives.
  - b.
    - 1) Buy computers for all middle managers.
    - 2) Purchase packaged software to manage inventory.
    - 3) Modify the existing system through funding new in-house programming efforts.

## Group Project

1. *The Weil Smile Clinic is a dental practice run by Drs. Bonnie and Jeff and they need to keep the necessary patient and insurance data safe and secure. They looked into online, cloud-based backup like SOS Online Backup, Spare Backup, MozyPro, and KineticD. Look into the cost of these or other services, and then help Drs. Bonnie and Jeff make a decision. What are the intangible costs and benefits of backing up this way? Should they use a backup system or find some other way? Write two paragraphs defending your group’s analysis and recommendations.*

The cost of these services will vary over time. The intangible costs and benefits are:

### SOS Online

Provides software that is safe, secure

Can also be set up to intelligently watch particular folders and either backup all the files in that folder or a subset of them

Easy recovery

Three-tiered security

Provides global access to data

### Spare Backup

Easy installation

- Backed up in two remote locations
- Easy recovery
- Fully encrypted
- Provides global access to data
- Unlimited storage
- Free trial

#### MozyPro

- Military grade encryption
- SSAE 16 audited, ISO 27001 certified
- Near continuous data protection
- Unlimited computers for one price Server backup
- Various pricing structures
- File scanning
- Data seeding
- Incremental backups

#### KineticD

- Fully automatic, continuous backup protection
- Total protection for your entire business
- Access and share your data securely from anywhere
- 100% data recovery track record
- Unlimited local backup for servers

The analysts should recommend that Drs. Bonnie and Jeff use one of these services. The one that they should use is MozyPro, because it provides backup as their staff keys in data. If there is a disaster, all the billing information will be stored offsite in a safe, secure location. Other providers require that the user initiate the backup, and if the staff forgets to run a backup, data could be lost. A dental office must keep secure data of patient appointments and financial information.

2. *Explore four or five voice-over IP (VoIP) providers.*
  - a. *Make a list of costs including the setup fee, monthly cost of the basic plan, monthly cost of the unlimited plan, and cost of an adapter or other fees if required.*
  - b. *Make a list of attributes, such as free in-network calls, international calling, virtual telephone numbers, teleconferencing, support for caller ID, and so on.*
  - c. *Write a paragraph with your group to explain how a person would use all of the quantitative and qualitative information to make an informed decision about which VoIP provider to select. Are any other variables important? Would you recommend any type of software to help compare these services?*
  - a. A sample of companies is listed below. The actual companies used by students will vary depending on the providers they choose and as new providers enter the market.
  - b. A person would use quantitative and qualitative information to make a decision based on the pricing, their unique needs, and the services provided. Other variables that are important depend on the organization. For example, a local organization might not need international calling. Fees will vary over time as plans and competition change.
  - c. Use COTS software to help choose a VoIP provider. Recommendation systems may also be used. Some of the attributes are included in the lists below.

**Vonage**

- Includes voicemail, caller ID, call waiting
- Free calls to Europe
- 24/7 Customer Service
- Unlimited local and long distance calling
- Keep your phone number
- Online Web account
- Call hunt
- In network calls

**Accessline**

- Purchase the number of lines you need
- No need to purchase an expensive phone system
- Voice mail, call forwarding, hunt groups, call screening, call conferencing, findme, followme, sim ring included
- Built in disaster recovery

3. *With your group, choose one VoIP provider you would recommend to a client based on the analysis in Group Project 2, Parts a. and b.*

The choice will depend on the VoIP providers reviewed by the group.

4. *With your group members, explore project management software such as Microsoft Project.*
- a. *What features are available? Work with your group to list them.*
  - b. *Have your group evaluate the usefulness of the software for managing a systems analysis and design team project. In a paragraph, state whether the software you are evaluating facilitates team member communication and management of team activities, time, and resources. State which particular features support these aspects of any project. Note whether the software falls short of these criteria in any regard.*

Although the results obtained from this exercise will vary for each school or university and from group to group within a class, the following is a suggested list of criteria to evaluate project management software.

**General product**

- Price
- Product support, is it free, is there a toll-free number?
- Ease of use, is the product easy to use, are icons easy to understand?
- What are the hardware requirements?
- What is the upgrade policy when a new release of the software is issued?
- What is the quality of the documentation? Is a tutorial available?

**Product features**

- Is a tool bar available?
- Can the product import or export files, such as spreadsheet or database? What types?
- How many reports are available? What kind?
- Can report formats be customized?
- Can new report formats be created?
- How many and what type of graphical outputs are available? Which graph or chart types?
- Are “What if...” scenarios available? How many and how easy are they to use?
- How many projects may be created?

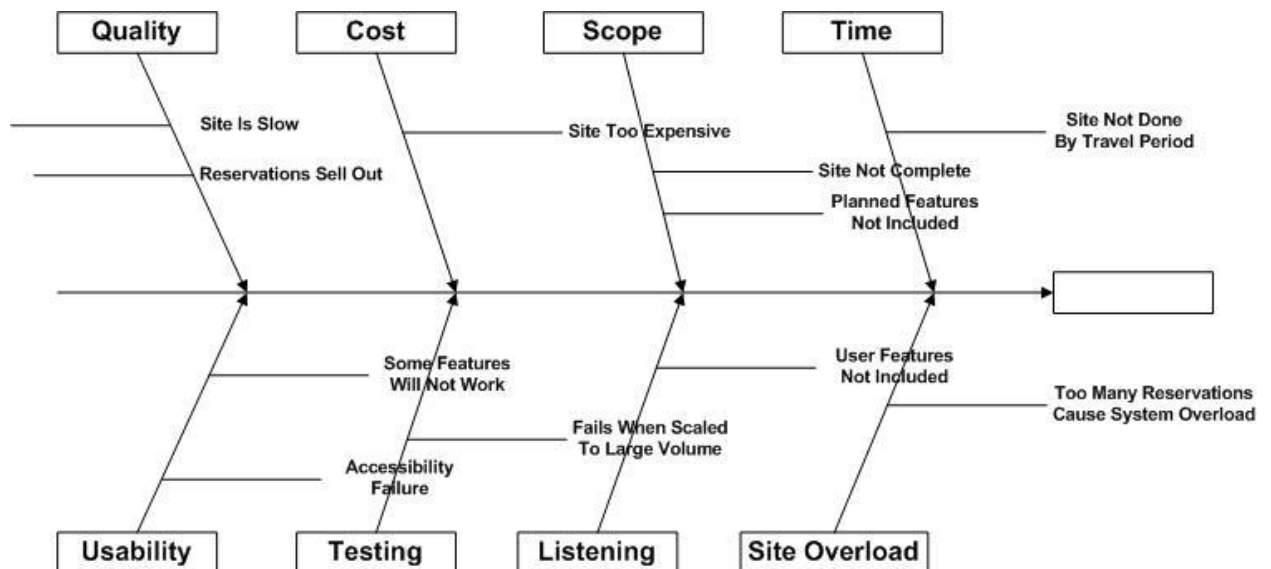
Are there project size limitations? If so, what are the limits?  
 What other limits exist for the software?  
 What constraint formats are available, such as “Finish No Later Than” dates?  
 Is context sensitive help available?  
 How extensive is the help facility?

5. *Brainstorm with your group about problems that can possibly occur when constructing a website for a travel company that wants to sell vacations online for the next big travel period (either December or June).*
- Make a list of the problems your group identified.*
  - Draw a fishbone diagram with your group that depicts all of the problems the group identified in Part a.*

The results of this group project will vary widely, depending on the team members and the problems that they can foresee.

- Site is slow, reservations sell out, some features will not work, accessibility failure, fails when scaled to large volume, site too expensive, site not complete, planned features not included, user features not included, site not done by travel period, too many reservations cause system overload.

- One example of the solution fishbone diagram is illustrated below.



## Central Pacific University

- Use Microsoft Visio or Visible Analyst to view the Gathering Information PERT diagram.  
 Refer to the Visible Analyst Unstructured Diagram called Pert Chart—Data Gathering.
- List all paths and calculate and determine the critical path for the Gathering Information PERT

*diagram.*

The paths are:

10-20-50-60-80-90  
 10-20-50-70-80-90  
 10-30-50-60-80-90  
 10-30-50-70-80-90  
 10-40-50-60-80-90  
 10-40-50-70-80-90

The critical path is: 10-20-50-60-80-90

3. *Use Microsoft Visio or Visible Analyst to create the PERT diagram shown in Figure E3.2. It represents the activities involved in interviewing the users and observing their offices.*

The diagram is the Visible Analyst Unstructured Diagram named Pert—Interviewing.

4. *List all paths and calculate and determine the critical path for the Interviewing Users PERT diagram. List all paths and calculate and determine the critical path for the Interviewing Users PERT diagram.*

The paths are:

10-20-30-40-70-80  
 10-20-30-40-80  
 10-20-30-40-60-80  
 10-20-30-50-40-70-80  
 10-20-30-50-40-80  
 10-20-30-50-40-60-80

The critical path is: 10-20-30-40-70-80

5. *Use Visio or Visible Analyst to create a PERT diagram for creating system prototypes. The activity information is shown in Figure E3.3.*

The PERT chart for creating prototypes is illustrated below.

6. *Create the problem definition for the CPU case. Read the interview with Hy Perteks in the CPU case found in Chapter 4. Go to [www.pearsonhighered.com/kendall](http://www.pearsonhighered.com/kendall) and click the CPU Student.*

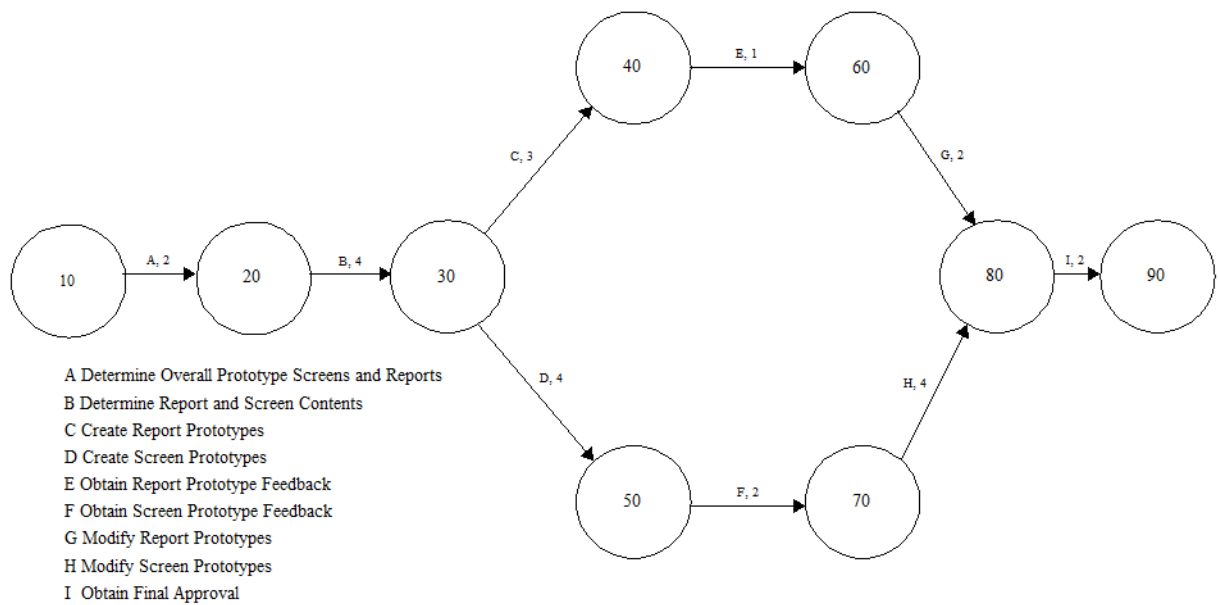
The results will vary from student to student. A suggested solution is below.

List of interview results:

Hy Perteks

Need to know software experts  
 Need to provide training

### **PERT Chart - Creating System Prototypes**

**Rhoda Booke**

Needs technical support  
 Would like training

**Mike Crowe**

Would like preventive maintenance information  
 Doesn't know when to perform preventive maintenance  
 Does not know which machines are under warranty  
 Limited access for students

**Dot Matricks**

Missing information  
 Needs preventive maintenance information  
 Should be easy to use  
 Should be flexible  
 Missing cost and repair information  
 Software cross-referencing is a must  
 Needs to have a method of refreshing computers  
 Have four satellite campuses

**Cher Ware**

Different versions of software on same computer  
 Needs software training  
 Doesn't know if computer hardware is robust enough to install software  
 Needs to have reliable information on which machines software is installed on  
 Needs cost information on software  
 Problems moving single license software from one machine to another  
 Problems changing a lab software image

**Paige Prynter**

Needs hardware and software cost subtotals and totals

Needs to know cost to upgrade software  
Needs accurate computer inventory

### **Problem Definition**

The system for keeping track of computer hardware and software at Central Pacific University lacks information that would make it more useful. It does not produce the output required by a number of faculty and staff members.

### Present Situation

Issue 1 There is missing information, such as costs and maintenance that would make the system more usable. Weight = 10

Issue 2 There is no information on which software is included on which machines. Weight = 9

Issue 3 Software experts and training are difficult to find. Weight = 8

Issue 4 Need to be able to determine the cost of upgrading software. Weight = 6

Issue 5 There is no way to perform an accurate inventory of computer hardware. Weight = 5

### Objectives

Objective 1 System will capture all required information, such as costs and maintenance data.

Objective 2 Provide hardware and software cross-reference information.

Objective 3 Provide an easy method to capture and find software expert information.

Objective 4 Produce information on software upgrade costs.

Objective 5 Devise a method for accurate inventory of computer hardware.

### Requirements

Should be easy to use  
Should be flexible

### Constraints

Limited access for students

7. *Write user requirements for the CPU case.*

Create a program to add all hardware information.

Create a program to add software information.



Write a program to update hardware maintenance data.  
Produce a hardware and software cross-reference report in a variety of formats.  
Write a program to enter software expert information.  
Create a query to find software expert information.  
Produce a report on software upgrade costs.  
Produce reports or queries for computers.  
Produce reports or queries for software.  
Produce queries that will produce cost information.  
Print inventory lists for each room.  
Write a program for updating room locations of computers.  
Create a website for displaying training courses.  
Create a website for registering for training courses.  
Create a website for updating lab software image information.

8. *Design a test plan for the requirements created in Exercise E-7.*

1. Create a program to add all hardware information.  
  
Test to ensure that all hardware information is accurately entered and stored on the database tables. Ensure that each field is tested for each possible error that may occur.
2. Create a program to add software information.  
  
Test to ensure that all software information is accurately entered and stored on the database tables. Ensure that each field is tested for each possible error that may occur.
3. Write a program to update hardware maintenance data.  
  
Test all possible valid and invalid combinations of data. Ensure that the data is stored correctly.
4. Produce a hardware and software cross-reference report in a variety of formats.  
  
Verify that the software is installed on the hardware.  
Verify that all software is included on the report.  
Verify that all hardware is included on the report.  
If the report is a Web query, ensure that the software is correct for the selected computer.
5. Write a program to enter software expert information.  
  
Test all possible valid and invalid combinations of expert information. Ensure that the data is stored correctly and references the correct software.
6. Create a query to find software expert information.  
  
Check for a variety of valid and invalid software products.  
Check for software that does not have an expert.
7. Produce a report on software upgrade costs  
  
Verify that the costs are correct for both single purchase software, multiple copy

- software, and site license software.
8. Produce reports or queries for computers.  
Ensure that each report or query finds the correct computer information.
  9. Produce reports or queries for software.  
Ensure that each report or query finds the correct software information.
  10. Produce queries that will produce cost information.  
Verify that the subtotals and total cost information is correct and that all computers or software are included.
  11. Print inventory lists for each room.  
Check to see that all computers for each room are included.  
Check for rooms that have no computers.
  12. Write a program for updating room locations of computers.  
Verify that the room location has been correctly entered for each campus, and correctly stored.
  13. Create a website for displaying training courses.  
Test the website for a number of different days that training will be offered.  
Ensure that each day has the proper number of training classes offered.  
Make sure that the calendar functions correctly display new calendars.
  14. Create a website for registering for training courses.  
Ensure that an individual has correctly entered all information and is correctly registered for a course.
  15. Create a website for updating lab software image information.  
Ensure that all information has been correctly entered, testing for both good and bad data.  
Verify that different lab images have been correctly updated with new information.