



CCJ-123-DASAR PENGEMBANGAN PERANGKAT LUNAK (PERTEMUA-3)

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Systems Planning, Analysis, and Design

Chapter 12

Describe the relationship of systems analysis to systems development as a whole.

- Systems development consists primarily of three phases:
 - 1 Systems analysis
 - 2 Systems design
 - 3 Systems implementation
- This chapter discusses the first two of these phases.
- *Systems planning* involves identifying subsystems within the information system that need special attention for development.
- *Systems analysis* begins after systems planning has identified subsystems for development.

Systems Planning and Feasibility Analysis

Objectives of Systems Analysis

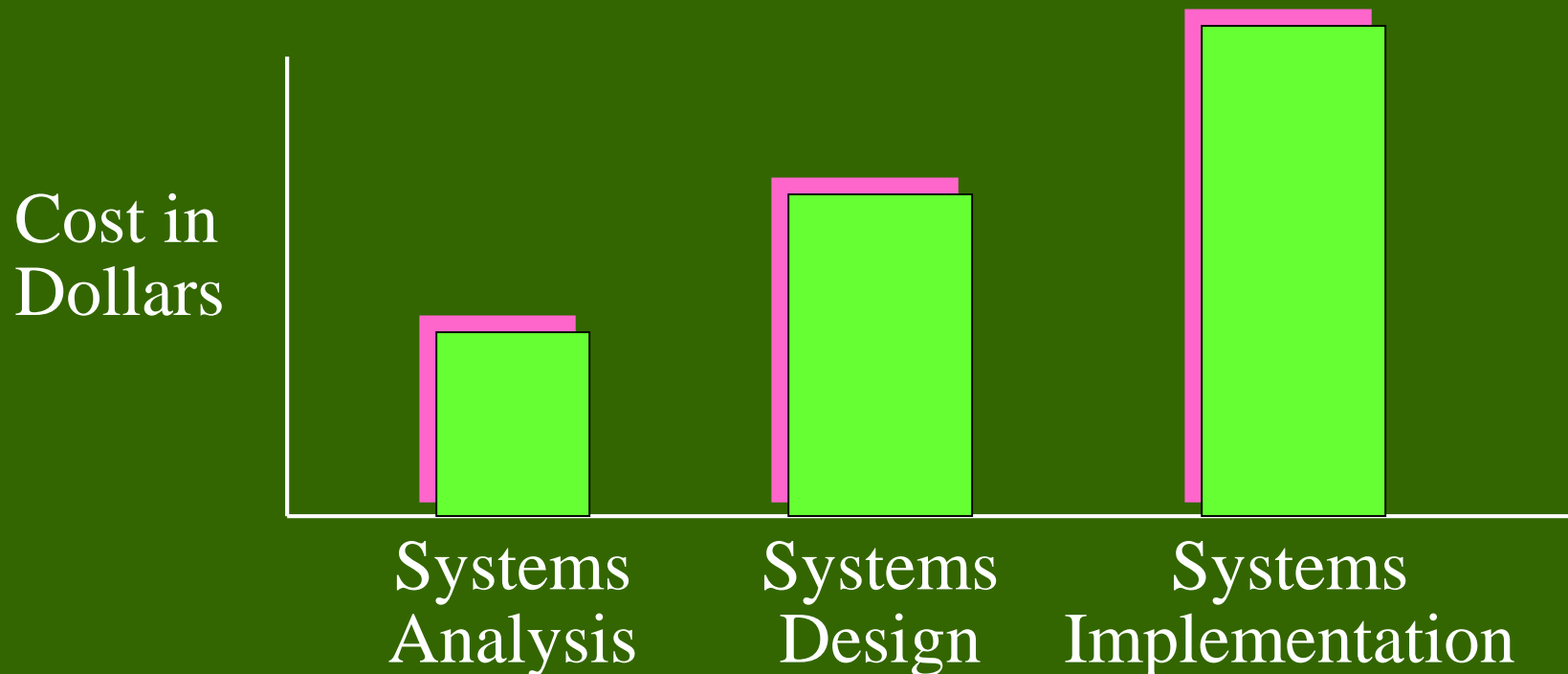
1. Gain an understanding of the existing system (if one exists).
2. Identify and understand problems.
3. Express identified problems in terms of information needs and system requirements.
4. Clearly identify subsystems to be given highest priority.

Focus

- Identify critical success factors.
- Give special attention to these factors.

Systems Planning and Feasibility Analysis

Cost Patterns at Varying Development Stages



Systems Planning and Feasibility Analysis

- An overall plan seeks to ensure the following objectives:
 - 1 Resources will be targeted to the subsystems where the needs are greatest.
 - 2 Duplication and wasted effort will be minimized.
 - 3 Systems development in the organization will be consistent with the overall strategic plan of the organization.

Systems planning and feasibility analysis involve seven phases:

- 1 Discussing and planning on the part of top management
- 2 Establishing a systems planning steering committee
- 3 Establishing overall objectives and constraints
- 4 Developing a strategic information systems plan
- 5 Identifying and prioritizing specific areas within the organization for the systems development focus
- 6 Setting forth a systems proposal to serve as a basis of the analysis and preliminary design for a given subsystem
- 7 Assembling a team of individuals for purposes of the analysis and preliminary systems design

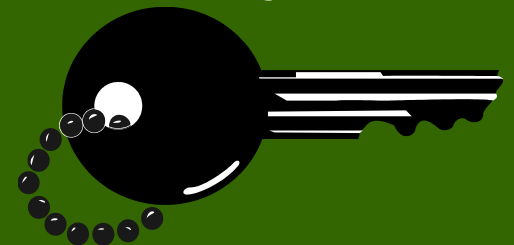
Systems Planning and Feasibility Analysis

- It is crucial that all major systems development efforts have the support of *top management*.
- A useful approach to guiding the overall systems development effort is to have a *steering committee*, representing top management and all major functional areas within the organization.
- *General objectives* include the overall strategic objectives relating to the company's long-run planning cycle.

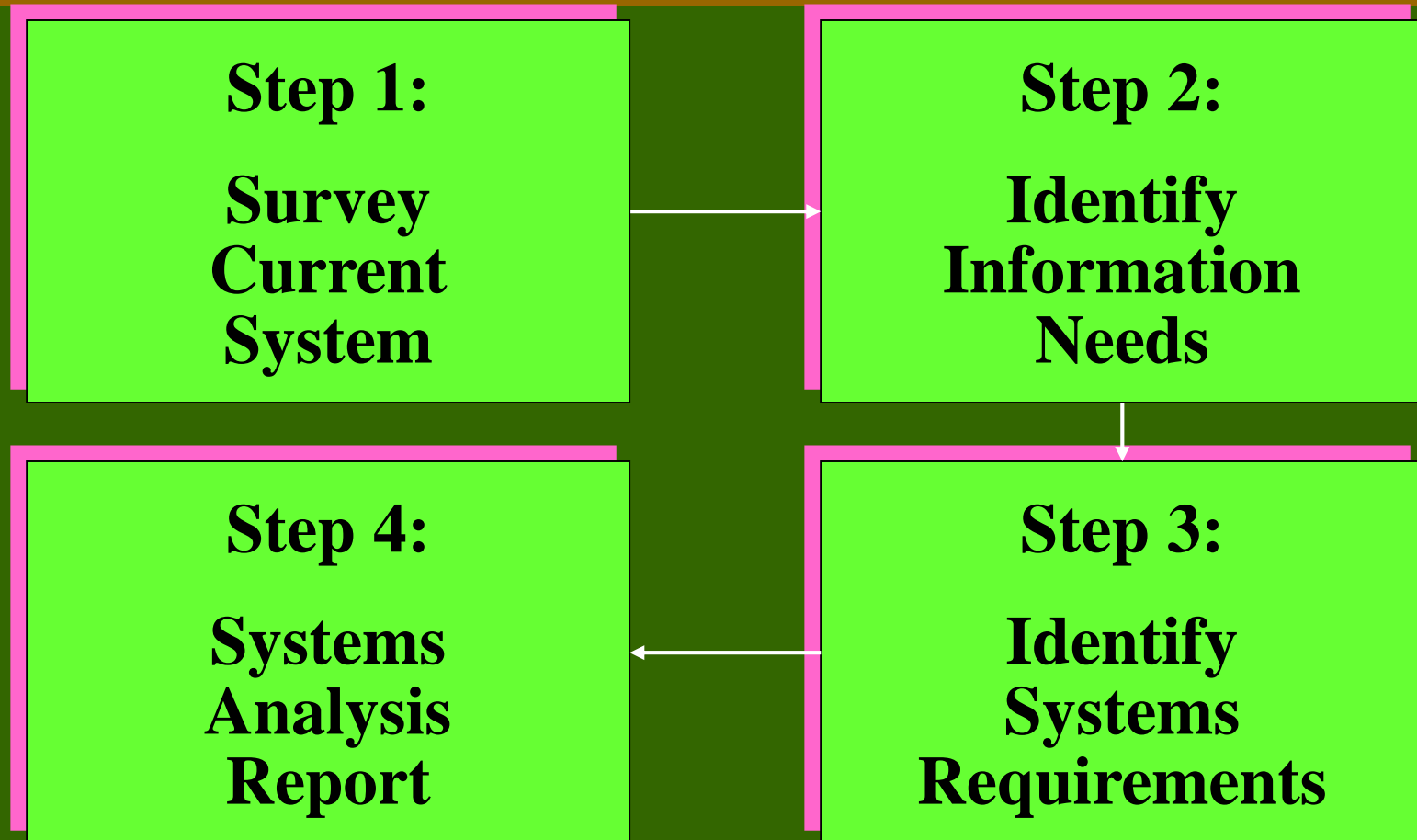
Systems Planning and Feasibility Analysis

- *Key success factors* must be incorporated into the objectives for systems design.

- What are key success factors?
- These factors are those characteristics that distinguish a company from its competitors and are the keys to its success.
- The *strategic systems plan* should take the form of a written document that incorporates both short-run and long-run goals relating to the company's systems development effort.
- The *strategic plan* should identify specific areas to be given the highest priority.



Steps Involved in Systems Analysis

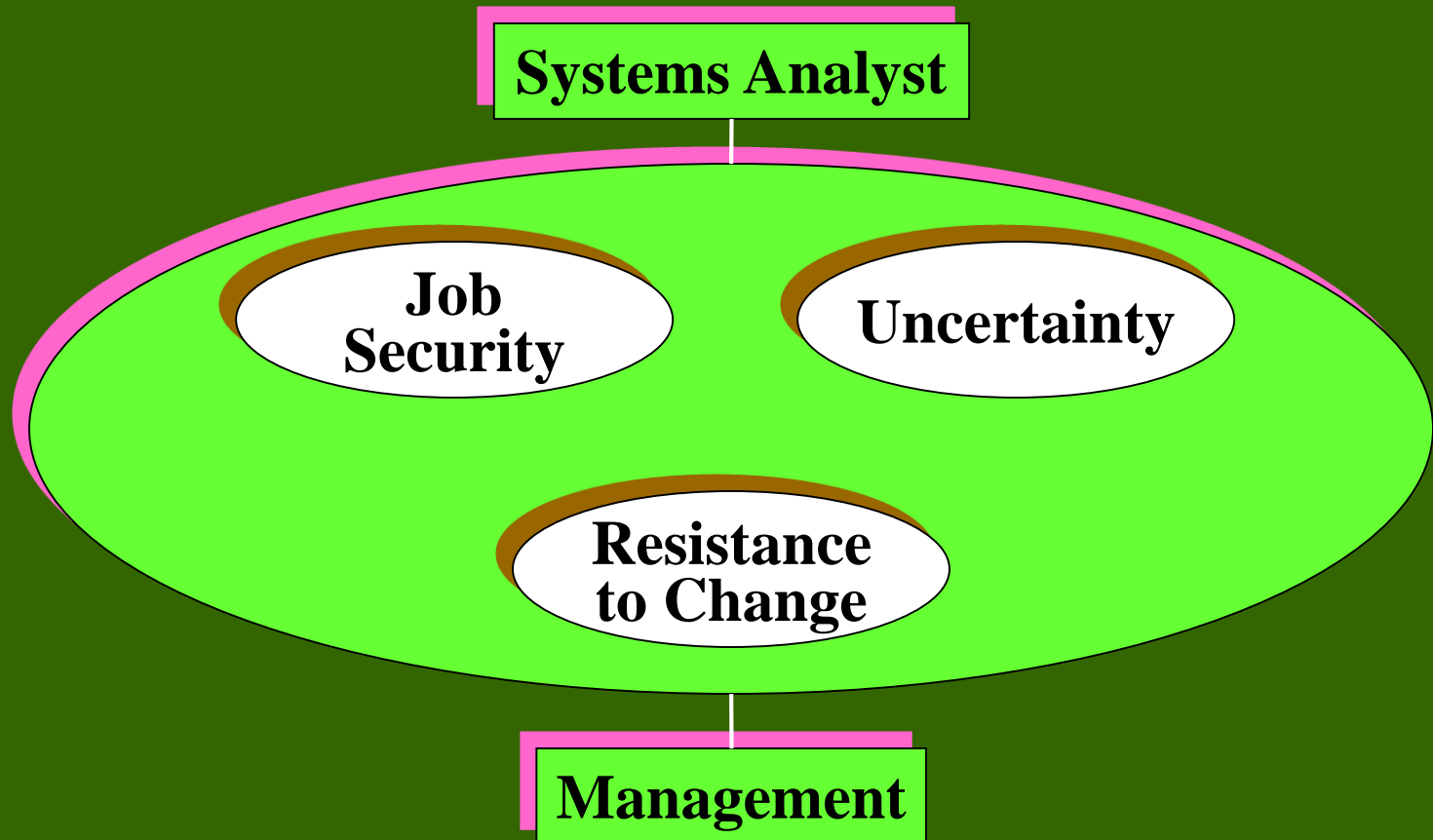


Phase I: Survey the Present System

- There are four objectives of the system survey:
 - 1 Gain a fundamental understanding of the operational aspects of the system.
 - 2 Establish a working relationship with the users of the system.
 - 3 Collect important data that are useful in developing the systems design.
 - 4 Identify specific problems that require focus in terms of subsequent design efforts.

Phase I: Survey the Present System

Communication Gap Problem



Phase I: Survey the Present System

- Certain approaches can help bridge this communication gap.
- Get to know as many people involved in the system as soon as possible.
- Communicate the benefits of the proposed system to the individuals involved.
- Provide assurances, to the degree possible, to all individuals that there will be no losses of jobs or major changes in job responsibilities.
- Provide assurance that there is a genuine concern with making life better for those involved in the system.

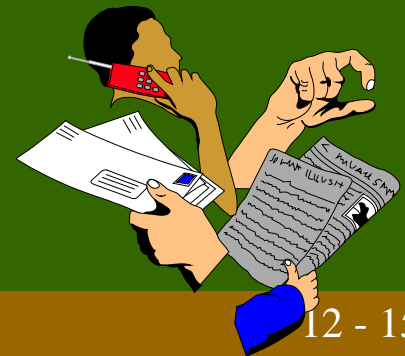
Phase I: Survey the Present System

- When the survey has been completed, the strengths and weaknesses of the subsystem under study should be thoroughly analyzed.
- What are some questions that might be asked in evaluating the present system?
- Is a given procedure necessary?
- Does the procedure involve unnecessary steps?

Phase II: Identify Information Needs

- The *second* major phase of systems analysis involves identifying *information requirements*.

- *Systematic techniques* can be used to gain an understanding of decisions and information needs.
- What are some of these techniques?
 - Identify the manager's primary job responsibilities.
 - Identify the means by which the manager is evaluated.
 - Identify some of the major problems the manager faces.
 - Identify the means by which the manager evaluates personal output.



Phase III: Identify the Systems Requirements

- The *third* phase of the system analysis project involves specifying systems requirements.
- Requirements can be specified in terms of inputs and outputs.
- The input requirements for one subsystem will specify, in turn, output requirements for another subsystem.

Phase IV: Develop a Systems Analysis Report

- The *final* output of the systems analysis project is a report.
- What are key elements of this report?
 - a summary of the scope and purpose of the analysis project
 - a reiteration of the relationship of the project to the overall strategic information systems plan

Phase IV: Develop a Systems Analysis Report

- a description of any overall problems in the specific subsystem being studied
- a summary of the decisions being made and their specific information requirements
- specification of system performance requirements
- an overall cost budget

Discuss the major techniques for gathering and organizing data for systems analysis.

- A large portion of the systems analyst's job is to collect and organize facts.
- There are a number of techniques that help the analyst perform these tasks.
- What are some of these techniques?
 - in-depth interview
 - structured interview
 - open-ended questionnaire
 - closed-ended questionnaire
 - document reviews
 - observations

Fact-Gathering Techniques

- What are some of the documents to be reviewed?
 - flowcharts, organization charts, procedure manuals, operations manuals, reference manuals, historical records
- The systems analyst needs formal techniques for organizing facts.

Techniques for Organizing Facts

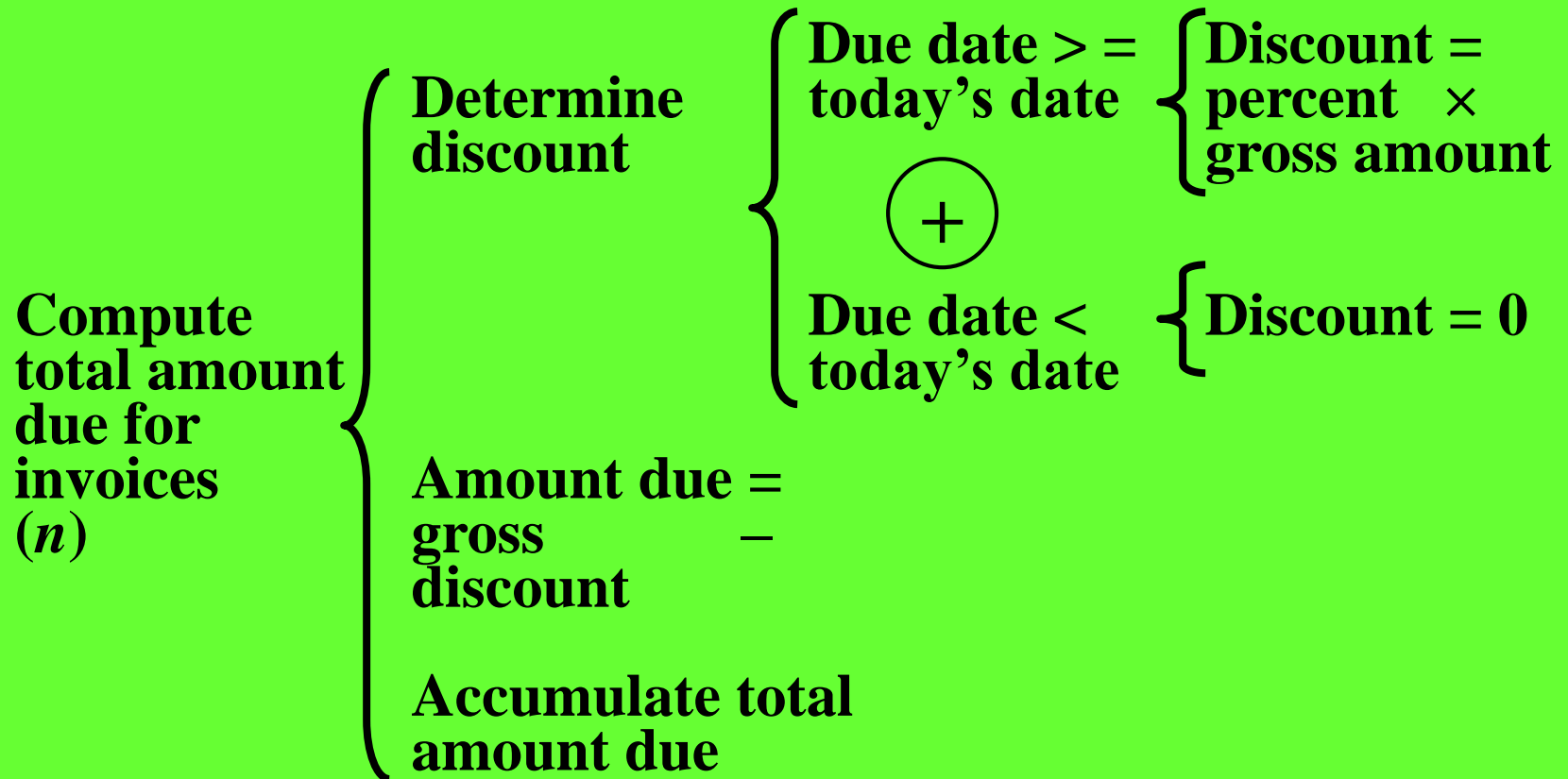
- What are some of these techniques?
 - work measurement
 - work distribution
 - flowcharting
 - decision analysis
 - functional analysis
 - hierarchical function
 - matrix analysis
 - narratives
 - file/report summaries

Techniques for Organizing Facts

- *Warnier-Orr methodology* is another useful technique.
- This methodology is based on analyzing the outputs of an application and factoring the application into a hierarchical structure of modules to accomplish the necessary processing.

Techniques for Organizing Facts

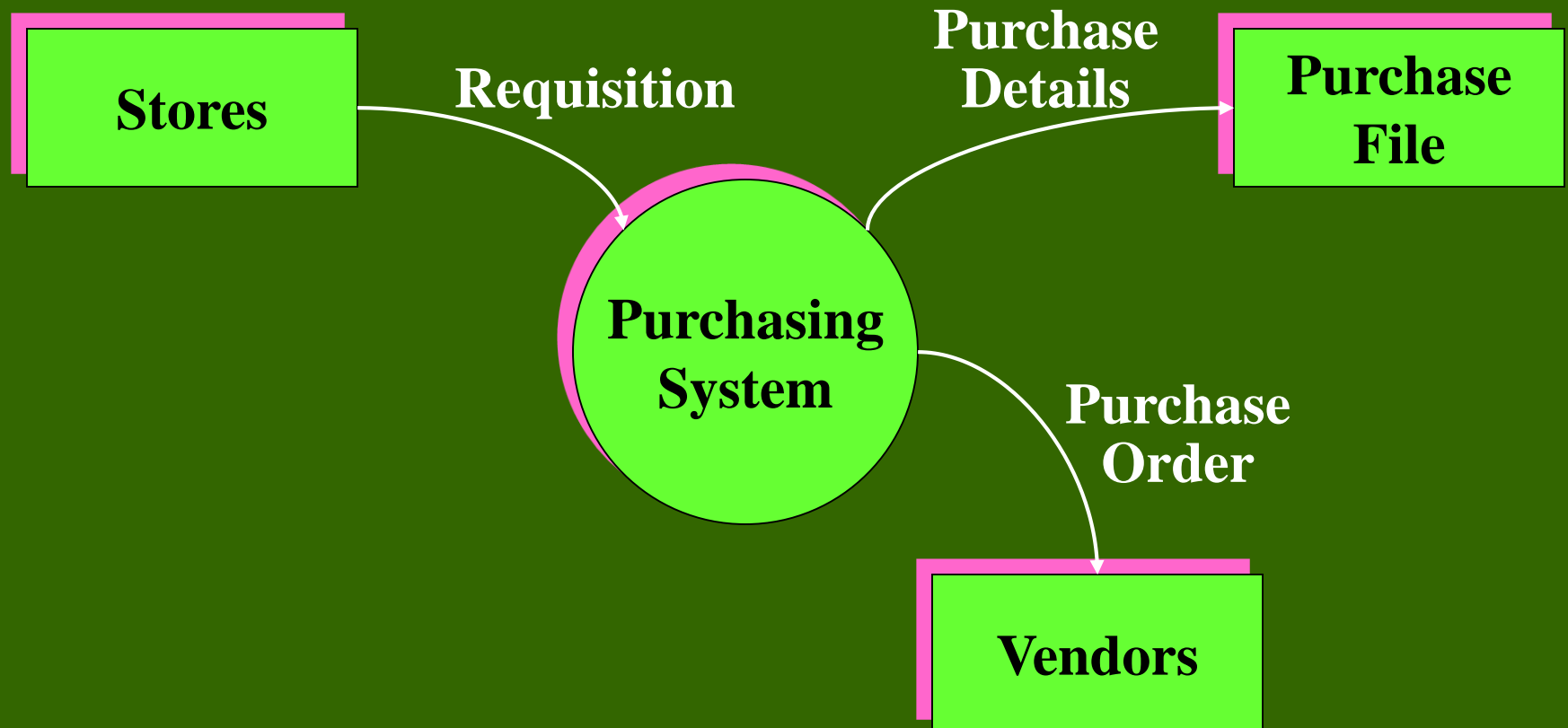
Warnier–Orr Illustration



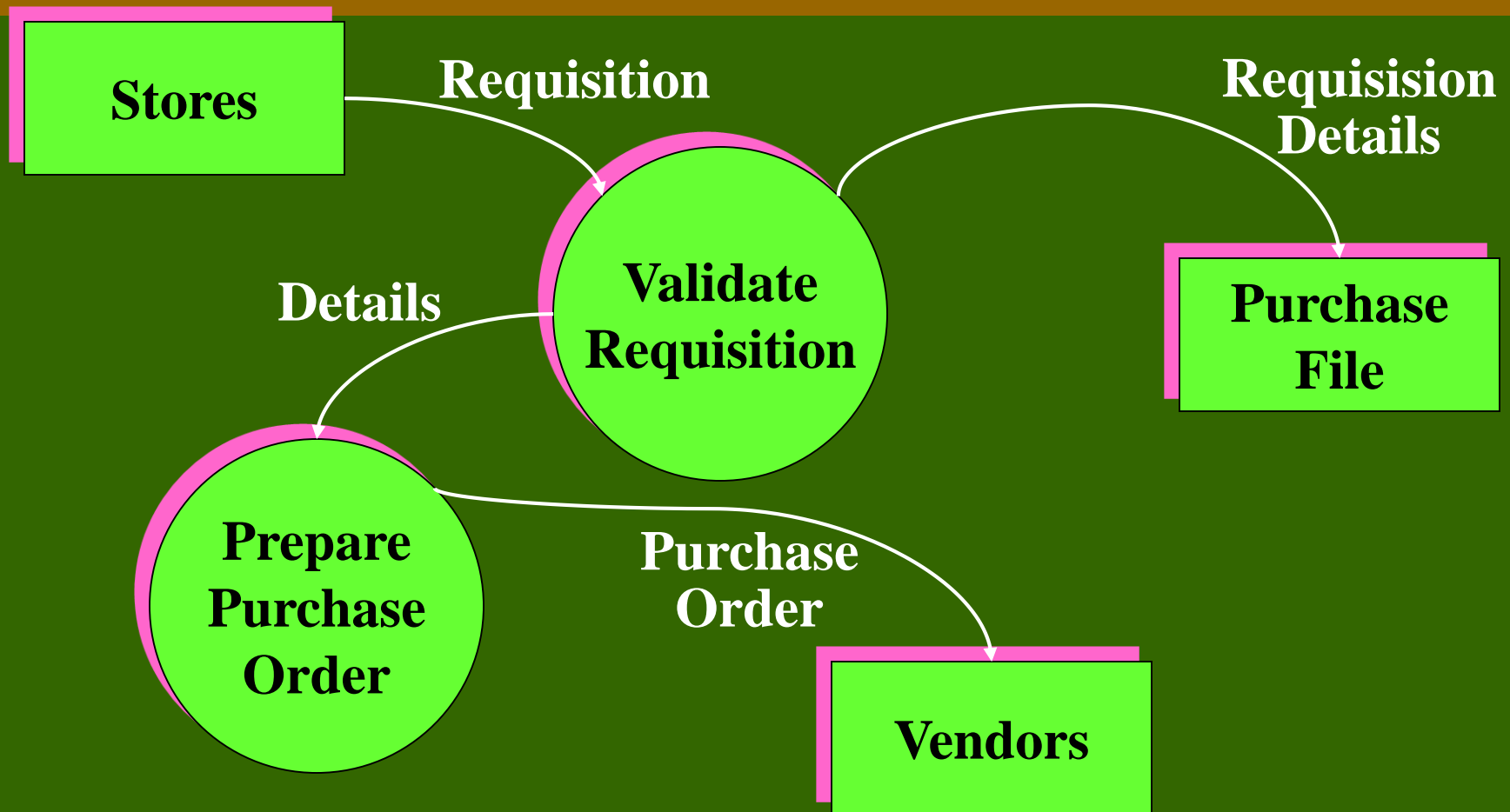
Structured Systems Analysis

- Structured systems analysis begins with a general logical data flow diagram.
- This diagram is supported with detailed data flow diagrams, data dictionaries, access method descriptions, and specifics on process logic.

Purchasing System Context Diagram



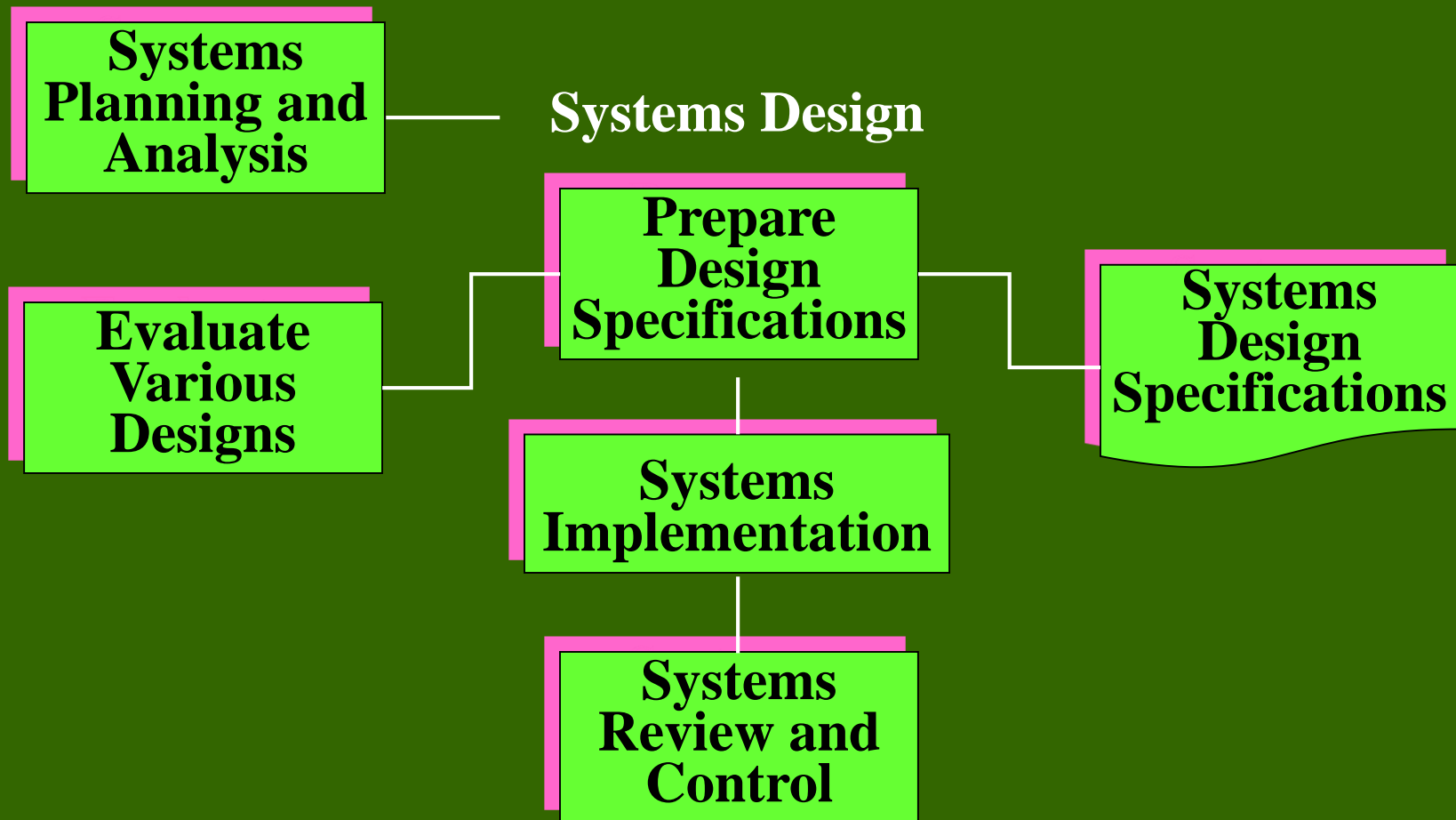
Expansion of Purchasing System Context Diagram



steps involved in specifying systems design alternatives.

- *Systems design* is an orderly process that begins at a very general level with the setting of objectives for a particular system.
- The process then proceeds to the more detailed level with the specification of file structures, processing operation, and form design.

Steps in Systems Design



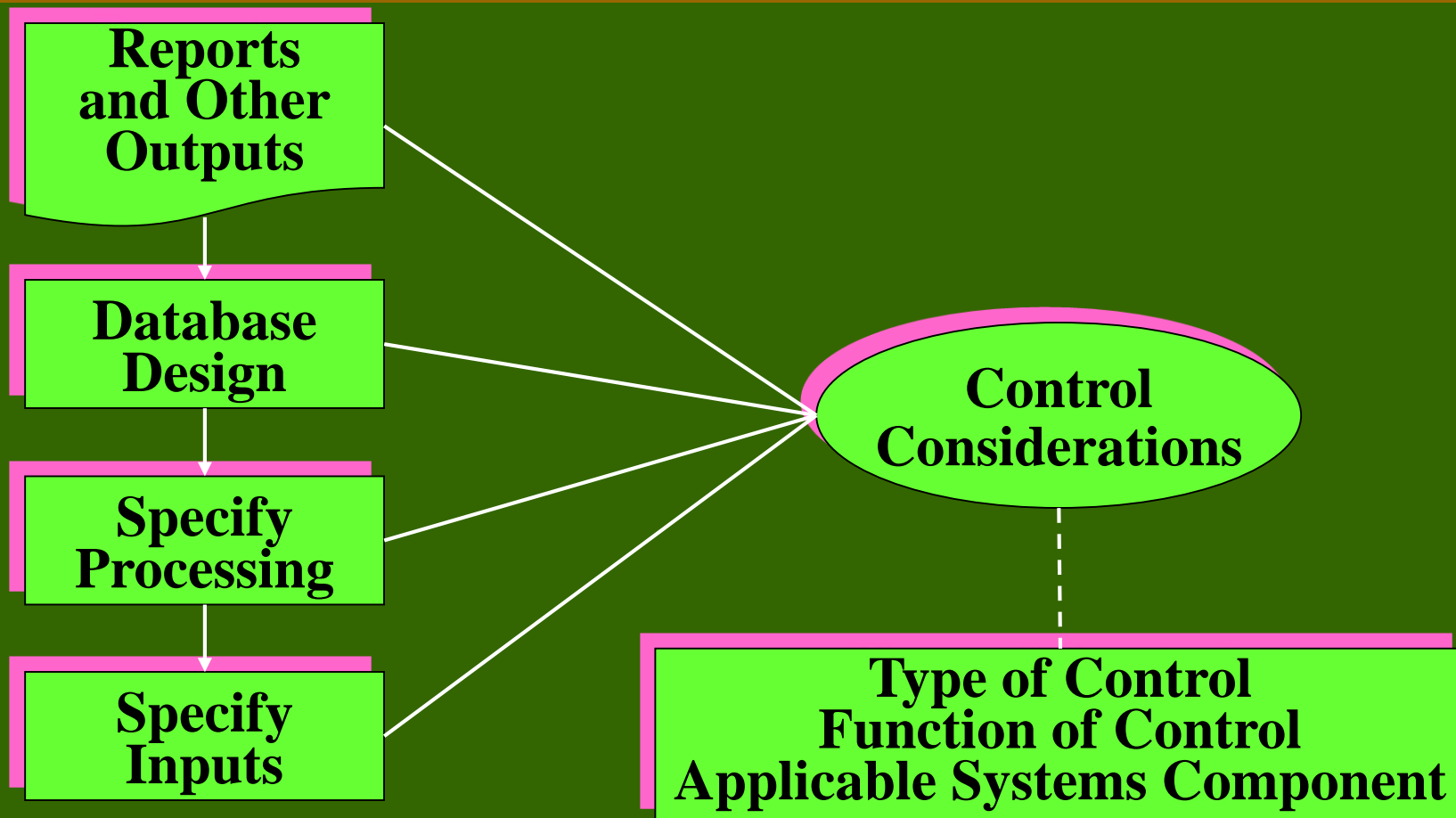
Step I: Evaluating Design Alternatives

- In every case, the systems design project arises out of a specific need as determined by the systems *planning and analysis* phase of the development cycle.
- What are some aspect of systems design?
 - enumeration of design alternatives
 - describing the alternatives
 - evaluating the alternatives

Step II: Preparing Design Specifications

- The primary role in developing design specifications is that the designer should work backward from outputs to inputs.
- The designer should design all management reports and operational output documents as a first step in the process.

Design of System Elements



Step III: Preparing and Submitting Specifications

- The completed design specification should take the form of a *proposal*.
- The *detailed design proposal* should include everything necessary to actually implement the design project.
- What should the proposal include?
 - specific timetables for completion
 - Budget
 - description of personnel requirements
 - flowcharts
 - other diagrams that describe the system to be implemented

Step III: Preparing and Submitting Specifications

- A copy of all proposed system outputs would be incorporated as well as specifics on any databases to be created or modified.
- Details regarding hardware and software should be included.
- Specific details relating to the input of data in the system should be provided.
- Specific volume and cost information should also be provided.

various considerations relevant to preparing design specifications

System Element

Design Consideration

*Output
(report or
document)*

**Cost-effectiveness
Relevance
Clarity
Timeliness**

*Controls and
security
measures*

**Cost-effectiveness
Comprehensiveness
Appropriateness**

General Design Considerations

System Element

Design Consideration

Database

Cost-effectiveness
Integration
Standardization
Flexibility
Security
Accuracy
Efficiency
Organization

System Element

Design Consideration

*Data
Processing*

**Cost-effectiveness
Uniformity
Integration
Accuracy**

Data input

**Cost-effectiveness
Accuracy
Uniformity
Integration**

Design Techniques

- Designing a system is a creative activity.
- Designers use certain techniques to assist in the design process.
- What are some of these techniques?
 - systems flowcharting
 - data flow diagrams
 - Warnier-Orr diagrams
- The process of designing specific forms is called *forms design*.
- Forms design should focus on producing documents that provide effective interface between managers and the information system.



Design Techniques

- There are a number of techniques for designing *databases*.
- What are some of these techniques?
 - data structure diagrams
 - record layouts
 - file analysis sheets
 - file related matrices

Systems Design Packages

- A number of prepackaged design methodologies are available to assist in the systems development cycle.
- CASE (computer-aided software engineering) can produce data flow diagrams, narrative documentation, screen and report prototypes, and data dictionary descriptions.
- The decision must be made as to whether the computer software is to be built from scratch or purchased.

Choosing Software and Hardware

- What are some advantages of purchased software packages?
 - less costly
 - already debugged
 - trials of the product prior to investing a great deal of money
- What is the main disadvantage of purchased software packages?
 - rarely exactly meets a company's needs