

Project Management

3

Systems Analysis and Design
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Lecture 03
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Project Management Fundamentals

- ▶ Project initiation
- ▶ Determining project feasibility
- ▶ Activity planning and control
- ▶ Project scheduling
- ▶ Managing systems analysis team members

Project Initiation

- ▶ Problems in the organization
 - ▶ Problems that lend themselves to systems solutions
- ▶ Opportunities for improvement
 - ▶ Caused through upgrading, altering, or installing new systems

Checking Output, Observing Employee Behavior, and Listening to Feedback Are All Ways to Help the Analyst Pinpoint Systems Problems and Opportunities (Figure 3.1)

To Identify Problems	Look for These Specific Signs:
Check output against performance criteria.	<ul style="list-style-type: none">• Too many errors• Work completed slowly• Work done incorrectly• Work done incompletely• Work not done at all
Observe behavior of employees.	<ul style="list-style-type: none">• High absenteeism• High job dissatisfaction• High job turnover
Listen to external feedback from: Vendors and service providers Customers. Suppliers.	<ul style="list-style-type: none">• Complaints• Suggestions for improvement• Loss of sales• Lower sales

Problem Definition

- ▶ Problem statement
 - ▶ Paragraph or two stating the problem or opportunity
- ▶ Issues
 - ▶ Independent pieces pertaining to the problem or opportunity
- ▶ Objectives
 - ▶ Goals that match the issues point-by-point
- ▶ Requirements
 - ▶ The things that must be accomplished along with the possible solutions, and constraints, that limit the development of the system
- ▶ Use the problem definition to create a preliminary test plan

Selection Of Projects

- ▶ Backing from management
- ▶ Appropriate timing of project commitment
- ▶ Possibility of improving attainment of organizational goals
- ▶ Practical in terms of resources for the system analyst and organization
- ▶ Worthwhile project compared with other ways the organization could invest resources

Selection of Projects: Improving Attainment of Organizational Goals

- ▶ Improving corporate profits
- ▶ Supporting the competitive strategy of the organization
- ▶ Improving cooperation with vendors and partners
- ▶ Improving internal operations support
- ▶ Improving internal decision support so that decisions are more effective
- ▶ Improving customer service
- ▶ Increasing employee morale

Defining Objectives

Many possible objectives exist including:

- ▶ Speeding up a process
- ▶ Streamlining a process
- ▶ Combining processes
- ▶ Reducing errors in input
- ▶ Reducing redundant storage
- ▶ Reducing redundant output
- ▶ Improving system and subsystem integration

Determining Feasibility

- ▶ Defining objectives
- ▶ Determining resources
 - ▶ Operationally
 - ▶ Technically
 - ▶ Economically

The Three Key Elements of Feasibility Include Technical, Economic, and Operational Feasibility (Figure 3.3)

The Three Key Elements of Feasibility	
Technical Feasibility	<ul style="list-style-type: none">Add on to present systemTechnology available to meet users' needs
Economic Feasibility	<ul style="list-style-type: none">Systems analysts' timeCost of systems studyCost of employees' time for studyEstimated cost of hardwareCost of packaged software or software development
Operational Feasibility	<ul style="list-style-type: none">Whether the system will operate when put in serviceWhether the system will be used

Technical Feasibility

- ▶ Can current technical resources be upgraded or added to in a manner that fulfills the request under consideration?
- ▶ If not, is there technology in existence that meets the specifications?

Economic Feasibility

- ▶ Economic feasibility determines whether value of the investment exceeds the time and cost
- ▶ Includes:
 - ▶ Analyst and analyst team time
 - ▶ Business employee time
 - ▶ Hardware
 - ▶ Software
 - ▶ Software development

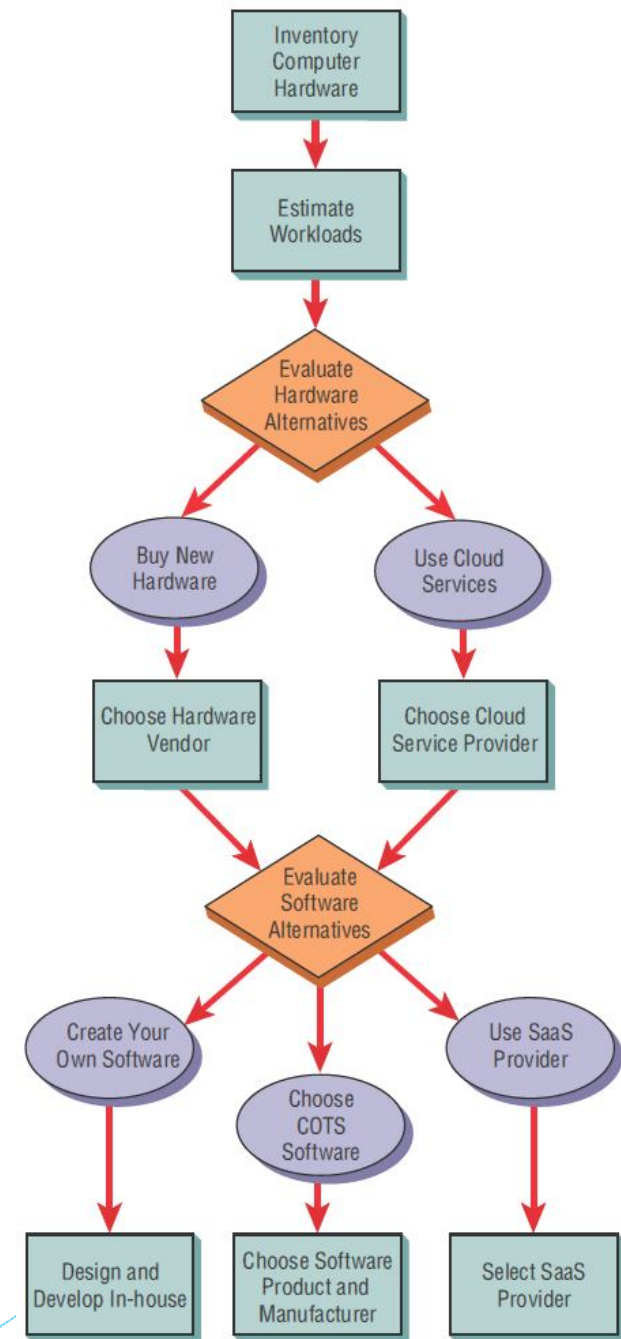
Operational Feasibility

- ▶ Operational feasibility determines if the human resources are available to operate the system once it has been installed
- ▶ Users that do not want a new system may prevent it from becoming operationally feasible

Ascertaining Hardware and Software Needs

- ▶ Steps used to determine hardware and software needs:
 - ▶ Inventory computer hardware currently available
 - ▶ Estimate current and future system workloads
 - ▶ Evaluate available hardware and software
 - ▶ Choose the vendor
 - ▶ Acquire the computer equipment

Steps in Choosing Hardware and Software (Figure 3.5)



Inventorying Computer Hardware

- ▶ Type of equipment
- ▶ Operation status of the equipment
- ▶ Estimated age of equipment
- ▶ Projected life of equipment
- ▶ Physical location of equipment
- ▶ Department or person responsible for equipment
- ▶ Financial arrangement for equipment

Evaluating Hardware

- ▶ Time required for average transactions
- ▶ Total volume capacity of the system
- ▶ Idle time of the CPU or network
- ▶ Size of memory provided

People that Evaluate Hardware

- ▶ Management
- ▶ Users
- ▶ Systems analysts

Acquisition of Computer Equipment

- ▶ Purchasing
- ▶ Using Cloud Services

Available cloud services

- ▶ Available cloud services may include:
 - ▶ Web hosting
 - ▶ Email hosting
 - ▶ Application hosting
 - ▶ Backup
 - ▶ Storage and processing of databases
 - ▶ Archiving
 - ▶ Ecommerce

Benefits of Cloud Computing

- ▶ Less time spent maintaining legacy systems
- ▶ May be simpler to acquire IT services
- ▶ Scalable applications that can grow by adding more cloud resources
- ▶ Consistency across multiple platforms
- ▶ Capital is not tied up

Drawbacks of Cloud Computing

- ▶ Loss of control of data stored in the cloud
- ▶ Potential security threats to data that is not stored on premises
- ▶ Reliability of the Internet as a platform

Evaluating Vendor Support

- ▶ Hardware support
- ▶ Software support
- ▶ Installation and training support
- ▶ Maintenance support

Guidelines for Vendor Selection (Figure 3.7)

Vendor Services	Specifics Vendors Typically Offer
Hardware Support	Full line of hardware Quality products Warranty
Software Support	Complete software needs Custom programming Warranty
Installation and Training	Commitment to schedule In-house training Technical assistance
Maintenance	Routine maintenance procedures Specified response time in emergencies Equipment loan while repair is being done
Cloud Services	Web hosting Email hosting Data storage
Software as a Service	Automatic software upgrades Support services Security and antivirus protection

Software Alternatives

- ▶ Created custom software
- ▶ Purchased as COTS (commercial off-the-shelf) software
- ▶ Provided by an software as a service (SaaS)

Software Alternatives (Figure 3.8)

	Advantages	Disadvantages
Creating Custom Software	<ul style="list-style-type: none">• Specific response to specialized business needs• Innovation may give firm a competitive advantage• In-house staff available to maintain software• Pride of ownership	<ul style="list-style-type: none">• May be significantly higher initial cost compared to COTS software or ASP• Necessity of hiring or working with a development team• Ongoing maintenance
Purchasing COTS Packages	<ul style="list-style-type: none">• Refined in the commercial world• Increased reliability• Increased functionality• Often lower initial cost• Already in use by other firms• Help and training comes with software	<ul style="list-style-type: none">• Programming focused; not business focused• Must live with the existing features• Limited customization• Uncertain financial future of vendor• Less ownership and commitment
Using SaaS	<ul style="list-style-type: none">• Organizations that do not specialize in information systems can focus on what they do best (their strategic mission)• There is no need to hire, train, or retain a large IT staff• There is no expenditure of employee time on nonessential IT tasks	<ul style="list-style-type: none">• Loss of control of data, systems, IT employees, and schedules• Concern over the financial viability and long-run stability of the SaaS provider• Security, confidentiality, and privacy concerns• Loss of potential strategic corporate advantage regarding innovativeness of applications

Software Evaluation

- ▶ Performance effectiveness
- ▶ Performance efficiency
- ▶ Ease of use
- ▶ Flexibility
- ▶ Quality of documentation
- ▶ Manufacturer support

Guidelines for Evaluating Software (Figure 3.9)

Software Requirements	Specific Software Features
Performance Effectiveness	Able to perform all required tasks Able to perform all tasks desired Well-designed display screens Adequate capacity
Performance Efficiency	Fast response time Efficient input Efficient output Efficient storage of data Efficient backup
Ease of use	Satisfactory user interface Help menus available “Read Me” files for last-minute changes Flexible interface Adequate feedback Good error recovery
Flexibility	Options for input Options for output Usable with other software
Quality of Documentation	Good organization Adequate online tutorial Website with FAQ
Manufacturer Support	Technical support hotline Newsletter/email Website with downloadable product updates

Identifying Benefits and Costs

- ▶ Tangible benefits are advantages measurable in dollars through the use of the information system
- ▶ Intangible benefits are difficult to measure
- ▶ Tangible costs are accurately projected by the systems analyst and accounting personnel
- ▶ Intangible costs are difficult to estimate and may not be known

Tangible Benefits

- ▶ Advantages measurable in dollars that accrue to the organization through the use of the information system
- ▶ Examples:
 - ▶ Increase in the speed of processing
 - ▶ Access to otherwise inaccessible information
 - ▶ Access to information on a more timely basis
 - ▶ The advantage of the computer's superior calculating power
 - ▶ Decreases in the amount of employee time needed to complete specific tasks

Intangible Benefits

- ▶ Intangible benefits are benefits from use of the information system that are difficult to measure
- ▶ Examples:
 - ▶ Improving the decision-making process
 - ▶ Enhancing accuracy
 - ▶ Becoming more competitive in customer service
 - ▶ Maintaining a good business image
 - ▶ Increasing job satisfaction

Tangible Costs

- ▶ Those that can be accurately projected by systems analysts and the business' accounting personnel
- ▶ Examples:
 - ▶ Cost of equipment
 - ▶ Cost of resources
 - ▶ Cost of systems analysts' time
 - ▶ Cost of programmers' time
 - ▶ Employees' salaries

Intangible Costs

- ▶ Those that are difficult to estimate and may not be known
- ▶ Examples:
 - ▶ Losing a competitive edge
 - ▶ Losing the reputation of being first
 - ▶ Declining company image
 - ▶ Ineffective decision making

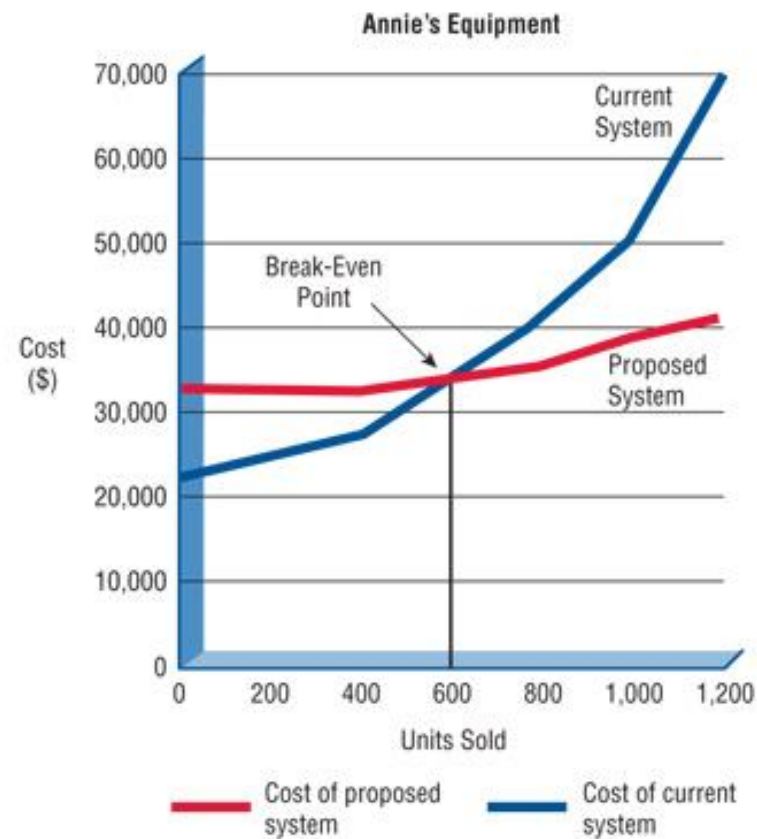
Comparing Costs and Benefits

- ▶ Break-even analysis
- ▶ Payback
- ▶ Cash-flow analysis
- ▶ Present value analysis

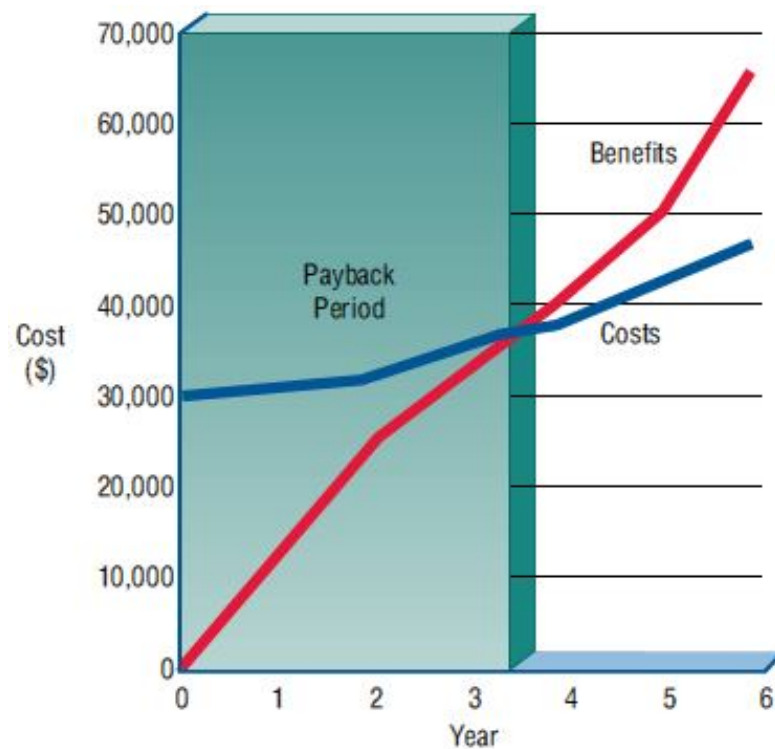
Break-Even Analysis

- ▶ The point at which the total cost of the current system and the proposed system intersect
- ▶ Useful when a business is growing and volume is a key variable in costs
- ▶ Disadvantage:
 - ▶ Benefits are assumed to remain the same
- ▶ Advantage:
 - ▶ Can determine how long it will take for the benefits of the system to pay back the costs of developing it

Break-Even Analysis (Figure 3.10)



Break-Even Analysis Showing a Payback Period of Three and a Half Years (Figure 3.11)



— Cumulative benefits from proposed system

— Cumulative costs of proposed system

Year	Cost (\$)	Cumulative Costs (\$)	Benefits (\$)	Cumulative Benefits (\$)
0	30,000	30,000	0	0
1	1,000	31,000	12,000	12,000
2	2,000	33,000	12,000	24,000
3	2,000	35,000	8,000	32,000
4	3,000	38,000	8,000	40,000
5	4,000	42,000	10,000	50,000
6	4,000	46,000	15,000	65,000

Cash-Flow Analysis

- ▶ Examines the direction, size, and pattern of cash flow that is associated with the proposed information system
- ▶ Determines when cash outlays and revenues will occur for both; not only for the initial purchase, but over the life of the information system

Cash-Flow Analysis for the Computerized Mail-Addressing System (Figure 3.12)

	Year 1				Year 2
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1
Revenue	\$5,000	\$20,000	\$24,960	\$31,270	\$39,020
Costs					
Software development	10,000	5,000			
Personnel	8,000	8,400	8,800	9,260	9,700
Training	3,000	6,000			
Equipment lease	4,000	4,000	4,000	4,000	4,000
Supplies	1,000	2,000	2,370	2,990	3,730
Maintenance	0	2,000	2,200	2,420	2,660
Total Costs	26,000	27,400	17,370	18,670	20,090
Cash Flow	-21,000	-7,400	7,590	12,600	18,930
Cumulative Cash Flow	-21,000	-28,400	-20,810	-8,210	10,720

Present Value Analysis

- ▶ Way to assess all the economic outlays and revenues of the information system over its economic life, and to compare costs today with future costs and today's benefits with future benefits
- ▶ Presents the time value of the investment in the information system as well as the cash flow

Present Value Analysis (Figure 3.14)

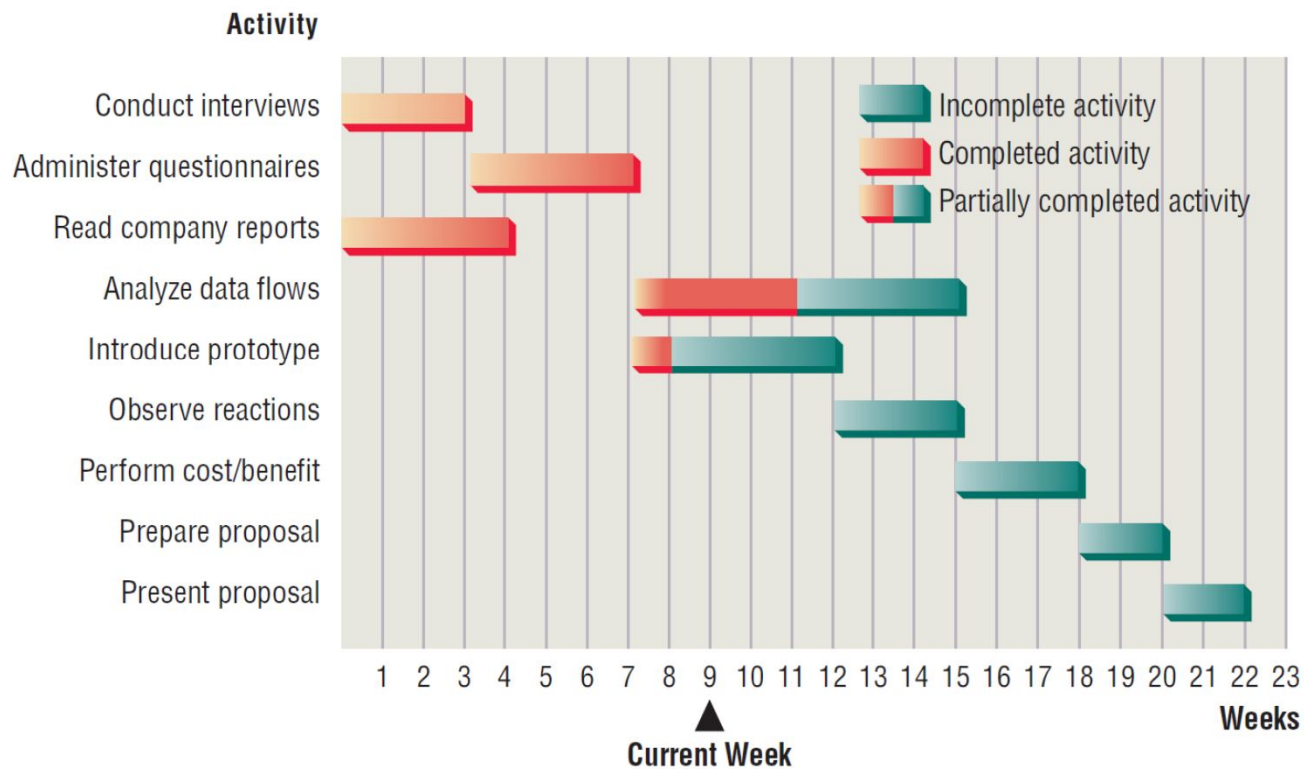
- ▶ Taking into account present value, the conclusion is that the costs are greater than the benefits.
- ▶ The discount rate, i , is assumed to be .12 in calculating the multipliers in this table.

	Year						
	1	2	3	4	5	6	Total
Costs	\$40,000	42,000	44,100	46,300	48,600	51,000	
Multiplier	.89	.80	.71	.64	.57	.51	
Present Value of Costs	35,600	33,600	31,311	29,632	27,702	26,010	183,855
Benefits	\$25,000	31,200	39,000	48,700	60,800	76,000	
Multiplier	.89	.80	.71	.64	.57	.51	
Present Value of Benefits	22,250	24,960	27,690	31,168	34,656	38,760	179,484

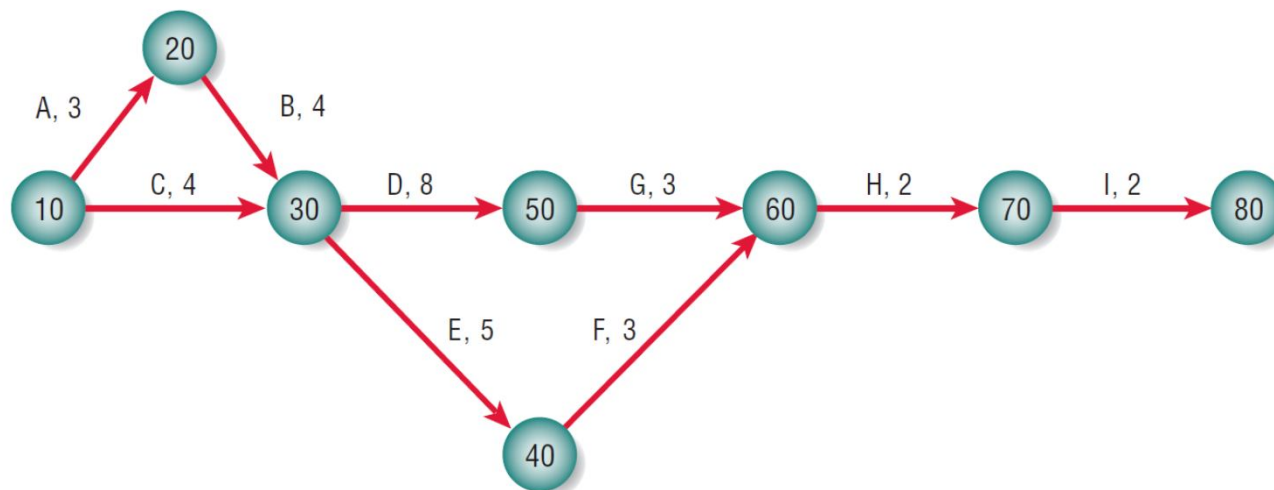
Project Scheduling

- ▶ Gantt Charts
 - ▶ Simple
 - ▶ Lends itself to end user communication
 - ▶ Drawn to scale
- ▶ PERT diagrams
 - ▶ Useful when activities can be done in parallel

Using a Two-Dimensional Gantt Chart for Planning Activities that Can Be Accomplished in Parallel (Figure 3.18)



A Completed PERT Diagram for the Analysis Phase of a Systems Project (Figure 3.22)



PERT Diagram Advantages

- ▶ Easy identification of the order of precedence
- ▶ Easy identification of the critical path and thus critical activities
- ▶ Easy determination of slack time

Project Due Dates

- ▶ Estimating models
 - ▶ Costar
 - ▶ Construx
- ▶ Function point analysis
 - ▶ Helps the analyst quantitatively estimate the overall length of software development efforts

Project Risk

- ▶ Project failures may be prevented by:
 - ▶ Training
 - ▶ Experience
 - ▶ Learning why other projects have failed
- ▶ Fishbone diagram systematically lists all of the possible problems that can occur

The Systems Proposal

- ▶ Cover letter
- ▶ Title page of project
- ▶ Table of contents
- ▶ Executive summary
- ▶ Outline of systems study with appropriate documentation
- ▶ Detailed results of the systems study
- ▶ Systems alternatives
- ▶ Systems analysts recommendations
- ▶ Summary
- ▶ Appendices