Xác định yêu cầu hệ thống

Gv: trần thị minh khoa

30LT + 30TH

2TK + 3TH + GK(thuchanh) + 1CK(tu luan)

diem danh (lt+th) -> 1cot

Thuyet trinh/bcao cao nhom (max 5 mems)

được sử dụng tài liệu GIẤY viết tay của bản thân (no limit)

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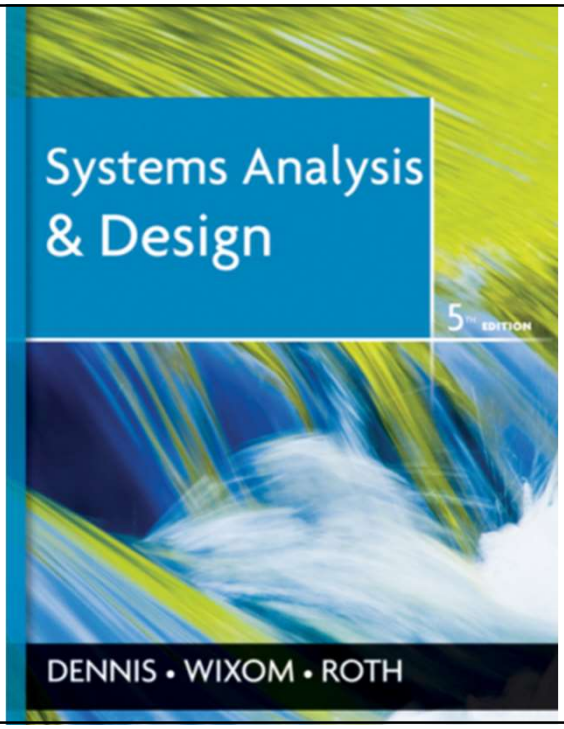

System Analysis & Design

Presenter: PhD. Tran Thi Minh Khoa

2

Agenda

Planning Phase

1. The Systems Analyst & Information Systems Development
2. Project Selection & Management

Design Phase

7. Moving Into Design
8. Architecture Design
9. User Interface Design
10. Program Design
11. Data Storage Design

Analysis Phase

3. Requirement Determination
4. Use Case Analysis
5. Process Modeling
6. Data Modeling

Implementation Phase

12. Moving Into Implementation
13. Transition To The New System
14. The Movement To Object

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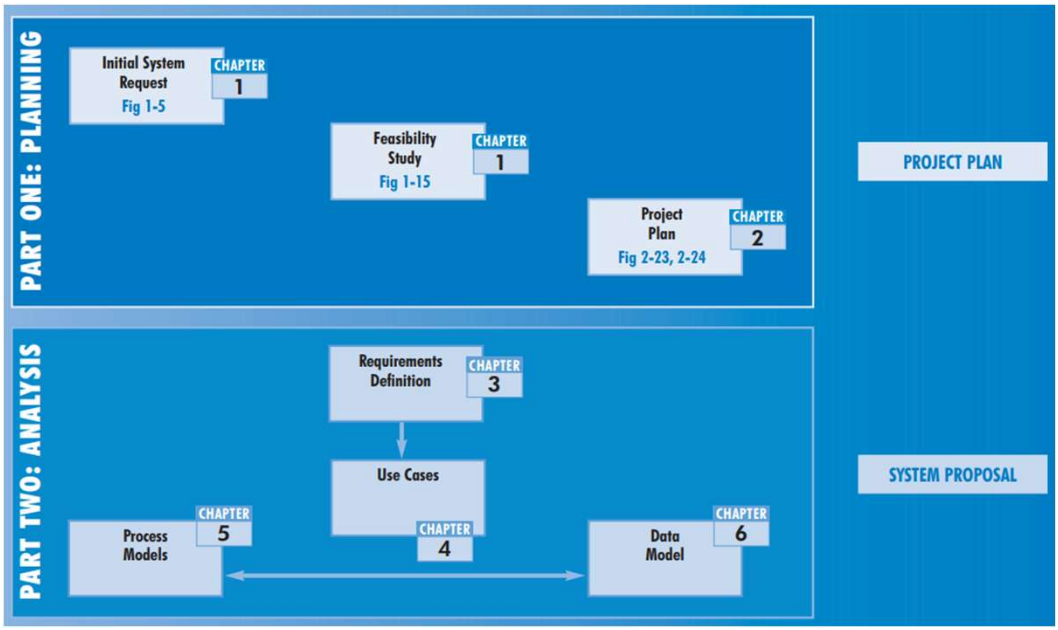

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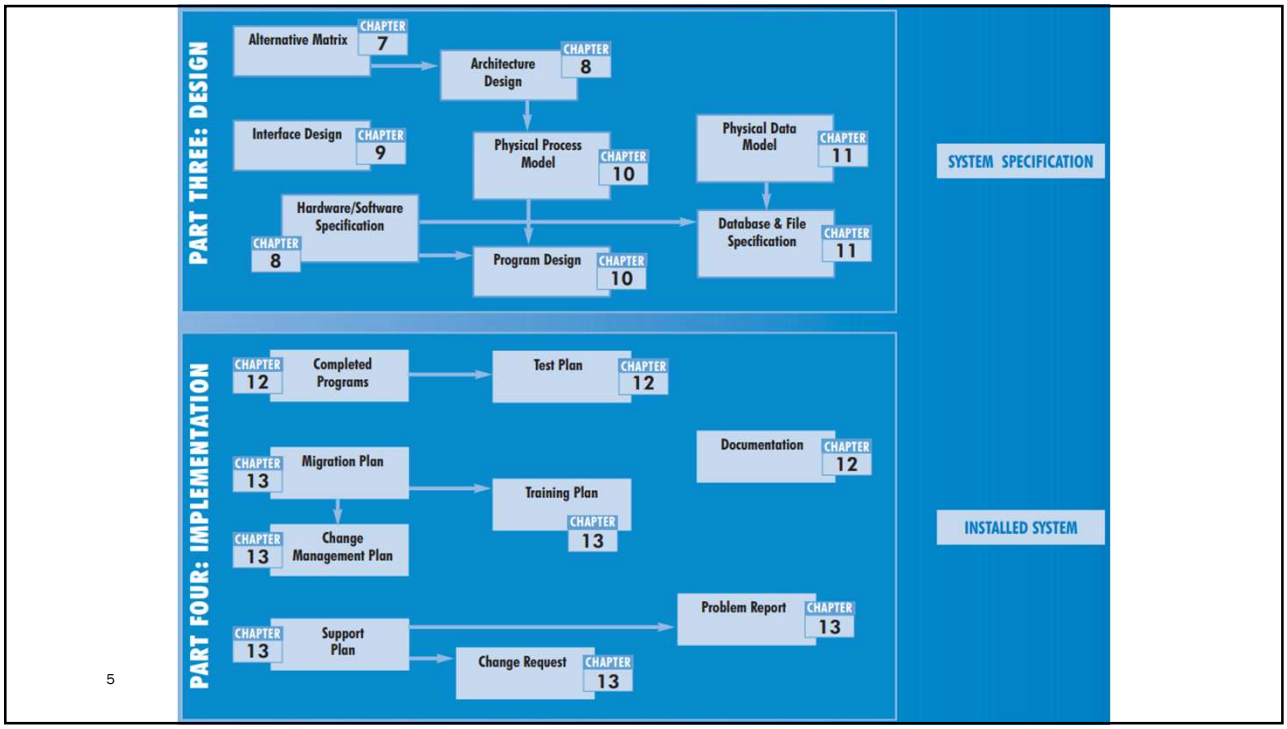

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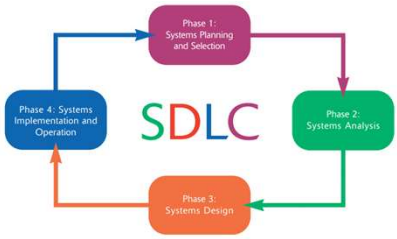
System Development Life Cycle (SDLC)



The Planning Phase is the fundamental two-step process of understanding why an information system should be developed and creating a plan for how the project team will develop it.

The Design phase decides how the system will operate. This collection of deliverables is the system specification that is handed to the programming team or implementation.

The Analysis phase answers the questions of who will use the system, what the system will do, and where and when it will be used.

The final phase in the SDLC is the **Implementation phase**, during which the system is actually built (or purchased, in the case of a packaged software design)

6

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The Planning Phase
is the fundamental two-step process
of understanding why
an information system should be developed
and creating a plan for how
the project team will develop it.

The deliverables from both steps
are combined into the project plan,
which is presented to the project sponsor and
approval committee at the end of the
Planning Phase. They decide whether it is
advisable to proceed with the system
development project.

7

Chapter 1: THE SYSTEMS ANALYST AND INFORMATION SYSTEMS DEVELOPMENT

OBJECTIVES

- Explain the role played in information systems development by the systems analyst.
- Describe the fundamental systems development life cycle and its four phases.
- Explain how organizations identify IS development projects.
- Explain the importance of linking the information system to business needs.
- Be able to create a system request.
- Describe technical, economic, and organizational feasibility assessment.
- Be able to perform a feasibility analysis.

CHAPTER OUTLINE

8

The *systems development life cycle* (SDLC) is the process of determining how an information system (IS) can support business needs, designing the system, building it, and delivering it to users. If you have taken a programming class or have programmed on your own, this probably sounds pretty simple. In the real world, however, it is not so easy.

In 2010, an estimated $2.4 trillion was spent by organizations and governments on IT hardware, software, and services worldwide. This spending level was projected to increase by 3.5% in 2011.[1] Unfortunately, a study conducted in 2008 found success is "improbable" in 68% of technology projects.[2] Many of the systems that aren't totally abandoned are delivered to the users significantly late, cost far more than expected, and have fewer features than originally planned.

A 2009 study attempting to quantify the costs of this failure rate estimated a toll on the global economy of $6.2 trillion.[3] While this specific outcome has been questioned by some, the point remains that the cost of IT project failures is staggering both in terms of the proportion of projects that fail and the costs of those failures.[4]

Today, both businesses and governments experience embarrassing and costly errors in their information systems. Here is a sample of just a few notable software glitches that occurred in 2010:

- A software error resulted in Toys R Us double billing some shoppers for purchases made on Black Friday.
- Verizon Wireless had to refund $50 million to customers due to billing system errors.
- Chase banking customers were unable to access their online banking accounts for over 24 hours due to a computer glitch.
- McAfee's anti-virus software product caused its users' computers to lock up. McAfee offered affected customers a free 2-year subscription and reimbursement for costs incurred to repair the machines.
- A U.S. Navy drone (unmanned aerial vehicle) reportedly flew into restricted air space near Washington D.C. when operators lost control for about 20 minutes due to a software issue.[5]

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THE SYSTEMS ANALYST

The systems analyst plays a key role in information systems development projects

Systems Analyst Skills

6 major categories:

technical, business, analytical, interpersonal, management, ethical.

Systems Analyst Roles

The *systems analyst* role
The *business analyst* role
The *requirements analyst* role
The *infrastructure analyst* role
The *change management analyst* role
The *project manager* role

**The roles and the names used to describe them may vary from organization to organization.*

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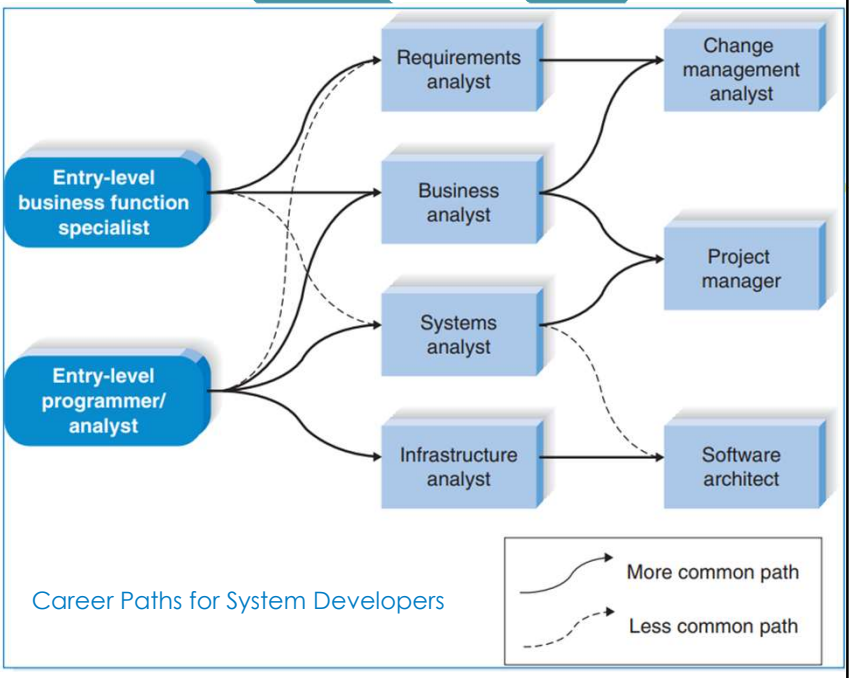
Some people may enter the field as a more technically-oriented programmer/analyst. Others may enter as a business-oriented functional specialist with an interest in applying IT to solve business problems.



Career Paths for System Developers

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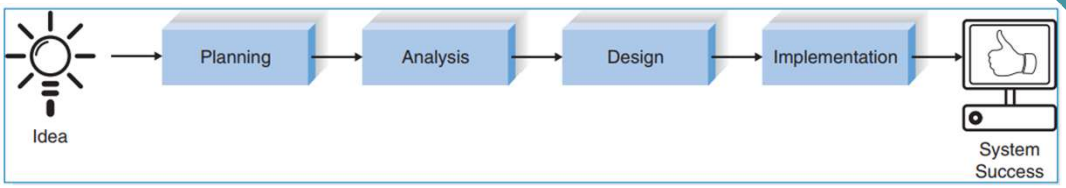
THE SYSTEMS DEVELOPMENT LIFE CYCLE



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Planning

The *planning phase* is the fundamental process of understanding *why* an information system should be built and determining how the project team will go about building it. It has two steps:

1. During *project initiation*, the system's business value to the organization is identified—how will it lower costs or increase revenues? Most ideas for new systems come from outside the IS area (from the marketing department, accounting department, etc.) in the form of a system request. A *system request* presents a brief summary of a business need, and it explains how a system that supports the need will create business value. The IS department works together with the person or department generating the request (called the *project sponsor*) to conduct a feasibility analysis. The *feasibility analysis* examines key aspects of the proposed project:
   - The technical feasibility (Can we build it?)
   - The economic feasibility (Will it provide business value?)
   - The organizational feasibility (If we build it, will it be used?)

   The system request and feasibility analysis are presented to an information systems *approval committee* (sometimes called a *steering committee*), which decides whether the project should be undertaken.
2. Once the project is approved, it enters *project management*. During project management, the *project manager* creates a *work plan*, staffs the project, and puts techniques in place to help the project team control and direct the project through the entire SDLC. The deliverable for project management is a *project plan* that describes how the project team will go about developing the system.

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Analysis

The *analysis phase* answers the questions of *who* will use the system, *what* the system will do, and *where* and *when* it will be used. (See Figure 1-3.) During this phase, the project team investigates any current system(s), identifies improvement opportunities, and develops a concept for the new system. This phase has three steps:

1. An *analysis strategy* is developed to guide the project team's efforts. Such a strategy usually includes a study of the current system (called the *as-is system*) and its problems, and envisioning ways to design a new system (called the *to-be system*).
2. The next step is *requirements gathering* (e.g., through interviews, group workshops, or questionnaires). The analysis of this information—in conjunction with input from the project sponsor and many other people—leads to the development of a concept for a new system. The system concept is then used as a basis to develop a set of business *analysis models* that describes how the business will operate if the new system were developed. The set typically includes models that represent the data and processes necessary to support the underlying business process.
3. The analyses, system concept, and models are combined into a document called the *system proposal*, which is presented to the project sponsor and other key decision makers (e.g., members of the approval committee) who will decide whether the project should continue to move forward.

The system proposal is the initial deliverable that describes what business requirements the new system should meet. Because it is really the first step in the design of the new system, some experts argue that it is inappropriate to use the term *analysis* as the name for this phase; some argue a better name would be *analysis and initial design*. Because most organizations continue to use the name *analysis* for this phase, we will use it in this book as well. It is important to remember, however, that the deliverable from the analysis phase is both an analysis and a high-level initial design for the new system.

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Design

The *design phase* decides *how* the system will operate in terms of the hardware, software, and network infrastructure that will be in place; the user interface, forms, and reports that will be used; and the specific programs, databases, and files that will be needed. Although most of the strategic decisions about the system are made in the development of the system concept during the analysis phase, the steps in the design phase determine exactly how the system will operate. The design phase has four steps:

1. The *design strategy* must be determined. This clarifies whether the system will be developed by the company's own programmers, whether its development will be outsourced to another firm (usually a consulting firm), or whether the company will buy an existing software package.
2. This leads to the development of the basic *architecture design* for the system that describes the hardware, software, and network infrastructure that will be used. In most cases, the system will add to or change the infrastructure that already exists in the organization. The *interface design* specifies how the users will move through the system (e.g., by navigation methods such as menus and on-screen buttons) and the forms and reports that the system will use.
3. The *database and file specifications* are developed. These define exactly what data will be stored and where they will be stored.
4. The analyst team develops the *program design*, which defines the programs that need to be written and exactly what each program will do.

This collection of deliverables (architecture design, interface design, database and file specifications, and program design) is the *system specification* that is used by the programming team for implementation. At the end of the design phase, the feasibility analysis and project plan are reexamined and revised, and another decision is made by the project sponsor and approval committee about whether to terminate the project or continue. (See Figure 1-3.)

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Implementation

The final phase in the SDLC is the *implementation phase*, during which the system is actually built (or purchased, in the case of a packaged software design and installed). This is the phase that usually gets the most attention, because for most systems it is the longest and most expensive single part of the development process. This phase has three steps:

1. System *construction* is the first step. The system is built and tested to ensure that it performs as designed. Since the cost of fixing bugs can be immense, testing is one of the most critical steps in implementation. Most organizations spend more time and attention on testing than on writing the programs in the first place.
2. The system is installed. *Installation* is the process by which the old system is turned off and the new one is turned on. There are several approaches that may be used to convert from the old to the new system. One of the most important aspects of conversion is the *training plan*, used to teach users how to use the new system and help manage the changes caused by the new system.
3. The analyst team establishes a *support plan* for the system. This plan usually includes a formal or informal post-implementation review, as well as a systematic way for identifying major and minor changes needed for the system.

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PROJECT IDENTIFICATION AND INITIATION

Where do project ideas come from?

→ *A project is identified when someone in the organization identifies a business need to build a system.*

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- BPM ***(Business Process Management)*** is a methodology used by organizations to continuously improve end-to-end business processes.
- BPM generally follows a continuous cycle of systematically creating, assessing, and altering business processes.
- Benefits by applying BPM:
  - Enhanced process agility
  - Improved process alignment with industry "best practices"
  - Increase process efficiencies

→**Project sponsor** is recognized

Including: marketing, accounting, or finance, or also members of the IT area

→ A **system request** is a document that describes the business reasons for building a system and the value that the system is expected to provide

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FEASIBILITY ANALYSIS

Feasibility analysis

- guides the organization in determining whether to proceed with the project.

- identifies the important risks associated with the project that must be managed if the project is approved

Include techniques to assess three areas: technical feasibility, economic feasibility, and organizational feasibility

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Technical Feasibility: Can We Build It?

- Familiarity with application: Less familiarity generates more risk.
- Familiarity with technology: Less familiarity generates more risk.
- Project size: Large projects have more risk.
- Compatibility: The harder it is to integrate the system with the company's existing technology, the higher the risk will be.

Economic Feasibility: Should We Build It?

- Development costs
- Annual operating costs
- Annual benefits (cost savings and/or increased revenues)
- Intangible benefits and costs

Organizational Feasibility: If We Build It, Will They Come?

- Project champion(s)
- Senior management
- Users
- Other stakeholders
- Is the project strategically aligned with the business?

Feasibility Analysis Assessment Factors

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Technical Feasibility: Technical feasibility analysis is, in essence, a *technical risk analysis* that strives to answer the question: "*Can* we build it?"
- Familiarity with the technology
- Project size
- The compatibility of the new system with the technology that already exists in the organization

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Economic Feasibility: also called a *cost–benefit analysis,* to answer the question "*Should* we build the system?"
- determined by identifying costs and benefits associated with the system,
- assigning values to them,
- calculating future cash flows, and
- measuring the financial worthiness of the project.

Result: the financial opportunities and risks of the project can be understood

Page 25-32

1. Identify Costs and Benefits	List the tangible costs and benefits for the project. Include both one-time and recurring costs.
2. Assign Values to Costs and Benefits	Work with business users and IT professionals to create numbers for each of the costs and benefits. Even intangibles should be valued if at all possible.
3. Determine Cash Flow	Forecast what the costs and benefits will be over a certain period, usually, three to five years. Apply a growth rate to the values, if necessary.
4. Assess Project's Economic Value	Evaluate the project's expected returns in comparison to its costs. Use one or more of the following evaluation techniques:
• **Return on Investment (ROI)**	Calculate the rate of return earned on the money invested in the project, using the ROI formula.
• **Break-Even Point (BEP)**	Find the year in which the cumulative project benefits exceed cumulative project costs. Apply the breakeven formula, using figures for that year. This calculation measures how long it will take for the system to produce benefits that cover its costs.
• **Net Present Value (NPV)**	Restate all costs and benefits in today's dollar terms (present value), using an appropriate discount rate. Determine whether the total present value of benefits is greater than or less than the total present value of costs.

Steps to Conduct an Economic Feasibility Analysis

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Organizational Feasibility: how well the system ultimately will be accepted by its users and incorporated into the ongoing operations of the organization, to answer the question "If we build it, will they come?"

	Role	To Enhance Organizational Feasibility
Champion	A champion: • Initiates the project • Promotes the project • Allocates his or her time to the project • Provides resources	• Make a presentation about the objectives of the project and the proposed benefits to those executives who will benefit directly from the system. • Create a prototype of the system to demonstrate its potential value.
Organizational Management	Organizational managers: • Know about the project • Budget enough money for the project • Encourage users to accept and use the system	• Make a presentation to management about the objectives of the project and the proposed benefits. • Market the benefits of the system, using memos and organizational newsletters. • Encourage the champion to talk about the project with his or her peers.
System Users	Users: • Make decisions that influence the project • Perform hands-on activities for the project • Ultimately determine whether the project is successful by using or not using the system	• Assign users official roles on the project team. • Assign users specific tasks to perform, with clear deadlines. • Ask for feedback from users regularly (e.g., at weekly meetings).

Important Stakeholders for Organizational Feasibility

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Case study: Appying the Concepts at Tune Source company

System Request for Tune Source

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System Request—Digital Music Download Project

Project Sponsor: Carly Edwards, Assistant Vice President, Marketing

Business Need: This project has been initiated to increase sales by creating the capability of selling digital music downloads to customers through kiosks in our stores, and over the Internet using our website.

Business Requirements: Using the Web or in-store kiosks, customers will be able to search for and purchase digital music downloads. The specific functionality that the system should have includes the following:

- Search for music in our digital music archive.
- Listen to music samples.
- Purchase individual downloads at a fixed fee per download.
- Establish a customer subscription account permitting unlimited downloads for a monthly fee.
- Purchase music download gift cards.

Business Value: We expect that Tune Source will increase sales by enabling existing customers to purchase specific digital music tracks and by reaching new customers who are interested in our unique archive of rare and hard-to-find music. We expect to gain a new revenue stream from customer subscriptions to our download services. We expect some increase in cross-selling, as customers who have downloaded a track or two of a CD decide to purchase the entire CD in a store or through our website. We also expect a new revenue stream from the sale of music download gift cards.

Conservative estimates of tangible value to the company include the following:

- $757,500 in sales from individual music downloads
- $950,000 in sales from customer subscriptions
- $205,000 in additional in-store or website CD sales
- $153,000 in sales from music download gift cards

Special Issues or Constraints:

- The marketing department views this as a strategic system. The ability to offer digital music downloads is critical in order to remain competitive in our market niche. Our music archive of rare and hard-to-find music is an asset that is currently underutilized.
- Many of our current loyal customers have been requesting this capability, and we need to provide this service or face the loss of these customers' business.
- Because customers have a number of music download options available to them elsewhere, we need to bring this system to market as soon as possible.

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FIGURE 1-6
Sales Projections for Tune Source Digital Music Download Project

Sales Projections				
	Individual Downloads	Subscriptions	Cross-Selling of CDs	Gift Cards
High-level estimate (prob. = 25%)	$900,000	$1,100,000	$250,000	$180,000
Medium-level estimate (prob. = 60%)	750,000	950,000	200,000	150,000
Low-level estimate (prob. = 15%)	550,000	700,000	150,000	120,000
Weighted average expected sales	$757,500	$950,000	$205,000	$153,000

For example, for individual downloads,

$$\begin{aligned}\text{Expected sales} &= (900{,}000 * .25) + (750{,}000 * .60) + (550{,}000 * .15)\\ &= 225{,}000 + 450{,}000 + 82{,}500\\ &= 757{,}500\end{aligned}$$

These projections are summarized in Figure 1-6.

After analyzing the survey results, Carly and her staff were confident that the sales projections and probability estimates were as accurate as they could make them this early in the project. The completed system request is shown in Figure 1-5.

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Feasibility Analysis Executive Summary for Tune Source

Figure 1-15 presents the executive summary page of the feasibility study: The report itself was about 10 pages long, and it provided additional detail and supporting documentation

Digital Music Download Project Executive Summary

Carly Edwards and Jason Wells created the following feasibility analysis for the Tune Source Digital Music Download Project. The System Request is attached, along with the detailed feasibility study. The highlights of the feasibility analysis are as follows:

Technical Feasibility

The Digital Music Download system is feasible technically, although there is some risk.

Tune Source's risk regarding familiarity with music download applications is moderately high.

- The Marketing Department has little experience with a subscription-based business model.
- The IT department has strong knowledge of the company's existing Web-based CD sales system, but it has not worked with music downloads or customer subscriptions.
- Numerous music download sites exist on the Internet.

Tune Source's risk regarding familiarity with the technology is moderately low.

- The IT department has knowledge of the current Web-based order entry system and the databases and Internet technology it uses.
- The IT department has no direct knowledge of the technology required to store and deliver digital music downloads; however, many of the technical issues will be the responsibility of the ISP.
- Consultants are readily available to provide help in this area.

The project size is considered medium risk.

- The project team will likely consist of 10 or fewer people.
- Business user involvement will be required.
- The project time frame is somewhat critical, since the system is needed to maintain our competitive position in the market.

The compatibility with Tune Source's existing technical infrastructure should be good.

- An Internet infrastructure is already in place at the retail stores and corporate headquarters.
- The ISP should be able to scale its services to accommodate the new Digital Music Download system.

Economic Feasibility

A cost-benefit analysis was performed; see attached spreadsheet for details (provided in Appendix 1A). Conservative estimates show that the Digital Music Download system has a good chance of significantly enhancing the company's bottom line.

ROI over 3 years: 280%
NPV over 3 years: $4,180,431
Break-even occurs after 0.17 years

Intangible Costs and Benefits
Improved customer satisfaction.
Enhanced competitive position through expansion of our brand into the music download market.

Organizational Feasibility

From an organizational perspective, this project has low risk. The top executives of the company have a strong interest in the project, and the project champion, Carly Edwards, is a respected and knowledgeable marketing executive.

The users of the system, Internet consumers and in-store kiosk users, are expected to appreciate the entry of Tune Source into the music download arena. Management at the stores may have some concern about lost CD sales; however, since customers have so many other options available for music downloads, this system may prevent our losing those customers to other digital music sources and may provide us with the opportunity to cross-sell those customers from our CD inventory.

Additional comments:

- The Marketing Department views this as a strategic system. This system will allow us to leverage our music archive and our well-established market position to establish a presence in the digital music download business. Our customers have been requesting such a capability, and we believe it will be well accepted.
- We should consider hiring a consultant with expertise in similar applications to assist with the project.
- We will need new staff to operate the system and potentially to provide customer service for subscribers and gift-card holders.

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Questions & Exercises

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Chapter 2: PROJECT SELECTION & MANAGEMENT

OBJECTIVES

- Explain how projects are selected in some organizations.
- Describe various approaches to the SDLC that can be used to structure a development project.
- Explain how to select a project methodology based on project characteristics.
- Become familiar with project estimation.
- Be able to create a project work plan.
- Describe project staffing issues and concerns.
- Describe and apply techniques to coordinate and manage the project.
- Explain how to manage risk on the project.

CHAPTER OUTLINE

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Project Selection

Ways to Classify Projects

Size	What is the size? How many people are needed to work on the project?
Cost	How much will the project cost the organization?
Purpose	What is the purpose of the project? Is it meant to improve the technical infrastructure? support a current business strategy? improve operations? demonstrate a new innovation?
Length	How long will the project take before completion? How much time will go by before value is delivered to the business?
Risk	How likely is it that the project will succeed or fail?
Scope	How much of the organization is affected by the system? a department? a division? the entire corporation?
Economic Value	How much money does the organization expect to receive in return for the amount the project costs?

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Creating the Project Plan

Once the project is launched by being selected by the approval committee, it is time to carefully plan the project

Project Methodology Options

- Waterfall Development, 2 variants
  - Parallel development method (evolved to address the lengthy time frame of waterfall development)
  - V-model (pays more explicit attention to testing)
- Rapid Application Development (RAD), 3 variants
  - Iterative development
  - System prototyping
  - Throwaway prototyping
- Agile Development
  - Extreme programming

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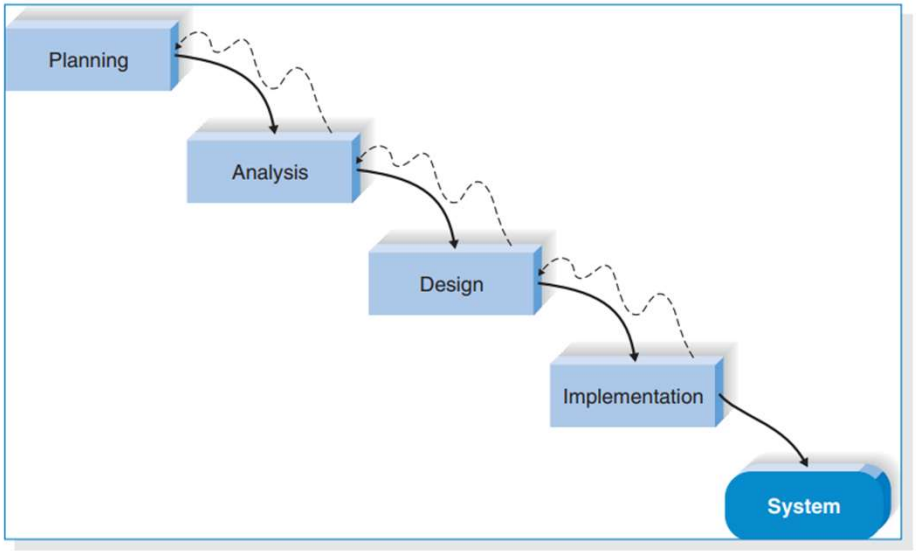

FIGURE 2-2
Waterfall Development

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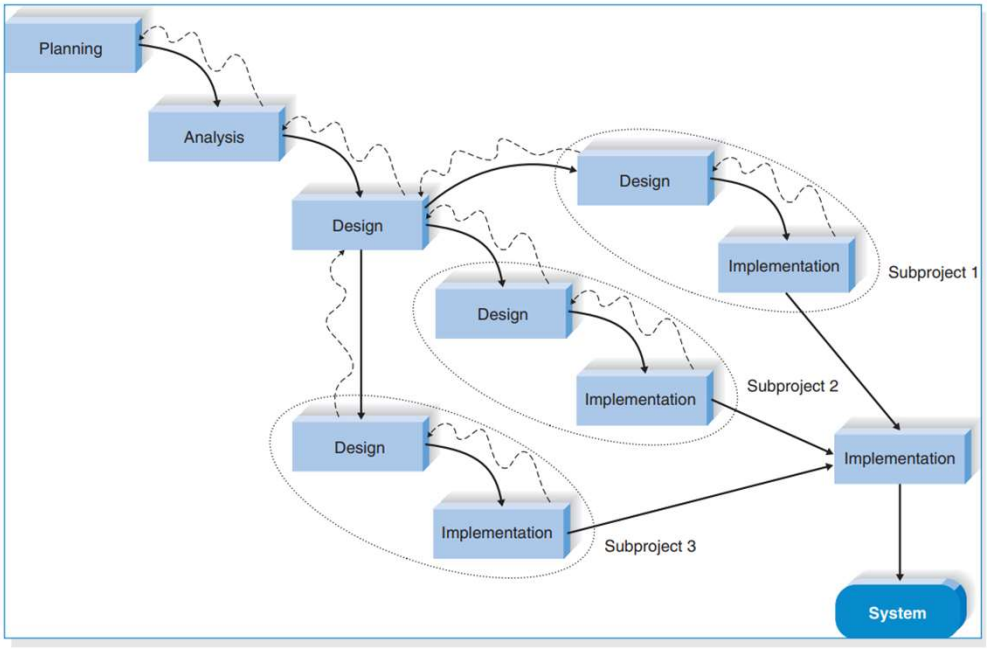

31 **FIGURE 2-3**
Parallel Development

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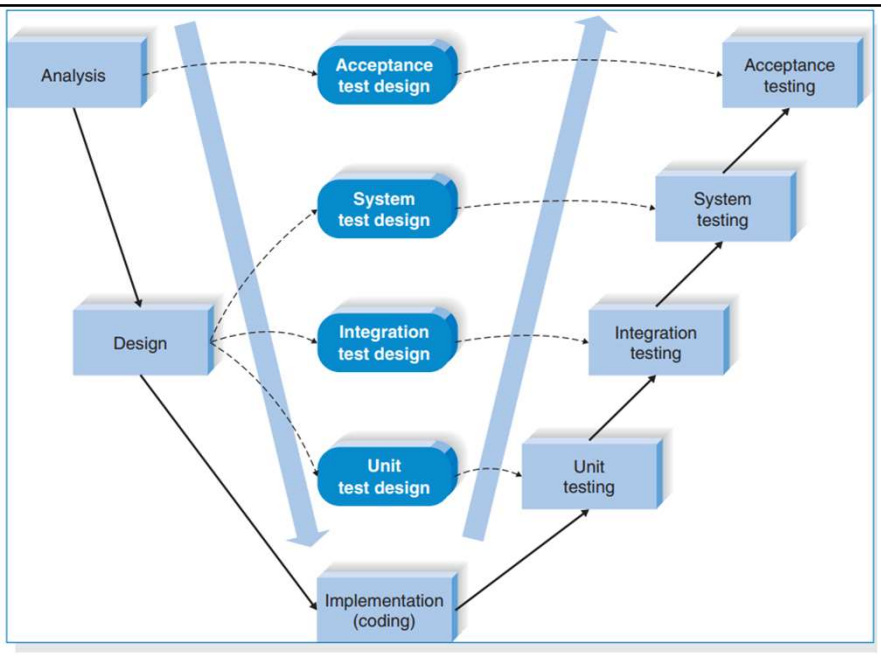

32 **FIGURE 2-4**
V-Model

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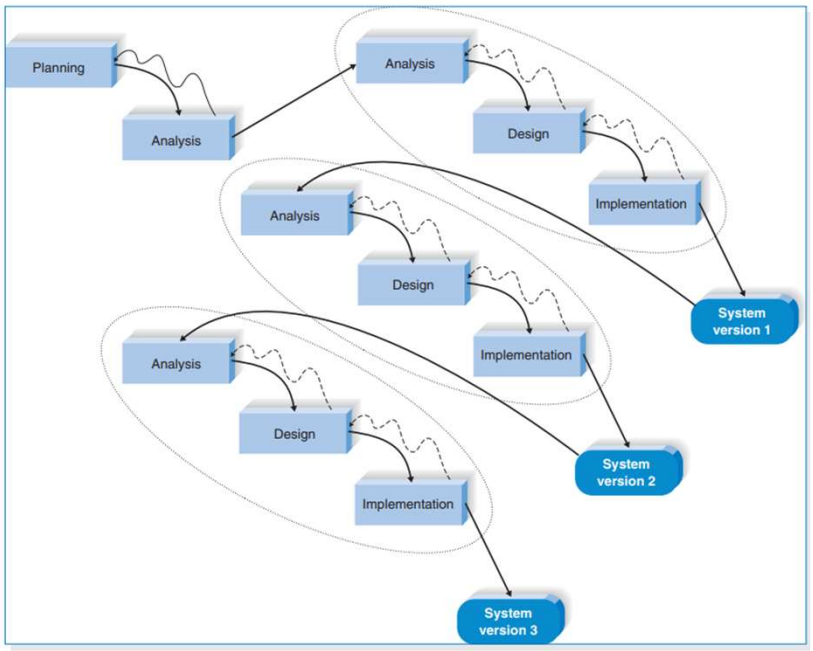

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FIGURE 2-5
Iterative Development

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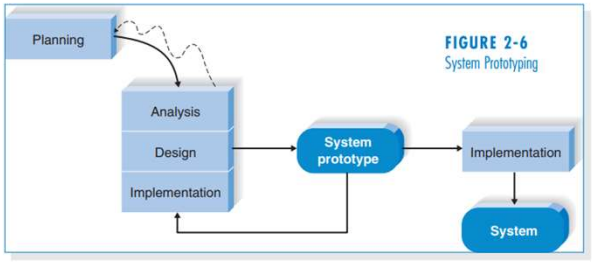

FIGURE 2-6
System Prototyping

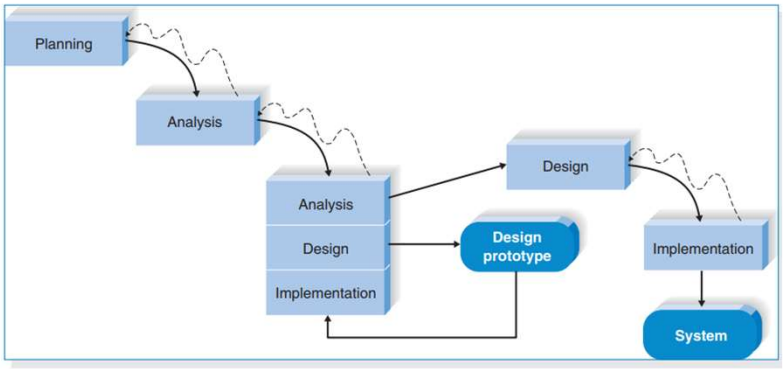

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FIGURE 2-7
Throwaway Prototyping

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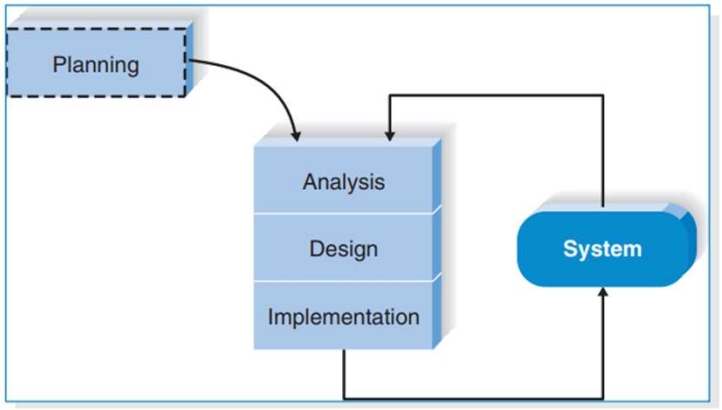

FIGURE 2-8
Extreme Programming

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Selecting the Appropriate Development Methodology

Usefulness in Developing Systems	Waterfall	Parallel	V-Model	Iterative	System Prototyping	Throwaway Prototyping	Agile Development
with unclear user requirements	Poor	Poor	Poor	Good	Excellent	Excellent	Excellent
with unfamiliar technology	Poor	Poor	Poor	Good	Poor	Excellent	Poor
that are complex	Good	Good	Good	Good	Poor	Excellent	Poor
that are reliable	Good	Good	Excellent	Good	Poor	Excellent	Good
with short time schedule	Poor	Good	Poor	Excellent	Excellent	Good	Excellent
with schedule visibility	Poor	Poor	Poor	Excellent	Excellent	Good	Good

FIGURE 2-9
Criteria for Selecting a Methodology

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Estimating the Project Time Frame

- Estimation is the process of assigning projected values for time and effort.
- Estimation can be performed manually or with the help of an estimation software package like Construx Estimate,TM Costar,TM or KnowledgePLAN® — there are over 50 available on the market
- There are two basic ways to estimate the time required to build a system.
  - The simplest method uses the amount of time spent in the planning phase to predict the time required for the entire project
  - A more precise approach to estimation is called the function point approach

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	Planning	Analysis	Design	Implementation
Typical industry standards for business applications	15%	20%	35%	30%
Estimates based on actual figures for first stage of SDLC	Actual: 4 person-months	Estimated: 5.33 person-months	Estimated: 9.33 person-months	Estimated: 8 person-months

SDLC = systems development life cycle.

Estimating Project Time Using Industry Standards

Task Information	Example
Name of the task	Perform economic feasibility
Start date	Jan 05, 2013
Completion date	Jan 19, 2013
Person assigned to the task	Project sponsor Mary Smith
Deliverable(s)	Cost–benefit analysis
Completion status	Complete
Priority	High
Resources needed	Spreadsheet software
Estimated time	16 hours
Actual time	14.5 hours

Task Information

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Developing the Work Plan

To create a work plan, the project manager identifies the tasks that need to be accomplished and determines how long each one will take. Then the tasks are organized within a work breakdown structure.

- Identify Tasks * (Fig. 2-12)
- The project work plan (Fig. 2-13)

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Staffing the Project

Staffing the project includes determining how many people should be assigned to the project, matching people's skills with the needs of the project, motivating them to meet the project's objectives, and minimizing project team conflict that will occur over time

Staffing Plan

1. The first step to staffing is determining the average number of staff needed for the project
2. Motivation : project managers need to motivate the people to make the project a success
3. Handling Conflict : The third component of staffing is organizing the project to minimize conflict among group members

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Coordinating Project Activities

1. CASE (*Computer-aided software engineering*) Tools
2. Standards
3. Documentation

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Managing and Controlling the Project

1. Refining Estimates
2. Managing Scope
3. Timeboxing
4. Management Risk

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