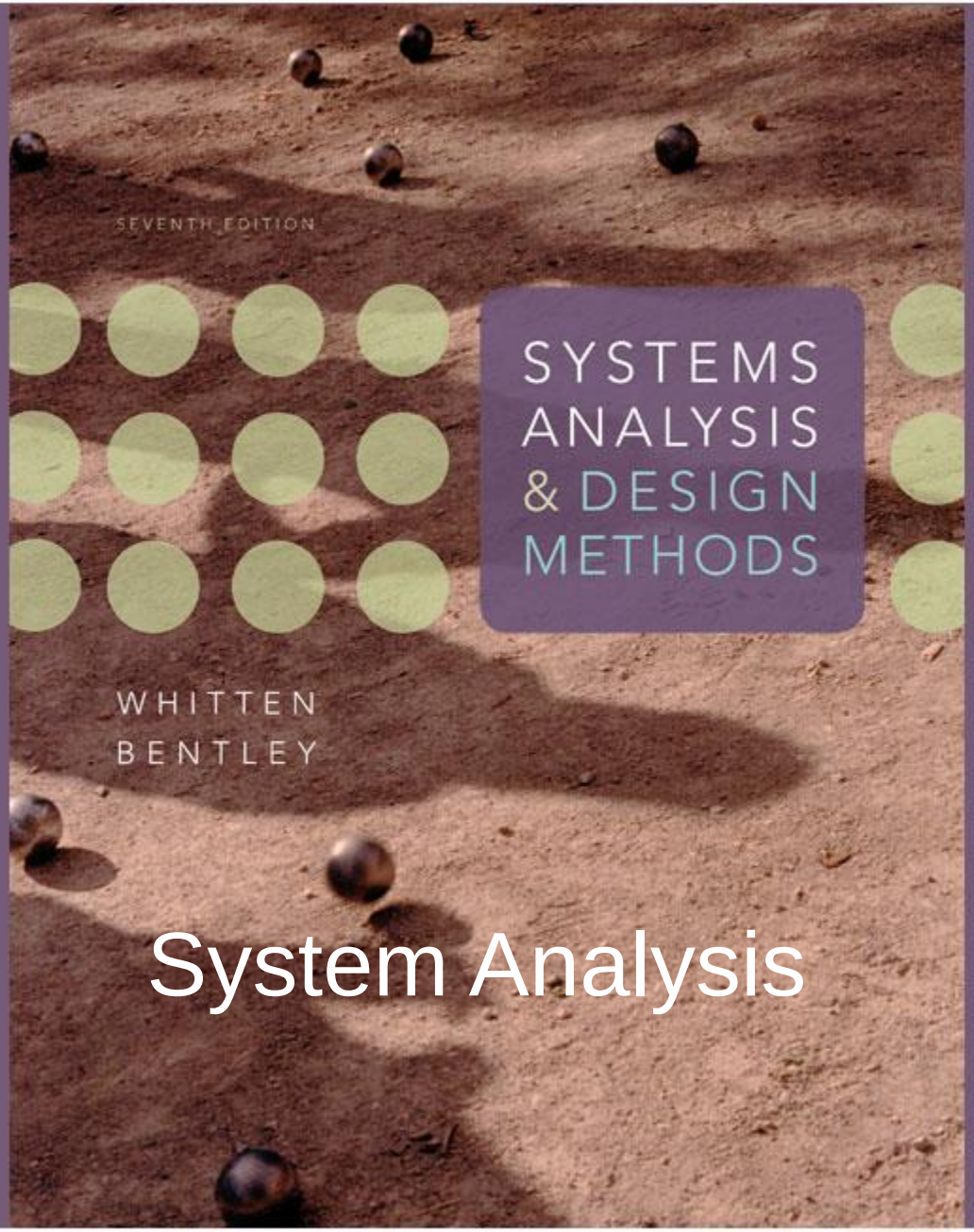


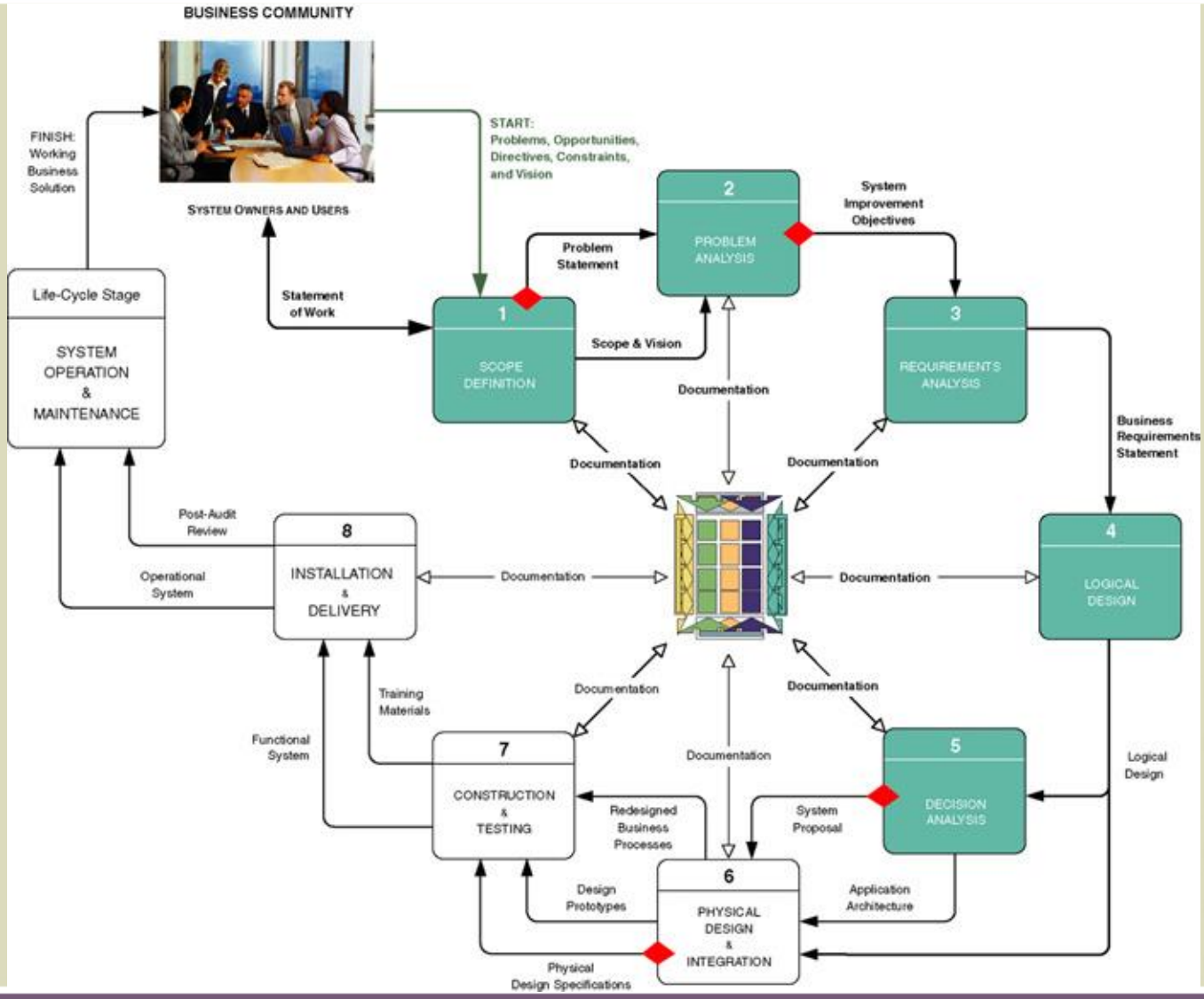
System Analysis

What is Systems Analysis ?

Information systems analysis –

فازهایی از توسعه سیستم اطلاعاتی که که تمرکز اصلی آنها بر مساله کسب و کار و نیازمندی ها است، مستقل از هر تکنولوژی که میتواند برای پیاده سازی راه حل به کار رود.

Context of Systems Analysis



Model-Driven Approaches

- **Traditional Approaches**
  - تمرکز اصلی بر ساختار داده های ذخیره شده و هم چنین جریان داده ها بین فرایند ها است.
  - مدل های اصلی: نمودار جریان داده (data flow diagram)
    و نمودار موجودیت رابطه (entity relationship diagram)
- **Object-Oriented Approach**
  - مسائل مرتبط با فرایند و داده را در اشیاء تجمیع میکند.
    - **Unified Modeling Language (UML)**

Accelerated Systems Analysis

Accelerated systems analysis

رویکردهایی که از ساخت نمونه های اولیه تاکید دارند تا از این رهگذر سریع تر نیازمندی های کسب و کار و کاربر را برای سیستم جدید شناسایی کنند.

prototype –

یک نمونه در مقیاس کوچک و ناکامل از یک سیستم مورد نظر که کار می کند.

- Accelerated systems analysis approaches
  - Discovery Prototyping
  - Rapid Architected Analysis

Discovery Prototyping

Discovery prototyping –

تکنیکی که برای شناسایی نیازمندی های کاربر مورد استفاده قرار می گیرد به این طریق که کاربران یک پیاده سازی سریع و کثیف از نیازمندی های خود را مشاهده می کنند.

Rapid Architected Analysis

Rapid architected analysis –

رویکردی که تلاش می کند مدل های سیستم را از سیستم های موجود یا نمونه های اولیه discovery استخراج کند.

- **Reverse engineering** – the use of technology that reads the program code for an existing database, application program, and/or user interface and automatically generates the equivalent system model.

Business Process Redesign

Business process redesign (BPR) –

اعمال روش های تحلیل سیستم با هدف تغییر و بهبود چشمگیر فرایندهای پایه ای یک سازمان، به صورت مستقل از تکنولوژی اطلاعاتی

FAST Systems Analysis Phases

- Scope Definition Phase
  - *Is the project worth looking at?*
- Problem Analysis Phase
  - *Is a new system worth building?*
- Requirements Analysis Phase
  - *What do the users need and want from the new system?*
- Logical Design Phase
  - *What must the new system do?*
- Decision Analysis Phase
  - *What is the best solution?*

Tasks for the Scope Definition Phase

- مشخص کردن مشکلات و فرصت‌های پایه
- تعامل در مورد موارد فوق
- تصمیم بر ارزشمند بودن کار بر موارد فوق
- تعیین زمان‌بندی و بودجه پایه
- اطلاع‌رسانی و تعامل در مورد برنامه پروژه

- Out put: the project scope, plan, methodology, standards, and so on.

Sample Problem Statements

Problem Statements

Project: Member services information system	Project manager: Sandra Shepherd
Created by: Sandra Shepherd	Last updated by: Robert Martinez
Date created: January 9, 2003	Date last updated: January 15, 2003

Brief Statements of Problem, Opportunity, or Directive	Urgency	Visibility	Annual Benefits	Priority or Rank	Proposed Solution
1. Order response time as measured from time of order receipt to time of customer delivery has increased to an average of 15 days.	ASAP	High	$175,000	2	New development
2. The recent acquisitions of Private Screenings Video Club and Game-Screen will further stress the throughput requirements for the current system.	6 months	Med	75,000	2	New development
3. Currently, three different order entry systems service the audio, video, and game divisions. Each system is designed to interface with a different warehousing system; therefore, the intent to merge inventory into a single warehouse has been delayed.	6 months	Med	515,000	2	New development
4. There is a general lack of access to management and decision-making information. This will become exasperated by the acquisition of two additional order processing systems (from Private Screenings and Game-Screen)	12 months	Low	15,000	3	After new system is developed, provide users with easy-to-learn and -use reporting tools.

Tasks of the Problem Analysis Phase

- فهم دامنه مسئله
- تحلیل مشکلات و فرصت‌ها
- اختیاری: تحلیل فرایندهای سازمان
- تعیین اهداف بهبود سیستم
- به روزرسانی برنامه پروژه
- اطلاع‌رسانی و تعامل در باب خروجی‌های بدست آمده

- Out put: System Improvement Report

Key Terms of the Problem Analysis Phase

Cause-and-effect analysis – a technique in which problems are studied to determine their causes and effects.

In practice, effects can be symptomatic of more deeply rooted problems which, in turn, must be analyzed for causes and effects until the causes and effects do not yield symptoms of other problems.

Requirements Analysis Phase Tasks

- مشخص‌سازی و طرح نیازمندی‌ها
- اولویت‌بندی نیازمندی‌ها
- به روزرسانی یا پالایش برنامه پروژه
- اطلاع‌رسانی و تعامل در باب سند نیازمندی‌ها

- Out put: Business requirement statement

Key Terms of Requirements Analysis Phase

Functional requirement – a description of activities and services a system must provide.

- inputs, outputs, processes, stored data

Nonfunctional requirement – a description of other features, characteristics, and constraints that define a satisfactory system.

- Performance, ease of learning and use, budgets, deadlines, documentation, security, internal auditing controls

Tasks for Logical Design Phase

- ساختاردهی به نیازمندی‌ها عملکردی (ایجاد مدل‌ها)
- ایجاد نمونه اولیه از نیازمندی‌های عملکردی
- تعریف تست‌های پذیرش
- درستی‌یابی نیازمندها

- Output: System models and/or prototype

Tasks for Decision Analysis Phase

- مشخص‌سازی راه‌حل‌های جایگزین
- تحلیل راه‌حل‌های جایگزین (تحلیل امکان‌پذیری)
- مقایسه راه‌حل‌های جایگزین (و انتخاب راه‌حل)
- به روزرسانی برنامه
- پیشنهاد راه‌حل سیستم

- Output: System proposal

Key Terms of Decision Analysis Phase

- **Technical feasibility** – Is the solution technically practical? Does our staff have the technical expertise to design and build this solution?
- **Operational feasibility** – Will the solution fulfill the users' requirements? To what degree? How will the solution change the users' work environment? How do users feel about such a solution?
- **Economic feasibility** – Is the solution cost-effective?
- **Schedule feasibility** – Can the solution be designed and implemented within an acceptable time period?

Optional: Feasibility Matrix

Feasibility Criteria	Weight	Candidate 1	Candidate 2	Candidate 3	Candidate . . .
Operational Feasibility **Functionality**. A description of to what degree the candidate would benefit the organization and how well the system would work. **Political**. A description of how well received this solution would be from both user management, user, and organization perspective.	30%	Only supports Member Services requirements and current business processes would have to be modified to take advantage of software functionality **Score: 60**	Fully supports user required functionality. **Score: 100**	Same as candidate 2. **Score: 100**	
Technical Feasibility **Technology**. An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate. **Expertise**. An assessment of the technical expertise needed to develop, operate, and maintain the candidate system.	30%	Current production release of Platinum Plus package is version 1.0 and has only been on the market for 6 weeks. Maturity of product is a risk and company charges an additional monthly fee for technical support. Required to hire or train C++ expertise to perform modifications for integration requirements. **Score: 50**	Although current technical staff has only Powerbuilder experience, the senior analysts who saw the MS Visual Basic demonstration and presentation have agreed the transition will be simple and finding experienced VB programmers will be easier than finding Powerbuilder programmers and at a much cheaper cost. MS Visual Basic 5.0 is a mature technology based on version number. **Score: 95**	Although current technical staff is comfortable with Powerbuilder, management is concerned with recent acquisition of Powerbuilder by Sybase Inc. MS SQL Server is a current company standard and competes with SYBASE in the Client/Server DBMS market. Because of this we have no guarantee future versions of Powerbuilder will "play well" with our current version SQL Server. **Score: 60**	
Economic Feasibility **Cost to develop:** **Payback period (discounted):** **Net present value:** **Detailed calculations:**	30%	 Approximately $350,000. Approximately 4.5 years. Approximately $210,000. See Attachment A. **Score: 60**	 Approximately $418,040. Approximately 3.5 years. Approximately $306,748. See Attachment A. **Score: 85**	 Approximately $400,000. Approximately 3.3 years. Approximately $325,500. See Attachment A. **Score: 90**	
Schedule Feasibility An assessment of how long the solution will take to design and implement.	10%	Less than 3 months. **Score: 95**	9–12 months **Score: 80**	9 months **Score: 85**	
Ranking	100%	60.5	92	83.5	

Optional: Typical System Proposal Outline

I. Introduction
   A. Purpose of the report
   B. Background of the project leading to this report
   C. Scope of the report
   D. Structure of the report
II. Tools and techniques used
   A. Solution generated
   B. Feasibility analysis (cost-benefit)
III. Information systems requirements
IV. Alternative solutions and feasibility analysis
V. Recommendations
VI. Appendices

Appendix A: System Improvement Report Outline

I. Executive summary (approximately 2 pages)
   A. Summary of recommendation
   B. Summary of problems, opportunities, and directives
   C. Brief statement of system improvement objectives
   D. Brief explanation of report contents

II. Background information (approximately 2 pages)
   A. List of interviews and facilitated group meetings conducted
   B. List of other sources of information that were exploited
   C. Description of analytical techniques used

III. Overview of current system (approximately 5 pages)
   A. Strategic implications (if project is part of or impacts existing IS strategic plan)
   B. Models of the current system
      1. Interface model (showing project scope)
      2. Data model (showing project scope)
      3. Geographical models (showing project scope)
      4. Process model (showing functional decomposition only)

System Improvement Report Outline (cont.)

IV. Analysis of the current system (approx. 5-10 pages)
- A. Performance problems, opportunities, cause-effect analysis
- B. Information problems, opportunities, cause-effect analysis
- C. Economic problems, opportunities, cause-effect analysis
- D. Control problems, opportunities, cause-effect analysis
- E. Efficiency problems, opportunities, cause-effect analysis
- F. Service problems, opportunities, and cause-effect analysis

V. Detailed recommendations (approx. 5-10 pages)
- A. System improvement objectives and priorities
- B. Constraints
- C. Project Plan
  1. Scope reassessment and refinement
  2. Revised master plan
  3. Detailed plan for the definition phase

VI. Appendixes
- A. Any detailed system models
- B. Other documents as appropriate

Optional: Sample Cause-and-Effect Analysis

PROBLEMS, OPPORTUNITIES, OBJECTIVES, AND CONSTRAINTS MATRIX

Project:	Member Services Information System	Project Manager:	Sandra Shepherd
Created by:	Robert Martinez	Last Updated by:	Robert Martinez
Date Created:	January 21, 2003	Date Last Updated:	January 31, 2003

CAUSE-AND-EFFECT ANALYSIS		SYSTEM IMPROVEMENT OBJECTIVES	
Problem or Opportunity	**Causes and Effects**	**System Objective**	**System Constraint**
1. Order response time is unacceptable.	1. Throughput has increased while number of order clerks was downsized. Time to process a single order has remained relatively constant. 2. System is too keyboard-dependent. Many of the same values are keyed for most orders. Net result is (with the current system) each order takes longer to process than is ideal. 3. Data editing is performed by the AS/400. As that computer has approached its capacity, order edit responses have slowed. Because order clerks are trying to work faster to keep up with the volume, the number of errors has increased. 4. Warehouse picking tickets for orders were never designed to maximize the efficiency of order fillers. As warehouse operations grew, order filling delays were inevitable.	1. Decrease the time required to process a single order by 30%. 2. Eliminate keyboard data entry for as much as 50% of all orders. 3. For remaining orders, reduce as many key-strokes as possible by replacing keystrokes with point-and-click objects on the computer display screen. 4. Move data editing from a shared computer to the desktop. 5. Replace existing picking tickets with a paperless communication system between member services and the warehouse.	1. There will be no increase in the order processing workforce. 2. Any system developed must be compatible with the existing Windows 95 desktop standard. 3. New system must be compatible with the already approved automatic identification system (for bar coding).

Optional: Candidate Systems Matrix

Characteristics	Candidate 1	Candidate 2	Candidate 3	Candidate ...
Portion of System Computerized Brief description of that portion of the system that would be computerized in this candidate.	COTS package Platinum Plus from Entertainment Software Solutions would be purchased and customized to satisfy Member Services required functionality.	Member Services and warehouse operations in relation to order fulfillment.	Same as candidate 2.	
Benefits Brief description of the business benefits that would be realized for this candidate.	This solution can be implemented quickly because it's a purchased solution.	Fully supports user required business processes for SoundStage Inc. Plus more efficient interaction with member accounts.	Same as candidate 2.	
Servers and Workstations A description of the servers and workstations needed to support this candidate.	Technically architecture dictates Pentium Pro, MS Windows NT class servers and Pentium, MS Windows NT 4.0 workstations (clients).	Same as candidate 1.	Same as candidate 1.	
Software Tools Needed Software tools needed to design and build the candidate (e.g., database management system, emulators, operating systems, languages, etc.). Not generally applicable if applications software packages are to be purchased.	MS Visual C++ and MS Access for customization of package to provide report writing and integration.	MS Visual Basic 5.0 System Architect 3.1 Internet Explorer	MS Visual Basic 5.0 System Architect 3.1 Internet Explorer	
Application Software A description of the software to be purchased, built, accessed, or some combination of these techniques.	Package Solution	Custom Solution	Same as candidate 2.	

Candidate Systems Matrix (cont.)

Method of Data Processing Generally some combination of: on-line, batch, deferred batch, remote batch, and real-time.	Client/Server	Same as candidate 1.	Same as candidate 1.	
Output Devices and Implications A description of output devices that would be used, special output requirements (e.g., network, preprinted forms, etc.), and output considerations (e.g., timing constraints).	(2) HP4MV department laser printers (2) HP5SI LAN laser printers	(2) HP4MV department laser printers (2) HP5SI LAN laser printers (1) PRINTRONIX bar-code printer (includes software & drivers) Web pages must be designed to VGA resolution. All internal screens will be designed for SVGA resolution.	Same as candidate 2.	
Input Devices and Implications A description of input methods to be used, input devices (e.g., keyboard, mouse, etc.), special input requirements (e.g., new or revised forms from which data would be input), and input considerations (e.g., timing of actual inputs).	Keyboard & mouse	Apple "Quick Take" digital camera and software (15) PSC Quickscan laser bar-code scanners (1) HP Scanjet 4C Flatbed Scanner Keyboard & mouse	Same as candidate 2.	
Storage Devices and Implications Brief description of what data would be stored, what data would be accessed from existing stores, what storage media would be used, how much storage capacity would be needed, and how data would be organized.	MS SQL Server DBMS with 100GB arrayed capability.	Same as candidate 1.	Same as candidate 1.	