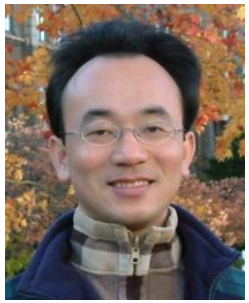
Case Study for Information Management
資訊管理個案

Building Information Systems: USAA (Chap. 13)

1041CSIM4C12
TLMXB4C (M1824)
Tue 2 (9:10-10:00) B502
Thu 7,8 (14:10-16:00) B601



Min-Yuh Day
戴敏育
Assistant Professor
專任助理教授
Dept. of Information Management, Tamkang University
淡江大學 資訊管理學系
http://mail. tku.edu.tw/myday/

2015-12-15, 17

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
1	2015/09/15, 17	Introduction to Case Study for Information Management
2	2015/09/22, 24	Information Systems in Global Business: UPS (Chap. 1) (pp.53-54)
3	2015/09/29, 10/01	Global E-Business and Collaboration: P&G (Chap. 2) (pp.84-85)
4	2015/10/06, 08	Information Systems, Organization, and Strategy: Starbucks (Chap. 3) (pp.129-130)
5	2015/10/13, 15	Ethical and Social Issues in Information Systems: Facebook (Chap. 4) (pp.188-190)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
6	2015/10/20, 22	IT Infrastructure and Emerging Technologies: Amazon and Cloud Computing (Chap. 5) (pp. 234-236)
7	2015/10/27, 29	Foundations of Business Intelligence: IBM and Big Data (Chap. 6) (pp.261-262)
8	2015/11/03, 05	Telecommunications, the Internet, and Wireless Technology: Google, Apple, and Microsoft (Chap. 7) (pp.318-320)
9	2015/11/10, 12	Midterm Report (期中報告)
10	2015/11/17, 19	期中考試週

課程大綱 (Syllabus)

週次	日期	內容（Subject/Topics）
11	2015/11/24, 26	Enterprise Applications: Summit and SAP (Chap. 9) (pp.396-398)
12	2015/12/01, 03	E-commerce: Zagat (Chap. 10) (pp.443-445)
13	2015/12/08, 10	Enhancing Decision Making: Zynga (Chap. 12) (pp.512-514)
14	2015/12/15, 17	Building Information Systems: USAA (Chap. 13) (pp.547-548)
15	2015/12/22, 24	Managing Projects: NYCAPS and CityTime (Chap. 14) (pp.586-588)
16	2015/12/29, 31	Final Report I (期末報告 I)
17	2016/01/05, 07	Final Report II (期末報告 II)
18	2016/01/12, 14	期末考試週

Chap. 13
Building Information Systems: USAA

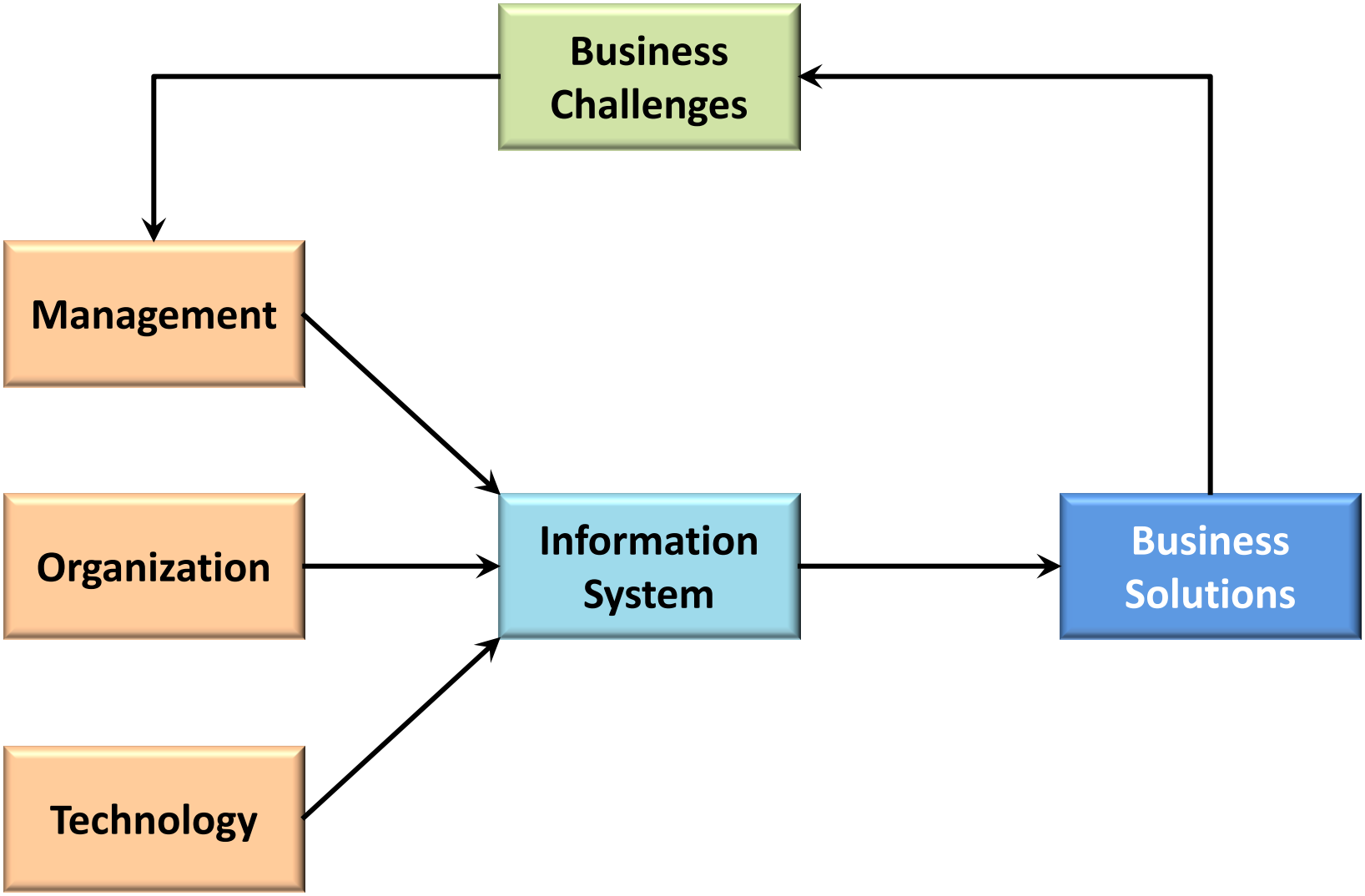
Case Study:

Building Information Systems: USAA (Chap. 13) (pp. 547-548)

What does it take to go mobile?

1. What management, organization, and technology issues need to be addressed when building mobile applications?
2. How does user requirement definition for mobile applications differ from that in traditional systems analysis?
3. Describe the business processes changed by USAA's mobile applications before and after the applications were deployed.

Overview of Fundamental MIS Concepts



Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Systems as Planned Organizational Change

- Structural organizational changes enabled by IT
  1. Automation
  2. Rationalization of procedures
  3. Business process redesign
  4. Paradigm shifts

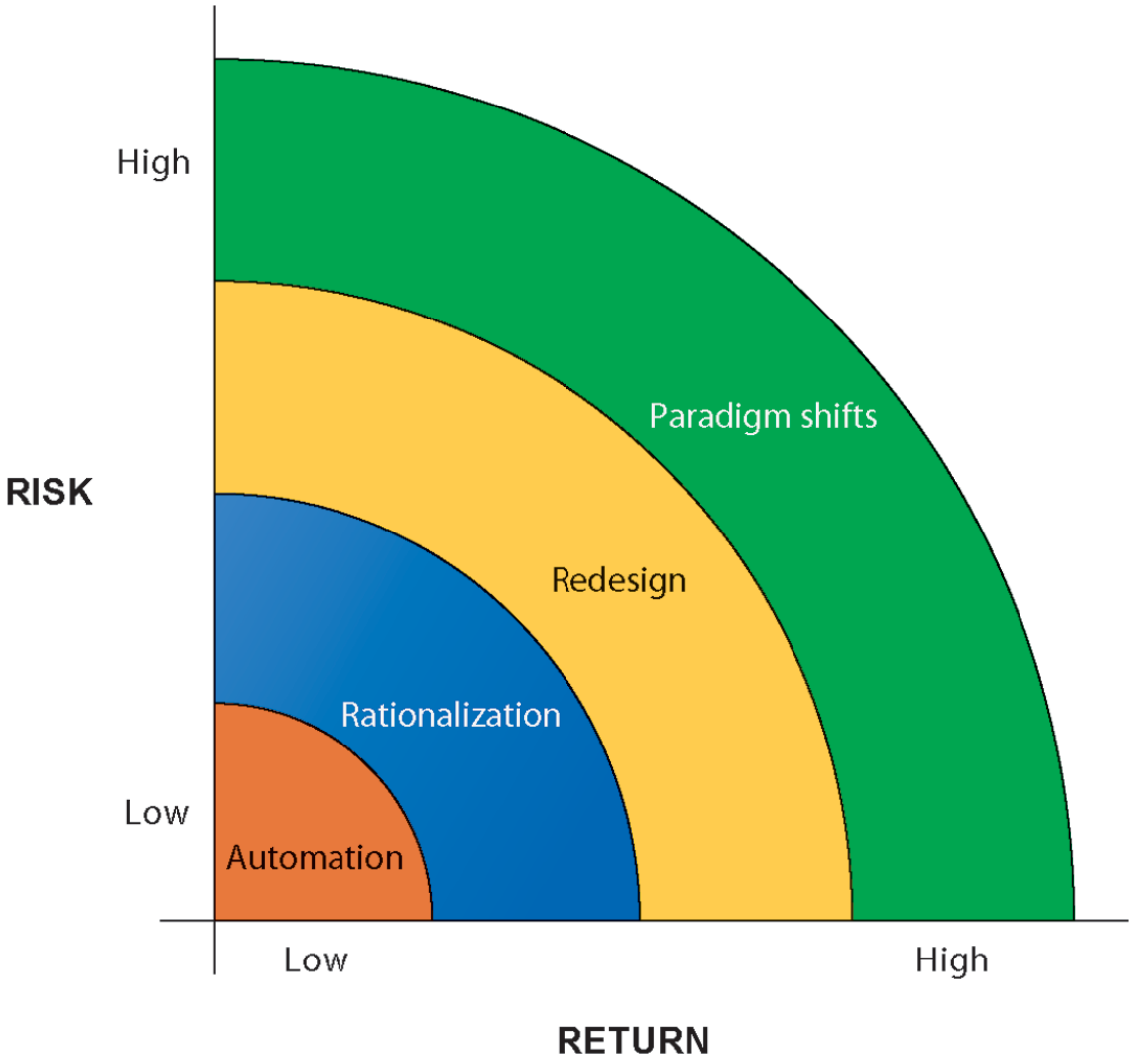
Structural Organizational Changes Enabled by IT

1. Automation
   - Increases efficiency
   - Replaces manual tasks
2. Rationalization of procedures
   - Streamlines standard operating procedures
   - Often found in programs for making continuous quality improvements
     - Total quality management (TQM)
     - Six sigma

Structural Organizational Changes Enabled by IT

3. Business process redesign
   - Analyze, simplify, and redesign business processes
   - Reorganize workflow, combine steps, eliminate repetition
4. Paradigm shifts
   - Rethink nature of business
   - Define new business model
   - Change nature of organization

Organizational Change Carries Risks and Rewards



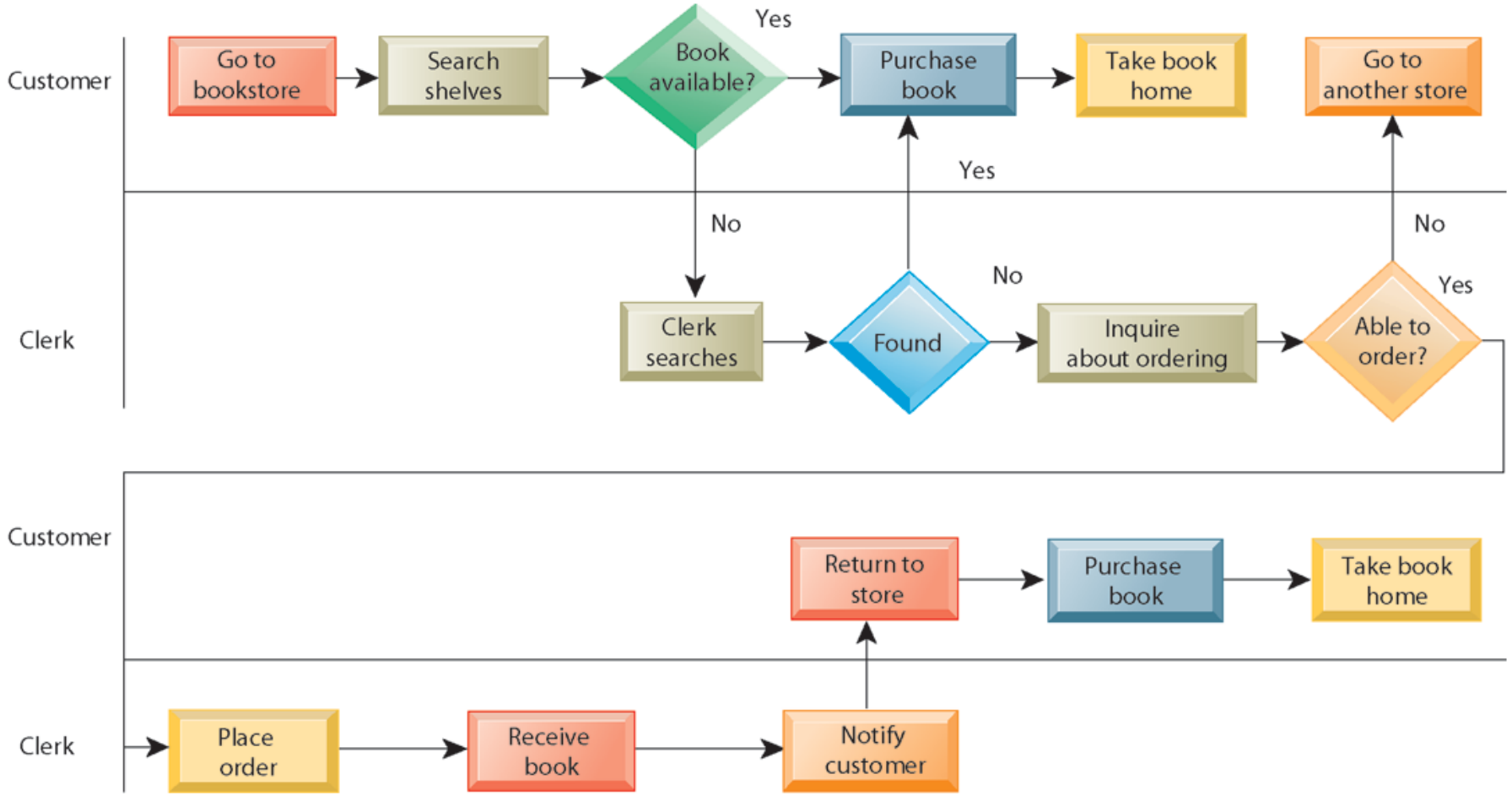
Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Business Process Management (BPM)

- Business Process Management (BPM)
  - Variety of tools, methodologies to analyze, design, optimize processes
  - Used by firms to manage business process redesign
- Steps in BPM
  1. Identify processes for change
  2. Analyze existing processes
  3. Design the new process
  4. Implement the new process
  5. Continuous measurement

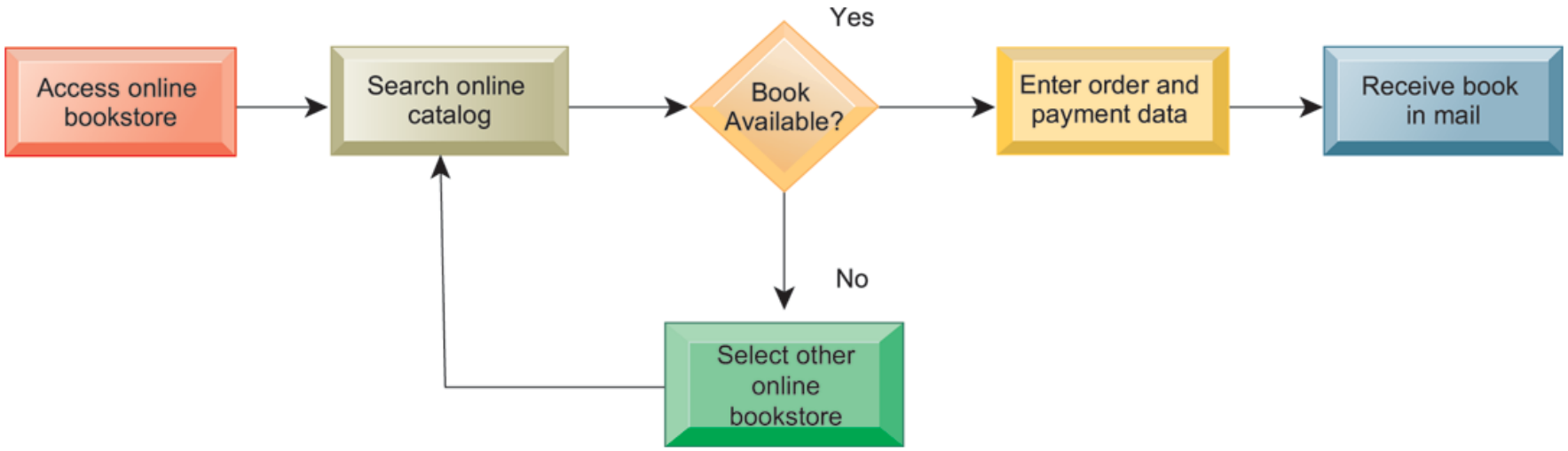
As-is Business Process for

Purchasing a Book from a Physical Bookstore



Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Redesigned Process For Purchasing A Book Online



Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Business Process Redesign (BPR)

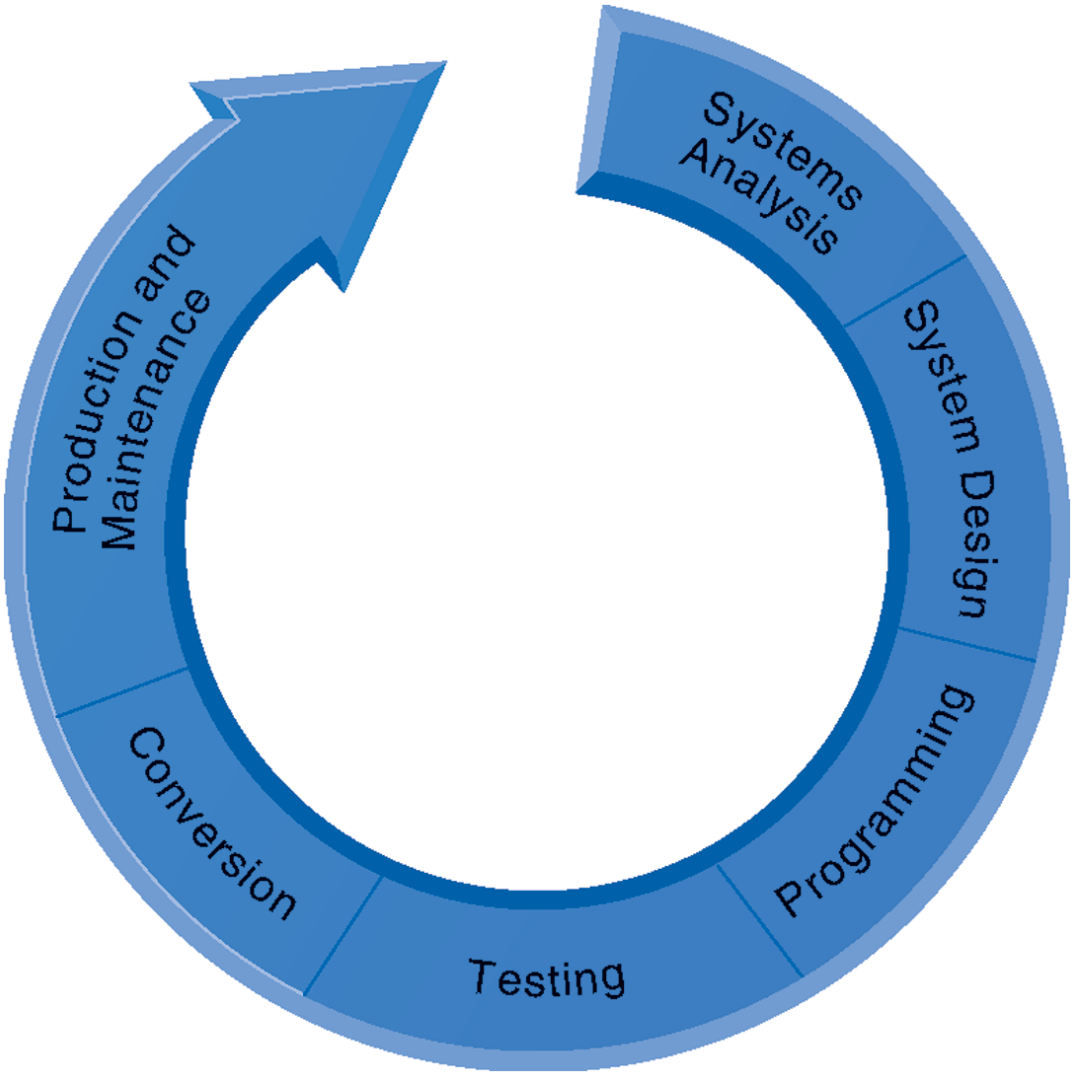
- Variety of tools for BPM, to
  - Identify and document existing processes
    - Identify inefficiencies
  - Create models of improved processes
  - Capture and enforce business rules for performing processes
  - Integrate existing systems to support process improvements
  - Verify that new processes have improved
  - Measure impact of process changes on key business performance indicators

Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Systems Development (SD)

- 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

The Systems Development Process



Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Systems Analysis (SA)

- Analysis of problem to be solved by new system
  - Defining the problem and identifying causes
  - Specifying solutions
    - Systems proposal report identifies and examines alternative solutions
  - Identifying information requirements
- Includes feasibility study
  - Is solution feasible and good investment?
  - Is required technology, skill available?

System Analysis (SA) (cont.)

- 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

Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Systems Design (SD)

- Describes 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 system reflects their business priorities and information needs
  - Insufficient user involvement in design effort is major cause of system failure

Systems Design: Design Specifications

OUTPUT
Medium
Content
Timing

INPUT
Origins
Flow
Data entry

USER INTERFACE
Simplicity
Efficiency
Logic
Feedback
Errors

DATABASE DESIGN
Logical data model
Volume and speed requirements
File organization and design
Record specifications

PROCESSING
Computations
Program modules
Required reports
Timing of outputs

MANUAL PROCEDURES
What activities
Who performs them
When
How
Where

CONTROLS
Input controls (characters, limit, reasonableness)
Processing controls (consistency, record counts)
Output controls (totals, samples of output)
Procedural controls (passwords, special forms)

SECURITY
Access controls
Catastrophe plans
Audit trails

DOCUMENTATION
Operations documentation
Systems documents
User documentation

CONVERSION
Transfer files
Initiate new procedures
Select testing method
Cut over to new system

TRAINING
Select training techniques
Develop training modules
Identify training facilities

ORGANIZATIONAL CHANGES
Task redesign
Job redesign
Process design
Organization structure design
Reporting relationships

Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Completing the Systems Development Process

- Programming
  - System specifications from design stage are translated into software program code
- Testing
  - Ensures system produces right results
  - Unit testing: Tests each program in system separately
  - System testing: Test functioning of system as a whole
  - Acceptance testing: Makes sure system is ready to be used in production setting
  - Test plan: All preparations for series of tests

A Sample Test Plan to Test a Record Change

Procedure	Address and Maintenance "Record Change Series"		Test Series 2		
	Prepared By:		Date:	Version:	
Test Ref.	Condition Tested	Special Requirements	Expected Results	Output On	Next Screen
2.0	Change records				
2.1	Change existing record	Key field	Not allowed		
2.2	Change nonexistent record	Other fields	"Invalid key" message		
2.3	Change deleted record	Deleted record must be available	"Deleted" message		
2.4	Make second record	Change 2.1 above	OK if valid	Transaction file	V45
2.5	Insert record		OK if valid	Transaction file	V45
2.6	Abort during change	Abort 2.5	No change	Transaction file	V45

Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Conversion

- Process of changing from old system to new system
- Four main strategies
  1. Parallel strategy
  2. Direct cutover
  3. Pilot study
  4. Phased approach
- Requires end-user training
- Finalization of detailed documentation showing how system works from technical and end-user standpoint

Production and Maintenance

- System reviewed to determine if revisions needed
- May include post-implementation audit document
- Maintenance
  - Changes in hardware, software, documentation, or procedures to a production system to correct errors, meet new requirements, or improve processing efficiency
    - 20% debugging, emergency work
    - 20% changes to hardware, software, data, reporting
    - 60% of work: User enhancements, improving documentation, recoding for greater processing efficiency

Systems Development (SD)

Summary of Systems Development Activities	
Core Activity	**Description**
Systems analysis	**Identify problem(s)** **Specify solutions** **Establish information requirements**
Systems design	**Create design specifications**
Programming	**Translate design specifications into code**
Testing	**Unit test** **Systems test** **Acceptance test**
Conversion	**Plan conversion** **Prepare documentation** **Train users and technical staff**
Production and maintenance	**Operate the system** **Evaluate the system** **Modify the system**

Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Most prominent methodologies for modeling and designing systems

1. Structured methodologies
2. Object-oriented development

Structured Methodologies

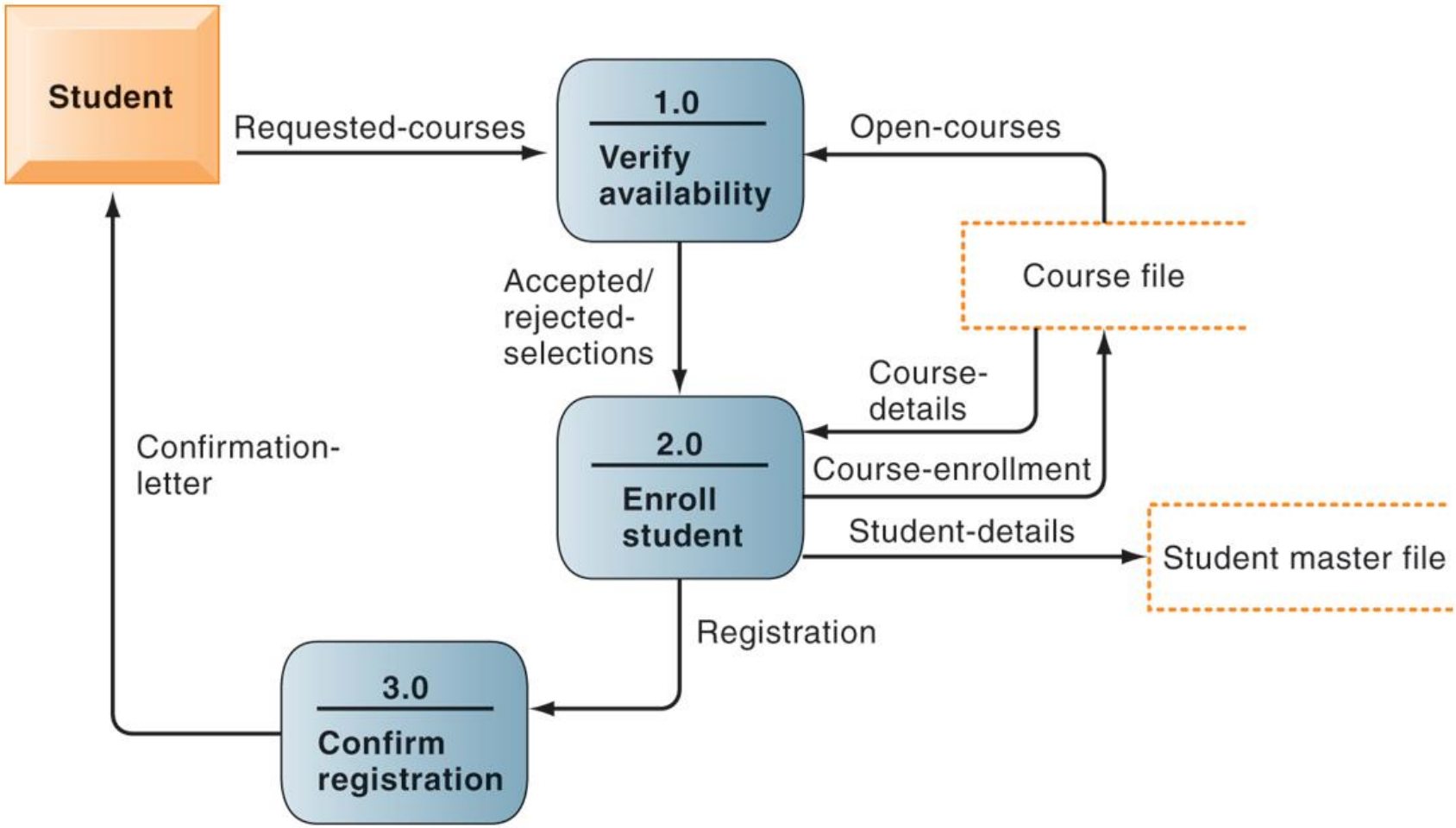
- Structured:
  - Techniques are step-by-step, progressive
- Process-oriented:
  - Focusing on modeling processes or actions that manipulate data
- Separate data from processes

Data Flow Diagram (DFD)

- Primary tool for representing system's component processes and flow of data between them
- Offers logical graphic model of information flow
- High-level and lower-level diagrams can be used to break processes down into successive layers of detail

Source: Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.

Data Flow Diagram (DFD) For Mail-in University Registration System



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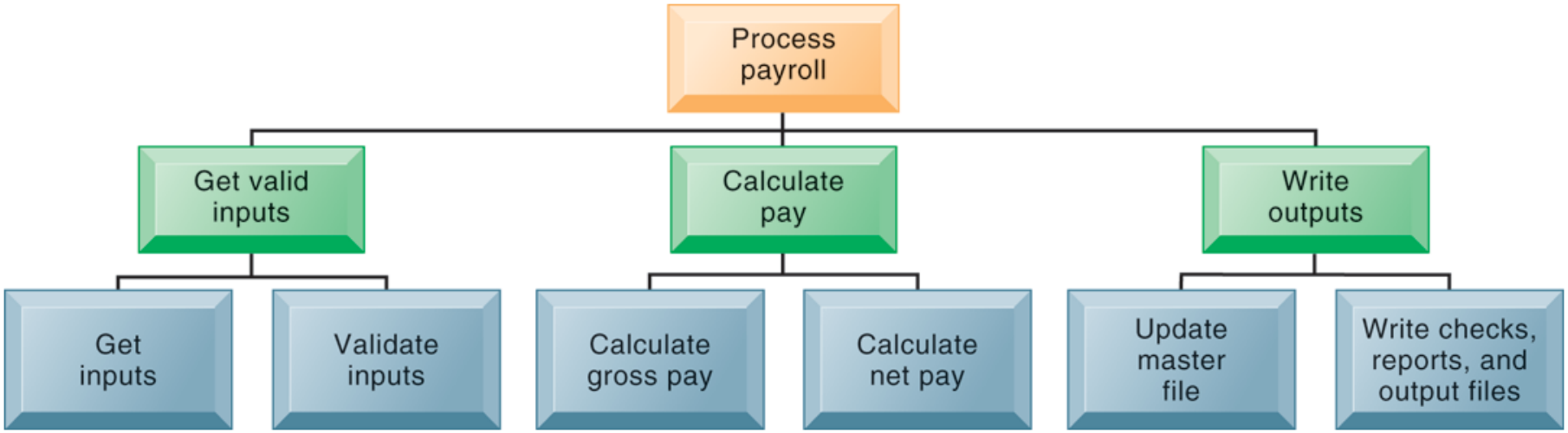
High-level Structure Chart for a Payroll System



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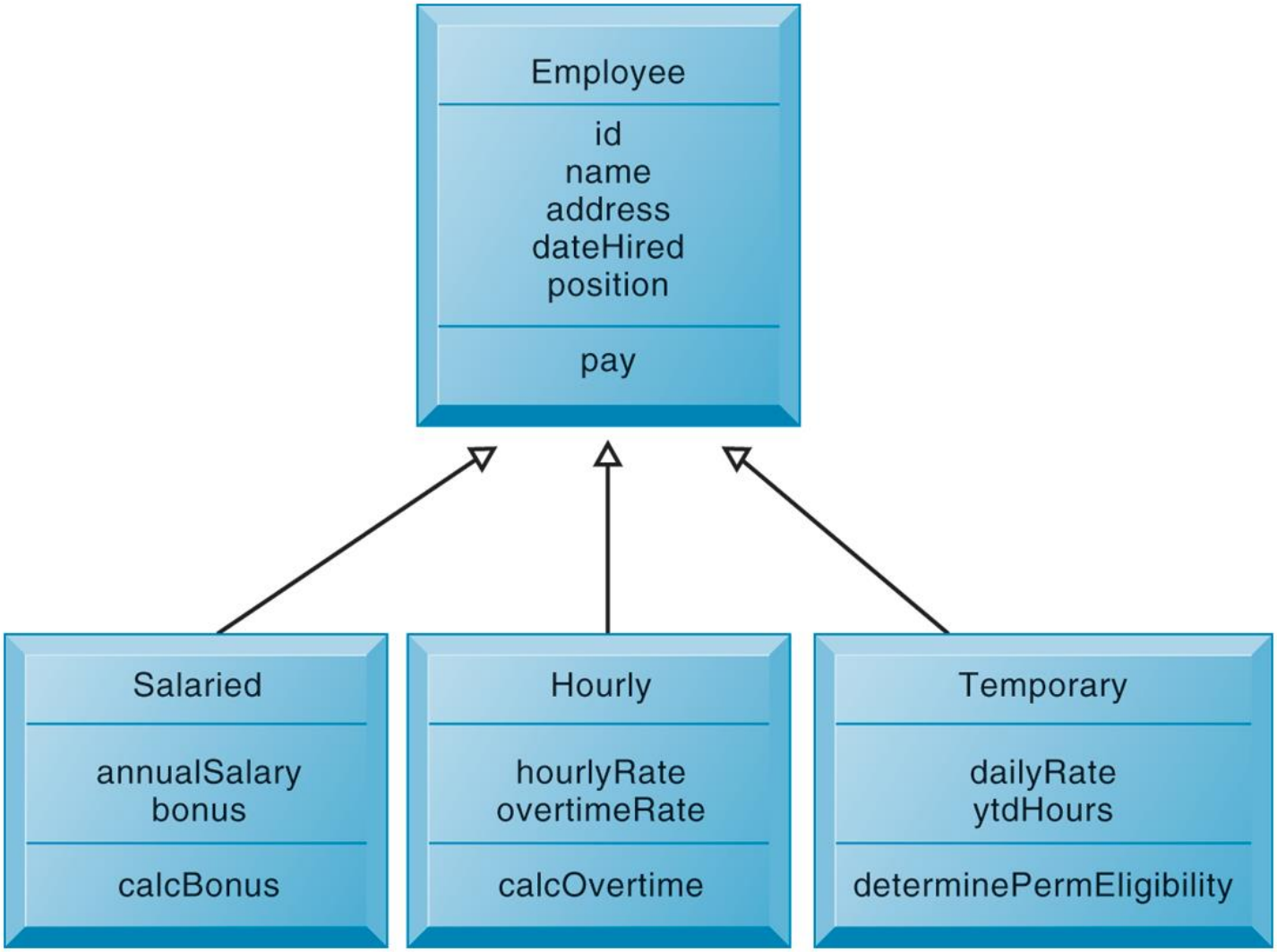
Object-oriented Development

- Object is basic unit of systems analysis and design
  - Object:
    - Combines data and the processes that operate on those data
    - Data encapsulated in object can be accessed and modified only by operations, or methods, associated with that object
- Object-oriented modeling based on concepts of class and inheritance
  - Objects belong to a certain class and have features of that class
  - May inherit structures and behaviors of a more general, ancestor class

Class and Inheritance



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Object-oriented Development

- More iterative and incremental than traditional structured development
  - Systems analysis: Interactions between system and users analyzed to identify objects
  - Design phase: Describes how objects will behave and interact; grouped into classes, subclasses and hierarchies
  - Implementation: Some classes may be reused from existing library of classes, others created or inherited
- Because objects reusable, object-oriented development can potentially reduce time and cost of development

Computer-Aided Software Engineering (CASE)

- Software tools to automate development and reduce repetitive work, including
  - Graphics facilities for producing charts and diagrams
  - Screen and report generators, reporting facilities
  - Analysis and checking tools
  - Data dictionaries
  - Code and documentation generators
- Support iterative design by automating revisions and changes and providing prototyping facilities
- Require organizational discipline to be used effectively

Alternative Systems-Building Methods

1. Traditional systems life-cycle
2. Prototyping
3. End-user development
4. Application software packages
5. Outsourcing

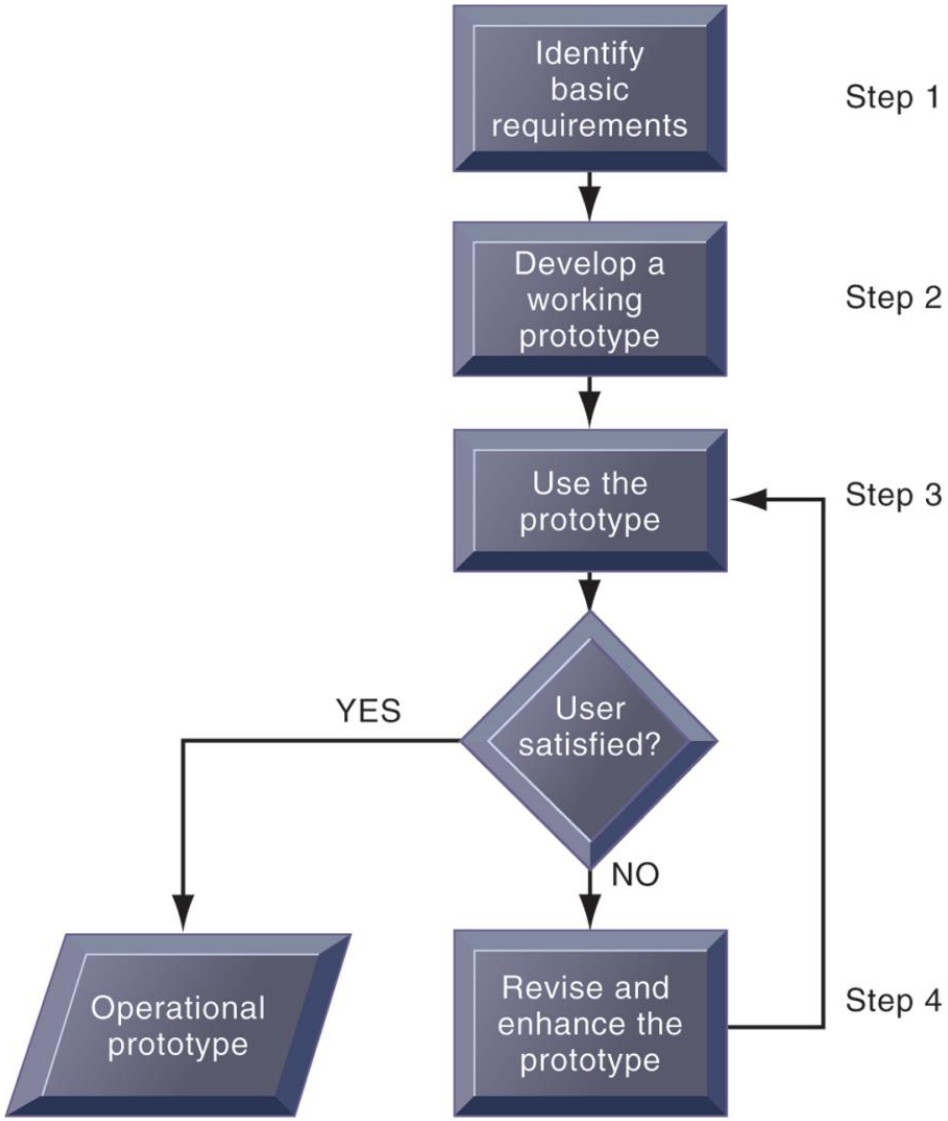
Traditional Systems Life-cycle

- Oldest method for building information systems
- Phased approach:
  - Development divided into formal stages
  - "Waterfall" approach: One stage finishes before next stage begins
- Formal division of labor between end users and information systems specialists
- Emphasizes formal specifications and paperwork
- Still used for building large complex systems
- Can be costly, time-consuming, and inflexible

Prototyping

- Building experimental system rapidly and inexpensively for end users to evaluate
- Prototype: Working but preliminary version of information system
  - Approved prototype serves as template for final system
- Steps in prototyping
  1. Identify user requirements.
  2. Develop initial prototype.
  3. Use prototype.
  4. Revise and enhance prototype.

The Prototyping Process



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Prototyping

- Advantages
  - Useful if some uncertainty in requirements or design solutions
  - Often used for end-user interface design
  - More likely to fulfill end-user requirements
- Disadvantages
  - May gloss over essential steps
  - May not accommodate large quantities of data or large number of users
    - May not undergo full testing or documentation

End-user Development

- Uses fourth-generation languages to allow end-users to develop systems with little or no help from technical specialists
- Fourth generation languages: Less procedural than conventional programming languages
  - PC software tools
  - Query languages
  - Report generators
  - Graphics languages
  - Application generators
  - Application software packages
  - Very high-level programming languages

End-user Development

- Advantages:
  - More rapid completion of projects
  - High-level of user involvement and satisfaction
- Disadvantages:
  - Not designed for processing-intensive applications
  - Inadequate management and control, testing, documentation
  - Loss of control over data
- Managing end-user development
  - Require cost-justification of end-user system projects
  - Establish hardware, software, and quality standards

Application Software Packages

- Save time and money
- Many offer customization features:
  - Software can be modified to meet unique requirements without destroying integrity of package software
- Evaluation criteria for systems analysis include:
  - Functions provided by the package, flexibility, user friendliness, hardware and software resources, database requirements, installation and maintenance efforts, documentation, vendor quality, and cost
- Request for Proposal (RFP)
  - Detailed list of questions submitted to packaged-software vendors
  - Used to evaluate alternative software packages

Outsourcing

- Several types
  - Cloud and SaaS providers
    - Subscribing companies use software and computer hardware provided by vendors
  - External vendors
    - Hired to design, create software
    - Domestic outsourcing
      - Driven by firms need for additional skills, resources, assets
    - Offshore outsourcing
      - Driven by cost-savings

Outsourcing

- Advantages
  - Allows organization flexibility in IT needs
- Disadvantages
  - Hidden costs, for example:
    - Identifying and selecting vendor
    - Transitioning to vendor
  - Opening up proprietary business processes to third party

Total Cost of Offshore Outsourcing

TOTAL COST OF OFFSHORE OUTSOURCING

Cost of outsourcing contract			$10, 000, 000	
Hidden Costs	Best Case	Additional Cost ($)	Worst Case	Additional Cost ($)
1. Vendor selection	0%	20,000	2%	200,000
2. Transition costs	2%	200,000	3%	300,000
3. Layoffs & retention	3%	300,000	5%	500,000
4. Lost productivity/cultural issues	3%	300,000	27%	2,700,000
5. Improving development processes	1%	100,000	10%	1,000,000
6. Managing the contract	6%	600,000	10%	1,000,000
Total additional costs		1,520,000		5,700,000
	Outstanding Contract ($)	Additional Cost ($)	Total Cost ($)	Additional Cost
Total cost of outsourcing (TCO) best case	10,000,000	1,520,000	11,520,000	15.2%
Total cost of outsourcing (TCO) worst case	10,000,000	5,700,000	15,700,000	57.0%

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Application Development for the Digital Firm

- Rapid Application Development (RAD)
  - Joint Application Design (JAD)
  - Agile Development
- Component-based Development and Web Services
  - Component-based Development
  - Web Services and Service-Oriented Computing

Rapid Application Development (RAD)

- Process of creating workable systems in a very short period of time
- Utilizes techniques such as:
  - Visual programming and other tools for building graphical user interfaces
  - Iterative prototyping of key system elements
  - Automation of program code generation
  - Close teamwork among end users and information systems specialists

Joint Application Design (JAD)

- Used to accelerate generation of information requirements and to develop initial systems design
- Brings end users and information systems specialists together in interactive session to discuss system's design
- Can significantly speed up design phase and involve users at intense level

Agile Development

- Focuses on rapid delivery of working software by breaking large project into several small sub-projects
- Subprojects
  - Treated as separate, complete projects
  - Completed in short periods of time using iteration and continuous feedback
- Emphasizes face-to-face communication over written documents, allowing collaboration and faster decision making

Component-based Development

- Groups of objects that provide software for common functions (e.g., online ordering) and can be combined to create large-scale business applications
- Web services
  - Reusable software components that use XML and open Internet standards (platform independent)
  - Enable applications to communicate with no custom programming required to share data and services
  - Can engage other Web services for more complex transactions
  - Using platform and device-independent standards can result in significant cost-savings and opportunities for collaboration with other companies

Mobile Application Development

- Special requirements for
  - Smaller screens, keyboards
  - Multitouch gestures
  - Saving resources (memory, processing)
- Responsive Web design
  - Web sites programmed so that layouts change automatically according to user's computing device
- Three main platforms
  - iPhone/iPad, Android, Windows Phone

Case Study: Managing Projects:

NYCAPS and CityTime (Chap. 14) (pp. 586-588)

A Tale of Two New York City IS Projects

1. How important were the NYCAPS and CityTime projects for New York City? What were their objectives? What would have been their business benefits?
2. Evaluate the key risk factors in both projects.
3. Classify and describe the problems each project encountered as the NYCAPS and CityTime systems were being implemented. What management, organization, and technology factors were responsible for these problems?
4. What were the similarities and differences in the management of both projects?
5. What was the business impact of these botched implementations? Explain your answer.
6. Describe the steps that should have been taken to prevent negative outcomes in these projects.

資訊管理個案
(Case Study for Information Management)

1. 請同學於資訊管理個案討論前
   應詳細研讀個案，並思考個案研究問題。
2. 請同學於上課前複習相關資訊管理相關理論
   ，以作為個案分析及擬定管理對策的依據。
3. 請同學於上課前
   先繳交個案研究問題書面報告。

References

- Kenneth C. Laudon & Jane P. Laudon (2014), Management Information Systems: Managing the Digital Firm, Thirteenth Edition, Pearson.
- Kenneth C. Laudon & Jane P. Laudon原著，游張松 主編，陳文生 翻譯 (2014)，資訊管理系統，第13版，滄海