Essentials of Systems Analysis and Design

Fifth Edition

Joseph S. Valacich
Joey F. George
Jeffrey A. Hoffer

Chapter 1

The Systems Development Environment

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Learning Objectives

- ✓ Define information systems analysis and design
- ✓ Discuss the modern approach to systems analysis and design that combines both process and data views of systems
- ✓ Describe the role of the systems analyst in information systems development

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Learning Objectives (continued)

- ✓ Describe the information systems development life cycle (SDLC)
- ✓ List alternatives to the systems development life cycle, including a description of the role of computer aided software engineering (CASE) tools in systems development

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Chapter Preview

Systems Analysis is a proven method to help a business utilize information to its fullest capacity

Systems Development Life Cycle (SDLC) Central to Information Systems Development

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

What is Information Systems Analysis and Design?

A method used by companies to create and maintain systems that perform basic business functions

Main goal is to improve employee efficiency by applying software solutions to key business tasks

A structured approach must be used in order to ensure success

* The 1st subphase in the design is to create the architecture
* The last subphase is the writing the algorithms for the system.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

What is Information Systems Analysis and Design? (continued)

Systems Analysts perform analysis and design based upon:

1- Understanding of organization's objectives, structure and processes

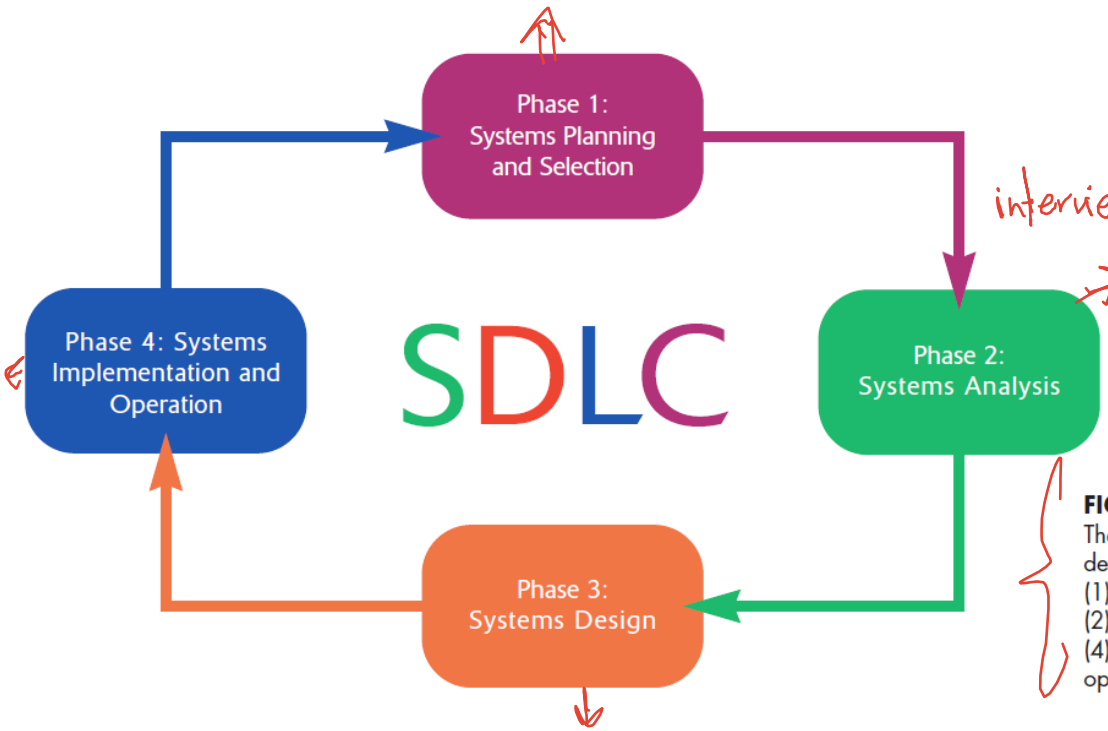
2 Knowledge of how to exploit information technology for advantage

Fig 1-1 illustrates the Systems Development Life Cycle, a four-phased approach used throughout this text

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

* Every phase has an input + output.
* The output of the current phase is the input for the next phase.

feasability study. Then select the optimal selection.



interview the custumer and write down the requirments. and validation of the requirements.

Implementing the sudo code to actual code.

FIGURE 1-1
The four steps of the systems development life cycle (SDLC): (1) planning and selection, (2) analysis, (3) design, and (4) implementation and operation.

writing the sudo code for the system.

1.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Systems Analysis and Design: Core Concepts

Major goal: to improve organizational systems by developing or acquiring application software and training employees in its use

Application software, or a system, supports organizational functions or processes

1.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Systems Analysis and Design: Core Concepts (continued)

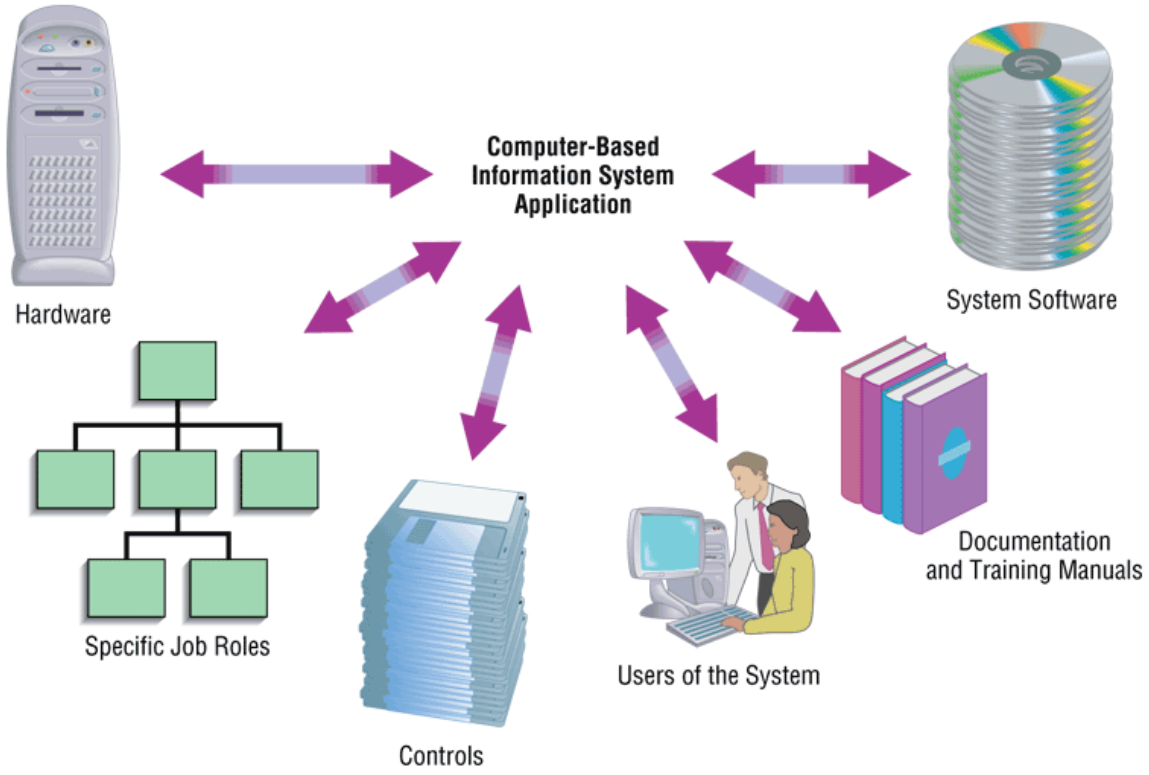
System: Turns data into information and includes:

- Hardware and system software
- Documentation and training materials
- Job roles associated with the system
- Controls to prevent theft or fraud
- The people who use the software to perform their jobs

Figure 1.2 illustrates all the components of a system

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Figure 1.2 Components of a Computer-Based Information System Application



1. Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Software Engineering Process

A process used to create an information system

Consists of:

Methodologies

A sequence of step-by-step approaches that help develop the information system

Techniques

- تشاكل

Processes that the analyst follows to ensure thorough, complete, and comprehensive analysis and design

Tools

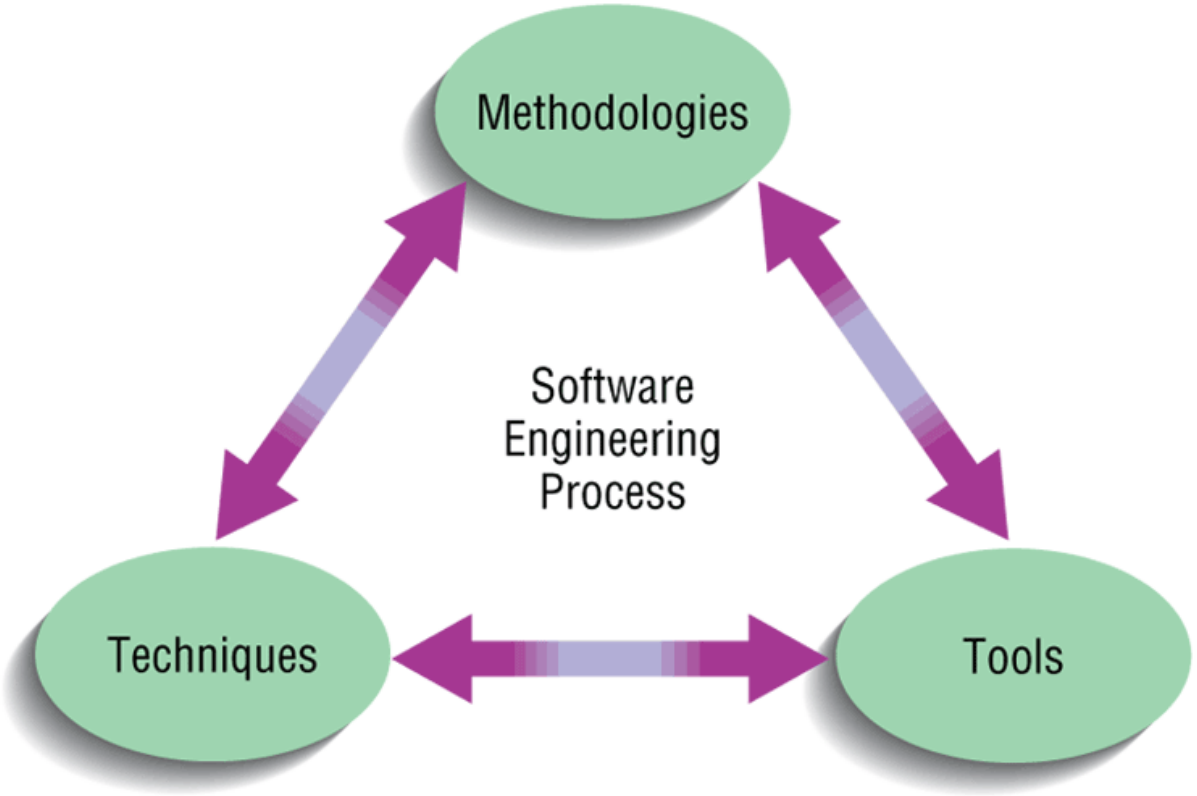
واسع الإدراك.

Computer programs that aid in applying techniques

1.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Figure 1.3 The software engineering process uses methodologies, techniques, and tools.



1.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

System

A system is an interrelated set of business procedures used within one business unit working together for a purpose
A system has nine characteristics
A system exists within an environment
A boundary separates a system from its environment

1.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

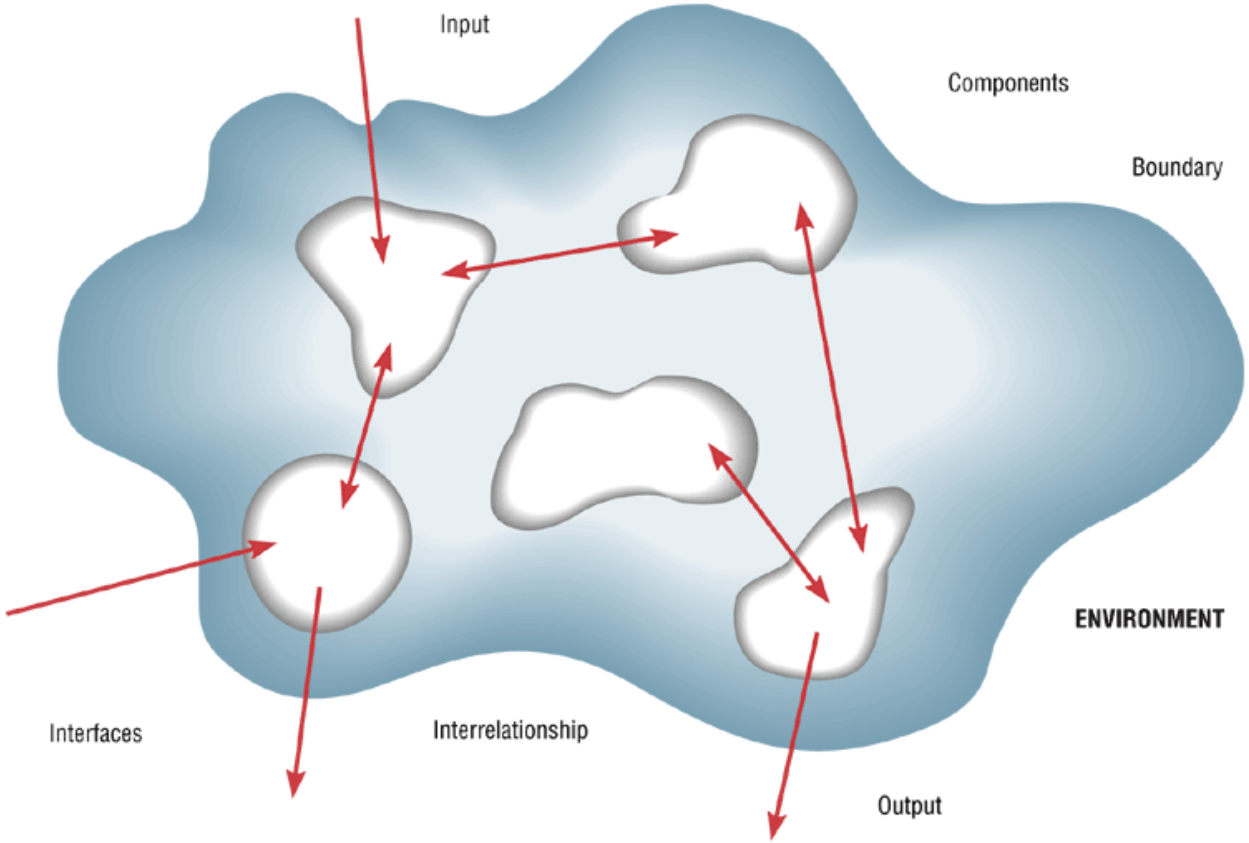
Characteristics of a System

Components ⇒ depends on size and complexity of a system
Interrelated Components
Boundary
Purpose
Environment
Interfaces
Constraints
Input
Output

1.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Figure 1.4 Seven Characteristics of a System



1.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Important System Concepts

cohesion and coupling.
↓ high ↓ low

{ losely coupled, highley cohesion. }

Decomposition

The process of breaking down a system into smaller components, but make sure the relationship as less as possible.

Allows the systems analyst to:

- Break a system into small, manageable and understandable subsystems
- Focus on one area at a time, without interference from other areas
- Concentrate on component pertinent to one group of users without confusing users with unnecessary details
- Build different components at independent times and have the help of different analysts

1.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

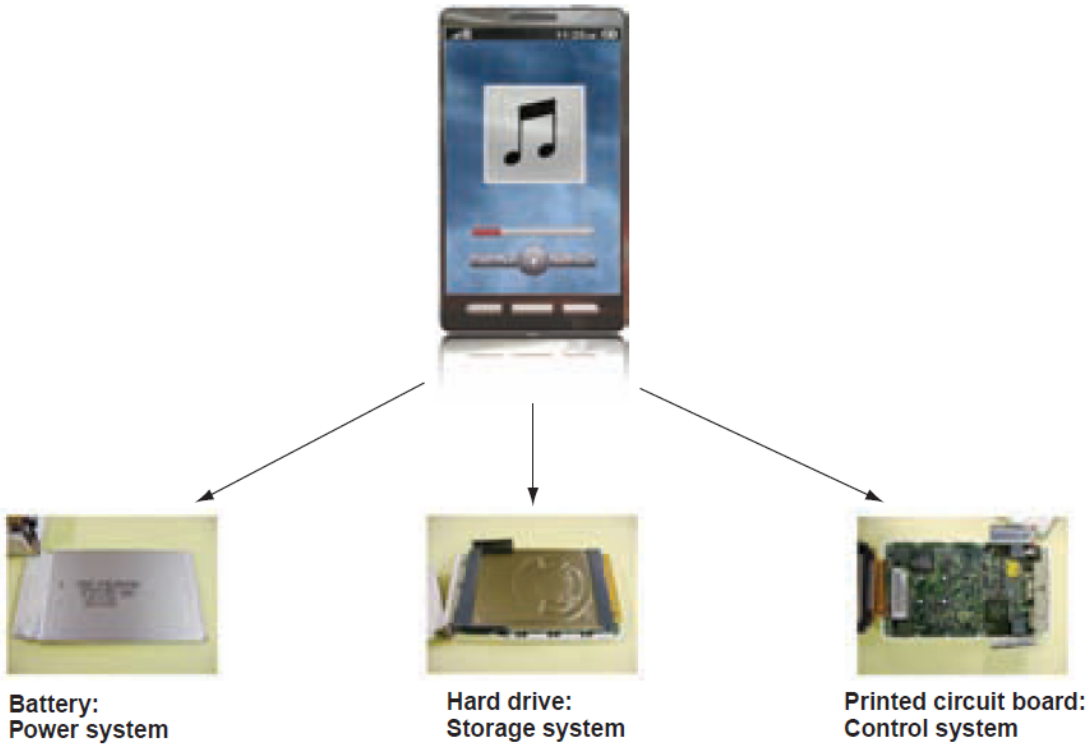


FIGURE 1-6
An MP3 player is a system with power supply, storage and control subsystems.

Sources: Shutterstock; ©Harald van Arkel/Chipmunk International;

1.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Important System Concepts (continued)

Modularity

Process of dividing a system into modules of a relatively uniform size

Modules simplify system design

Coupling

Subsystems that are dependent upon each other are coupled

Cohesion ⇒ The relationship b/w components inside a Component.

Extent to which a subsystem performs a single function

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

A Modern Approach to Systems Analysis and Design

Systems Integration

- Allows hardware and software from different vendors to work together
- Enables procedural language systems to work with visual programming systems
- Visual programming environment uses client/server model

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Your Role in Systems Development

Study problems and needs of an organization

Determine best approach to improving organization through use of:

- People
- Methods
- Information technology

Help system users and managers define their requirements for new or enhanced information systems

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Developing Information Systems and the Systems Development Life Cycle

Systems Development Methodology

A standard process followed in an organization to conduct all the steps necessary to

analyze
design
implement
and maintain information systems.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Developing Information Systems and the Systems Development Life Cycle (continued)

Systems Development Life Cycle

Series of steps used to manage the phases of development for an information system

Consists of four phases:

- Planning and Selection 1
- Analysis 2
- Design 3
- Implementation and Operation 4

↳ testing and maintenance.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Developing Information Systems and the Systems Development Life Cycle (continued)

Phases are not necessarily sequential
Each phase has a specific outcome and deliverable
Every company customizes the life-cycle model to its individual needs

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Phases of the Systems Development Life Cycle

1. Systems Planning and Selection

   Two Main Activities

   - Identification of need
   - Investigation and determination of scope

2. Systems Analysis

   Study of current procedures and information systems

   - Determine requirements
   - Generate alternative designs
   - Compare alternatives
   - Recommend best alternative

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Phases of the Systems Development Life Cycle (continued)

3. System Design

Logical Design ⇒ Diagrams are built.

Concentrates on business aspects of the system

Physical Design

built it on the device

Technical specifications → fully detailed.

4. System Implementation and Operation

Implementation

Hardware and software installation

Programming ⇒ writing the code.

User Training

Documentation ⇒ Must be upto date.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Phases of the Systems Development Life Cycle (continued)

System Implementation and Operation (continued)

System changed to reflect changing conditions

System obsolescence

النظام يصل الى مرحلة غير قابل للتعديل.

the system can't be updated anymore.

- Legacy System

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Alternative Approaches to Development

Prototyping

Building a scaled-down working version of the system

Advantages:

Users are involved in design ⇒ when the customer tries the prototyped system.

Captures requirements in concrete form

↳ No misunderstanding involved.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Alternative Approaches to Development (continued)

Computer-Assisted Software Engineering (CASE) Tools

- Automated software tools used by systems analysts to develop information systems
- Can be used throughout SDLC
- Product and tool integration is provided through a repository

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Alternative Approaches to Development (continued)

* Examples of Tools :-

General types of CASE tools

- Diagramming tools
- Computer display and report generators
- Analysis tools
- Repository
- Documentation generators
- Code generators

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Alternative Approaches to Development (continued)

Joint Application Design (JAD)

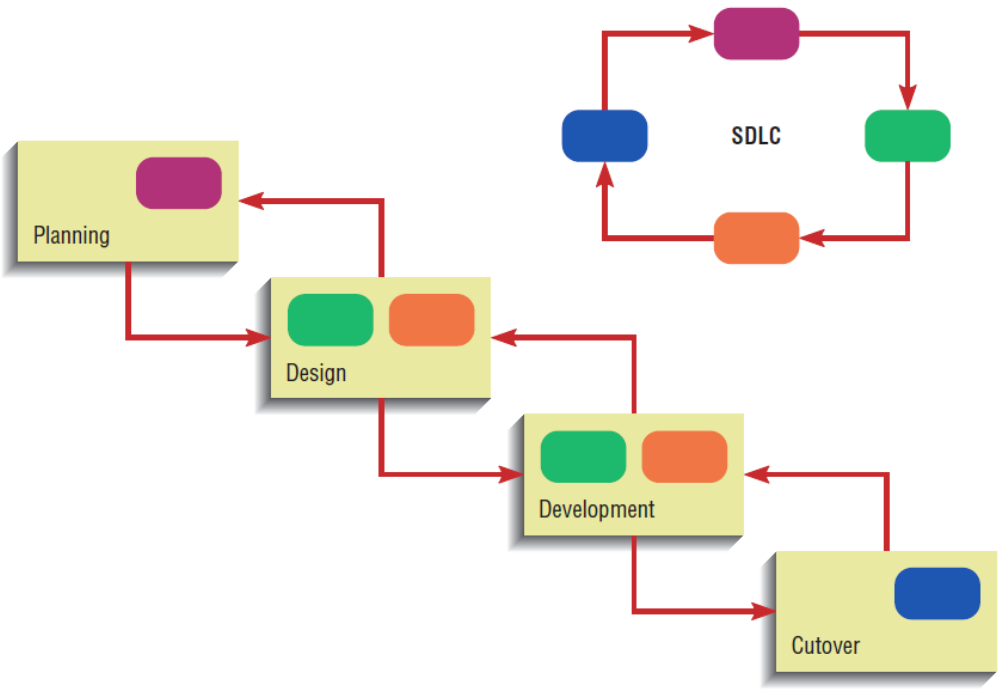
- Users, Managers and Analysts work together for several days
- System requirements are reviewed
- Structured meetings

Rapid Application Development (RAD)

- Utilizes prototyping to delay producing system design until after user requirements are clear

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

FIGURE 1-13
RAD systems development life cycle compared to standard SDLC.



1.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Approaches to Development (continued)

Participatory Design (PD)

Emphasizes role of the user ⇒ structured meeting.

Entire user community can be involved in design

Agile Methodologies

Focuses on

- Adaptive methodologies ⇒ تعديل حسب طلب العميل.
- People instead of roles
- Self-adaptive development process

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Summary

Information systems analysis and design

- Process of developing and maintaining an information system

Modern approach to systems analysis

- Process-oriented
- Data-oriented

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Summary (continued)

Role of Systems Analyst

Systems Development Life Cycle (SDLC)

- Systems Planning and Selection
- Systems Analysis
- Systems Design
- Systems Implementation

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Summary (continued)

Alternatives to Systems Development Life Cycle

- Prototyping
- Rapid Application Development (RAD)
- CASE
- Joint Application Design (JAD)
- Participatory Design (PD)
- Agile Methodologies

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. Printed in the United States of America.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Essentials of Systems Analysis and Design

Fifth Edition

Joseph S. Valacich
Joey F. George
Jeffrey A. Hoffer

Chapter 2

The Sources of Software

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Learning Objectives

Understand outsourcing

Describe six different sources of software

Discuss how to evaluate off-the-shelf software

Discuss reuse and its role in software development

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Sources of Software

- Information technology service firms
- Packaged software providers
- Vendors of enterprise solutions software (ERP)
- Cloud computing providers
- Open-source software solutions
- Build it yourself

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Outsourcing

- Practice of turning over some or all responsibility for information systems applications and operations to another firm.

  موشرط يكون كامل، يمكن يكون جزئية.

- Examples:
  - Outsourcing firm develops and runs applications on their computers (Payroll application)
  - Outsourcing firm runs applications at your site on your computers.
- Why would an organization do this?
- Reasons to outsource
  - Cost effective
  - Not a core competency of many businesses ⇒ قدرات الموظفين لا تؤهلهم.
  - Overcome organizational problems in information systems unit
- Needs to be considered during systems analysis

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Information Technology Service Firms

متى نلجأ لل firms ؟

- Utilize when
  - Organization lacks resources to develop in-house
  - Suitable off-the-shelf solution is not available
- Develop custom information systems
- Develop, host and run applications
- Can provide domain expertise ⇒ شخص خبير بالمجال اللذي تريده.
- IT Service firms employ consultants with domain-specific experience
- See Table 2-1 for a list of top 10 firms

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Packaged Software Producers

= off the shelf =

- Produce pre-packed or off the shelf systems
  - MS Project, Intuit QuickBooks,
- Products range from broad-based packages (MS Office) to industry specific packages (AP/AR)

  تقدم اكبر قدر من الناس

  موجهة لشريحة معينة من الناس
- Off-the-shelf software can meet up to 70% of an organization's needs.
- Two types of software
  - Turnkey – not modified, one size fits all
  - Non-turnkey – modified by vendor to meet great portion of user needs → when there is a feedback from the customers.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Enterprise Solutions Software

- Enterprise Resource Planning (ERP) Systems
- Consist of a series of integrated modules
  - Accounting
  - Distribution
  - Manufacturing
  - Human Resources

* Combines different types of systems eg: accounting, production, etc into one whole system

يركز على العمليات التجارية بدلاً من المجالات الوظيفية

- Integrated to focus on business processes rather than business functional areas
  - Enables an organization to integrate all parts of a business process in a unified information system
  - E.g. - All aspects of an order transaction occur seamlessly in single information system

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Enterprise Solutions Software

- Benefits
  - Single repository for all aspects of a business process
    - Ensures more consistent and accurate data
    - Less maintenance
  - Flexibility of modules
    - Additional modules can be added as needed
    - Immediately integrated into existing system
- Disadvantages
  - Complexity and time of implementation ⇒ لانه حجمه كبير ، لهذا بده وقت اكثر
  - Reliance upon consultants
  - Often, organizations must change the way that they do business in order to use systems
- ERP vendors
  - SAP AG, Oracle Corp

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Cloud Computing

الدفع مقابل خدمة

- Pay for use (software as a service): dynamically rent software from third party providers (runs on remote servers = the cloud)
- Pay for service: Applications bought, installed and maintained by service provider
- Pay for platform (hardware as a service): dynamically rent platform and manage your own virtual data centre
- Applications accessed through the Internet (VPN)
- Users pay per-use or month-to-month license
- Some examples:
  - Google Apps
  - Salesforce.com
  - Amazon cloud

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Cloud Computing

- Predicted that by 2013, 12% of world's computing will be done by cloud computing (source: Merrill Lynch)
  - Total market of $160 billion
- Benefits:
  - Freeing internal IT staff
  - Faster access to applications than internal development
  - Lower-cost access to corporate-quality applications
- Concerns
  - Reliability
  - Security of information
  - Compliance with government regulations

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Open-Source Software

- Freely available
- Includes source-code
- Maintained by a group of interested individuals
- Some examples
  - Linux
  - Firefox
  - mySQL

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

In-House Development

In-House Development

- Complete system
- Hybrid systems
  - Off the shelf PLUS custom code

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Choosing Off-the-Shelf Software

Criteria

- Cost / Benefit - In-house versus purchase
- Functionality ⇒ All the functions i want in the system are available.
- Vendor Support ⇒ maintenance of the system, after purchase.
- Viability of Vendor ⇒ reputation of the vendor, or even does the vendor exist.
- Flexibility ⇒ not expensive maintenance, able to work with the systems in the organization.
- Documentation ⇒
- Response Time ⇒ The total time of the transactions
- Ease of Installation

Quiz on Thursday.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Validating Purchased Software Information

Information from vendor ⇒ معلومات من المزود .

- Documentation
- Marketing literature ⇒ للمعة المزود في انتاج الأنظمة .
- Questionnaire ⇒ تسأل اسئلة .

Request for Proposal (RFP) ⇒ طلب عرض من المزود من اجل إقناع العميل .

Software Test drive ⇒ Test cases already written to test the system.

Feedback from other users

Independent software testing services

استاجار ناس معينة من اجل عمل اختبار النظام . ⇒

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Reuse

Use of previously written software resources in new applications

Most often applied to object-oriented and component-based development

Reuse of object classes

- Increases productivity
- Reduces defect density
- Reduces rework

Advantages.

يقلل من كثافة الأخطاء.

Reuse plan must be matched with companies strategic business goals

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

* Important
Explain one of the approaches:-

Reuse

Four Approaches

1. Ad hoc Reuse ⇒ The developer decided to reuse. the industry didn't force him.
2. Facilitated Reuse ⇒ The organization incourage the developer to make reusabe system.
3. Managed Reuse ⇒
4. Designed Reuse ⇒

الموسسة من البداية تشتغل على ال reusability.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Essentials of Systems Analysis and Design
Fifth Edition

Joseph S. Valacich
Joey F. George
Jeffrey A. Hoffer

Chapter 3
Managing the Information Systems Project

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Learning Objectives

Discuss skills required to be an effective project manager
Describe skills and activities of a project manager during project initiation, planning, execution and closedown
Discuss critical path scheduling
Explain Gantt Charts and Network Diagrams
Review commercial project management software packages

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Pine Valley Furniture

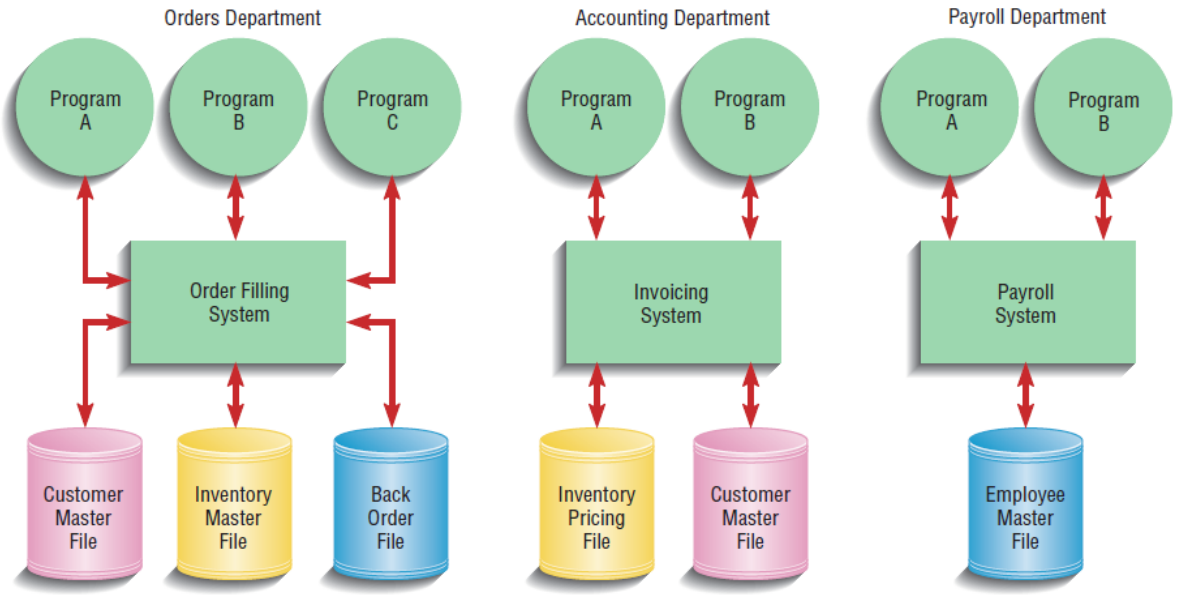
Manufacturing Company

- Product: Wood Furniture
- Market: United States
- Organized into functional areas
  - Manufacturing
  - Sales
- Three independent computer systems were converted to a database in 1990s

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

FIGURE 3-2
Three computer applications at Pine Valley Furniture: order filling, invoicing, and payroll.

Source: Hoffer, Ramesh, and Topi, 2011.



Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Managing the Information Systems Project

Goal

Focus of Project Management

- To assure that information system projects meet customer expectations
- Delivered in a timely manner
- Meet constraints and requirements

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Managing the Information Systems Project (continued)

Project Manager

Systems Analyst responsible for

- Project initiation
- Planning
- Execution
- Closing down

Requires diverse set of skills

- Management → resource managment.
- Leadership
- Technical
- Conflict management
- Customer relations

↳ feedback from the customers.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Image not Available.

* check from PC.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Project Management Process

Project

Planned undertaking of related activities to reach an objective that has a beginning and an end

Four Phases

Initiating
Planning
Executing
Closing down

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Initiating the Project

There is still no requirements from the customer.

order is important

1. Establish the project initiation team → team members.
2. Establish a relationship with the customer
3. Establish the project initiation plan → when to start, plan, time, project scope.
4. Establish management procedures → assign jobs / roles to the team members and team members communication
5. Establish the project management environment and workbook → file / website page available for the customers and developers. like main points, funds, team members etc.
6. Develop the project charter

tools to use while developing the project

like a contract. High level document.
No technical details. Duration time. Contacts, title of the Project, description of the objectives of the project. stakeholders

Scope:
description about the project.

Question: design a project charter

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Planning the Project

1. Describe project scope, alternatives and feasibility → And feasibility study of the choosen alternative ↳ alternative solutions.

   Scope and Feasibility
   - Understand the project
   - What problem is to be addressed → why developing this project?
   - What results are to be achieved
   - Measures of success (الأهداف التي حققتها.)
   - Completion criteria

2. Divide the project into manageable tasks

   - Work breakdown structure
   - Gantt chart

(سهلة التنفيذ ليست طويلة.)

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Planning the Project (continued)

People, hardware, software.

3- Estimate resources and create a resource plan.

4- Develop a preliminary schedule for the tasks.

- Utilize Gantt Charts and Network Diagrams

5. Develop a communication plan

- Outline communication processes among customers, team members and management
- Define types of reports and their distribution
- Determine frequency of reports

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Table 3-2:

Not available

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Planning the Project (continued)

لازم يتوافقوا مع بعض

International standards
National standard
Organization standard
Project standard.

المعايير

6. Determine project standards and procedures
   - Specify how deliverables are tested and produced
7. Identify and assess risk
   - Identify sources of risk
   - Estimate consequences of risk
8. Create a preliminary budget

→ what kinds of risks we will face?
- Risks will be predicted.
eg:- one of the developers got sick.
- make assesment of the risks i.e how to fix this risk.
→ prioritize of risk. The risk which is catastrophic will be fixed first.

eg:- cost estimation.

تحديد الميزانية للمشروع.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Planning the Project (continued)

(Output of the Planning phase.)

9. Develop a project scope statement
   - Describe what the project will deliver
10. Set a baseline project plan
   - Estimate of project's tasks and resources

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

3rd Phase

Executing the Project

start the development of the Project.

1. Execute baseline project plan
   - Acquire and assign resources
   - Train new team members
   - Keep project on schedule
2. Monitor project progress
   - Adjust resources, budget, and/or activities

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Executing the Project (continued)

3. Manage changes to baseline project plan
   - Slipped completion dates → Delay in delivering the project.
   - Bungled activity that must be redone
   - Changes in personnel
   - New activities

tasks developed in a wrong way.

4. Maintain project workbook → must be uptodate.
5. Communicate project status

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

4th Phase.

Closing Down the Project

1. Termination
   - Types of termination:
     - Natural
       - Requirements have been met
     - Unnatural
       - Project stopped
   - Documentation
   - Personnel Appraisal

Question in exam.: Importorta,

1) We put an assumption that is false.
2) Running out of time / money.
3) The requirements are not adequate.

↳ Evaluation of developers.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Closing Down the Project (continued)

2. Conduct post-project reviews
   - Determine strengths and weaknesses of
     - Project deliverables
     - Project management process
     - Development process
3. Close customer contract

Quiz on Thursday. Till this slide

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Representing and Scheduling Project Plans

* إذا كان complex system ما بتقدر تستخدم الـ Gantt chart .
* هو مناسب لـ simple system .

Gantt Charts

- Useful for depicting simple projects or parts of large projects
- Show start and completion dates for individual tasks

Network Diagrams

بهتم بترتيب الـ activities .

- Show order of activities

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Image not available

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Comparison of Gantt Charts and Network Diagrams

Gantt Charts

- Visually show duration of tasks
- Visually show time overlap between tasks
- Visually show slack time

التداخل

critical path: الوقت اللي ما بصير اتأخر عشان انفذ ال tasks او المشروع.

* ال slack هو الوقت إذا اتأخرت شوي ما راح يأثر على ال critical path.

Network Diagrams

Visually show dependencies between tasks

Visually show which tasks can be done in parallel

Show slack time by data in rectangles

* There may be more than critical path in Gantt chart.

* In some cases, all the paths may be critical

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Representing Project Plans

Network diagramming is a critical path scheduling technique

Used when tasks

1 Are well-defined and have a clear beginning and end point
2 Can be worked on independently of other tasks → No dependency b/w tasks.
3 Are ordered
4 Serve the purpose of the project

Major strength is ability to show how completion times vary by activity

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Gantt Chart and Network Diagram for Pine Valley Furniture

Steps

1. Identify each activity
   - Requirements collection T_1
   - Screen design T_2
   - Report design T_3
   - Database construction T_4
   - User documentation creation T_5
   - Software programming T_6
   - Installation and testing T_8

T_7

*Determination of time depends on the experience of the System Analyst that is the project manager.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Gantt Chart and Network Diagram for Pine Valley Furniture (continued)

2. Determine time estimates and expected completion times for each activity

الوقت المثالي.
optimistic

الوضع الحقيقي.
realistic

اسوء الحالات
pesimistic

ACTIVITY	TIME ESTIMATE (in weeks) o	r	p	EXPECTED TIME (ET) $\frac{o+4r+p}{6}$
1. Requirements Collection	1	5	9	5
2. Screen Design	5	6	7	6
3. Report Design	3	6	9	6
4. Database Design	1	2	3	2
5. User Documentation	3	6	7	5.67
6. Programming	4	5	6	5
7. Testing	1	3	5	3
8. Installation	1	1	1	1

According to this equation.

From experience

FIGURE 3-23
Estimated Time Calculations for the SPTS Project

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Gantt Chart and Network Diagram for Pine Valley Furniture (continued)

- Determine sequence of activities

Preceding activity:

يعني ح في task لازم نشتغلها قبل هذه ال task.

determined by the project manager.

* إذا وصلت ال Preceding activities بقدر ارسم ال Gantt chart.

* الباتات اللي مش عليها critical ممكن يكون عندها slack.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Gantt Chart and Network Diagram for Pine Valley Furniture (continued)

- Determine the critical path
  Sequence of events that will affect the final project delivery date

ES → first activity = 0

EF = ES + duration.

LF → last activity = EF

LS = LF - duration

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

— On Tuesday Quiz only on Gantt chart —

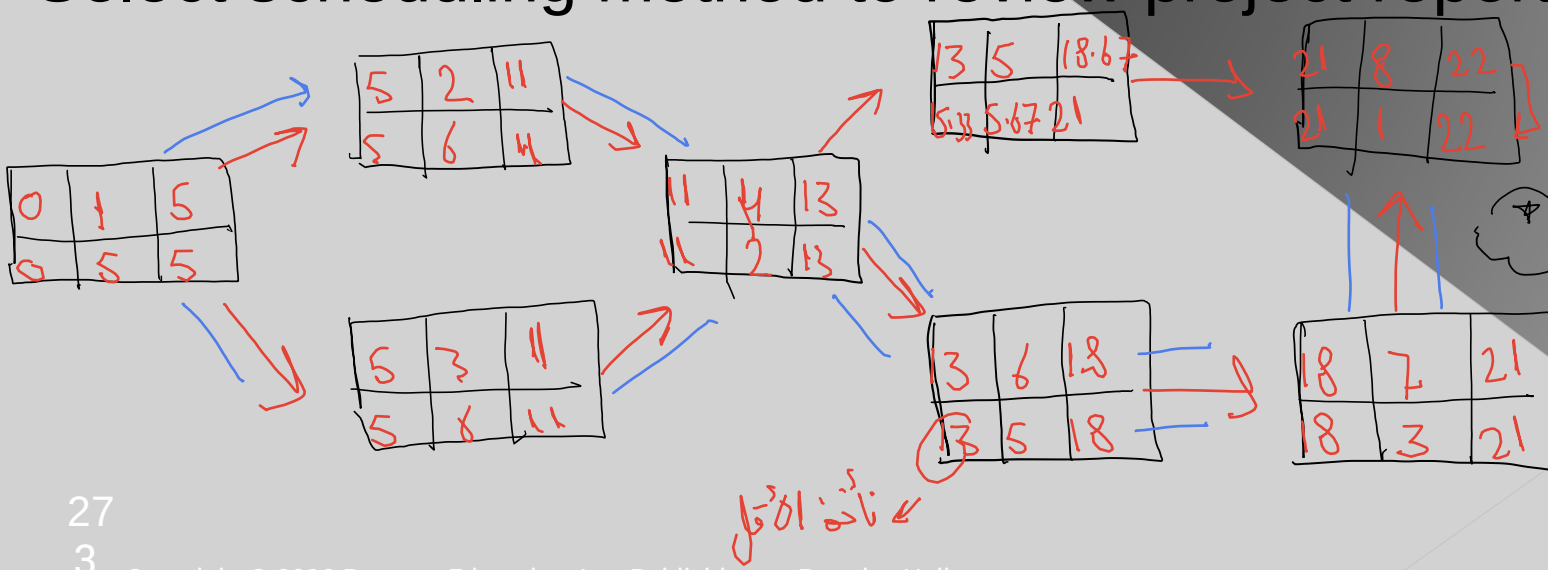
Commercial Project Management Software

Many systems are available

Three activities are required:

- Establish project start or end date
- Enter tasks and assign task relationships
- Select scheduling method to review project reports

* When forward take the largest..
* When backward take the smallest
* When ES and EF = LS and LF, it is on the critical path.



* in blue = critical path.

* Slack = LF - EF
= LS - ES

3.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Summary

Skills of An Effective Project Manager
Activities of Project Manager
- Initiation
- Planning
- Execution
- Close down

Gantt Charts and Network Diagrams
Commercial PM Software

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. Printed in the United States of America.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Essentials of Systems Analysis and Design
Fifth Edition

Joseph S. Valacich
Joey F. George
Jeffrey A. Hoffer

Chapter 4
Systems Planning and Selection

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Learning Objectives

Describe the steps involved when identifying and selecting projects and initiating and planning projects

Discuss the content of and need for a project scope statement and baseline project plan

Describe various methods for accessing project feasibility

1- Ranking of potential projects.

Steps for choosing the project:

1- identifying and selecting projects

2. classify and rank project development.

3- selecting the project.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Learning Objectives (continued)

Explain intangible and tangible costs and benefits
Explain recurring and one-time costs
Describe various methods of cost/benefit analysis
Describe a structured walkthrough

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Identifying and Selecting Projects

→ may be taken or not.

Sources of Projects → 3 sources of potential projects

- Managers and business units
  to gain more information or provide new services
- Managers
  to make a system more efficient, less costly, or want a new operating environment
- Formal planning groups
  to improve an existing system in order to help the organization meet its corporate objectives

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Identifying and Selecting Projects (continued)

1. Projects are identified by
   - Top management → strategic organizational focus = خدمة الاستراتيجية الشركة
   - Steering committee
   - User departments ⇒ Narrow tactical focus.
   - Development group or senior IS staff

إذا طلبوا مشروع . بحيث الحجم

cross-functional focus.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Identifying and Selecting Projects (continued)

- Top-Down identification
  - Senior management or steering committee
  - Focus is on global needs of organization
- Bottom-up identification
  - Business unit or IS group
  - Don’t reflect overall goals of the organization

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Identifying and Selecting Projects (continued)

2. Classify and rank development projects
3. Select development projects

Factors:

- Perceived needs of the organization
- Existing systems and ongoing projects
- Resource availability
- Evaluation criteria
- Current business conditions
- Perspectives of the decision makers

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Factors.

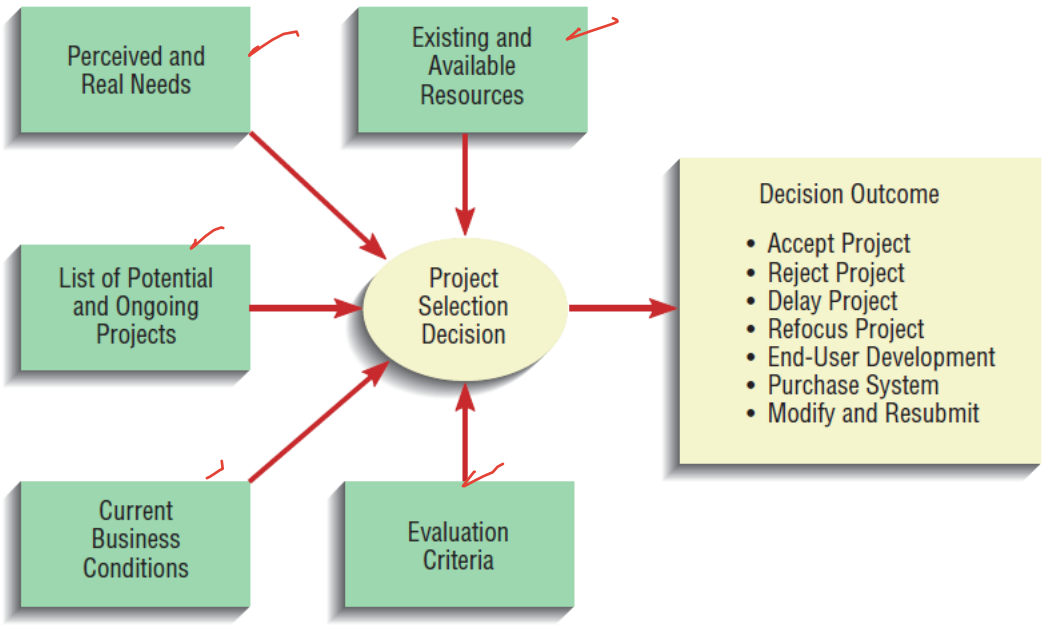


FIGURE 4-3
Numerous factors must be considered when selecting a project. Decisions can result in one of seven outcomes.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Identifying and Selecting Projects (continued)

Deliverables and Outcomes

- Primary deliverable of this phase is a schedule of specific IS development projects
- Incremental commitment
  - Continuous reassessment of project after each phase

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

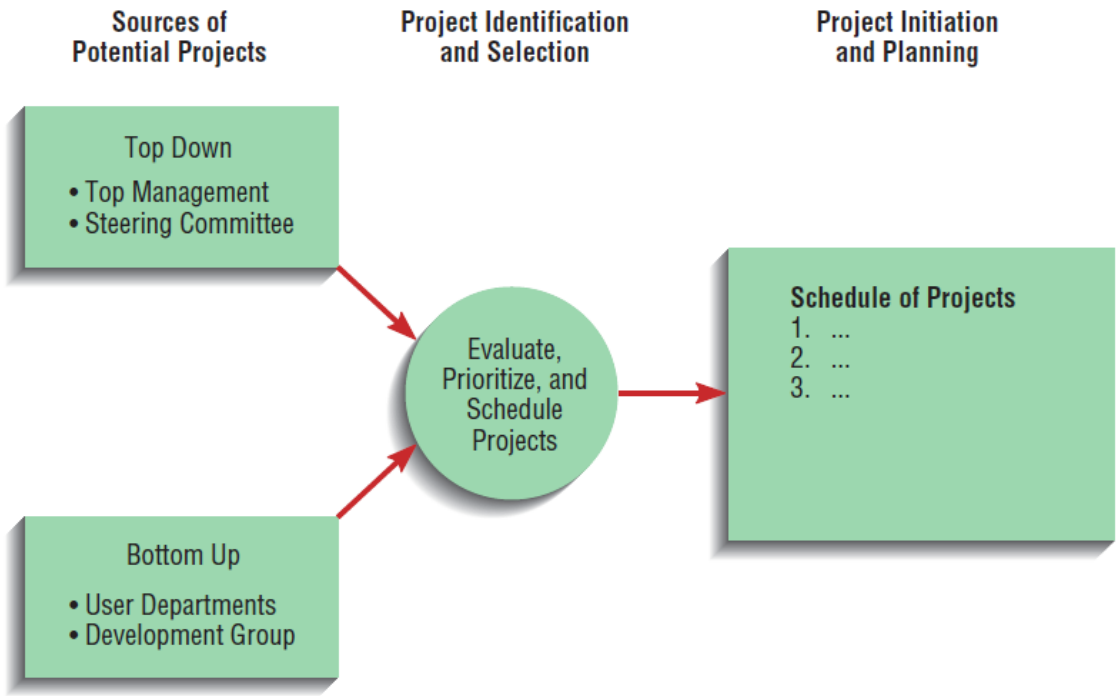


FIGURE 4-4
Information systems development projects come from both top-down and bottom-up initiatives.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Initiating and Planning System Development Projects

Objectives

- Baseline Project Plan (BPP)
  - Internal document → For the developers inside the organization. Not for the client
- Project Scope Statement
  - Prepared for external and internal stakeholders
  - Provides a high-level overview of the project

No technical details.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Assessing Project Feasibility

Six Categories

- Economic → the most important category. Do a cost benefit analysis.
- Operational →
- Technical →
- Schedule
- Legal and contractual →
- Political

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Assessing Economic Feasibility

- Cost–Benefit Analysis → calculate the cost and the benefit.
- Determine Benefits → tangible / intangible.
  - Tangible benefits →
    - Can be measured easily
      - Examples
        - Cost reduction and avoidance → تقليل التكاليف. مثلاً تقليل عدد الموظفين
        - Error reduction → كلما قللت الأخطاء، زادت الفائدة.
        - Increased flexibility
        - Increased speed of activity →
        - Increased management planning and control

اعطاء رقم فعلي للفائدة.

زيادة التخطيط والرقابة الإدارية

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Assessing Economic Feasibility (continued)

Intangible Benefits

- Cannot be measured easily

Examples

- Increased organizational flexibility
- Increased employee morale → معنويات الموظفين.
- Competitive necessity → التنافسية
- More timely information → توفير المعلومة المناسبة في الوقت المناسب
- Promotion of organizational learning and understanding

↓

التعلم والتعليم المستمر.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

FIGURE 4-7
Tangible Benefits Worksheet for the Customer Tracking System at Pine Valley Furniture

TANGIBLE BENEFITS WORKSHEET *Customer Tracking System Project*	Year 1 through 5
A. Cost reduction or avoidance	$ 4,500
B. Error reduction	2,500
C. Increased flexibility	7,500
D. Increased speed of activity	10,500
E. Improvement in management planning or control	25,000
F. Other _____	0
TOTAL Tangible Benefits	**$50,000**

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Assessing Economic Feasibility (continued)

Determine Costs

- Tangible Costs
  - Can easily be measured in dollars
    - Example: Hardware
- Intangible costs
  - Cannot be easily measured in dollars
  - Examples:
    - Loss of customer goodwill
    - Loss of employee morale

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Assessing Economic Feasibility (continued)

One-Time Costs

يتم دفعه مرة واحدة.

Associated with project start-up, initiation and development

Includes

- System development
- New hardware and software purchases
- User training
- Site preparation
- Data or system conversion

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Assessing Economic Feasibility (continued)

feasability study is part of baseline project Plan

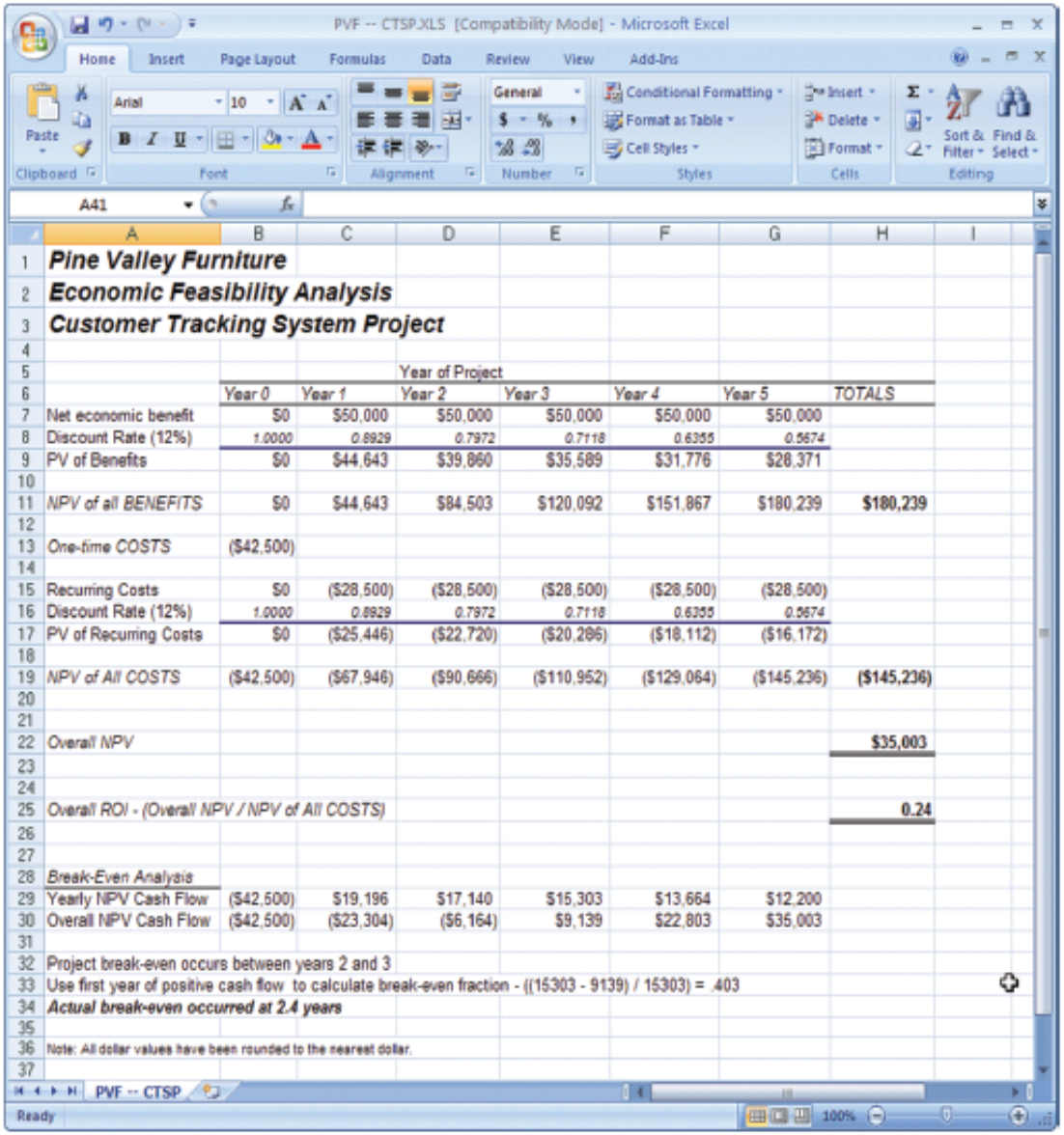
- Recurring Costs
  - Associated with on-going use of the system
  - Includes:
    - Application software maintenance
    - Incremental data storage expense
    - Incremental communications
    - New software and hardware releases
    - Consumable supplies
- Time value of money (TVM)

  القيمة اللي تم تدفعها ، كم القيمة رح تصير بالمستقبل .
  - The process of comparing present cash outlays to future expected returns

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

FIGURE 4-10
Worksheet Reflecting the Present Value Calculations of All Benefits and Costs for the Customer Tracking System at Pine Valley Furniture

This worksheet indicates that benefits from the project over five years exceed its costs by $35,003.



	A	B	C	D	E	F	G	H
1	***Pine Valley Furniture***							
2	***Economic Feasibility Analysis***							
3	***Customer Tracking System Project***							
4								
5				Year of Project				
6		*Year 0*	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*TOTALS*
7	Net economic benefit	$0	$50,000	$50,000	$50,000	$50,000	$50,000	
8	Discount Rate (12%)	*1.0000*	*0.8929*	*0.7972*	*0.7118*	*0.6355*	*0.5674*	
9	PV of Benefits	$0	$44,643	$39,860	$35,589	$31,776	$28,371	
10								
11	*NPV of all BENEFITS*	$0	$44,643	$84,503	$120,092	$151,867	$180,239	**$180,239**
12								
13	*One-time COSTS*	($42,500)						
14								
15	Recurring Costs	$0	($28,500)	($28,500)	($28,500)	($28,500)	($28,500)	
16	Discount Rate (12%)	*1.0000*	*0.8929*	*0.7972*	*0.7118*	*0.6355*	*0.5674*	
17	PV of Recurring Costs	$0	($25,446)	($22,720)	($20,286)	($18,112)	($16,172)	
18								
19	*NPV of All COSTS*	($42,500)	($67,946)	($90,666)	($110,952)	($129,064)	($145,236)	**($145,236)**
20								
21								
22	*Overall NPV*							**$35,003**
23								
24								
25	*Overall ROI - (Overall NPV / NPV of All COSTS)*							**0.24**
26								
27								
28	*Break-Even Analysis*							
29	Yearly NPV Cash Flow	($42,500)	$19,196	$17,140	$15,303	$13,664	$12,200	
30	Overall NPV Cash Flow	($42,500)	($23,304)	($6,164)	$9,139	$22,803	$35,003	
31								
32	Project break-even occurs between years 2 and 3							
33	Use first year of positive cash flow to calculate break-even fraction - ((15303 - 9139) / 15303) = .403							
34	***Actual break-even occurred at 2.4 years***							
35								
36	Note: All dollar values have been rounded to the nearest dollar.							
37								

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Assessing Other Feasibility Concerns

قدرة الـ

Operational Feasibility ⇒ proposed project يحل المشاكل داخل المؤسسة.

Assessment of how a proposed system solves business problems or takes advantage of opportunities

Technical Feasibility

Assessment of the development organization's ability to construct a proposed system

مدى قدرة الموظفين على بناء هذا النظام.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Assessing Other Feasibility Concerns (continued)

Schedule Feasibility

Assessment of time-frame and project completion dates with respect to organization constraints for affecting change

Legal and Contractual Feasibility

Assessment of legal and contractual ramifications of new system

- قانونية بناء هذا النظام..

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Assessing Other Feasibility Concerns (continued)

Political Feasibility

Assessment of key stakeholders' view in organization toward proposed system

وجهة نظر المؤسسين/ متخذي القرار في بناء هذا النظام.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Building the Baseline Project Plan

Output:
- baseline project plan
- project scope assement

Objectives

- Assures that customer and development group have a complete understanding of the proposed system and requirements
- Provides sponsoring organization with a clear idea of scope, benefits and duration of project

- Project scope is part of project baseline plan. But it is for the customer.

4.
Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Building the Baseline Project Plan (continued)

Four Sections of a Baseline Project Plan:

- Introduction
- System description
- Feasibility assessment (part of project baseline plan).
- Management issues

4.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Building the Baseline Project Plan (continued)

Introduction (short)

- Brief overview → document ماذا يحتوي الـ
- Recommended course of action → The activities we will work on.
- Project scope defined → Part of baseline specifically Introduction. → Important Question in quiz.
  - Units affected → The department maybe affected in the organization.
  - Interaction with other systems
  - Range of system capabilities → قدرات النظام.

Characteristics of introduction:-

- short
- prepared for customer
- High level
- Good communication tool b/w customer and developer.

4.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Building the Baseline Project Plan (continued)

System Description

- Outline of possible alternative solutions
- Narrative format

Feasibility Assessment (section 3)

- Project costs and benefits
- Technical difficulties
- High-level project schedule

4.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Building the Baseline Project Plan (continued)

Management Issues

- Outlines concerns that management may have about the project
- Team composition ⇒ اسماء الفريق اللي راح يشتغلوا.
- Communication plan ⇒ كيف طبيعة التواصل.
- Project standards and procedures

لازم نحط قوانين كتان يمشي عليها الفريق اللي بيبني ال system.

4.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Image not available

very important (must revise)

4.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Reviewing the Baseline Project Plan

Objectives

- Assure conformity to organizational standards
- All parties agree to continue with project

يجب أن تضمن انه المشروع تم بناءة ضمن المعايير.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Reviewing the Baseline Project Plan (continued)

Walkthrough

- Peer group review ⇒ عملية المراجعة بتكون مع مجموعة.
- Participants
  - Coordinator ⇒ The leader of the project.
  - Presenter ⇒ one of the author of the baseline project plan.
  - User ⇒ The customer.
  - Secretary ⇒ One of system analysis who takes notes.
  - Standard Bearer ⇒ Makes sure the system is acording to the organizations standards.
  - Maintenance Oracle ⇒ The one who makes the maintenance.
- Activities
  - Walkthrough review form
  - Individuals polled
  - Walkthrough action list
- Advantages
  - Assures that review occurs during project

Q:- بيعطيك وصف هذا الشخص، وأنت حدد مين هو؟؟

Very important.

4.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Image not available

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Image not available

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Electronic Commerce Application

- Development process for Internet projects is no different than other projects
- Special issues need to be taken into account

↳ like security.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Electronic Commerce Application (continued)

Internet

Worldwide network comprised of individual networks used for global computing and electronic commerce

Intranet

Internet-based communication to support business activities within a single organization

Extranet

Internet-based communication to support business-to-business activities

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Electronic Commerce Application (continued)

Electronic Data Interchange (EDI)

- The use of telecommunications technologies to transfer business documents directly between organizations

Internet vs. Intranet/Extranet Apps

- Intranet/Extranet: Developer knows how application will be run and used
- Internet: Developer faces various unknowns

Till this chapter, the mid exam

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Summary

Project Identification and Selection involves:

- Identifying potential projects
- Classifying and ranking of projects
- Selecting projects

Baseline Project Plan (BPP)

- Created during project initiation and planning

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Summary (continued)

Contains:

- Introduction
- High-level description of system
- Outline of feasibility
- Overview of management issues

Project Scope Statement

Describes what project will deliver

4.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Summary (continued)

Feasibility
- Economic
- Operational
- Technical
- Schedule
- Legal
- Contractual
- Political

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Summary (continued)

Benefits
- Tangible vs. Intangible

Costs
- Tangible vs. Intangible
- One-time vs. Recurring

Internet Applications
- Internet
- Intranet
- Extranet

4. Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. Printed in the United States of America.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Essentials of Systems Analysis and Design
Fifth Edition

Joseph S. Valacich
Joey F. George
Jeffrey A. Hoffer

Chapter 5
Determining System Requirements

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Learning Objectives

- ✓ Describe options for designing and conducting interviews
- ✓ Discuss planning an interview to determine system requirements
- ✓ Explain advantages and disadvantages of observing workers and analyzing business documents to determine requirements

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Learning Objectives (continued)

- ✓ Learn about Joint Application Design (JAD) and Prototyping
- ✓ Discuss appropriate methods to elicit system requests
- ✓ Explain Business Process Reengineering (BPR)
- ✓ Examine requirements determination for Internet applications

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Performing Requirements Determination

Gather information on what system should do from many sources → requirements المصادر اللي يقدم احصل منها المعلومات او

Users → the client

Reports →

Forms → النماذج

Procedures

الإجراءات التي تتم داخل المؤسسة

* The system Analysis must use all these sources to gathere information / requirements.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Performing Requirements Determination (continued)

Characteristics for Gathering Requirements

- Impertinence → السؤال في كل شي .
  - Question everything
- Impartiality → المحايدة . → يعني ما اسمع عن المدير فقط، لكن من الجميع .
  - Find the best organizational solution
- Relaxation of constraints → function مستحيل يشتغل . يعني ما بصير اقول انو هذا الـ
  - Assume anything is possible and eliminate the infeasible
- Attention to detail → الإنتباه الى التفاصيل .
  - Every fact must fit with every other fact → يعني ما يصير في contradiction بالمعلومات .
- Reframing → اوعية المؤسسة من جميع النواحي
  - View the organization in new ways

* لمفهوم انظمة، ما تحاول تستنتج الـ requirements .

5. Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Deliverables and Outcomes

Types of Deliverables: → outcomes.

- Information collected from users → المعلومات اللي جمعناها من المستخدمين.
- Existing documents and files → Reports / Forms.
- Computer-based information → The old version of the system.
- Understanding of organizational components → نفهم المؤسسة كيف تشتغل + الـ components.
  - Business objectives → The system must be compatible with the business objectives.
  - Information needs
  - Rules of data processing →
  - Key events →

اهم الـ functions بالـ system كمان تحطهم اولوية.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

7
5.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Traditional Methods for Determining Requirements

1) Interviews with individuals. → لازم يعرف جدولة المقابلة والوقت .

2) Observations of workers. → ما بتكون العملية متواصلة ، ولازم نخيم الشغل اللي بدي اعمله observations .

3) Business Documents.

→ Any documents that is related with the system, we will collect the inf. from it.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Traditional Methods for Determining Requirements (continued)

Interviewing and Listening

- Gather facts, opinions, and speculations → التكهنات .
- Observe body language and emotions
- Guidelines
  - Plan the interview
    - Checklist
    - Appointment
  - Be neutral → المحايدة، ما تكون الأسئلة موجهة .
  - Listen and take notes → السماع اكثر من الكلام .
  - Seek a diverse view
    - Different points of views.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Traditional Methods for Determining Requirements (continued)

Interviewing (Continued)

- Interview Questions
  - Open-Ended
    - No pre-specified answers
    - Used to probe for unanticipated answers → وجدت لتحصيل إجابات غير مفتوحة
- Close-Ended
  - Respondent is asked to choose from a set of specified responses
  - Work well when the popular answers to questions are known
  - Do not require a long period of time, and can cover a greater number of topics

Advantages of open-ended:
- Different points of view.
- Because using words that the user is familier with I can get all the info I want.

Disadvantages
- It takes long time for the interview.
- Long time in taking notes.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Table 5-3: Not available.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Interview Outline	
Interviewee: *Name of person being interviewed*	Interviewer: *Name of person leading interview*
Location/Medium: *Office, conference room, or phone number*	Appointment Date: Start Time: End Time:
Objectives: *What data to collect* *On what to gain agreement* *What areas to explore*	Reminders: *Background/experience of interviewee* *Known opinions of interviewee*
Agenda: Introduction Background on Project Overview of Interview Topics to Be Covered Permission to Tape Record Topic 1 Questions Topic 2 Questions ... Summary of Major Points Questions from Interviewee Closing	Approximate Time: 1 minute 2 minutes 1 minute 5 minutes 7 minutes ... 2 minutes 5 minutes 1 minute
General Observations: Interviewee seemed busy—probably need to call in a few days for follow-up questions because he gave only short answers. PC was turned off—probably not a regular PC user.	
Unresolved Issues, Topics Not Covered: He needs to look up sales figures from 1998. He raised the issue of how to handle returned goods, but we did not have time to discuss.	

(continues on next page)

FIGURE 5-2
A Typical Interview Guide

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Traditional Methods for Determining Requirements (continued)

Directly Observing Users

The interviewee must know that he is being observed.

- Serves as a good method to supplement interviews
- Often difficult to obtain unbiased data
  - People often work differently when being observed

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Analyzing Procedures and Other Documents

Disadvantage:
In business documents there is no follow up.

Types of Information to Be Discovered:

- Problems with existing system
- Opportunity to meet new need
- Organizational direction
- Title and names of key individuals → To make interview with that person.
- Values of organization → Assets.
- Special information processing circumstances → ex: discount for loyal clients.
- Rules for processing data

Advantage:
No defined time for the document

Types of Document:
- Report
- Form
- Description

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Modern Methods for Determining Requirements

This type of Questions is scenario.

Joint Application Design (JAD) ⇒ This method is structured.

- Brings together key users, managers, and systems analysts ⇒ interviewing them altogether.
- Purpose: collect system requirements simultaneously from key people
- Conducted off-site ⇒ It is held outside the organization.
  * And it is intense ⇒ takes a long time. from 4 hours to 1 week.

Prototyping

- Repetitive process
- Rudimentary version of system is built
- Replaces or augments SDLC ⇒ Disadvantage.
- Goal: to develop concrete specifications for ultimate system

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Joint Application Design (JAD)

Participants

- Session leader ⇒ System Analyst, but he/she does not participate is descussion.
- Users ⇒
- Managers ⇒ Head of the department, but not the CEO.
- Sponsor ⇒ The Ceo. Attend the into or outro.
- Systems analysts
- Scribe ⇒ System Analyst who takes notes only.
- IS staff ⇒ Programmers, testers, Maintainers. etc.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Joint Application Design (JAD) (continued)

End Result

- Documentation detailing
  - Existing system = All the requirments in the current system.
  - Features of a replacement system =

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Prototyping

↳ Create version of the system from the written requirements.

- User quickly converts requirements to working version of system
- Once the user sees requirements converted to system, will ask for modifications or will generate additional requests

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Prototyping (continued)

Most useful when:

- User requests are not clear = Not well understood or unclear.
- Few users are involved in the system
- Designs are complex and require concrete form to evaluate fully
- History of communication problems between analysts and users
- Tools are readily available to build prototype

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Prototyping (continued)

Drawbacks

- Tendency to avoid formal documentation
- Difficult to adapt to more general user audience
- Sharing data with other systems is often not considered
- Systems Development Life Cycle (SDLC) checks are often bypassed

→ New users can't be added to the old group of users.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Business Process Reengineering (BPR)

Search for and implementation of radical change in business processes to achieve breakthrough improvements in products and services

Goals

- Reorganize complete flow of data in major sections of an organization
- Eliminate unnecessary steps
- Combine steps
- Become more responsive to future change

البحث عن و تغيير جذري في العمليات التجارية لتحسين المنتجات و الخدمات.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Business Process Reengineering (BPR) (continued)

Identification of processes to reengineer

- Key business processes
  - Set of activities designed to produce specific output for a particular customer or market
  - Focused on customers and outcome
  - Same techniques are used as were used for requirements determination

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Business Process Reengineering (BPR) (continued)

Identify specific activities that can be improved through BPR

Disruptive Technologies

Technologies that enable the breaking of long-held business rules that inhibit organizations from making radical business changes

See Table 5-5

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Summary

Interviews

- Open-ended and close-ended questions
- Preparation is key

Other means of gathering requirements are:

- Observing workers
- Analyzing business documents

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Summary (continued)

Joint Application Design (JAD)
Prototyping
Business Process Reengineering (BPR)
Disruptive technologies

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. Printed in the United States of America.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Essentials of Systems Analysis and Design
Fifth Edition

Joseph S. Valacich
Joey F. George
Jeffrey A. Hoffer

Chapter 6
Structuring System Requirements: Process Modeling

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Learning Objectives

Explain process modeling
Discuss data-flow diagramming mechanics, definitions, and rules
Discuss balancing data-flow diagrams
Discuss the use of data-flow diagrams as analysis tools
Examine decision tables used to represent process logic

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Process Modeling

The importance of DFD :-
- Used to increase SW development Productivity.

ex: 1) register a course.
2) Drop course, etc.

Graphically represents the processes that capture, manipulate, store, and distribute data between a system and its environment and among system components

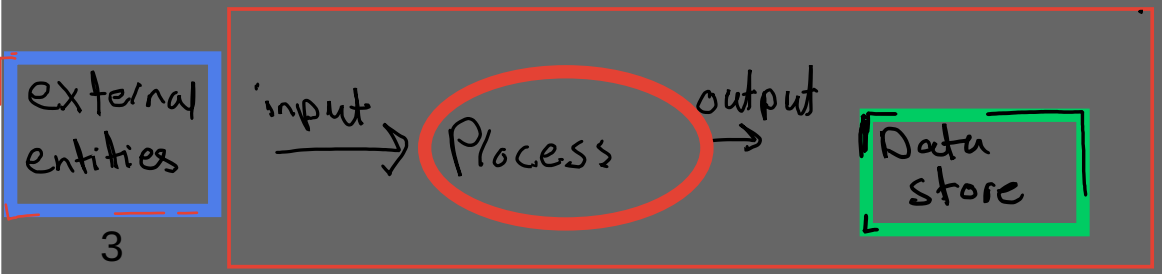
Data-flow Diagrams (DFD) ①

input + output.

Person / DB ②

Graphically illustrate movement of data between external entities and the processes and data stores within a system

③ ④



Any external system that deals with our system is system enviroment.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Process Modeling (continued)

Modeling a System's Process

- Utilize information gathered during requirements determination

استخدام المعلومات اللي جمعناها خلال تحديد المتطلبات.

- Structure of the data is also modeled in addition to the processes

+ تصميم هيكلية المعلومات + العمليات

Deliverables and Outcomes

Set of coherent, interrelated data-flow diagrams

* There are levels of data-flow diagram. In every new level we add details from the prenous levels. The new level cannot vidate the previous level.

- مش لازم تتكامل مع المرحلة السابقة.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Process Modeling (continued)

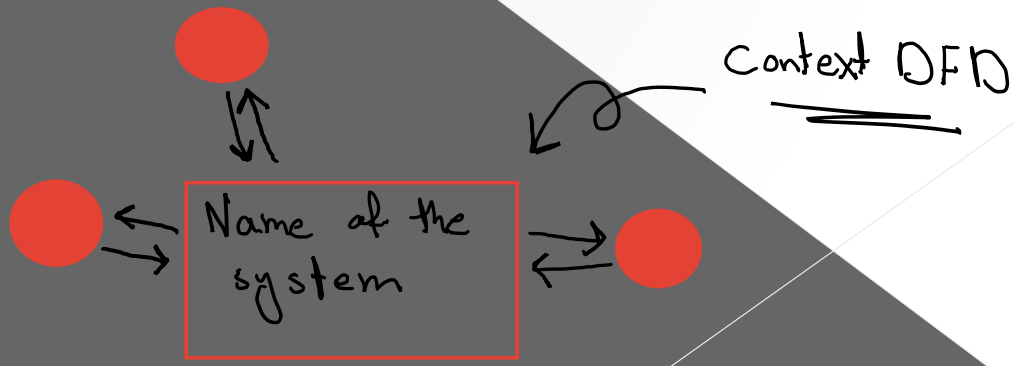
Deliverables and Outcomes (continued)

- Context data-flow diagram (DFD) → 1st Diagram in Data-Flow Diagram.
  - Scope of system → General description of system.
- DFDs of current system
  - Enable analysts to understand current system
- DFDs of new logical system
  - Technology independent
  - Show data flows, structure and functional requirements of new system

← لكون اسم ال processes بكون اسم النظام.

- أول نسخة من ال DFD.
- يعني النظام بكون عبارة عن عملية واحدة.
و بكون اسمها اسم النظام.

عشان نزيد من فهم النظام بنستخدم ال DFD.



Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Process Modeling (continued)

Deliverables and Outcomes (continued)

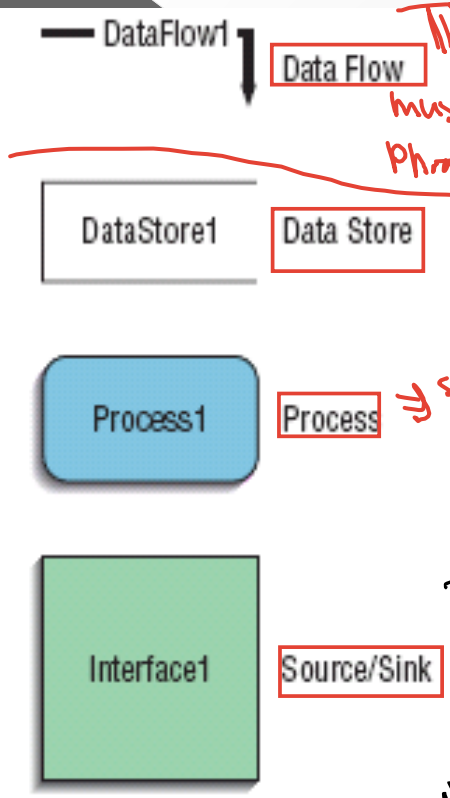
Project dictionary and CASE repository → every item in th DFD and description about them.

Data-flow Diagramming Mechanics

→ symbols

- Four symbols are used
  - See Figure 6-2
- Developed by Gane and Sarson

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall



The name of the Data flow must start with noun, or noun Phrase. Not a Verb.

start with a verb.

FIGURE 6-2
Gane and Sarson identified four symbols to use in data-flow diagrams to represent the flow of data: data-flow symbol, data-store symbol, process symbol, and source/sink symbol. We use the Gane and Sarson symbols in this book.

* اي للي بيتكامل مع السيستم بدكنا يكتبر external entity.

* When external entity gives input for the system it is called source.

* When the system gives output it is called sink.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Data-Flow Diagramming Mechanics

Data Flow

- Depicts data that are in motion and moving as a unit from one place to another in the system
- Drawn as an arrow
- Select a meaningful name to represent the data

- ما يصير اسم ال DF يكون فعل (verb).
- لازم نستخدم اسماء حقيقية.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Data-Flow Diagramming Mechanics (continued)

Data Store

- Depicts data at rest ⇒ مكان لتخزين البيانات
- May represent data in
  - File folder
  - Computer-based file
  - Notebook
- Drawn as a rectangle with the right vertical line missing
- Label includes name of the store as well as the number

1) كل DS لازم يكون عنده اسم.

2 كل DS لازم نعطيه رقم.

* ال DS هو جزء من السيستم.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Data-Flow Diagramming Mechanics (continued)

Process

- Depicts work or actions performed on data so that they are transformed, stored, or distributed
- Drawn as a rectangle with rounded corners
- Number of process as well as names are recorded

كل عملية بتأخذ رقم و اسم .

transformed:- the output is for another input.

stored:

distributed:

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Data-Flow Diagramming Mechanics (continued)

Source/Sink

- Depicts the origin and/or destination of the data
- Sometimes referred to as an external entity = Source.
- Drawn as a square symbol
- Name states what the external agent is
- Because they are external, many characteristics are not of interest to us

- في البداية كتير ما بيهمنا شان هيك هي external

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

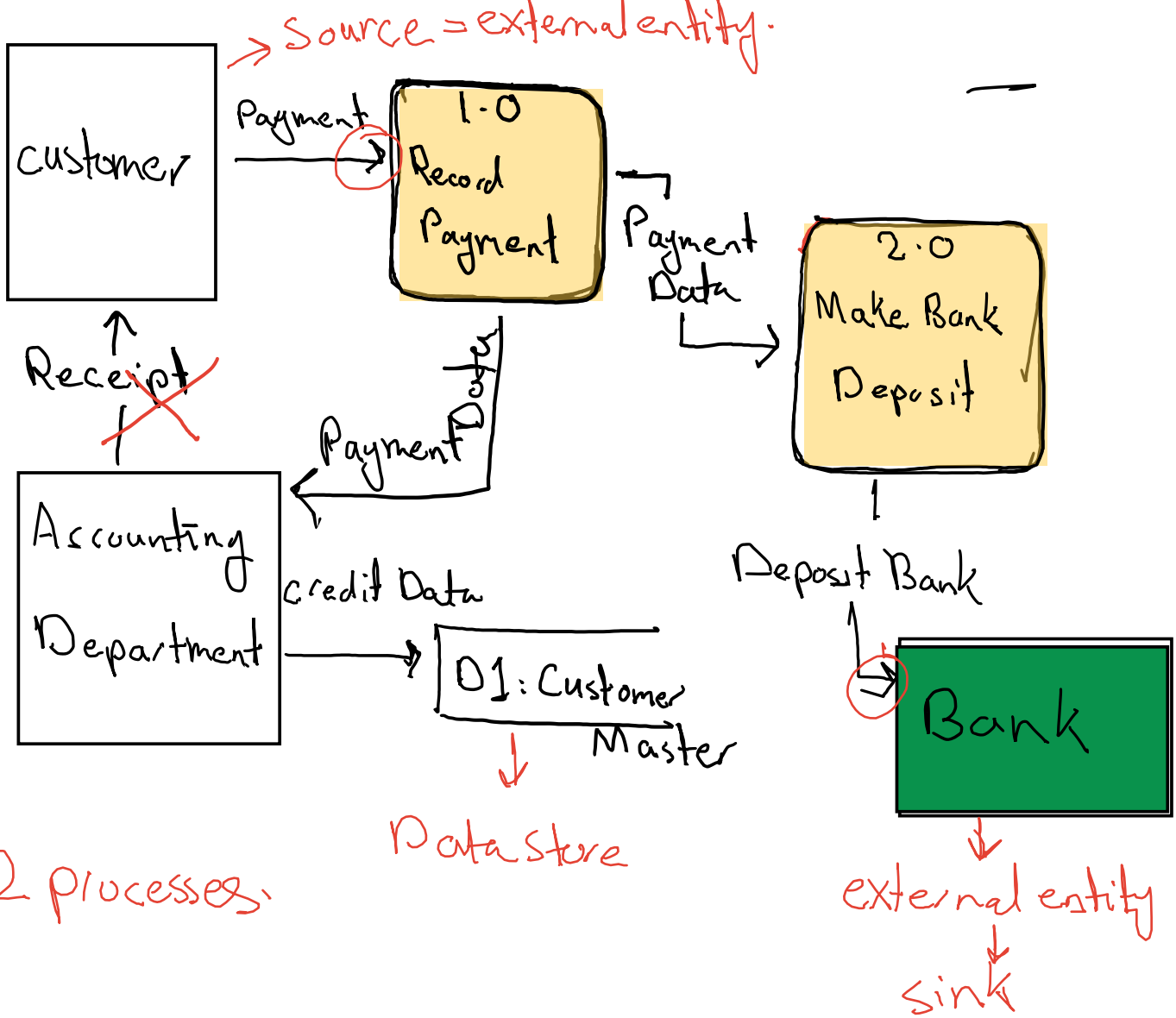
The image is very important.

Must check it out.

Q: Where is the violation in this diagram?

You must understand the DFD.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

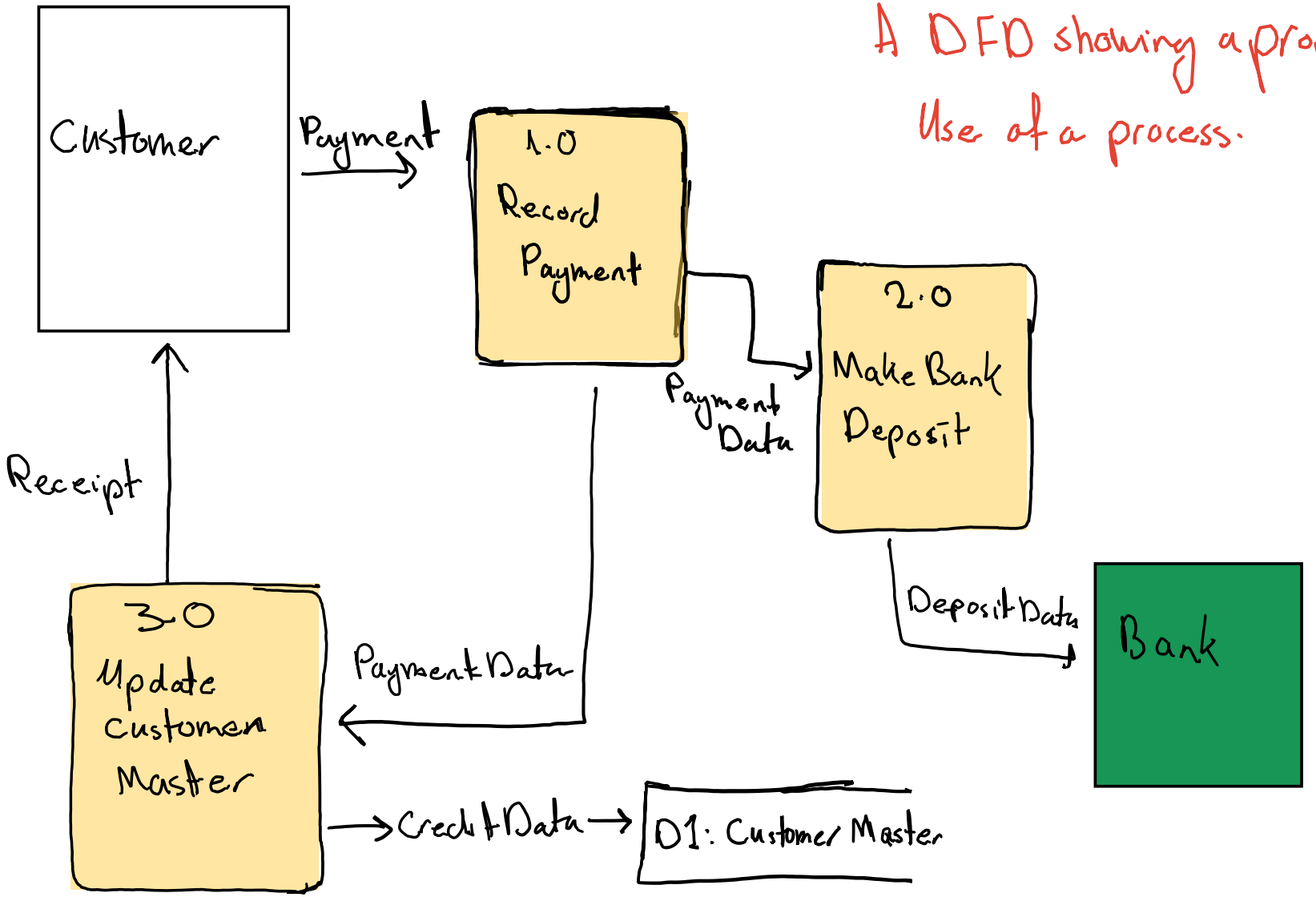


2 processes.

- An Incorrect Diagram showing a process as a Source / Sink.

- المشكلة هون انه ما بصير source يطلع sink او العكس.

A DFD showing a proper Use of a process.



Data-Flow Diagramming Definitions

This is not a Data flow Diagram.

Context Diagram

General diagram, no details.

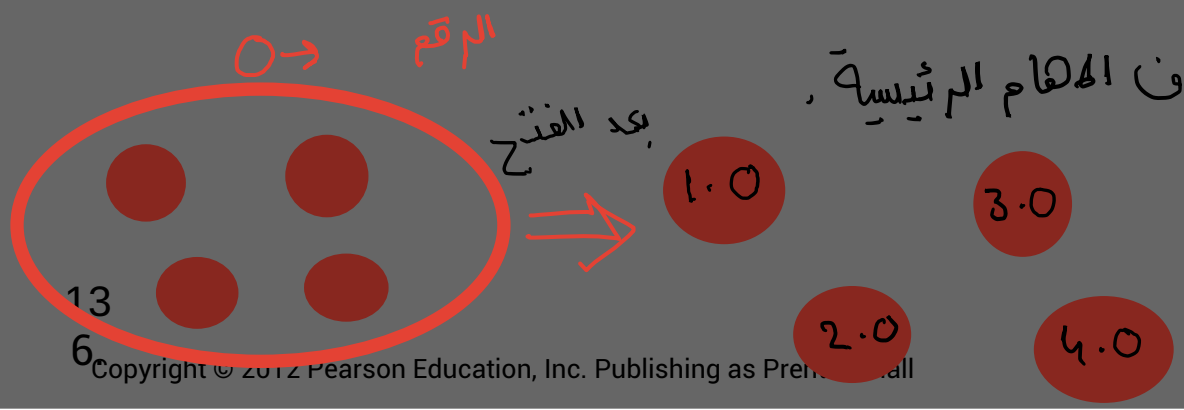
A data-flow diagram of the scope of an organizational system that shows the system boundaries, external entities that interact with the system and the major information flows between the entities and the system

عملية الـ transaction المهام الرئيسية.

Level-0 Diagram

A data-flow diagram that represents a system's major processes, data flows, and data stores at a higher level

كأنه منتفتح النظام و بنشوف المهام الرئيسية.



Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Developing DFDs: An Example

- Hoosier Burger's Automated Food Ordering System
- Context Diagram (Figure 6-4) contains no data stores

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

external entity may be a source and sink at the same time.

Context diagram represent the system which mean it name is the system delination. Not a verb.

Context diagram represent the scope.

Question on the final: Draw a context diagram.

Important: must watch the videos to understand.

* The external entities must remain the same. It shouldn't increase when moving to the next level.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Developing DFDs: An Example (continued)

Next step is to expand the context diagram to show the breakdown of processes (Figure 6-5)

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

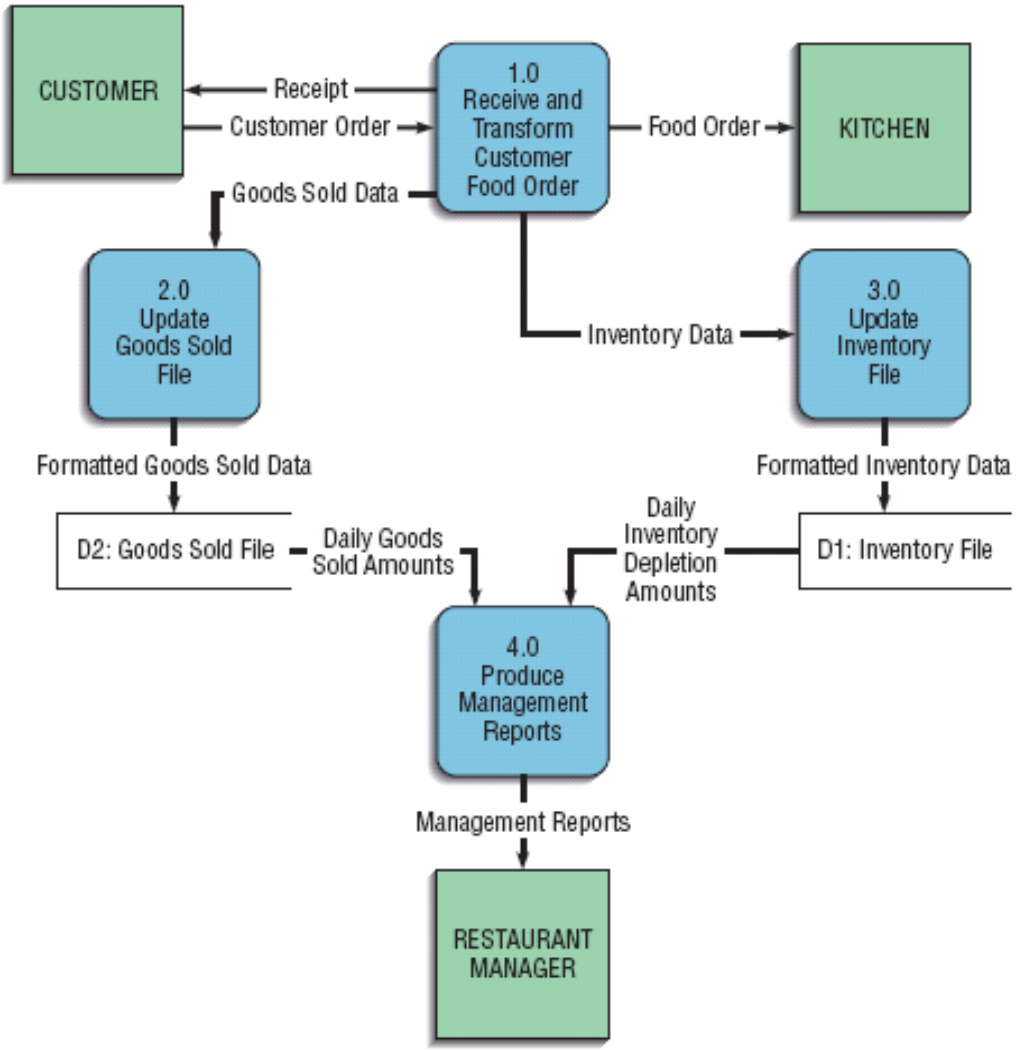


FIGURE 6-5
Four Separate Processes of the Hoosier Burger Food-Ordering System

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Data-Flow Diagramming Rules

Basic rules that apply to all DFDs:

- Inputs to a process are always different than outputs
- Objects always have a unique name

In order to keep the diagram uncluttered, you can repeat data stores and data flows on a diagram

لا يوجد تقاطع .

ما بصير الـ input يطلع output بنفس الاسم .

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Data-Flow Diagramming Rules (continued)

These rules are important

Process

- No process can have only outputs (a miracle)
- No process can have only inputs (black hole)
- A process has a verb phrase label

There must be input and output.

Data Store

- Data cannot be moved from one store to another
- Data cannot move from an outside source to a data store
- Data cannot move directly from a data store to a data sink
- Data store has a noun phrase label

external entity cannot access the data store.

Source/Sink

H. Data cannot move directly from a source to a sink

I. A source/sink has a noun phrase label

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Data-Flow Diagramming Rules (continued)

either → or ←

Data Flow

- A data flow has only one direction of flow between symbols
- A fork means that exactly the same data go from a common location to two or more processes, data stores, or sources/sinks → 2 different outputs not accepted
- A join means that exactly the same data come from any two or more different processes, data stores or sources/sinks to a common location → Like the fork but for the output.
- A data flow cannot go directly back to the same process it leaves ⇒ يعني الـ process ما يصير يطلع output و يرجع input لنفس الـ process.
- A data flow to a data store means update
- A data flow from a data store means retrieve or use
- A data flow has a noun phrase label

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Decomposition of DFDs

Functional Decomposition

- Act of going from one single system to many component processes
- Repetitive procedure
- Lowest level is called a primitive DFD

→ every process given one function. Cannot be decomposed any more → Imp

Level-n Diagrams

- A DFD that is the result of *n* nested decompositions of a series of subprocesses from a process on a level-0 diagram

Q: Draw the primitive data flow diagram → on finals.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Balancing DFDs

When decomposing a DFD, you must conserve inputs to and outputs from a process at the next level of decomposition

* نفس ال processes اللي خلصوا بال level الحالي، لازم تخلصوا بال level اللي بعده ،

This is called balancing

Example: Hoosier Burgers

In Figure 6-4, notice that there is one input to the system; the customer order

Three outputs:

Customer receipt
Food order
Management reports

ترتيب ال levels :-

1) Context level
2) level - 0
3) level 1

and so on

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Balancing DFDs (continued)

Example (Continued)

- Notice Figure 6-5. We have the same inputs and outputs
- No new inputs or outputs have been introduced
- We can say that the context diagram and level-0 DFD are balanced

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Balancing DFDs
An Unbalanced Example

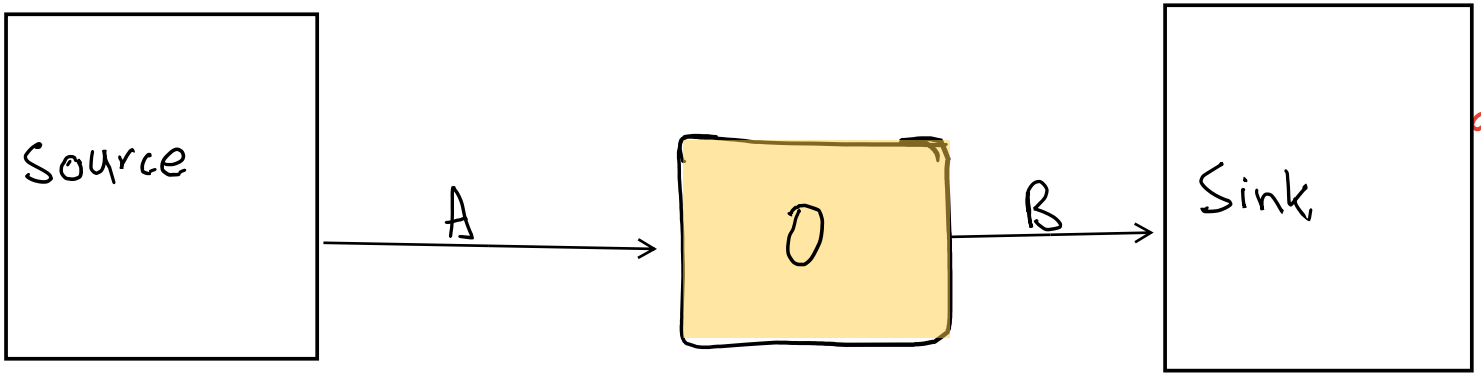
Q: Given a diagram How many violation in this diagram.

(Violation in the rules)

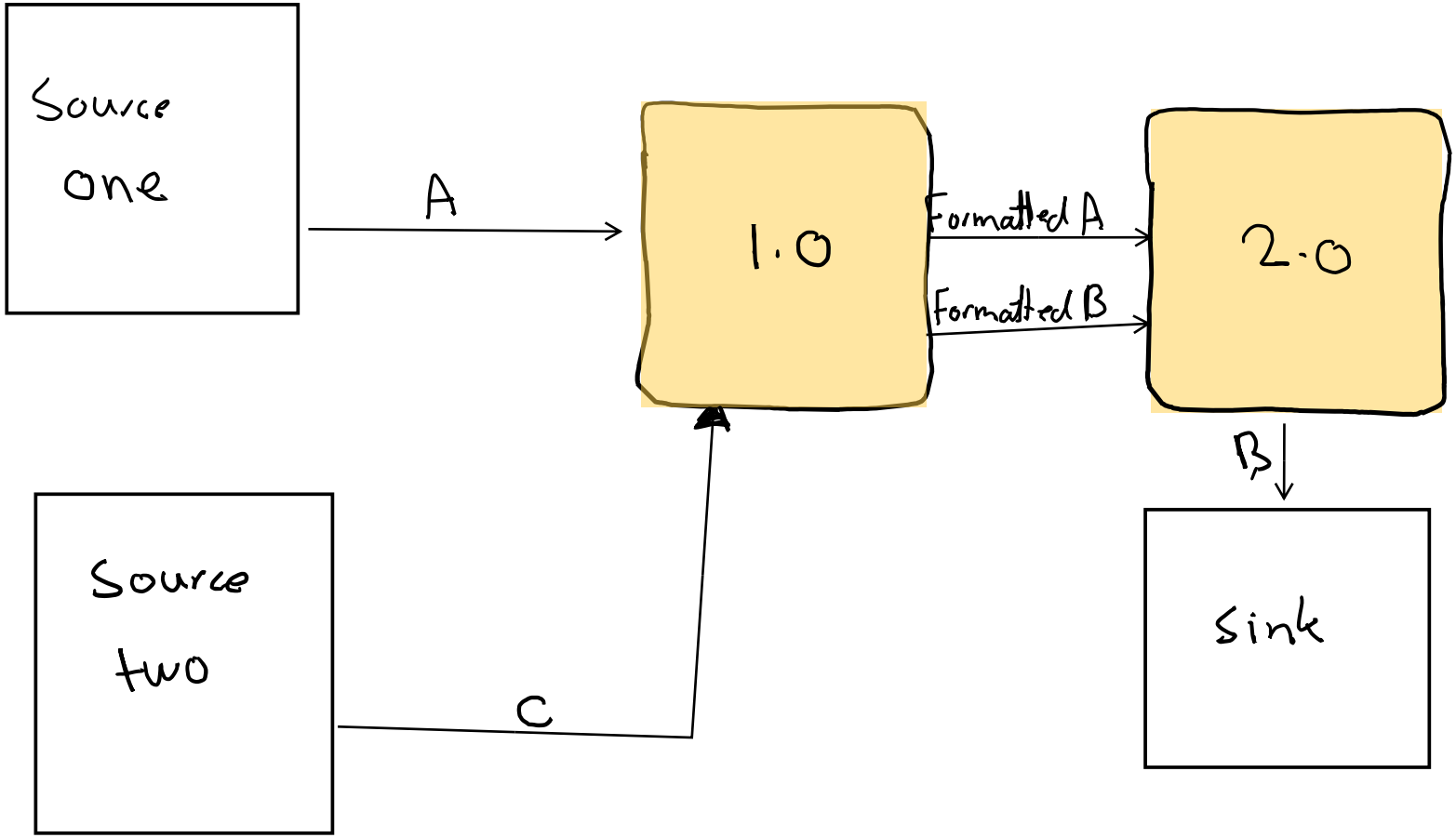
Q. Given a diagram Is this balanced. and how can we balance it

- In context diagram, we have one input to the system, A and one output, B
- Level-0 diagram has one additional data flow, C
- These DFDs are not balanced

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall



* This DFD are not balanced



Balancing DFDs

We can split a data flow into separate data flows on a lower level diagram

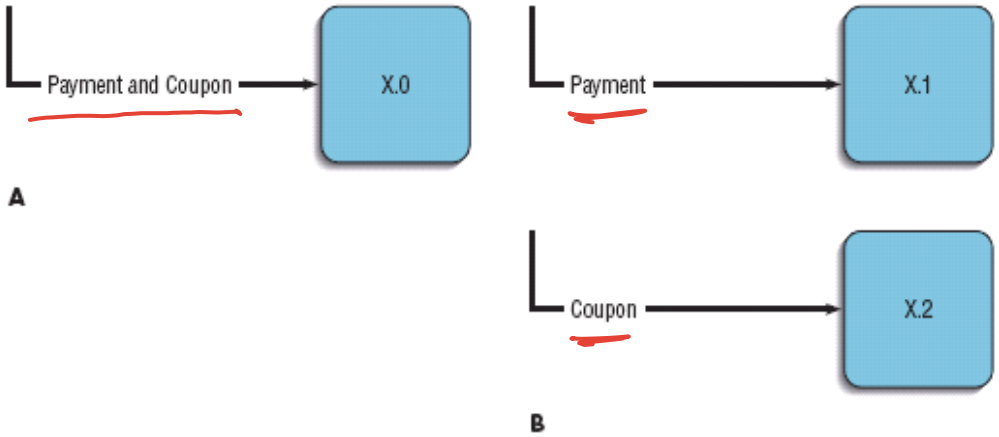


FIGURE 6-11
Example of a Data-Flow Splitting
(A) Composite Data Flow
(B) Disaggregated Data Flows

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Balancing DFDs
Four Additional Advanced Rules

lowest level = primitive level.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Guidelines for Drawing DFDs

- **Completeness**
  DFD must include all components necessary for the system
  Each component must be fully described in the project dictionary or CASE repository
- **Consistency**
  The extent to which information contained on one level of a set of nested DFDs is also included on other levels

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Guidelines for Drawing DFDs (continued)

- **Timing**
  Time is not represented well on DFDs
  Best to draw DFDs as if the system has never started and will never stop
- **Iterative Development**
  Analyst should expect to redraw diagram several times before reaching the closest approximation to the system being modeled

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Guidelines for Drawing DFDs (continued)

- Primitive DFDs
  Lowest logical level of decomposition
  Decision has to be made when to stop decomposition

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Guidelines for Drawing DFDs (continued)

Rules for stopping decomposition:

- When each process has been reduced to a single decision, calculation or database operation
- When each data store represents data about a single entity
- When the system user does not care to see any more detail

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Guidelines for Drawing DFDs (continued)

Rules for stopping decomposition: (continued)

- When every data flow does not need to be split further to show that data are handled in various ways
- When you believe that you have shown each business form or transaction, online display and report as a single data flow
- When you believe that there is a separate process for each choice on all lowest-level menu options

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Using DFDs as Analysis Tools

ناخذ 2 DFD ونشوف إذا في تناقضات او لا.

Gap Analysis

The process of discovering discrepancies between two or more sets of data-flow diagrams or discrepancies within a single DFD

Inefficiencies in a system can often be identified through DFDs

- افضل مكان نشوفوا إذا في مشاكل بالسيستم هو ال DFD -

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Using DFDs in Business Process Reengineering

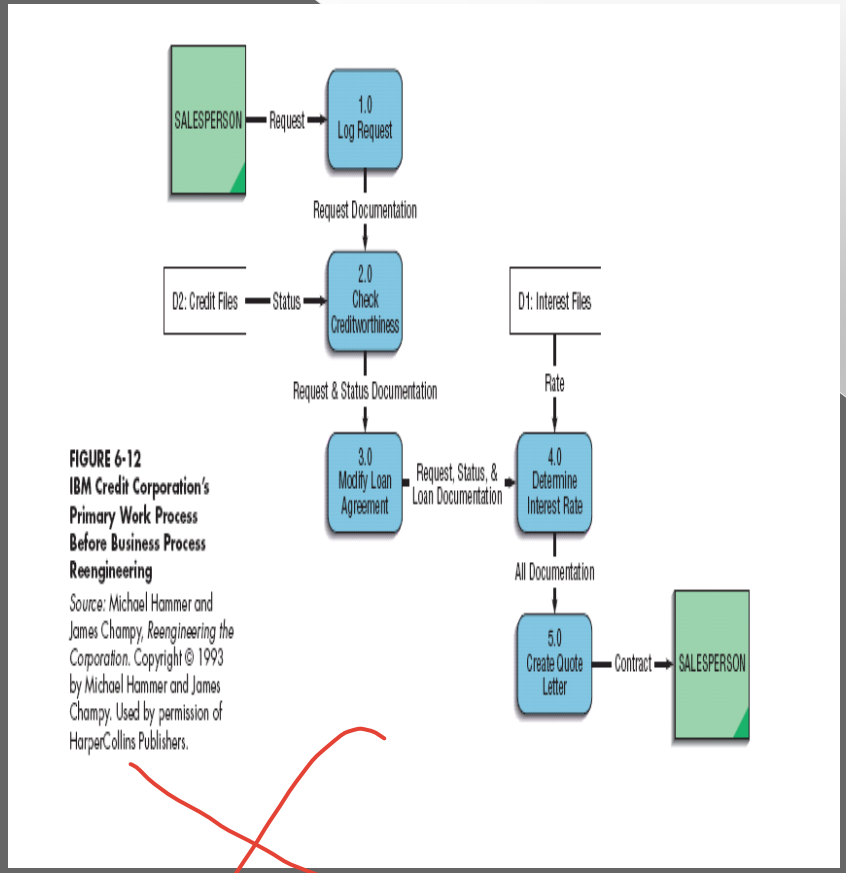


FIGURE 6-12
IBM Credit Corporation's Primary Work Process Before Business Process Reengineering

Source: Michael Hammer and James Champy, *Reengineering the Corporation*. Copyright © 1993 by Michael Hammer and James Champy. Used by permission of HarperCollins Publishers.

Example: IBM Credit

Credit approval process is required six days before Business Process Reengineering (see Fig 6-12)

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Using DFDs in Business Process Reengineering (continued)

After Business Reprocess Engineering, IBM was able to process 100 times the number of transactions in the same amount of time

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Logic Modeling

- Data-flow diagrams do not show the logic inside the processes
- Logic modeling involves representing internal structure and functionality of processes depicted on a DFD
- Utilizes Decision Tables

→ internal structure.

- logic modeling لازم نعمل ، DFD ال

— كمان نزيد من فهم ال

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Modeling Logic with Decision Tables

مصفوفة تبين جميع القرارات اللتي ممكن اني اتخذها.

- A matrix representation of the logic of a decision
- Specifies the possible conditions and the resulting actions
- Best used for complicated decision logic

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Modeling Logic with Decision Tables (continued)

Consists of three parts:

Condition stubs → الشرط

Lists condition relevant to decision

Action stubs → الفعل

Actions that result for a given set of conditions

Rules → القوانين

Specify which actions are to be followed for a given set of conditions

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Modeling Logic with Decision Tables (continued)

Indifferent Condition ⇒ يكون في different rules لكن ال action واحد

- Condition whose value does not affect which action is taken for two or more rules

Standard procedure for creating decision tables:

- Name the conditions and values each condition can assume
- Name all possible actions that can occur
- List all possible rules
- Define the actions for each rule (See Figure 6-16)
- Simplify the decision table (See Figure 6-17)

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

FIGURE 6-16
Complete Decision Table for Hoosier Burger's Inventory Reordering System

Conditions / Courses of Action	Rules											
	1	2	3	4	5	6	7	8	9	10	11	12
Type of item	P	N	P	N	P	N	P	N	P	N	P	N
Time of week	D	D	W	W	D	D	W	W	D	D	W	W
Season of year	A	A	A	A	S	S	S	S	H	H	H	H
Standing daily order	X				X				X			
Standing weekend order			X				X				X	
Minimum order quantity		X		X		X		X		X		X
Holiday reduction									X		X	
Summer reduction					X		X					

Action

different conditions = combine together

Type of item:
P = perishable ← قابل للكسر ،
N = nonperishable ← غير قابل للكسر .

Time of week:
D = weekday
W = weekend

Season of year:
A = academic year
S = summer
H = holiday

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Q: Given the decision table. Simplify it.

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Process Modeling for Electronic Commerce Application

Process modeling for electronic commerce projects is no different than other projects

See Pine Valley Furniture example; Table 6-4

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

TABLE 6-4: System Structure of the WebStore and Corresponding Level-0 Processes

WebStore System	Processes
Main page	Information display (minor/no processes)
Product line (Catalog)	1.0 Browse Catalog
• Desks	2.0 Select Item for Purchase
• Chairs	
• Tables	
• File cabinets	
Shopping cart	3.0 Display Shopping Cart
Checkout	4.0 Check-Out Process Order
Account profile	5.0 Add/Modify Account Profile
Order status/history	6.0 Order Status Request
Customer comments	Information display (minor/no processes)
Company information	
Feedback	
Contact information	

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

Summary

- Data-flow Diagrams (DFD)
  - Symbols
  - Rules for creating
  - Decomposition
  - Balancing
- DFDs for Analysis
- DFDs for Business Process Reengineering (BPR)
- Logic Modeling
  - Decision Tables
- Process Modeling for the Internet

Copyright © 2012 Pearson Education, Inc. Publishing as Prentice Hall

This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. Printed in the United States of America.

Copyright © 2012 Pearson Education, Inc.
Publishing as Prentice Hall

Essentials of Systems Analysis and Design Third Edition

Joseph S. Valacich
Joey F. George
Jeffrey A. Hoffer

Chapter 8

Designing the Human Interface

Copyright 2006 Prentice-Hall, Inc.

Learning Objectives

- Explain the process of designing forms and reports and the deliverables for their creation.
- Apply the general guidelines for formatting forms and reports.
- Learn how to effectively format text, tables, and lists.
- Explain the process of designing interfaces and dialogues and the deliverables for their creation.

Copyright 2006 Prentice-Hall, Inc.

Learning Objectives (continued)

Discuss the general guidelines for interface design including:

- Layout and design
- Structuring data-entry fields
- Providing feedback
- System help

Copyright 2006 Prentice-Hall, Inc.

Learning Objectives (continued)

Discuss the design of human-computer dialogues and the use of dialogue diagramming.

Explain interface design guidelines unique to the design of Internet-based electronic commerce systems.

Copyright 2006 Prentice-Hall, Inc.

Designing Forms and Reports

System inputs and outputs are produced at the end of the analysis phase ⇒ Start of design phase.

- Precise appearance was not defined during this phase Design input and outputs where not detailed.

Forms and reports are integrally related to DFD and E-R diagrams

⇒ With that ER diagram we can make a report.

+ flow diagram.

Copyright 2006 Prentice-Hall, Inc.

Designing Forms and Reports Key Concepts

*Best to use predefined data.

Form

- A business document that contains some predefined data and may include some areas where additional data are to be filled in
- An instance of a form is typically based on one database record . one record

البيانات اللي بالفورم تتشكل

Report ⇒ Retriere from the DB.

- A business document that contains only predefined data
- A passive document for reading or viewing data
- Typically contains data from many database records or transactions

Copyright 2006 Prentice-Hall, Inc.

The Process of Designing Forms and Reports

- User Focused Activity ⇒ يركز على المستخدم .
- Follows a Prototyping Approach
- Requirements Determination:
  - Who will use the form or report?
  - What is the purpose of the form or report?
  - When is the report needed or used?
  - Where does the form or report need to be delivered and used?
  - How many people need to use or view the form or report?

Copyright 2006 Prentice-Hall, Inc.

The Process of Designing Forms and Reports (continued)

Prototyping ⇒ Depends on the requirments.

- Initial prototype is designed from requirements
- Users review prototype design and either accept the design or request changes
- If changes are requested, the construction-evaluation-request cycle is repeated until the design is accepted

Copyright 2006 Prentice-Hall, Inc.

Deliverables and Outcome

The output of Design is called design specification report./document.

Design specifications are major deliverables and contain three sections

1- Narrative overview

Provides a general overview of the characteristics of the target users, tasks, and environment factors.

2- Sample design ⇒ prototype.

3- Testing and usability assessment

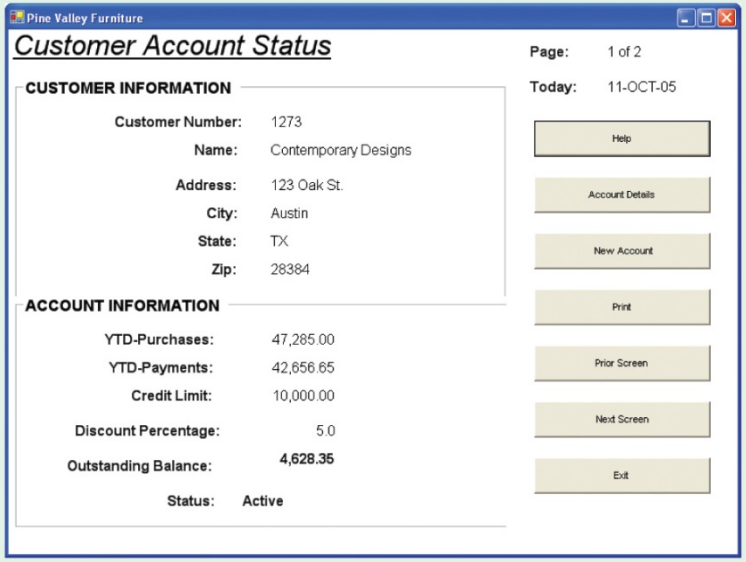
يتم عرضه على المستخدمين اللي حددناهم بالـ narrative overview - وبخليهم يقيموا الـ prototype/ sample design.

Copyright 2006 Prentice-Hall, Inc.

(a) Narrative overview

Form: Customer Account Status
Users: Customer account representatives within corporate offices
Task: Assess customer account information: address, account balance, year-to-date purchases and payments, credit limit, discount percentage, and account status.
System: Novell Network, Microsoft Windows
Environment: Standard office environment

(b) Sample design



(c) Testing and usability assessment

User-Rated Perceptions (average 14 users):

consistency [1 = consistent to 7 = inconsistent]:	1.52
sufficiency [1 = sufficient to 7 = insufficient]:	1.43
accuracy [1 = accurate to 7 = inaccurate]:	1.67
…	

FIGURE 8-4
A Design Specification for a Customer Account Status Form for Pine Valley Furniture
(A) The Narrative Overview Containing the Information Relevant to Developing and Using the Form within PVF
(B) A Sample Design of the PVF Form
(C) Testing and Usability Assessment Information

TABLE 8-2: Guidelines for Designing Forms and Reports

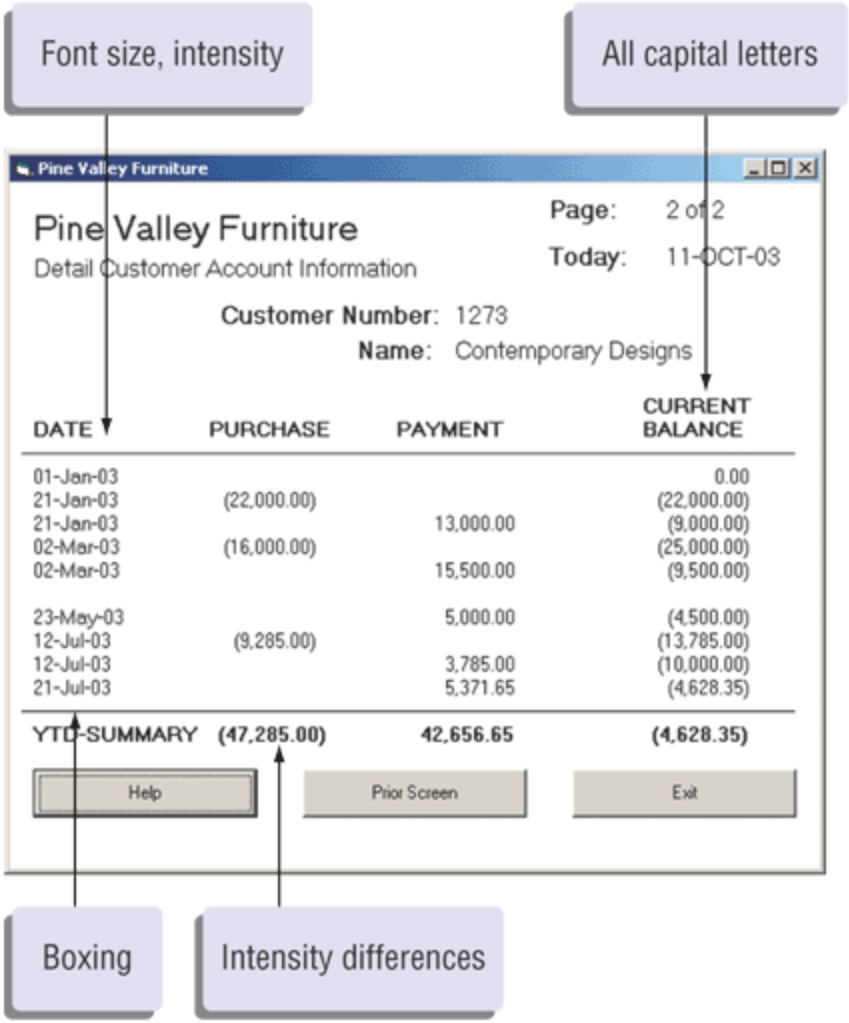
Guideline	Description
Use meaningful titles	Clear and specific titles describing content and use of form or report
	Revision date or code to distinguish a form or report from prior versions
	Current date that identifies when the form or report was generated
	Valid date that identifies on what date (or time) the data in the form or report were accurate
Include meaningful information	Only needed information displayed
	Information provided in a usable manner without modification
Balance the layout	Information balanced on the screen or page
	Adequate spacing and margins used
	All data and entry fields clearly labeled
Design an easy navigation system	Clearly show how to move forward and backward
	Clearly show where you are (e.g., page 1 of 3)
	Notify user of the last page of a multipage sequence

Table 8.3 Methods of Highlighting

Blinking and audible tones
Color differences
Intensity differences
Size differences
Font differences
Reverse video
Boxing
Underlining
All capital letters
Offsetting the position of nonstandard information

Copyright 2006 Prentice-Hall, Inc.

Figure 8.6 A Form in Which Several Types of Highlighting Are Used



Copyright 2006 Prentice-Hall, Inc.

General Formatting Guidelines for Forms and Reports (continued)

Displaying Text

- Display text in mixed upper and lower case and use conventional punctuation
- Use double spacing if space permits. If not, place a blank line between paragraphs
- Left-justify text and leave a ragged right margin
- Do not hyphenate words between lines
- Use abbreviations and acronyms only when they are widely understood by users and are significantly shorter than the full text

Copyright 2006 Prentice-Hall, Inc.

General Formatting Guidelines for Forms and Reports (continued)

Displaying Tables and Lists

- Labels
  - All columns and rows should have meaningful labels
    اسماء الصفوف والأعمدة ذات معنى .
  - Labels should be separated from other information by using highlighting
  - Redisplay labels when the data extend beyond a single screen or page

Copyright 2006 Prentice-Hall, Inc.

General Formatting Guidelines for Forms and Reports (continued)

Displaying Tables and Lists (continued)

- Formatting columns, rows, and text
  - Sort in a meaningful order مرتبة مثلاً حسب التاريخ
  - Place a blank line between every 5 rows in long columns
  - Similar information displayed in multiple columns should be sorted vertically
  - Columns should have at least two spaces between them
  - Allow white space on printed reports for user to write notes
  - Use a single typeface, except for emphasis
  - Use same family of typefaces within and across displays and reports
  - Avoid overly fancy fonts

Copyright 2006 Prentice-Hall, Inc.

General Formatting Guidelines for Forms and Reports (continued)

Displaying tables and lists (continued)

- Formatting numeric, textual, and alphanumeric data
  - Right-justify *numeric data* and align columns by decimal points or other delimiter
    الارقام محاذاة لليمين
  - Left-justify *textual data*. Use short line length, usually 30 to 40 characters per line
  - Break long sequences of *alphanumeric data* into small groups of three to four characters each

Copyright 2006 Prentice-Hall, Inc.

Figure 8.8a Contrasting Two Pine Valley Furniture Forms — A Poorly Designed Form

No column labels

Single column for all types of data

Pine Valley Furniture

CUSTOMER INFORMATION

CUSTOMER NO:	1273	
NAME:	CONTEMPORARY DESIGNS	
ADDRESS:	123 OAK ST.	
CITY-STATE-ZIP:	AUSTIN, TX 28384	
YTD-PURCHASE:	47,285.00	
CREDIT LIMIT:	10,000.00	
YTD-PAYMENTS:	42,656.65	
DISCOUNT %:	5.0	
PURCHASE:	21-JAN-03	22,000.00
PAYMENT:	21-JAN-03	13,000.00
PURCHASE:	02-MAR-03	16,000.00
PAYMENT:	02-MAR-03	15,500.00
PAYMENT:	23-MAY-03	5,000.00
PURCHASE:	12-JUL-03	9,285.00
PAYMENT:	12-JUL-03	3785.00
PAYMENT:	21-SEP-03	5,371.65
STATUS:	ACTIVE	

Numeric data are left-justified

A

Figure 8.8b Contrasting Two Pine Valley Furniture Forms — An Improved Design Form

Clear and separate column labels for each data type

Pine Valley Furniture

Page: 2 of 2

Today: 11-OCT-03

Pine Valley Furniture

Detail Customer Account Information

Customer Number: 1273

Name: Contemporary Designs

DATE	PURCHASE	PAYMENT	CURRENT BALANCE
01-Jan-03			0.00
21-Jan-03	(22,000.00)		(22,000.00)
21-Jan-03		13,000.00	(9,000.00)
02-Mar-03	(16,000.00)		(25,000.00)
02-Mar-03		15,500.00	(9,500.00)
23-May-03		5,000.00	(4,500.00)
12-Jul-03	(9,285.00)		(13,785.00)
12-Jul-03		3,785.00	(10,000.00)
21-Jul-03		5,371.65	(4,628.35)
YTD-SUMMARY	(47,285.00)	42,656.65	(4,628.35)

Help | Prior Screen | Exit

Numeric data are right-justified

B

Copyright 2006 Prentice-Hall, Inc.

Figure 8.9 Tabular Report Illustrating Good Report Design Guidelines

Place meaningful labels on all columns and rows

Alphabetic text is left-justified

Use a meaningful title

Box the table data to improve the appearance of the table

Pine Valley Furniture

Salesperson Annual Summary Report, 2002

January 10, 2003 Page 1 of 2

Region	Salesperson	SSN	*Quarterly Actual Sales* First	Second	Third	Fourth
Northwest & Mountain						
	Baker	999-99-9999	195,000	146,000	133,000	120,000
	Hawthorne	999-99-9999	220,000	175,000	213,000	198,000
	Hodges	999-99-9999	110,000	95,000	170,000	120,000
Midwest & Mid-Atlantic						
	Franklin	999-99-9999	110,000	120,000	170,000	90,000
	Stephenson[1]	999-99-9999	75,000	66,000	80,000	80,000
	Swenson	999-99-9999	110,000	98,000	100,000	90,000
New England						
	Brightman	999-99-9999	250,000	280,000	260,000	330,000
	Kennedy	999-99-9999	310,000	190,000	270,000	280,000

1. Sales reflect May 1, 2002 – December 31, 2002.

Superscript characters can be used to alert reader of more detailed information

Sort columns in some meaningful order (names are sorted alphabetically within region)

Long sequence of alphanumeric data is grouped into smaller segments

Right-justify all numeric data

Try to fit table onto a single page to help in making comparisons

Q: Given a Report. Find the violations.

Copyright 2006 Prentice-Hall, Inc.

Designing Interfaces and Dialogues

- Focus on how information is provided to and captured from users
- Dialogues are analogous to a conversation between two people
- A good human-computer interface provides a unifying structure for finding, viewing, and invoking the different components of a system

Copyright 2006 Prentice-Hall, Inc.

The Process of Designing Interfaces and Dialogues

- User-focused Activity ⇒ تهتم برضى المستخدم.
- Parallels Form and Report Design Process
- Employs Prototyping Methodology
  - n Collect information
  - n Construct prototype
  - n Assess usability
  - n Make refinements

Copyright 2006 Prentice-Hall, Inc.

The Process of Designing Interfaces and Dialogues (continued)

- Deliverables
  - n Design Specifications
    - w Narrative overview
    - w Sample design
    - w Testing and usability assessment

Copyright 2006 Prentice-Hall, Inc.

Designing Interfaces

Designing Layouts

- Standard formats similar to paper-based forms and reports should be used
- Screen navigation on data entry screens should be left-to-right, top-to-bottom as on paper forms

Copyright 2006 Prentice-Hall, Inc.

Designing Layouts

Flexibility and consistency are primary design goals

- Users should be able to move freely between fields
  سهولة بالتنقل بين ال fields .
- Data should not be permanently saved until the user explicitly requests this
- Each key and command should be assigned to one function

Copyright 2006 Prentice-Hall, Inc.

TABLE 8-6: Checklist for Validating the Usability of User Interface

Cursor-Control Capabilities

Move the cursor forward to the next data field.

Move the cursor backward to the previous data field.

Move the cursor to the first, last, or some other designated data field.

Move the cursor forward one character in a field.

Move the cursor backward one character in a field.

Editing Capabilities

Delete the character to the left of the cursor.

Delete the character under the cursor.

Delete the whole field.

Delete data from the whole form (empty the form).

Exit Capabilities

Transmit the screen to the application program.

Move to another screen/form.

Confirm the saving of edits or go to another screen/form.

Help Capabilities

Get help on a data field.

Get help on a full screen/form.

Source: Adapted from J. S. Dumas (1988). *Designing User Interfaces for Software*. Upper Saddle River, NJ: Prentice Hall.

Structuring Data Entry

TABLE 8-7: Guidelines for Structuring Data-Entry Fields

Entry	Never request data that are already online or that can be computed; for example, do not request customer data on an order form if that data can be retrieved from the database, and do not request extended prices that can be computed from quantity sold and unit prices.
Defaults	Always provide default values when appropriate; for example, assume today's date for a new sales invoice, or use the standard product price unless overridden.
Units	Make clear the type of data units requested for entry; for example, indicate quantity in tons, dozens, pounds, etc.
Replacement	Use character replacement when appropriate; for example, allow the user to look up the value in a table or automatically fill in the value once the user enters enough significant characters.
Captioning	Always place a caption adjacent to fields; see Table 8-8 for caption options.
Format	Provide formatting examples when appropriate; for example, automatically show standard embedded symbols, decimal points, credit symbol, or dollar sign.
Justify	Automatically justify data entries; numbers should be right-justified and aligned on decimal points, and text should be left-justified.
Help	Provide context-sensitive help when appropriate; for example, provide a hot key, such as the F1 key, that opens the help system on an entry that is most closely related to where the cursor is on the display.

Controlling Data Input

- One objective of interface design is to reduce data-entry errors
- Role of systems analyst is to anticipate user errors and design features into the system's interfaces to avoid, detect, and correct data-entry mistakes

Table 8-9 describes types of data entry errors

Table 8-10 lists techniques used by system designers to detect errors

Copyright 2006 Prentice-Hall, Inc.

TABLE 8-8: Display Design Options for Entering Text

Options	Example
Line caption	Phone Number ( ) -
Drop caption	( ) - Phone Number
Boxed caption	Phone Number
Delimited characters	|(| | | |)| | | |-| | | | | Phone Number
Check-off boxes	Method of payment (check one) ❑ Check ❑ Cash ❑ Credit card: Type

Table 8.9 Types of Data Errors

Data Error	Description
Appending	Adding additional characters to a field
Truncating	Losing characters from a field
Transcripting	Entering invalid data into a field
Transposing	Reversing the sequence of one or more characters in a field

Table 8.10 Techniques Used by Systems Designers to Detect Data Errors before Saving or Transmission

Validation Test	Description
Class or composition	Test to assure that data are of proper type (e.g., all numeric, all alphabetic, alphanumeric)
Combinations	Test to see if the value combinations of two or more data fields are appropriate or make sense (e.g., does the quantity sold make sense given the type of product?)
Expected values	Test to see if data are what is expected (e.g., match with existing customer names, payment amount, etc.)
Missing data	Test for existence of data items in all fields of a record (e.g., is there a quantity field on each line item of a customer order?)
Pictures/templates	Test to assure that data conform to a standard format (e.g., are hyphens in the right places for a student ID number?)
Range	Test to assure data are within a proper range of values (e.g., is a student's grade point average between 0 and 4.0?)
Reasonableness	Test to assure data are reasonable for situation (e.g., pay rate for a specific type of employee)
Self-checking digits	Test where an extra digit is added to a numeric field in which its value is derived using a standard formula (see Figure 8-15)
Size	Test for too few or too many characters (e.g., is social security number exactly nine digits?)
Values	Test to make sure values come from a set of standard values (e.g., two-letter state codes)

Copyright 2006 Prentice-Hall, Inc.

Providing Feedback

- Status Information
  - Keeps users informed of what is going on in system
  - Displaying status information is especially important if the operation takes longer than a second or two
- Prompting Cues
  - Best to keep as specific as possible ex: gives a message server is down.
- Error and Warning Messages
  - Messages should be specific and free of error codes and jargon
  - User should be guided toward a result rather than scolded
  - Use terms familiar to user
  - Be consistent in format and placement of messages

Copyright 2006 Prentice-Hall, Inc.

TABLE 8-11: Examples of Poor and Improved Error Messages

Poor Error Messages	Improved Error Messages
ERROR 56 OPENING FILE	The file name you typed was not found. Press F2 to list valid file names.
WRONG CHOICE	Please enter an option from the menu.
DATA ENTRY ERROR	The prior entry contains a value outside the range of acceptable values. Press F9 for list of acceptable values.
FILE CREATION ERROR	The file name you entered already exists. Press F10 if you want to overwrite it. Press F2 if you want to save it with a new name.

Copyright 2006 Prentice-Hall, Inc.

Providing Help

Place yourself in user's place when designing help

Guidelines

- Simplicity
  - Help messages should be short and to the point
- Organization
  - Information in help messages should be easily absorbed by users
- Show
  - It is useful to explicitly provide examples to users on how to perform an operation

Copyright 2006 Prentice-Hall, Inc.

Providing Help (continued)

Context-Sensitive Help

- Enables user to get field-specific help

Users should always be returned to where they were when requesting help

Copyright 2006 Prentice-Hall, Inc.

Figure 8.12 Paper-Based Form for Reporting Customer Sales Activity at Pine Valley Furniture

PINE VALLEY FURNITURE

Sequence and Time Information

INVOICE No. _____

Date: _____

Sales Invoice

Header

SOLD TO:

Customer Number: _____

Name: _____

Address: _____

City: _____ State: ____ Zip: _____

Phone: _____

SOLD BY: _____

Product Number	Description	Quantity Ordered	Unit Price	Total Price

Body

Total Order Amount _____

Less Discount ____ % _____

Total Amount _____

Authorization

Customer Signature: _____

Date: _____

Totals

Copyright 2006 Prentice-Hall, Inc.

Designing Dialogues

- Dialogue
  - Sequence in which information is displayed to and obtained from a user
- Primary design guideline is consistency in sequence of actions, keystrokes, and terminology
- Three step process:
  1. Design the dialogue sequence
  2. Build a prototype
  3. Assess usability

Copyright 2006 Prentice-Hall, Inc.

Designing the Dialogue Sequence

- Define the sequence
- Have a clear understanding of the user, task, technological, and environmental characteristics
- Dialogue Diagram
  - A formal method for designing and representing human-computer dialogues using box and line diagrams
  - Consists of a box with three sections

    Top: Unique display reference number used by other displays for referencing dialogue

    Middle: Contains the name or description of the display

    Bottom: Contains display reference numbers that can be accessed from the current display

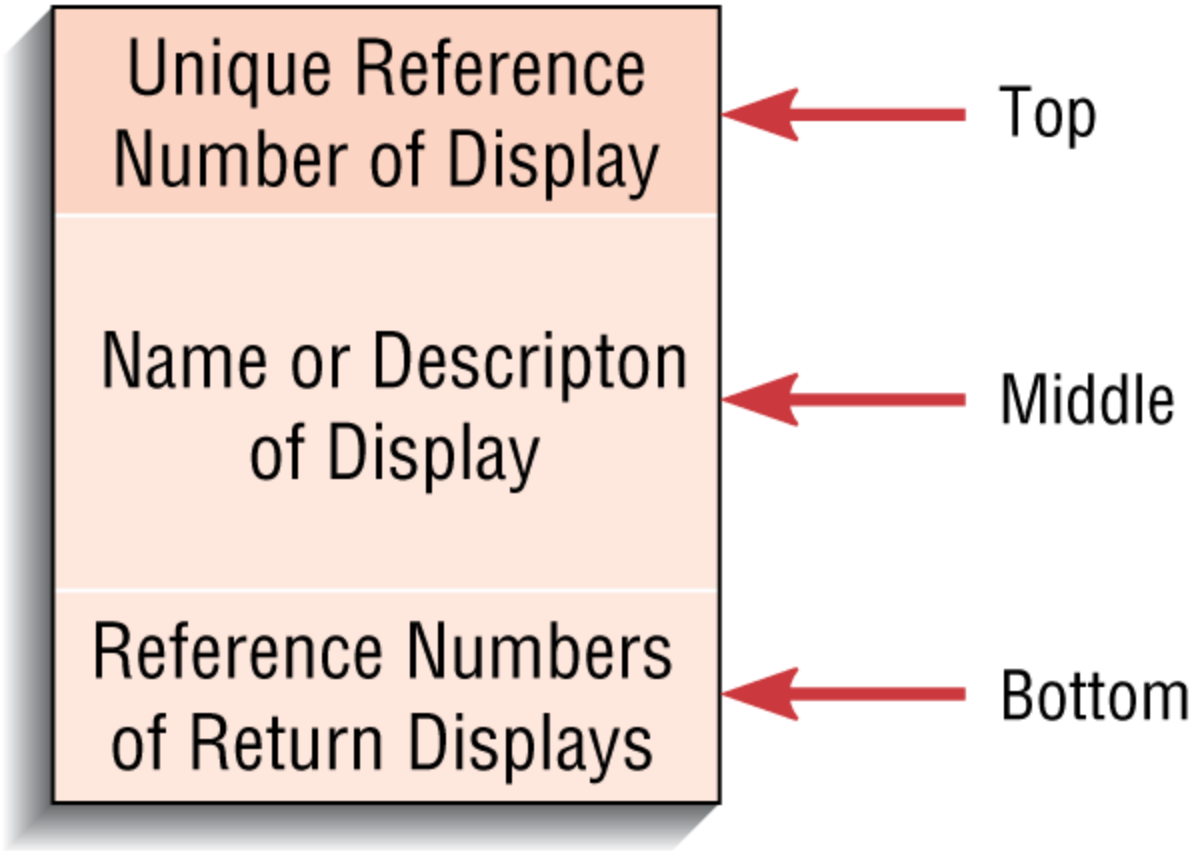
Copyright 2006 Prentice-Hall, Inc.

TABLE 8-14: Guidelines for the Design of Human-Computer Dialogues

Guideline	Explanation
Consistency	Dialogues should be consistent in sequence of actions, keystrokes, and terminology (e.g., use the same labels for the same operations on all screens and the same location of the same information on all displays).
Shortcuts and sequence	Allow advanced users to take shortcuts using special keys (e.g., CTRL-C to copy highlighted text). A natural sequence of steps should be followed (e.g., enter first name before last name, if appropriate).
Feedback	Feedback should be provided for every user action (e.g., confirm that a record has been added, rather than simply putting another blank form on the screen).
Closure	Dialogues should be logically grouped and have a beginning, middle, and end (e.g., the last in the sequence of screens should indicate that there are no more screens).
Error handling	All errors should be detected and reported; suggestions on how to proceed should be made (e.g., suggest why such errors occur and what the user can do to correct the error). Synonyms for certain responses should be accepted (e.g., accept either "t," "T," or "TRUE").
Reversal	Dialogues should, when possible, allow the user to reverse actions (e.g., undo a deletion); data should not be deleted without confirmation (e.g., display all the data for a record the user has indicated is to be deleted).
Control	Dialogues should make the user (especially an experienced user) feel in control of the system (e.g., provide a consistent response time at a pace acceptable to the user).
Ease	Dialogues should provide simple means for users to enter information and navigate between screens (e.g., provide means to move forward, backward, and to specific screens, such as first and last).

Source: Adapted from B. Shneiderman (2002). *Designing the User Interface: Strategies for Effective Human-Computer Interaction, Third Edition.* Reading, MA: Addison-Wesley.

Figure 8.18 A dialogue diagramming box has three sections.



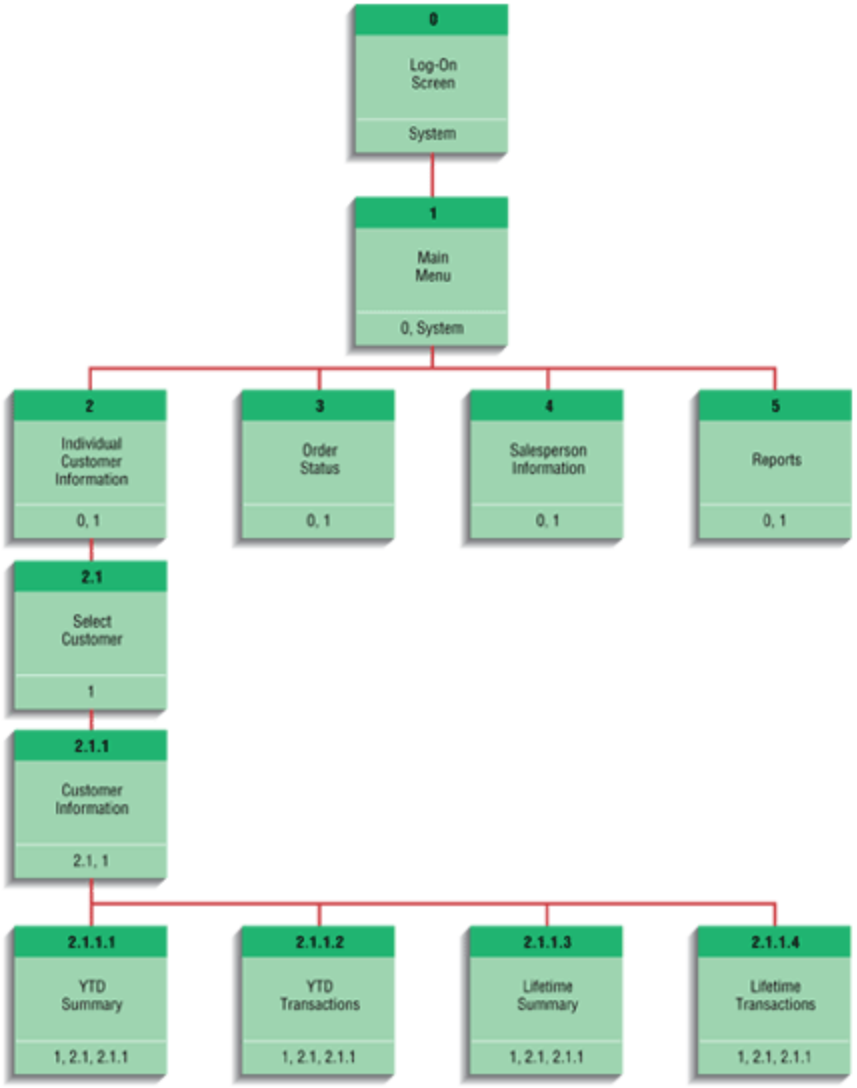
Copyright 2006 Prentice-Hall, Inc.

Designing Dialogues: Building Prototypes and Assessing Usability

- Activities often are optional
- Task is simplified by using graphical design environment

Copyright 2006 Prentice-Hall, Inc.

Figure 8.20 Dialogue Diagram for the Customer Information System at Pine Valley Furniture



Copyright 2006 Prentice-Hall, Inc.

PVF WebStore: Designing the Human Interface at Pine Valley Furniture

Design Guidelines

- Navigation via cookie crumbs
  - A technique that uses a series of tabs on a Web page to show users where they are and where they have been in the site
  - Tabs are hyperlinks to allow users to move backward easily within the site
  - Two important purposes:
    - Allows users to navigate to a point previously visited
    - Shows users where they have been and how far they have gone from point of entry into site

Copyright 2006 Prentice-Hall, Inc.

Electronic Commerce Application : Design Guidelines

Lightweight Graphics

- The use of small images to allow a Web page to be displayed more quickly

Forms and Data Integrity

- All forms that record information should be clearly labeled and provide room for input
- Clear examples of input should be provided to reduce data errors
- Site must clearly designate which fields are required, which are optional, and which have a range of values

Copyright 2006 Prentice-Hall, Inc.

Electronic Commerce Application : Design Guidelines (continued)

Template-based HTML

- Templates to display and process common attributes of higher-level, more abstract items
- Creates an interface that is very easy to maintain

Copyright 2006 Prentice-Hall, Inc.

Summary

- Designing Forms and Reports
- General Guidelines for Designing Forms and Reports
- Formatting Text, Tables and Lists
- Design Guidelines for Interfaces
  - Layout design
  - Structuring data-entry fields
  - Providing feedback
  - Designing help

Copyright 2006 Prentice-Hall, Inc.

Summary (continued)

- Human-Computer Dialogue Design
- Interface Design Guidelines Unique to the Internet

Copyright 2006 Prentice-Hall, Inc.

Essentials of Systems Analysis and Design Third Edition

Joseph S. Valacich
Joey F. George
Jeffrey A. Hoffer

Chapter 10
Systems Implementation and Operation

Copyright 2006 Prentice-Hall, Inc.

Learning Objectives

- ✓ Describe the process of coding, testing and converting an organizational information system. implementation
- ✓ Discuss four installation strategies.
  - ✓ Direct
  - ✓ Parallel ⇒ old with new.
  - ✓ Single location ⇒ install it on 1 device.
  - ✓ Phased installation ⇒ don't download all at once. but component by component.
- ✓ Describe the deliverables for documenting the system and for training and supporting the users.
- ✓ Compare the many modes available for organizational system training, including self-training and electronic performance support systems.

Copyright 2006 Prentice-Hall, Inc.

Learning Objectives (continued)

- ✓ Discuss the issues of providing support to end users.
- ✓ Discuss system implementation failure.
- ✓ Explain four types of maintenance.
- ✓ Describe several factors that influence the cost of maintaining an information system.

Copyright 2006 Prentice-Hall, Inc.

System Implementation and Operation

Seven major activities

- Coding → translation of the algorithm into one of the programming languages.
- Testing
- Installation
- Documentation → After installation because there is training.
- Training
- Support
- Maintenance

4 types

Purpose

- 1 To convert final physical system specifications into working and reliable software
  output of the design. into code testing and free from errors.
- 2 To document work that has been done
- 3 To provide help for current and future users → training, support and maintenance.

Copyright 2006 Prentice-Hall, Inc.

The Processes of Coding, Testing and Installation

Coding

Design output ⇒ Algorithm

- Physical design specifications are turned into working computer code

Testing

- Tests are performed using various strategies
- Testing can be performed in parallel with coding

Installation

- Process during which the current system is replaced by the new system

Copyright 2006 Prentice-Hall, Inc.

The Processes of Coding, Testing, and Installation: Deliverables

Action	Deliverable
Coding	Code Program documentation.
Testing	Test scenarios and test data. Results of program and system testing.
Installation	User guides User training plans. Installation and conversion plan.

How testing works:-

- comparing actual result with the expected results.
- if same, then system is free from errors

Copyright 2006 Prentice-Hall, Inc.

The Processes of Documenting the System, Training Users, and Supporting Users

Two audiences for documentation

- The information systems personnel who will maintain the system throughout its productive life
- The people who will use the system as part of their daily lives

Deliverables

- Documentation
  - System documentation
  - User documentation
- User training plan
  - Classes
  - Tutorials
- User training modules
  - Training materials
  - Computer-based training aids

Copyright 2006 Prentice-Hall, Inc.

The Processes of Documenting the System, Training Users, and Supporting Users (continued)

Deliverables (continued)

- n User support plan
  - wHelp desk
  - wOn-line help
  - wBulletin boards and other support mechanisms

Copyright 2006 Prentice-Hall, Inc.

The Process of Maintaining Information Systems

#Maintenance

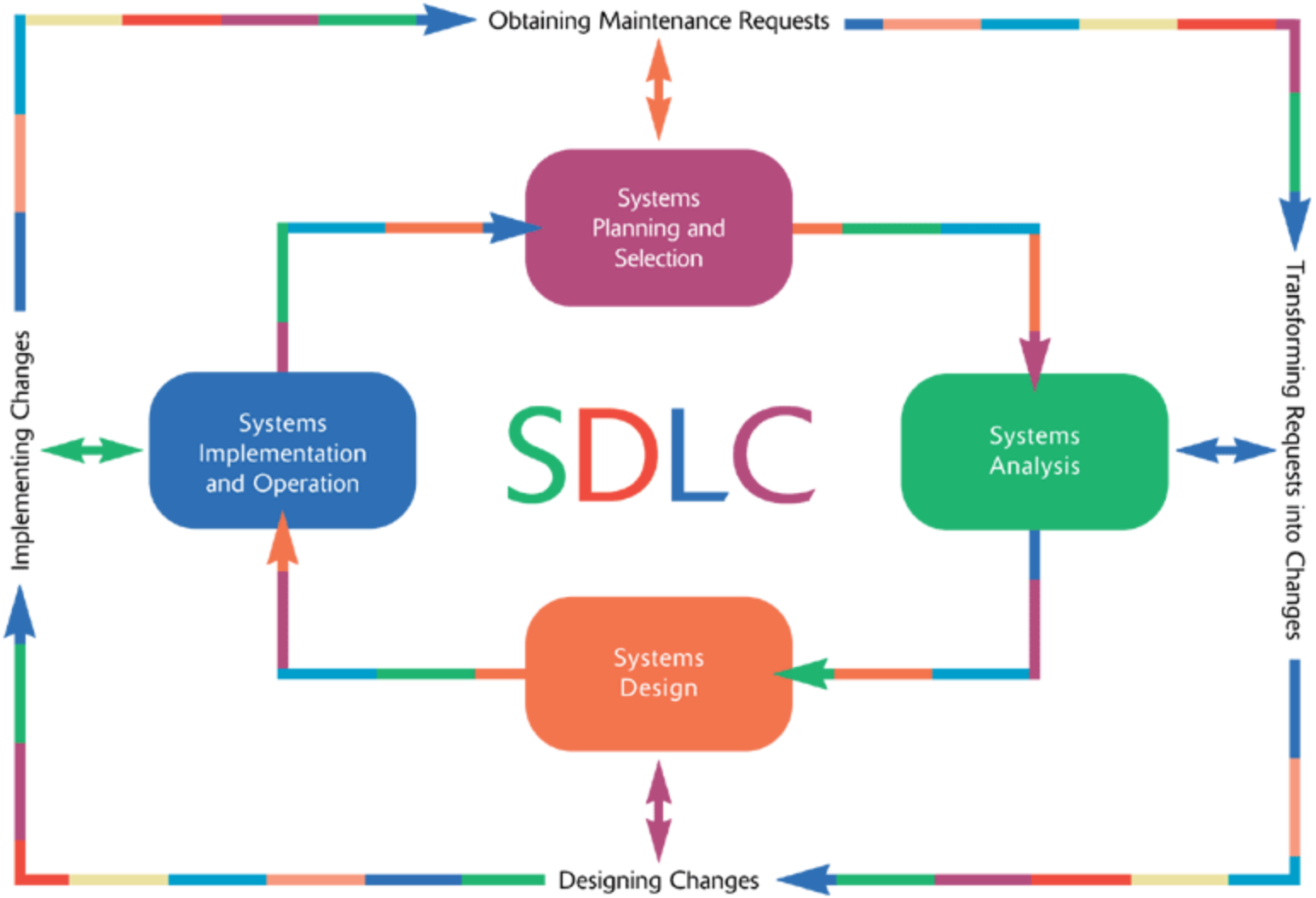
Process of returning to the beginning of the SDLC and repeating development steps focusing on system change until the change is implemented

Four major activities:

1. Obtaining maintenance requests
2. Transforming requests into changes
3. Designing changes
4. Implementing changes

Copyright 2006 Prentice-Hall, Inc.

Figure 10.2 Maintenance Activities in Relation to the SDLC



Copyright 2006 Prentice-Hall, Inc.

The Process of Maintaining Information Systems (continued)

Deliverables and Outcomes

- Development of a new version of the software, new versions of all design documents and training materials created or modified during the maintenance effort

Copyright 2006 Prentice-Hall, Inc.

Software Application Testing

- A test plan is developed during the analysis phase
- During the design phase, a unit test plan and a system test plan are developed
- The actual testing is done during implementation
- Test plans provide improved communication among all parties involved in testing
  - Serve as checklists

Copyright 2006 Prentice-Hall, Inc.

Software Application Testing
Types of Testing

Inspection

- A testing technique in which participants examine program code for predictable language-specific errors

- إكتشاف الأخطاء اللي بالكود بسبب اللغة .

Walkthrough

- A peer group review of any product created during the systems development process; also called a structured walkthrough

Desk Checking

- A testing technique in which the program code is sequentially executed manually by the reviewer

↳ like tracing and finding the output

Copyright 2006 Prentice-Hall, Inc.

Software Application Testing Types of Testing (continued)

Unit Testing

- Each module is tested alone in an attempt to discover any errors in its code, also called module testing

Integration Testing

- The process of bringing together all of the modules that a program comprises for testing purposes. Modules are typically integrated in a top-down, incremental fashion

→ From the main Unit (most imp. unit)

Copyright 2006 Prentice-Hall, Inc.

Software Application Testing Types of Testing (continued)

System Testing

- The bringing together of all the programs that a system comprises for testing purposes. Programs are typically integrated in a top-down, incremental fashion

Stub Testing

- A technique used in testing, especially where modules are written and tested in a top-down fashion, where a few lines of code are used to substitute for subordinate modules

Copyright 2006 Prentice-Hall, Inc.

Software Application Testing
The Testing Process

1- The purpose of the testing is confirming that the system satisfies requirements

2- Testing must be planned

Always assume that the requirments are correct, and the testing is for assuring that the system meets the requirments

Test Case

- A specific scenario of transactions, queries or navigation paths that represent a typical, critical or abnormal use of the system
  alternatives.
- Test cases and results should be thoroughly documented so they can be repeated for each revision of an application

Copyright 2006 Prentice-Hall, Inc.

Figure 10.4 Test Case Description and Summary Form

Pine Valley Furniture Company
Test Case Description and Summary

Test Case Number: Date:
Test Case Description:

Program/Module Name:
Testing State:
Test Case Prepared By:
Test Administrator:
Description of Test Data:

Expected Results:

Actual Results:

the most important which determines if the testing passed or failed

Explanation of Differences between Actual and Expected Results:

Suggestions for Next Steps:

Copyright 2006 Prentice-Hall, Inc.

Software Application Testing: Acceptance Testing by Users

The process whereby actual users test a completed information system, the end result of which is the users' acceptance of it

- Alpha Testing
  - User testing of a completed information system using simulated data
  - Recovery testing
    - Forces the software (or environment) to fail in order to verify that recovery is properly performed
  - Security testing
    - Verifies that protection mechanisms built into the system will protect it from improper penetration
  - Stress testing
    - Tries to break the system

Copyright 2006 Prentice-Hall, Inc.

Software Application Testing: Acceptance Testing by Users (continued)

- Alpha Testing (continued)
  - Performance testing
    - Determines how the system performs on the range of possible environments in which it may be used
- Beta Testing
  - User testing of a completed information system using real data in the real user environment

Copyright 2006 Prentice-Hall, Inc.

Installation

The organizational process of changing over from the current information system to a new one

Four approaches

- Direct Installation
  - Changing over from the old information system to a new one by turning off the old system when the new one is turned on
- Parallel Installation
  - Running the old information system and the new one at the same time until management decides the old system can be turned off

Copyright 2006 Prentice-Hall, Inc.

Installation (continued)

- Single location installation
  - Trying out an information system at one site and using the experience to decide if and how the new system should be deployed throughout the organization
- Phased Installation
  - Changing from the old information system to the new one incrementally, starting with one or a few functional components and then gradually extending the installation to cover the whole new system

السيستم القديم شغال،
بس بشيل ال module 1
القديمة وبحط بدالها
ال new module 1

Copyright 2006 Prentice-Hall, Inc.

Figure 10.5a Comparison of Installation Strategies — Direct Installation

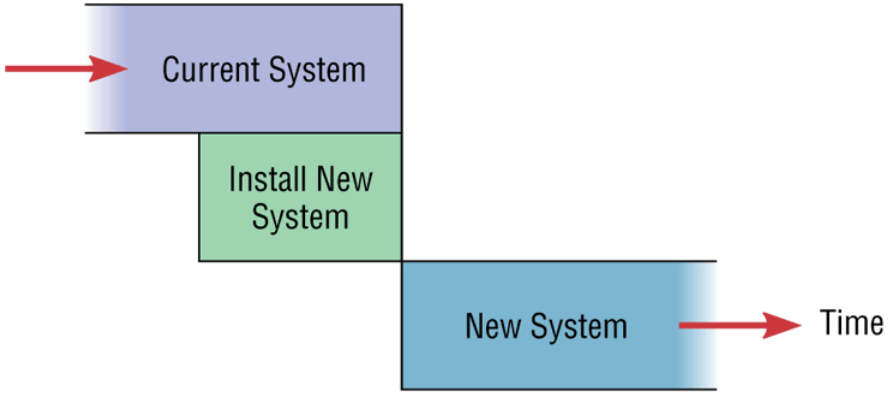
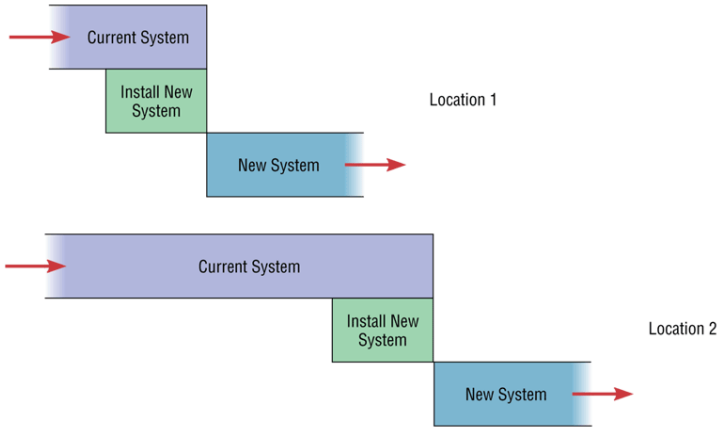


Figure 10.5c Comparison of Installation Strategies — Single Location Installation (with Direct Installation at Each Location)



Very important: draw the Installation.

Figure 10.5b Comparison of Installation Strategies — Parallel Installation

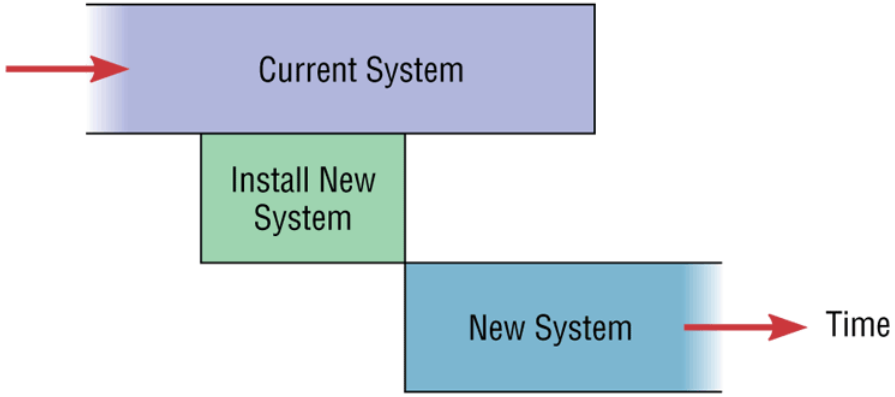
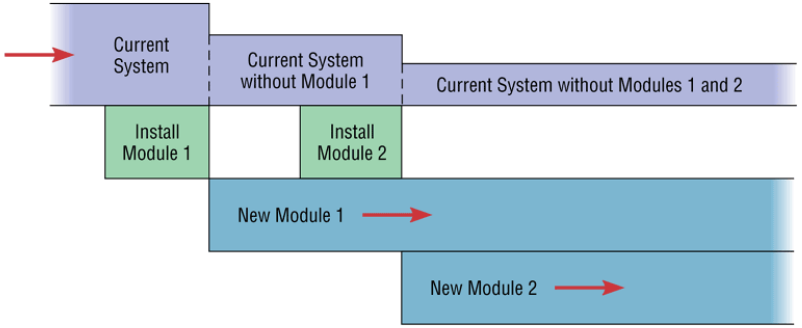


Figure 10.5d Comparison of Installation Strategies — Phased Installation



Copyright 2006 Prentice-Hall, Inc.

Planning Installation

Considerations

- Data conversion
  - Error correction
  - Loading from current system
- Planned system shutdown
- Business cycle of organization

Copyright 2006 Prentice-Hall, Inc.

Documenting the System

System Documentation

- Detailed information about a system's design specifications, its internal workings, and its functionality
- Internal documentation
  - System documentation that is part of the program source code or is generated at compile time
- External documentation
  - System documentation that includes the outcome of structured diagramming techniques such as data-flow and entity-relationship diagrams

Copyright 2006 Prentice-Hall, Inc.

Documenting the System (continued)

User Documentation

- Written, or other visual information, about an application system, how it works, and how to use it

Preparing User Documentation

- Traditional source has been information systems department
- Application-oriented documentation is now often supplied by vendors and users themselves

Copyright 2006 Prentice-Hall, Inc.

Training Information System Users

Potential Training Topics

- Use of the system
- General computer concepts
- Information system concepts
- Organizational concepts
- System management
- System installation

Copyright 2006 Prentice-Hall, Inc.

Training Information System Users (continued)

Training Methods

- n Resident expert
- n Computer-aided instruction
- n Formal courses
- n Software help components
- n Tutorials
- n Interactive training manuals
- n External sources, such as vendors

Copyright 2006 Prentice-Hall, Inc.

Table 10.5 Types and Frequencies of Training Methods

Method of Training	Relative Frequency
Resident expert	51
Computer-aided instruction	12
Formal courses—several people taught at the same time	10
Software help components	10
Tutorials—one person taught at a time	7
Interactive training manuals—combination of tutorials and computer-aided instruction	5
External sources, such as vendors	5

Copyright 2006 Prentice-Hall, Inc.

Training Information System Users (continued)

- Electronic performance support system (EPSS)
  - n Component of a software package or application in which training and educational information is embedded

Copyright 2006 Prentice-Hall, Inc.

Supporting Information System Users

- Support is extremely important to users
  - n J.D. Power and Associates survey found user support to be number one criterion contributing to user satisfaction with personal computing
- Most organizations provide support by two means:
  - n Information center
  - n Help desk

Copyright 2006 Prentice-Hall, Inc.

Supporting Information System Users Information Center

An organizational unit whose mission is to support users in exploiting information technology

Staff might perform the following tasks:

- Install new hardware or software and set up user accounts
- Consult with users writing programs in fourth-generation languages
- Extract data from organizational databases onto personal computers
- Answer basic on-demand questions
- Provide a demonstration site for viewing hardware and software
- Work with users to submit system change requests

Copyright 2006 Prentice-Hall, Inc.

Supporting Information System Users Help Desk

- A single point of contact for all user inquiries and problems about a particular information system or for all users in a particular department

Copyright 2006 Prentice-Hall, Inc.

Why Implementation Sometimes Fails

Two conditions necessary for a successful implementation

- Management support of the system under development
- Involvement of users in the development process

Copyright 2006 Prentice-Hall, Inc.

Why Implementation Sometimes Fails (continued)

Insights about implementation process

- n Risk
- n Commitment to the project
- n Commitment to change
- n Extent of project definition and planning
- n Realistic user expectations

Copyright 2006 Prentice-Hall, Inc.

Why Implementation Sometimes Fails (continued)

Implementation success factors

- Extent to which system is used
- System ease of use and reliability
- User's satisfaction with system
- User demographics, such as age and degree of computer experience

Copyright 2006 Prentice-Hall, Inc.

Project Closedown

- Evaluate team
  - Reassign members to other projects
- Notify all affected parties that the development project is ending and that you are switching to operation and maintenance mode
- Conduct post project reviews
- Close out customer contract
  - Formal signoff

Copyright 2006 Prentice-Hall, Inc.

Conducting System Maintenance: Types of Maintenance

- Corrective maintenance
  - Changes made to a system to repair flaws in its design, coding, or implementation
- Adaptive maintenance
  - Changes made to a system to evolve its functionality to changing business needs or technologies
- Perfective maintenance
  - Changes made to a system to add new features or to improve performance
- Preventive maintenance
  - Changes made to a system to avoid possible future problems

Copyright 2006 Prentice-Hall, Inc.

Conducting System Maintenance: The Cost of Maintenance

Many organizations allocate as much as 60 to 80 percent of information systems budget to maintenance

Factors that influence system maintainability:

- Latent defects
- Number of customers for a given system
- Quality of system documentation
- Maintenance personnel
- Tools
- Well-structured programs

Copyright 2006 Prentice-Hall, Inc.

Conducting System Maintenance Measures of Effectiveness

- Number of Failures
- Time between Each Failure
- Type of Failure
- Mean Time between Failures (MTBF)
  - n A measurement of error occurrences that can be tracked over time to indicate the quality of a system

Copyright 2006 Prentice-Hall, Inc.

Controlling Maintenance Requests

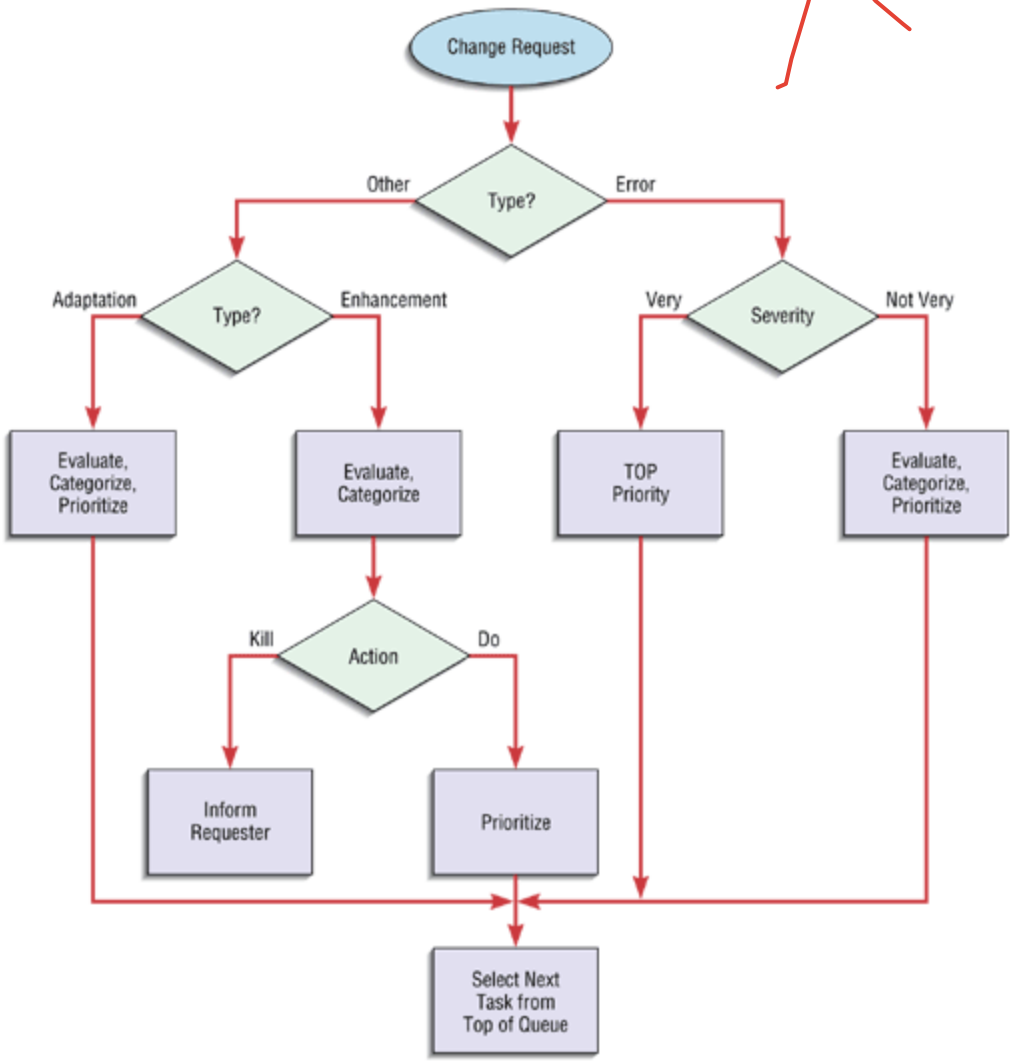
Determine type of request

- Error
- Adaptation
- Enhancement

Figure 10-9 shows a flowchart for a request procedure

Copyright 2006 Prentice-Hall, Inc.

Figure 10.9 Flowchart Showing How to Control Maintenance Request



Source: Adapted from Pressman, 1992.

Copyright 2006 Prentice-Hall, Inc.

Configuration Management

- The process of assuring that only authorized changes are made to the system
- Baseline Modules
  - Software modules that have been tested, documented, and approved to be included in the most recently created version of a system
- System Librarian
  - A person responsible for controlling the checking out and checking in of baseline modules when a system is being developed or maintained
- Build Routines
  - Guidelines that list the instructions to construct an executable system from the baseline source code

Copyright 2006 Prentice-Hall, Inc.

PVF WebStore: Systems Implementation and Operation

- System implementation and operation of an Internet-based electronic commerce project is no different than other projects
- Develop Test Cases
  - Simple functionality
  - Multiple functionality
  - Function chains
  - Elective functions
  - Emergency/crisis
- Bug Tracking and System Evolution
- Alpha and Beta Testing the WebStore
- WebStore Installation

Copyright 2006 Prentice-Hall, Inc.

Summary

Process of coding, testing, and converting an organizational information system

Four installation strategies:

- Direct
- Parallel
- Single location
- Phased installation

Copyright 2006 Prentice-Hall, Inc.

Summary (continued)

- Documentation
  - n System
  - n User
- User Training
- Providing Support for End Users
- Systems Implementation Failures

Copyright 2006 Prentice-Hall, Inc.

Summary (continued)

- Maintenance
  - n Corrective
  - n Adaptive
  - n Perfective
  - n Preventive
- Cost of Maintenance
- Measuring Effectiveness of Maintenance

Copyright 2006 Prentice-Hall, Inc.

Summary (continued)

- Controlling Maintenance Requests
- Configuration Management
- Internet Development

Copyright 2006 Prentice-Hall, Inc.