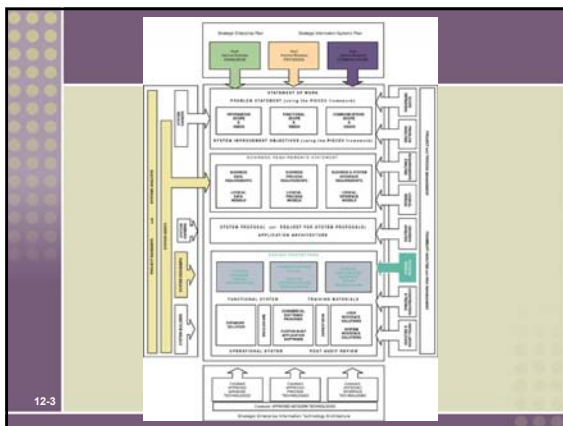


Objectives

- Describe the design phase in terms of your information building blocks.
- Identify and differentiate between several systems design strategies.
- Describe the design phase tasks in terms of a computer-based solution for an in-house development project.
- Describe the design phase in terms of a computer-based solution involving procurement of a commercial systems software solution.

12-2



System Design

Systems design – the specification of a detailed computer-based solution.

- Also called **physical design**.
- systems analysis emphasizes the business problem
- systems design emphasizes the technical or implementation concerns of the system.

12-4

System Design Approaches

- Model-Driven
 - Modern structured design
 - Information engineering
 - Prototyping
 - Object-oriented
- RAD
- JAD

12-5

Model-Driven Approaches

Model-driven strategy – a system design approach that emphasizes drawing system models to document technical and implementation aspects of a system.

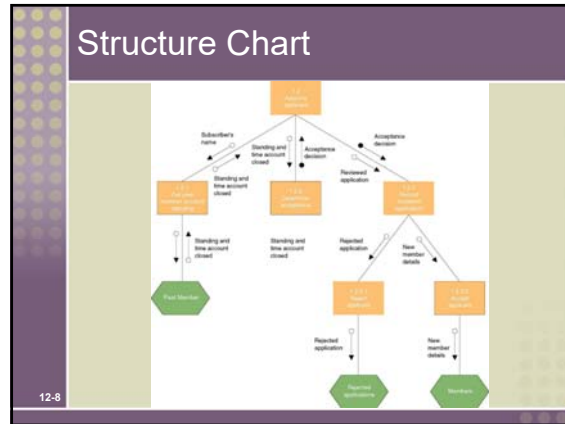
12-6

Model-Driven Approaches – Modern Structured Design

Modern structured design – a system design technique that decomposes the system's processes into manageable components.

- Synonyms (although technically inaccurate) are top-down program design and structured programming.
- Design in a top-down hierarchy of modules
- Easier to implement and maintain (change).
- Modules should be highly cohesive
 - Accomplish one function only
- Modules should be loosely coupled
 - Minimally dependent on one another

12-7

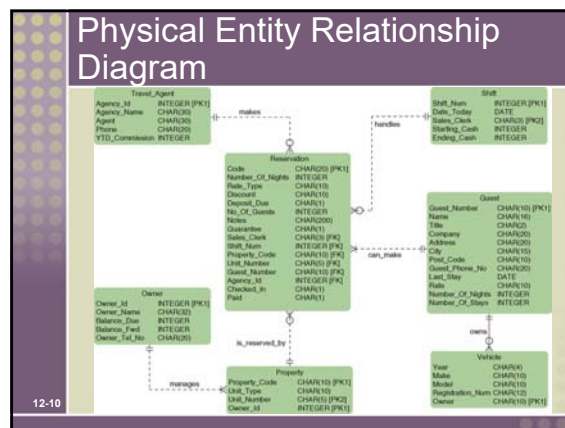


Model-Driven Approaches – Information Engineering

Information engineering (IE) – a model-driven and data-centered, but process-sensitive technique for planning, analyzing, and designing information systems. IE models are pictures that illustrate and synchronize the system's data and processes.

- The primary tool of IE is a data model diagram.

12-9



Model-Driven Approaches – Prototyping

Prototype – a small-scale, incomplete, but working sample of a desired system

Iterative process involving a close working relationship between the designer and the users.

Key Benefits:

- Encourages and requires active end-user participation.
- Iteration accommodates end-users who tend to change their minds.
- Endorses philosophy that end-users won't know what they want until they see it.
- Active model that end-users can interact with.
- Errors can be detected earlier.
- Can increase creativity as it allows for quicker user feedback.
- Accelerates several phases of the life cycle.

12-11

Model-Driven Approaches – Prototyping

Disadvantages and Pitfalls:

- Encourages "code, implement, and repair" life cycle that cause maintenance nightmares.
- Still need systems analysis phases, but so easy to skip.
- Cannot completely substitute a prototype for a paper specification (like architect without a blueprint).
- Numerous design issues are not addressed by prototyping.
- Often leads to premature commitment to a design.
- Scope and complexity of the system can expand out of control.
- Can reduce creativity in designs .
- Often suffer from slower performance because of language considerations (rapidly becoming a non-issue).

12-12

Prototype screen

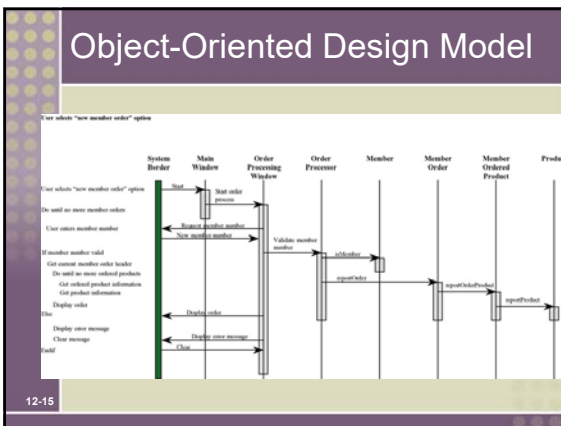
12-13

Model-Driven Approaches – Object-Oriented Design

Object-oriented design (OOD) techniques are used to refine the object requirements identified earlier during analysis, and to define design specific objects.

- Extension of object-oriented analysis
- Attempt to eliminate the separation of concerns about data and process.

12-14



Rapid Application Development (RAD)

Rapid application development (RAD) – a systems design approach that utilizes structured, prototyping, and JAD techniques to quickly develop systems.

- The merger of various structured techniques to accelerate systems development
 - Data-driven information engineering
 - Prototyping
 - Joint application development

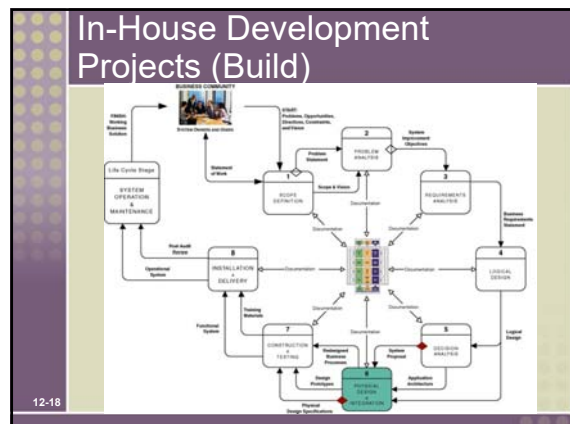
12-16

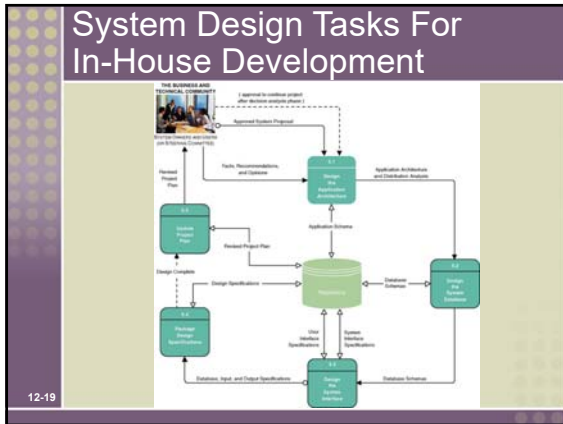
Joint Application Development (JAD)

Joint Application Development (JAD) is a technique that complements other systems analysis and design techniques by emphasizing *participative development* among system owners, users, designers, and builders.

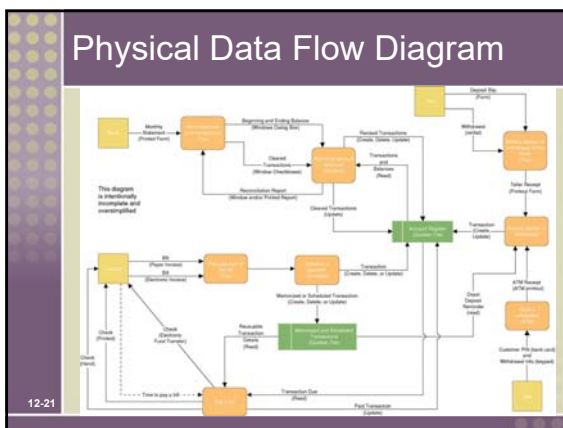
During the JAD sessions for systems design, the systems designer will take on the role of facilitator for possibly several full-day workshops intended to address different design issues and deliverables.

12-17





- ### System Design Tasks For In-House Development (Build)
- Design the Application Architecture
 - Define technologies to be used by (and used to build) one, more, or all information systems.
 - Revise models as physical models
 - Design the System Databases
 - Database schema
 - Optimized for implementation DBMS
 - Design the System Interface
 - Input, output, and dialogue specifications
 - Prototypes
 - Package Design Specifications
 - Specifications to guide programmers
 - Update Project Plan
- 12-20

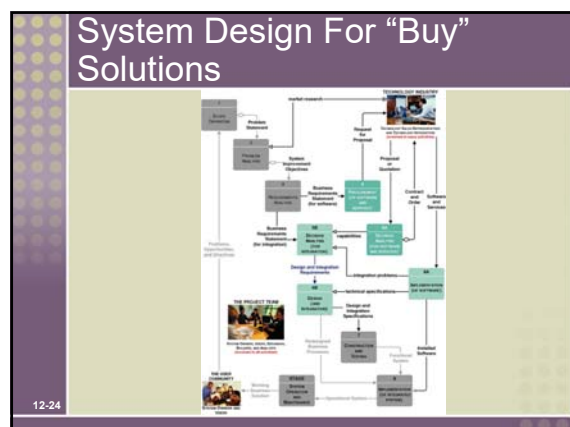
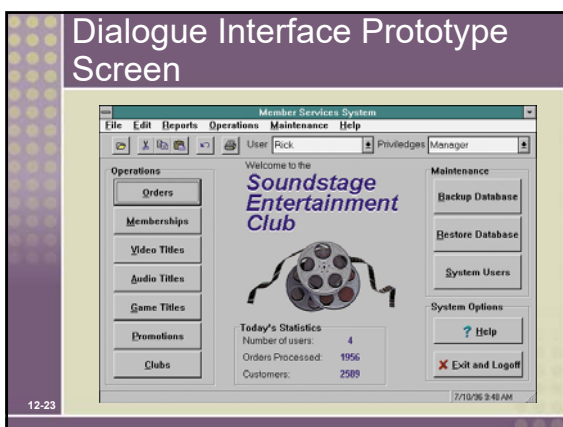


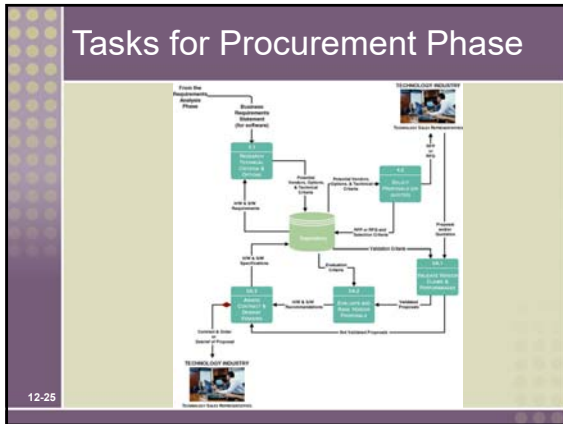
Output Prototype Screen

Category	Product Codes	Selection of the Month	Alternate Selection	Selection of Month + Alternates	Number of Orders
Action Adventure	8342	240	828	241	287
Animated	3877	1528	648	1854	1341
Comedy	954	102	30	95	716
Documentary	1488	677	45	88	477
Drama	540	389	54	39	58
Western	104	9	54	1	40
Misc	100	99	73	409	268
Musical	239	40	78	289	103
Science Fiction	4098	2011	888	2230	1520
Sports	288	288	277	121	387

Sum of Product Codes: 19819
 Sum of Selection of the Month: 7882
 Sum of Alternate Selections: 2606
 Sum of Selection of the Month + Alternates: 13868
 Total Number of Orders: 13778

12-22





- ### Tasks for Procurement Phase
- Research Technical Criteria and Options
 - Solicit Proposals or Quotes from Vendors
 - Validate Vendor Claims and Performances
 - Evaluate and Rank Vendor Proposals
 - Award Contract and Debrief Vendors
- 12-26

- ### Research Technical Criteria and Options
- Magazines and journals
 - Internal standards may exist for hardware and software selection.
 - Information services are primarily intended to constantly survey the marketplace for new products and advise prospective buyers on what specifications to consider.
 - Trade newspapers and periodicals offer articles and experiences on various types of hardware and software that you may be considering.
- 12-27

Solicit Proposals (or Quotes) From Vendors

Request for Proposals (RFP) – used to communicate requirements and desired features to prospective vendors. Several different vendors and/or products are candidates. They will respond with a proposal.

Request for Quotations (RFQ) – used when you have already decided on a specific product that can be acquired from multiple sources. They respond with a price quotation.

12-28

- ### Typical Request For Proposal Outline
- I. Introduction
 - A. Background
 - B. Brief summary of needs
 - C. Explanation of RFP document
 - D. Call for action on part of vendor
 - II. Standards and instructions
 - A. Schedule of events leading to contract
 - B. Ground rules that will govern selection decision
 1. Who may talk with whom and when
 2. Who pays for what
 3. Required format for a proposal
 4. Demonstration expectations
 5. Contractual expectations
 6. References expected
 7. Documentation expectations
- 12-29

- ### Typical Request For Proposal Outline (cont.)
- III. Requirements and features
 - A. Hardware
 1. Mandatory requirements, features, and criteria
 2. Essential requirements, features, and criteria
 3. Desirable requirements, features, and criteria
 - B. Software
 1. Mandatory requirements, features, and criteria
 2. Essential requirements, features, and criteria
 3. Desirable requirements, features, and criteria
 - C. Service
 1. Mandatory requirements
 2. Essential requirements
 3. Desirable requirements
 - IV. Technical questionnaires
 - V. Conclusion
- 12-30

Validate Vendor Claims and Performances

- Review vendor proposals and eliminate any that does not meet all mandatory requirements.
- Validate the vendor claims and promises against validation criteria.
 - User References
 - Technical Manuals
 - Demonstrations

12-31

Evaluate and Rank Vendor Proposals

- Feasibility assessment
- Scoring system
 - **Hard-dollar costs** – you will have to pay to the selected vendor.
 - **Soft-dollar costs** – additional costs you will incur if you select a particular vendor (to overcome a shortcoming, etc.)

12-32

Award Contract and Debrief Vendors

- Negotiate contract with selected vendor.
- Debrief vendors that submitted losing proposals.
 - Not to offer a second chance.
 - But to inform them of precise weaknesses in their proposals and/or products.

12-33

Impact of Buy Decision on Remaining Life-Cycle Phases

- Must integrate or interface the new system to other existing systems.
- Decision Analysis
 - Make revisions in models to reflect purchased solution.
 - Implement purchased solution.
 - Integration problems lead to revised business requirements statements.
- Design
 - Technical specification for a subset of programs to integrate purchased and built solutions.

12-34