Learning Objectives

1. Describe the six phases of the systems life cycle.
2. Identify information needs and formulate possible solutions.
3. Analyze existing information systems and evaluate the feasibility of alternative systems.
4. Identify, acquire, and test new system software and hardware.
5. Switch from an existing information system to a new one with minimal risk.
6. Perform system audits and periodic evaluations.
7. Describe prototyping and rapid applications development.
Introduction

- Most people in an organization are involved with an information system of some kind.
- For the organization to create and use the system requires thought and effort.
- In this chapter, you learn about a six step process for performing systems analysis and design.
System Analysis and Design

A system is defined as a collection of activities and elements organized to accomplish a goal

- System Analysis and Design
  - Six-phase problem-solving procedure for examining and improving an information system
# Six-Phase System Life Cycle

<table>
<thead>
<tr>
<th>Phase</th>
<th>Activity</th>
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<tbody>
<tr>
<td>1. Preliminary investigation</td>
<td>Define problem, suggest alternatives, prepare short report</td>
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<tr>
<td>2. Systems analysis</td>
<td>Gather data, analyze data, document</td>
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<td>3. Systems design</td>
<td>Design alternatives, select best alternative, write report</td>
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<td>4. Systems development</td>
<td>Develop software, acquire hardware, test system</td>
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<td>5. Systems implementation</td>
<td>Convert, train</td>
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<tr>
<td>6. Systems maintenance</td>
<td>Perform systems audit, evaluate periodically</td>
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Phase 1: Preliminary Investigation

• The preliminary investigation determines the need for a new information system
  1. Define the problem
  2. Suggest alternatives
  3. Prepare report
Phase 2: Systems Analysis

- Data is collected about the present system and then analyzed to determine the new requirements
  1. Gather data
  2. Analyze data
  3. Create summary
Analyzing the Data in Phase 2

- Top-down analysis method is used to identify the top-level components of a complex system and each component is broken down into small components making analysis easier
  - Grid charts show the relationship between input and output documents
  - System flowcharts show the flow of input data to processing and finally to output or distribution of information
  - Data flow diagrams show the data or information flow within an information system
- Automated design tools
  - Computer-aided software engineering tools (CASE)
- Documenting
  - Systems Analyst Report
Data Analysis Tools – Grid Chart

- Show the relationship between input and output documents

<table>
<thead>
<tr>
<th>Forms (input)</th>
<th>Reports (output)</th>
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<tbody>
<tr>
<td></td>
<td>Client billing</td>
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<tr>
<td>Time sheet</td>
<td>✔️</td>
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<tr>
<td>Telephone log</td>
<td>✔️</td>
</tr>
<tr>
<td>Travel log</td>
<td>✔️</td>
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Data Analysis Tools – System Flowchart

- System flowcharts show the flow of input data to processing and finally to output or distribution of information.
- System flowchart is to the left.
- System flowchart symbols are to the right.
Data Analysis Tools – Data Flow Diagram

- Show the data or information flow within an information system
- Data is traced from its origin through processing, storage, and output
- Top diagram shows data flow
- Bottom diagram shows data flow symbols
Phase 3: Systems Design

- Three tasks
  - Define the alternatives
  - Select the best system
  - Write a systems design report
- Evaluate systems according to:
  - Economic feasibility asks is a new system be economical?
  - Technical feasibility asks is it technically possible?
  - Operational feasibility asks how it will be received by all users
Phase 4: Systems Development

Three steps
1. Acquire the software
2. Acquire the hardware
3. Test the new system
Phase 5: Systems Implementation or Conversion

Types of conversion

- Direct – out with the old and in with the new
- Parallel – old and new systems operate side by side until new system is reliable
- Pilot – new system is tried by one section of the organization, then another, etc.
- Phased – new system is introduced a little at a time
Phase 6: Systems Maintenance

Systems maintenance is an ongoing activity

- **Two Parts**
  - Systems audit - system’s performance is compared to the original design specs to determine productivity
  - Periodic evaluation – all system’s should be evaluated time to time
Alternatives to the systems life cycle

- Prototyping - building a model of the new system for trial
- Rapid applications development (RAD) – costly but development is short and quality is better
Careers in IT

- A systems analyst plans and designs new systems, following the systems life cycle
- Requires a Bachelor’s degree in Computer Science or Information Systems
- Technical experience
- Can expect to earn an annual salary of $50,000 to $64,000
A Look to the Future ~
The Challenge of Keeping Pace

- To stay competitive with today’s fast business pace, new technologies must be incorporated
- Increased use of RAD and prototyping
- Increased use of outside consulting
1. What is a system? What are the six phases of the systems life cycle? Why do corporations undergo this process?

2. What are the tools used in the analysis phase? What is top-down analysis? How is it used?
3. Describe each type of system conversion. Which is the most commonly used?

4. What is system maintenance? When does it occur?

5. Explain prototyping and RAD. When might they be used by corporations?