

Chapter 10: Information Systems Development

- ❖ **Structural organizational change enabled by IT**
 - ◆ **Automation** = replace manual tasks increase efficiency
 - ◆ **Rationalization** = Streamline operating procedures
- ❖ **Business process reengineering (BPR)**
 - ◆ Analyze, simplify, and redesign business processes
 - ◆ Benefits result from redesigning business processes
 - ◆ **Work flow management** - Process of streamlining business procedures documents for efficiently
 - ◆ Understand how improving the right processes will help the firm execute its business strategy
 - ◆ Measure performance of current processes
 - ◆ **Paradigm shifts**
 - ◆ Rethink nature of business, define new business model, change nature of organization

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Business Process Management (BPM)

- ❖ Helps firms manage incremental process changes that are less disruptive BPR
- ❖ Uses process-mapping tools to:
 - ◆ Identify and document existing processes
 - ◆ Create models of improved processes that can be translated into software systems
 - ◆ Measure impact of process changes on key business performance indicators
- ❖ Includes:
 - ◆ Work flow management
 - ◆ Quality measurement and management
 - ◆ Change management
 - ◆ Process monitoring and analysis

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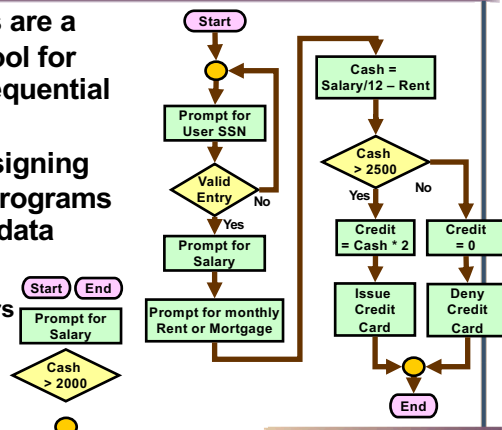
Business Process Modeling

- ❖ Used to document Business Processes
- ❖ Modeling methodologies
 - ◆ Entity Relationship Diagrams
 - ◆ Data dictionary: Contents of data tables
 - ◆ **Flow Charts** – describes sequential processes that branch based on decisions or repeat
 - ◆ **Data flow diagram** – models processes and data flow
 - ◆ **Process specifications**: Describes transformation occurring within lowest level of data flow diagrams

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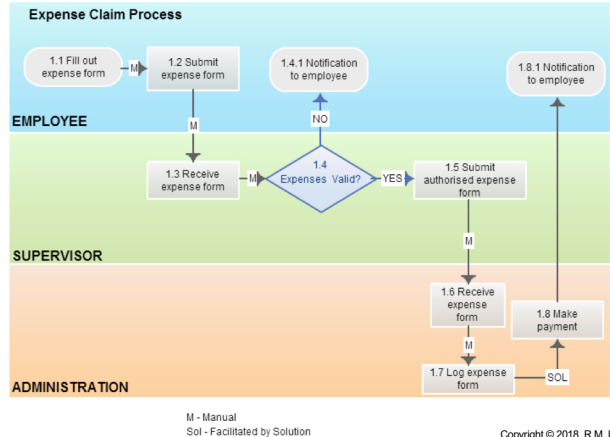
Flow Charts

- ❖ Flow charts are a modeling tool for mapping sequential processes
- ❖ Tool for designing computer programs to process data
- ❖ Symbols
 - ◆ Terminators (Start/End)
 - ◆ Processes (Prompt for User SSN, Prompt for Salary, Prompt for monthly Rent or Mortgage, Cash = Salary/12 - Rent, Credit = Cash * 2, Deny Credit Card)
 - ◆ Selection (Cash > 2500, Cash > 2000)
 - ◆ Junction (Yellow circle)



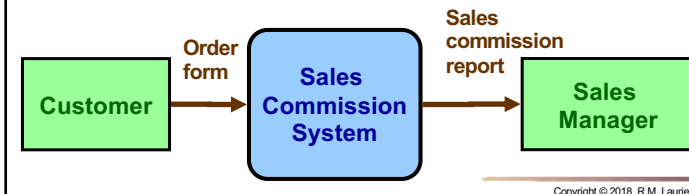
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Flow Charts – Sequential Business Processes



Data Flow Diagrams (DFDs)

- ❖ Graphic representation of data flows through interconnected processes
 - ◆ Emphasis on **Processes** rather than data
 - ◆ Actions that capture, store, manipulate, and distribute data
- ❖ DFD - Context Diagram
 - ◆ The most top level diagram that shows system as a single process within environment

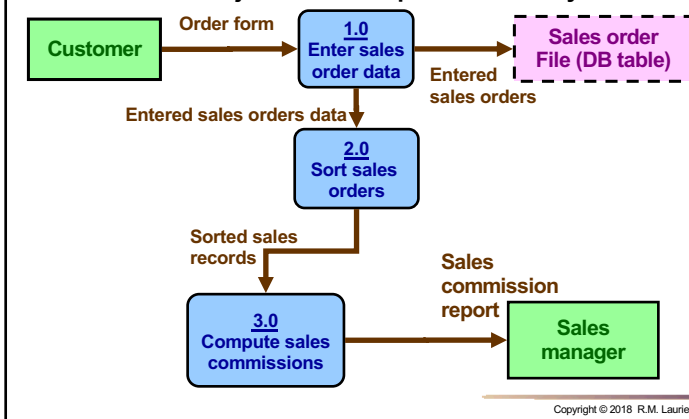


DFDs have Four Symbols

- ❖ **Terminators**
 - ◆ Environmental elements or other systems
 - ◆ Originator or receiver of information outside system
 - ◆ Square boxes labeled with nouns
 - ❖ **Processes** transform inputs to outputs
 - ◆ Data transformation subsystem
 - ◆ Rounded boxes labeled with verb and object
 - ◆ Implement using a program, DB query, or module
 - ❖ **Data flows** are data in motion
 - ◆ Represented by arrows that can diverge or converge
 - ◆ Labeled with a noun representing file or record
 - ◆ Networked data flowing between processes
 - ❖ **Data stores** are data at rest
 - ◆ Open boxes with dashed border
 - ◆ Database file, table, or record
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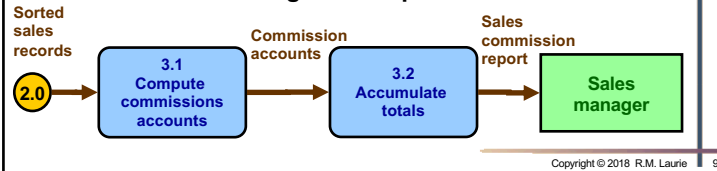
Level 0 Diagram: Sales Commission System

- ❖ DFD shows major numbered processes of system



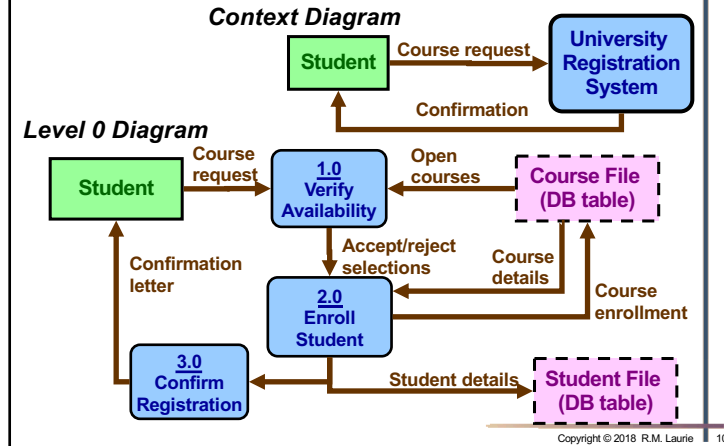
Level n Diagrams

- ❖ Documents a single process of a DFD in a greater amount of detail
- ❖ n represents the number of the process on the next higher level that is being documented
 - ◆ This DFD is the Level 3 diagram with sub-processes 3.1 and 3.2
 - ◆ Note that the input is from process 2.0
 - ◆ Restrict each diagram to 8 processes maximum



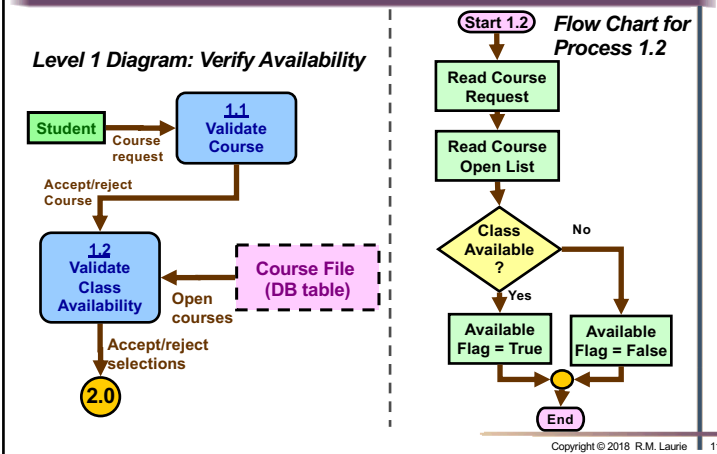
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DFDs: Mail-in University Registration System



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DFDs: Mail-in University Registration System

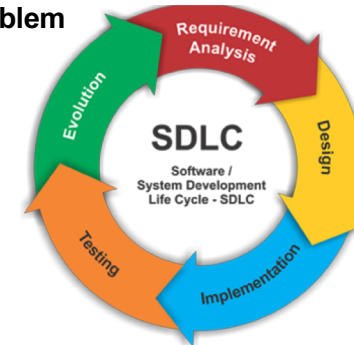


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Systems Development

- ❖ Core activities that go into producing an information system solution to an organizational problem or opportunity

1. Systems analysis
2. Systems design
3. Programming
4. Testing
5. Conversion
6. Production and maintenance



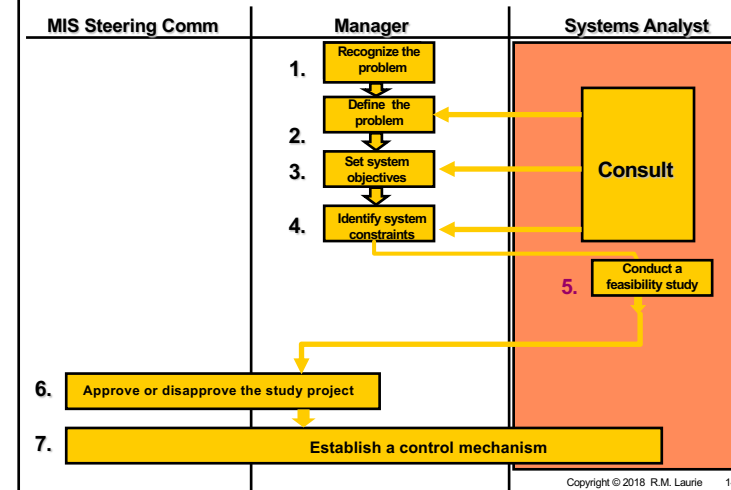
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1. Systems Analysis

- ❖ Analysis of problem that will be solved by system
 - ◆ Defining the problem and identifying causes
 - ◆ Identifies and examines alternative solutions
 - ◆ Identifying information requirements
- ❖ Feasibility Study (Final Project)
 - ◆ Is solution feasible based on technical, organizational constraints
 - ◆ Is solution a good financial investment?
 - ◆ Is required technology, skill available?
 - ◆ Establishing information requirements
 - ◆ Who needs what information, where, when, and how?
 - ◆ Define objectives of new/modified system
 - ◆ Detail the functions new system must perform
- ❖ Faulty requirements analysis is leading cause of systems failure and high systems development cost

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System Analysis Phase



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Outline of Feasibility Study

1. Introduction
2. Description of current systems
 - 2.1 System objectives and constraints
 - 2.2 Problems with current system
3. Expected impact of a new system
 - 3.1 Impact on firm's organization structure
 - 3.2 Impact on the firm's operations
 - 3.3 Impact on the firms resources
 - 3.4 Economic and Noneconomic return
4. The scope of recommended system design project
 - 4.1 Tasks to be performed
 - 4.2 Human resource requirements
 - 4.3 Schedule of work
 - 4.4 Estimated cost
5. Identify end-user information needs
6. Summary

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2. Systems Design

- ❖ Describe system specifications that will deliver functions identified during systems analysis
- ❖ Should address all managerial, organizational, and technological components of system solution
- ❖ Role of end users
 - ◆ User information requirements drive system building
 - ◆ Users must have sufficient control over design process to ensure that system reflects their business priorities and information needs
 - ◆ Insufficient user involvement in design effort is major cause of system failure

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Design Specifications		
OUTPUT Medium Content Timing	PROCESSING Computations Program modules Required reports Timing of outputs	DOCUMENTATION Operations documentation Systems documents User documentation
INPUT Origins Flow Data entry	MANUAL PROCEDURES What activities Who performs them When How Where	CONVERSION Transfer files Initiate new procedures Select testing method Cut over to new system
USER INTERFACE Simplicity Efficiency Logic Feedback Errors	CONTROLS Input controls (characters, limit, reasonableness) Processing controls (consistency, record counts) Output controls (totals, samples of output) Procedural controls (passwords, special forms)	TRAINING Select training techniques Develop training modules Identify training facilities
DATABASE DESIGN Logical data model Volume and speed requirements File organization and design Record specifications	SECURITY Access controls Catastrophe plans Audit trails	ORGANIZATIONAL CHANGES Task redesign Job redesign Process design Organization structure design Reporting relationships

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Outline of System Design Document

1. Introduction \
2. System objectives and constraints
3. Possible system alternatives
4. The recommended design project
 - 4.1 Tasks to be performed
 - 4.2 System Specifications
 - 4.3 System Design to include: DFD's, ERD's, Flowcharts
 - 4.4 Human resource requirements
 - 4.5 Schedule of work
 - 4.6 Estimated cost - Create Excel spreadsheet evaluating costs
5. Expected impact of the system
 - 5.1 Impact on the firm's organization structure
 - 5.2 Impact on the firm's operations
 - 5.3 Impact on the firms resources
6. Summary

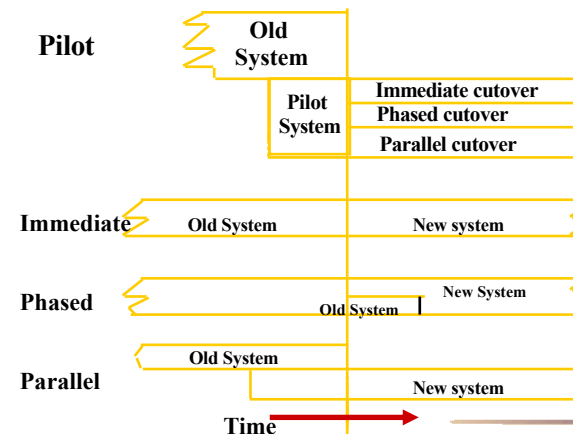
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3. 4. 5. Implementation Activities

- ❖ **3. Programming**
 - ◆ System specifications from design stage are translated into software program code
 - ◆ Software may be purchased, leased, or outsourced
- ❖ **4. Testing**
 - ◆ **Unit testing:** Tests each program in system separately
 - ◆ **System testing:** Tests functioning within whole system
 - ◆ **Acceptance testing:** Ready for production setting
- ❖ **5. Conversion = Changing from old to new system**
 - ◆ Parallel strategy = old system phased out
 - ◆ Direct cutover = plug in new, pull plug on old system
 - ◆ Pilot study = new system installed for subset of firm
 - ◆ Phased approach = new system introduce in units
 - ◆ **Requires end-user training**
- ❖ **6. Production and maintenance**

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Cutover Approaches



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