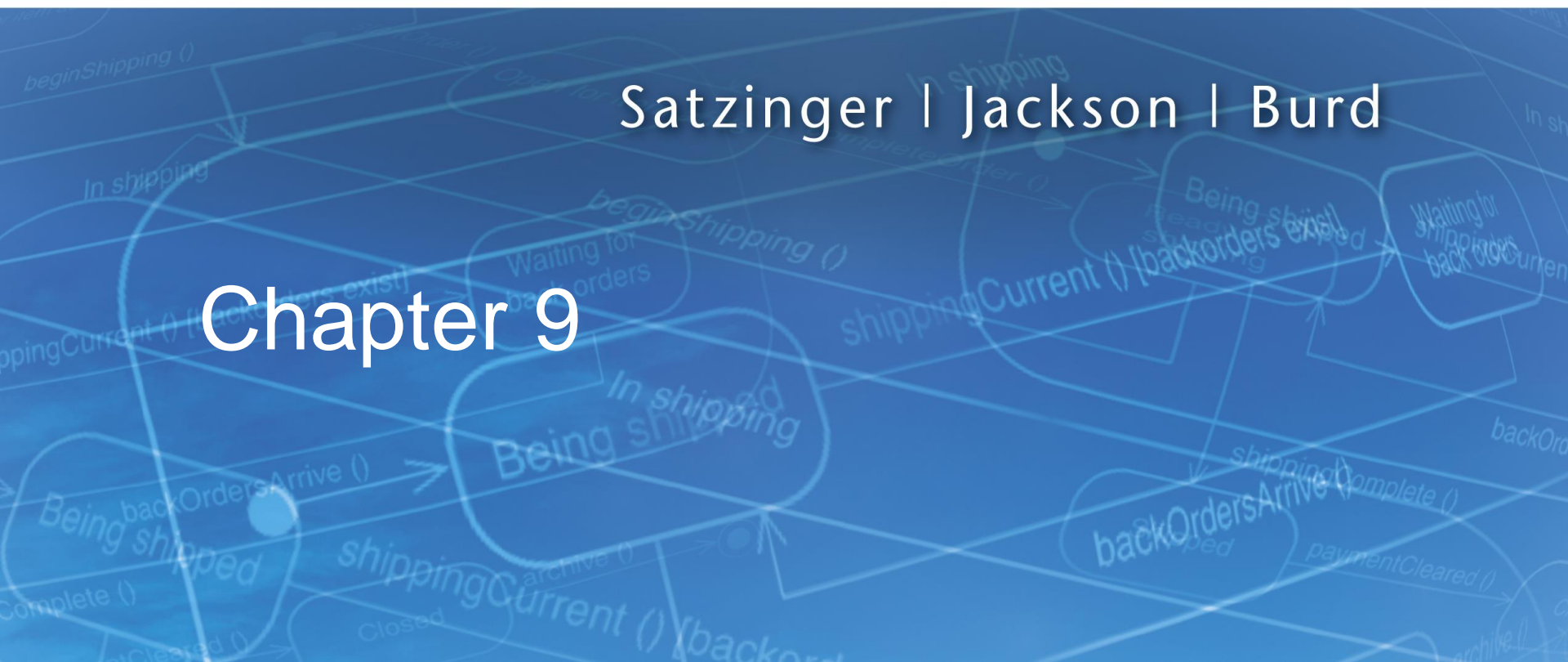# SYSTEMS
ANALYSIS AND DESIGN
IN A CHANGING WORLD

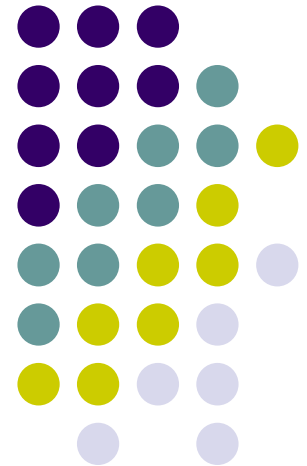Satzinger | Jackson | Burd

Chapter 9

Project Planning and Project Management

Chapter 9

Systems Analysis and Design
in a Changing World 6th Ed

Satzinger, Jackson & Burd

Chapter 9 Outline

- Principles of Project Management

- Activities of SDLC Core Process 1:

  - Identify the Problem and Obtain Approval

- Activities of SDLC Core Process 2:

  - Plan and Monitor the Project

Learning Objectives

- Describe the factors that cause a software development project to succeed or fail

- Describe the responsibilities of a project manager

- Describe the knowledge areas in the project management body of knowledge (PMBOK)

- Describe the Agile approach to the project management knowledge areas

- Explain the activities required to get a project approved (Core Process 1)

- Explain the activities required to plan and monitor a project (Core Process 2)

Overview
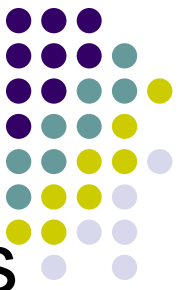
- Chapter 8 covered the various alternatives for the SDLC and approaches to development

- You should be asking yourself:

  - "How are all these activities coordinated?"

  - "How do I know which tasks to do first?"

  - "How is the work assigned to the different teams and team members?"

  - "How do I know which parts of the new system should be developed first?"

Principles of Project Management:
The Need for Project Management
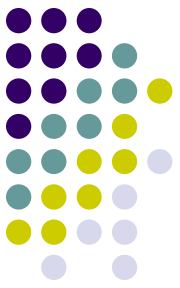
- Standish Group CHAOS Report shows too many IT project fail (only 32% completely successful)
- Reasons for failure
  - Undefined project management practices
  - Poor IT management and poor IT procedures
  - Inadequate executive support for the project
  - Inexperienced project managers
  - Unclear business needs and project objectives
  - Inadequate user involvement

The Role of the Project Manager

- Project Management
  - Organizing and directing other people to achieve a planned result within a predetermined schedule and budget
  - The processes used to plan the project and then to monitor and control it.
- Project Manager
  - Great need for effective project managers
  - Internally managing people and resources
  - Externally conducting public relations

Project Manager Responsibilities

- Internal Responsibilities
    - Developing the project schedule
    - Recruiting and training team members
    - Assigning work to teams and team members
    - Assessing project risks
    - Monitoring and controlling project deliverables and milestones

- External Responsibilities
    - Reporting the project's status and progress
    - Working directly with the client (the project's sponsor) and other stakeholders
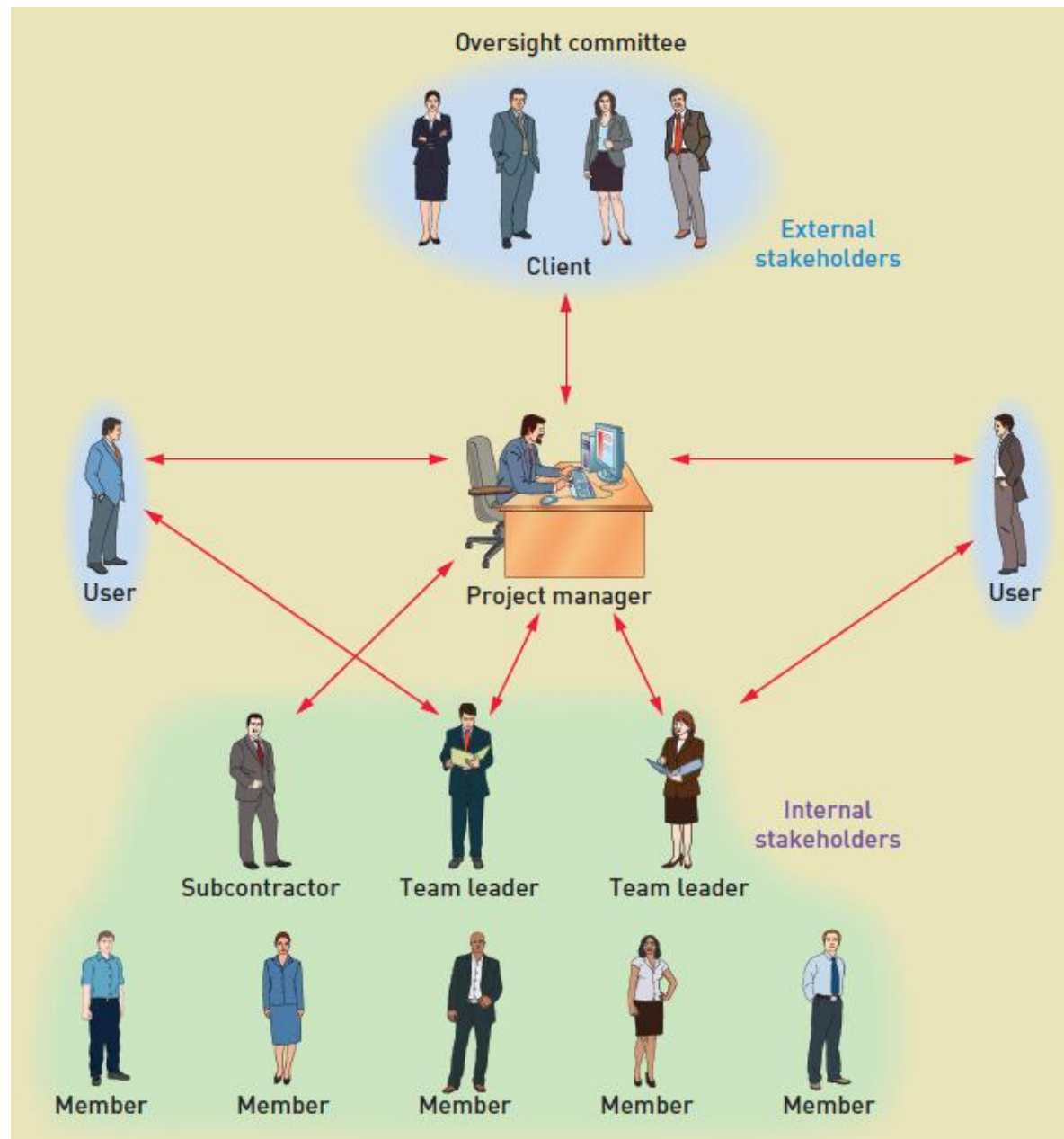   - Identifying resource needs and obtaining resources

Additional Project Stakeholders

- ## Client
  - the person or group that funds the project
- ## Oversight Committee
  - clients and key managers who review the progress and direct the project
- ## Users
  - the person or group of people who will use the new system

Project Manager & Project Stakeholders

Oversight committee

Client

External stakeholders

User

Project manager

User

Subcontractor

Team leader

Team leader

Internal stakeholders

Member

Member

Member

Member

Member

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10

Project Management Body of Knowledge (PMBOK)
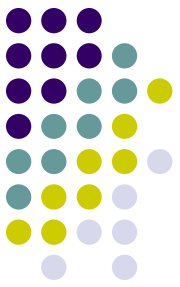
PMPOK is organized into 9 knowledge areas:
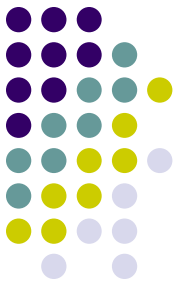
- **Project Scope Management**—Defining and controlling the functions that are to be included in the system as well as the scope of the work to be done by the project team
- **Project Time Management**—Creating a detailed schedule of all project tasks and then monitoring the progress of the project against defined milestones
- **Project Cost Management**—Calculating the initial cost/benefit analysis and its later updates and monitoring expenditures as the project progresses
- **Project Quality Management**—Establishing a comprehensive plan for ensuring quality, which includes quality control activities for every phase of a project

Project Management Body of Knowledge (PMBOK)
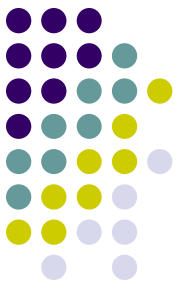
- **Project Human Resource Management**—Recruiting and hiring project team members; training, motivating, and team building; and implementing related activities to ensure a happy, productive team

- **Project Communications Management**—Identifying all stakeholders and the key communications to each; also establishing all communications mechanisms and schedules

- **Project Risk Management**—Identifying and reviewing throughout the project all potential risks for failure and developing plans to reduce these risks

- **Project Procurement Management**—Developing requests for proposals, evaluating bids, writing contracts, and then monitoring vendor performance

- **Project Integration Management**—Integrating all the other knowledge areas into one seamless whole

Project Management and Ceremony
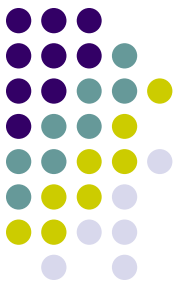
- Ceremony
  - The level of formality of a project; the rigor of holding meetings and producing documentation
- High Ceremony
  - Meetings are often held on a predefined schedule, with specific participants, agendas, minutes, and follow-through
  - Specifications are formally documented with an abundance of diagrams and documentation and are frequently verified through formal review meetings between developers and users.
- Low Ceremony
  - Meetings occur in the hallway or around the water cooler.
  - Written documentation, formal specifications, and detailed models are kept to a minimum
  - Developers and users usually work closely together on a daily basis to define requirements and develop the system
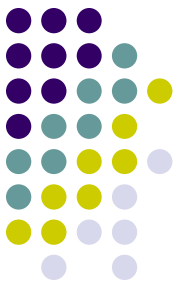
"Agile" Project Management

- Agile Scope Management
  - Scope is not well understood, but needs to be controlled

- Agile Time Management
  - Schedule must be flexible due to changes

- Agile Cost Management
  - Costs are more difficult to estimate

- Agile Risk Management
  - Higher risk aspects of project are completed first

- Agile Quality Management
  - Quality assessed after each iteration

Activities of Core Process 1:
Identify Problem and Obtain Approval

Identify Problem Activities

Identify the problem.
Quantify project approval factors.
Perform risk and feasibility analysis.
Review with the client and obtain approval.

Core Processes	Iterations					
	1	2	3	4	5	6
Identify problem and obtain approval.						
Plan and monitor the project.						
Discover and understand details.						
Design system components.						
Build, test, and integrate system components.						
Complete system tests and deploy solution.						

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15

Identify the Problem

- IS Development Projects usually:
  - Respond to an opportunity
    - Strategic initiative
    - Something that provides competitive advantage
  - Resolve a problem
    - Operational issues keep coming up
    - User needs aren't being met
  - Respond to an external directive
    - Legislation requires new form of reporting
    - Changes in tax laws or regulations

Identify the Problem

- ## System Vision Document
  - ### Problem Description
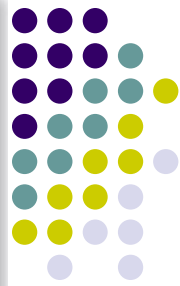   - What is the problem and idea for the solution?
  - ### System Capabilities
    - What are the capabilities the new system will have?
    - Helps define the scope
  - ### Business Benefits
    - The benefits that accrue to the organization
    - Tangible (in dollars) and intangible benefits

System Vision Document

RMO CSMS

Consolidated Sales and Marketing System
System Vision Document

Problem Description

Sales and marketing on the Web has changed drastically since the CSS system was built. Customers are more sophisticated, and they are used to catalog and sales systems that are easy to use and provide many services, such as one-click ordering, deferred-purchase tracking, simplified searches, and comparison shopping. In addition, research has shown that sales increase dramatically when social media marketing tools are combined with basic sales functionality. Hence, the new CSMS is needed not only to respond to today's competition but to launch RMO into today's world of social media and mobile computing. The longer RMO delays in starting this project, the more opportunities it misses.

System Capabilities

This document identifies the required system capabilities at a high level. Later documents will specify the detailed requirements. These capabilities are required:

- Provide a shopping cart capability.
  - Support customer sales with high automation (one-click, etc.).
  - Recommend related product purchases and comparison shopping.
  - Allow customer ratings and recommendations.
  - Include "friend" network capability.
- Include comprehensive order fulfillment.
  - Support multiple and split-order shipping and tracking.
  - Support back-ordering and tracking.
  - Allow customer comments and feedback.
- Provide customer account and billing capability.
  - Provide individualized customer accounting.
  - Support electronic billing and many electronic payment methods.
  - Accumulate customer "points" and allow transfer and sharing.
- Include marketing functions for promotions and specials.
  - Provide flexible promotions and sales.
  - Accumulate and track "points" from suppliers directly to customers.
  - Interface with social marketing media for advertising and social marketing activities.
  - Support mobile devices for social marketing and sales.

Business Benefits

The primary business benefit of these capabilities will be to increase sales by connecting with customers and improving the customer experience. The specific benefits include:

- Increasing the size of customer purchases
- Increasing the frequency of customer purchases
- Increasing customer satisfaction
- Increasing product recommendations from customers to friends
- Attracting new customers through recommendations and social marketing
- Building customer loyalty with recommendations and service
- Increasing speed of product availability
- Eliminating shipping delays and outages

Systems Analysis

RMO CSMS Vision Document (1)

Consolidated Sales and Marketing System

System Vision Document

Problem Description

Sales and marketing on the Web has changed drastically since the CSS system was built. Customers are more sophisticated, and they are used to catalog and sales systems that are easy to use and provide many services, such as one-click ordering, deferred-purchase tracking, simplified searches, and comparison shopping. In addition, research has shown that sales increase dramatically when social media marketing tools are combined with basic sales functionality. Hence, the new CSMS is needed not only to respond to today's competition but to launch RMO into today's world of social media and mobile computing. The longer RMO delays in starting this project, the more opportunities it misses.

RMO CSMS Vision Document (2)

System Capabilities

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20

RMO CSMS Vision Document (3)

Business Benefits

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- Increasing the size of customer purchases
- Increasing the frequency of customer purchases
- Increasing customer satisfaction
- Increasing product recommendations from customers to friends
- Attracting new customers through recommendations and social marketing
- Building customer loyalty with recommendations and service
- Increasing speed of product availability
- Eliminating shipping delays and outages

Quantify Project Approval Factors

- Estimated Time for Completion

Time Estimate for the New CSMS Project			
Subsystem	Functional requirements	Iterations required	Estimated time
Sales subsystem*	15	5	20 weeks
Order Fulfillment subsystem*	12	5	20 weeks
Customer Account subsystem**	10	4	15 weeks
Marketing subsystem**	6	3	13 weeks
Reporting subsystem**	7	3	12 weeks
Total development time (2 teams)			40 weeks
Final hardening and acceptance testing		2	8 weeks
Total project time			48 weeks

*Assigned to Tiger team
**Assigned to Cougar team

Quantify Project Approval Factors

- Estimated Cost for Development

Summary of Development Costs for CSMS	
Expense category	**Amount**
Salaries/wages (includes benefits costs) (1 PM, 8 analysts, 1 support)	$936,000.00
Equipment/installation	$308,000.00
Training	$78,000.00
Facilities	$57,000.00
Utilities	$97,000.00
Travel/miscellaneous	$87,000.00
Licenses	$18,000.00
Total	**$1,581,000.00**

Quantify Project Approval Factors

- Estimated Cost for Support

Summary of Estimated Annual Operating Costs for CSMS	
Recurring expense	**Amount**
Connectivity/hosting	$156,000.00
Programming	$75,000.00
Help desk	$90,000.00
Total	**$321,000.00**

Quantify Project Approval Factors

- ## Estimated Benefits from New System
  - Opening up new markets with new services, products, or locations
  - Increasing market share in existing markets
  - Enhancing cross-sales capabilities with existing customers
  - Reducing staff by automating manual functions or increasing efficiency
  - Decreasing operating expenses, such as shipping charges for "emergency shipments"
  - Reducing error rates through automated editing or validation
  - Reducing bad accounts or bad credit losses
  - Reducing inventory or merchandise losses through tighter controls
  - Collecting receivables (accounts receivable) more rapidly
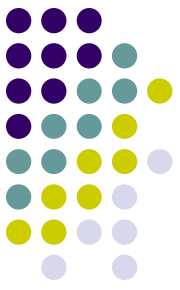
Quantify Project Approval Factors

- ## Tangible "Dollar" Benefits
  - Used for Cost/Benefit Analysis--process of comparing costs and benefits to see whether investing in a new system will be beneficial--

Estimated Annual Benefits for CSMS	
Benefit or cost saving	**Amount**
Recapture/prevention of lost sales	$200,000.00
Increase sales to existing customers	$300,000.00
Sales to new customers	$350,000.00**
Increased efficiency in order processing	$50,000.00
Reduction of data center and equipment costs because of hosting	$146,000.00
Total	**$1,046,000.00**

**plus 8% annual growth
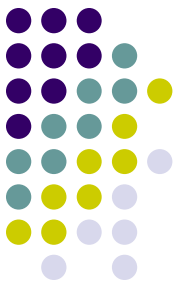
Cost/Benefit Analysis

- ## Net Present Value (NPV)
  - the present value of dollar benefits and dollar costs of a particular investment

- ## Payback Period
  - the time period after which the dollar benefits have offset the dollar costs

- ## Tangible Benefit
  - a benefit that can be measured or estimated in terms of dollars

- ## Intangible Benefit
  - a benefit that accrues to an organization but that can't be measured quantitatively or estimated accurately
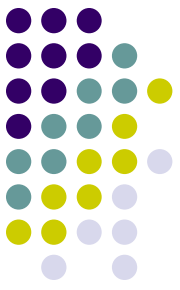
Cost/Benefit Analysis

- Use present value (after discount factor) for all dollar values

- Estimate the useful life of the system

- The NPV after 5 years is $1,713,097

- Payback Period is 2 years amd 128 days

	A	B	C	D	E	F	G	H
1				RMO Cost/Benefit Analysis for CSMS				
2		Category	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
3	1	Value of benefits		$1,046,000	$1,074,000	$1,104,240	$1,136,899	$1,172,171
4	2	Development costs	-$1,581,000					
5	3	Annual expenses		-$321,000	-$321,000	-$321,000	-$321,000	-$321,000
6	4	Net benefit/costs	-$1,581,000	$725,000	$753,000	$783,240	$815,899	$851,171
7	5	Discount factor	1.0000	0.9434	0.8900	0.8396	0.7921	0.7473
8	6	Net present value	-$1,581,000	$683,965	$670,170	$657,608	$646,274	$636,080
9	7	Cumulative NPV	-$1,581,000	-$897,035	-$226,865	$430,743	$1,077,017	$1,713,097
10	8	Payback period	2 years +	226865 / (226865+430743) = .35			or 2 years + 128 days (.35*365)	

Examples of Intangible Benefits

- Increased levels of service (in ways that can't be measured in dollars)
- Increased customer satisfaction (not measurable in dollars)
- Survival—need to do it to compete
- Need to develop in-house expertise (such as a pilot program with new technology)

Determine Project Risk and Feasibility

- Determine the organizational risks and feasibility
  - How well does the new system fit the organizational culture? Risk of negative impacts?
- Evaluate the technological risks and feasibility
  - Can the system be built by the team using technology needed? Training available?
- Assess the resource risks and feasibility
  - Are the needed resources available? Skilled people?
- Identify the schedule risks and feasibility
  - Can the system be built in the amount of time available? Fixed Deadline?

Review with Client and Obtain Approval

- Executive committee reviews and approves
- Board must review and approve for very large projects
- Involved stakeholders need to understand what is expected of them
- IS department needs to know what to do for staffing and support
- Whole organization should be made aware of the project and its importance

Activities of Core Process 2:
Plan and Monitor the Project

Plan and Monitor Activities

Establish the project environment.
Schedule the work.
Staff and allocate resources.
Evaluate work processes.
Monitor progress and make corrections.

Core Processes	Iterations					
	1	2	3	4	5	6
Identify problem and obtain approval.						
Plan and monitor the project.						
Discover and understand details.						
Design system components.						
Build, test, and integrate system components.						
Complete system tests and deploy solution.						

Establish the Project Environment

- Project manager must establish project parameters and the work environment:
  - Recording and communicating—internal and external
    - Who, what, when, and how
  - Work environment
    - Workstations, software development tools (IDE), servers and repositories, office and meeting space, support staff
  - Process and procedures followed
    - Reporting and documentation, programming approach, testing, deliverables, code and version control
- In other words, tailor and operationalize the methodology being used

Establish the Project Environment:

Communication, environment, and procedures

Sample Dashboard showing project information and status

Conference Registration System

Project Definition Statement	Current Status	
Create a new online Web-based system to allow conference attendees to register for conferences and sign up for specific events and activities.	As of Jan 1st all coding was complete. System test has begun. Preparing for acceptance test in 60 days.	Report Status / Report Bug

Triple Constraint Matrix

OK / Caution / Critical

Least Flexible	Moderate	Most Flexible
Scope	Schedule	Cost/Resources
Stable	Delays caused by rework of database design. Critical task 5 days late.	Slightly over, not critical

Timeline

Jan10 Ap10 Jl10 Oc10 Ja11 Ap11 Jl11 Oc11

Investigation · Requirements · Design & Code · Acceptance Test

View/Update Details–Click on link below

View/Update Issues Log	View/Update Team Roster	View/Update Budget	View/Update Schedule	View/Update Documentation

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Establish the Project Environment:

Communication, environment, and procedures

Electronic digital repositories of information

Project plans, schedules, and reports

Analysis and discovery documentation

Test cases, test procedures, test results

Design decisions and specifications

Problems and issues with resolutions

Screen and report specifications

Program code

Digital data repositories

Distributed team with universal connectivity and repository availability
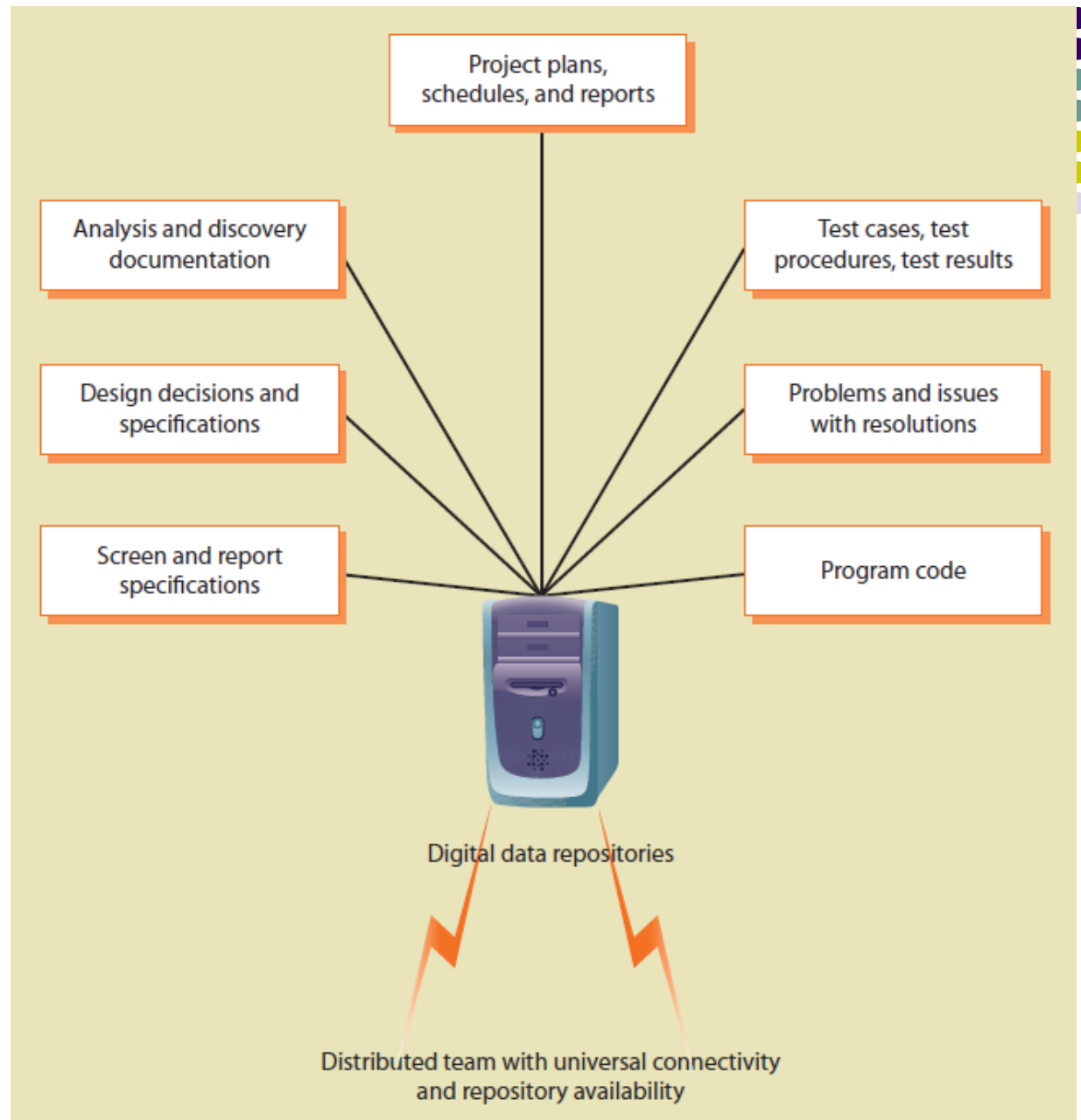
Establish the Project Environment:

Communication, environment, and procedures

Information stored in repositories for team member use

Electronic Digital Repositories		
Information captured	**Electronic tools**	**Who can update/view**
User definitions and functions User documents	Forum software Document server Scanners	Analysts, users/all
Screens and reports layouts	Web design tools Visio PowerPoint/Keynote	Analysts, users/all
Design specifications and diagrams	Wiki software Visio	Analysts/all
Issues and outstanding problems	Issue-tracking software	Analysts, users/all
Program code	Apache subversion (SVN)	Analysts/analysts
Project schedule	MS project	Analysts/all
Project status and information	Forum software	Analysts, users/all
Daily team coordination meeting	Video laptop conferencing	Project team
Distributed team communication	IM chat with video	Project team
Project update newsletter	Blog software	Project manager/all
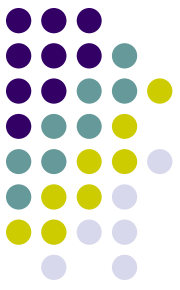
Schedule the Work

- Project manager must establish initial project schedule and keep adjusting:
  - Project Iteration Schedule
    - The list of iterations and use cases or user stories assigned to each iteration
  - Detailed Work Schedule
    - Within an iteration, the schedule that lists, organizes, and describes the dependencies of the detailed work tasks
    - As each iteration is finished, a detailed work schedule is prepared for the next iteration
    - The next detailed work schedule takes into account the changes necessary based on feedback/progress
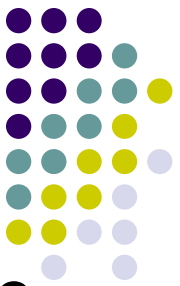
Schedule the Work

- Developing Detailed Work Schedule takes three steps:
  - Develop a Work Breakdown Structure (WBS)
    - The list or hierarchy of activities and tasks used to estimate the work to be done in a project or iteration
  - Estimate effort and identify dependencies
    - Task times
    - Tasks that must be completed before another task begins
    - Critical path--a sequence of tasks that can't be delayed without causing the entire project to be delayed
  - Create a schedule using a Gantt chart
    - Bar chart that portrays the schedule by the length of horizontal bars superimposed on a calendar

Schedule the Work:

Work Breakdown Structure (WBS) with Time Estimates and Notes

Work Breakdown Structure
Iteration 1 of Sales Subsystem

I. Project planning
Develop WBS and build schedule and then plan the work – 1/2 day.

II. Analysis tasks
Meet with sales department – 1 day.
Meet with marketing department – 1 day.
Define required information and data elements (share with Cougar team) – 1 day.
Model user activities – 1 day.

III. Design tasks
Design database schema (work with Cougar team) – 1 day.
Design screen layouts and cross links – 2 days.
Identify program classes and methods – 1 day.

IV. Build tasks
Build database (coordinate with Cougar team) – 1/2 day.
Write program code – 4 days.
Integrate 3-D imaging code – 2 days.
Build test data – 2 days.
Set up user "simulated live environment" – 1/2 day.
Perform acceptance tests with users – 2 days.
Release accepted version – 1/2 day.
Perform team introspection – 1/2 day.

Note: The use cases in this iteration require data and a database schema that is also used in building the catalog. Building the catalog will be done in the first iteration of the Marketing subsystem. The two iterations will be done in parallel, and the two teams (Tiger team and Cougar team) will coordinate and share information.

Note: This is a four-person team. The work pattern is (1) all together for fact finding and design tasks and (2) pairs for programming and testing tasks.

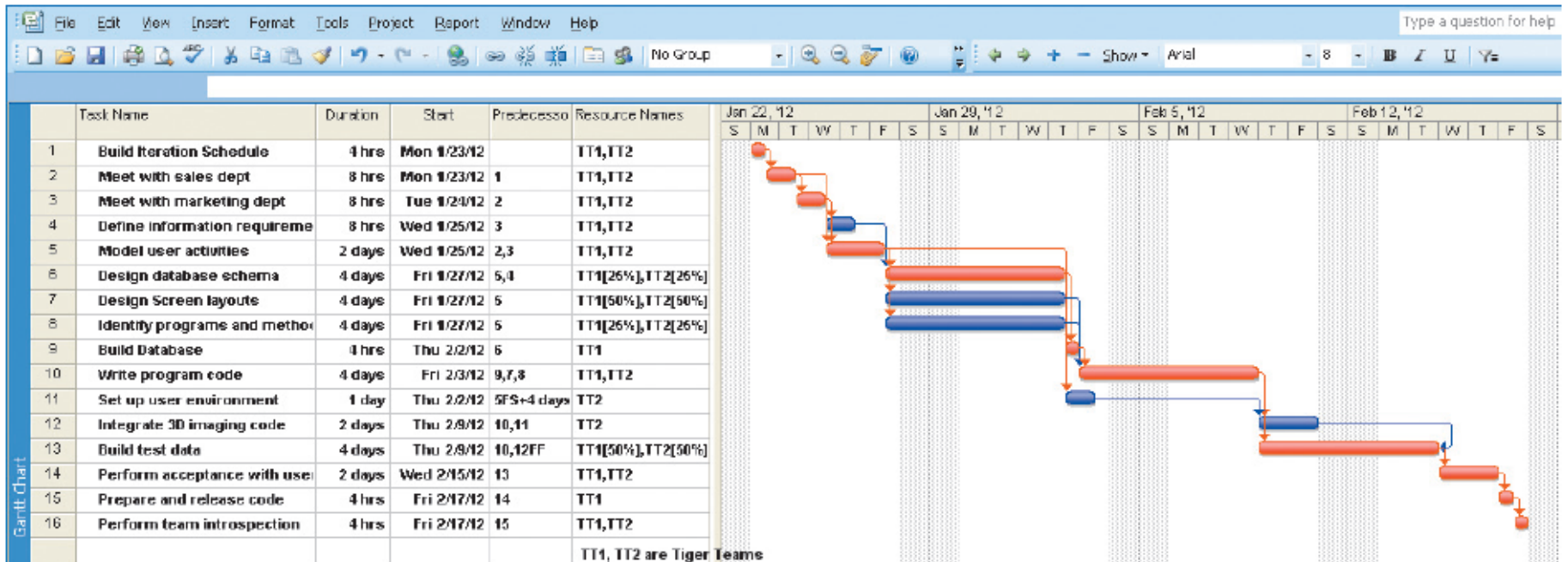Note: The four use cases that will be developed during this iteration are:
1. Search for item.
2. View detailed information for an item.
3. View rotating (3-D) image of item.
4. Compare characteristics and prices across multiple items.
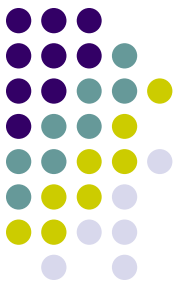
Systems An

Schedule the Work

- Gantt Chart for first iteration
  - Shows task, duration, start date, predecessors, and resources assigned to task
  - Generates chart graphically showing dates, predecessors, tasks, and critical path
 - See Online Chapter C for more examples

File   Edit   View   Insert   Format   Tools   Project   Report   Window   Help   Type a question for help

	Task Name	Duration	Start	Predecesso	Resource Names
1	Build Iteration Schedule	4 hrs	Mon 1/23/12		TT1,TT2
2	Meet with sales dept	8 hrs	Mon 1/23/12	1	TT1,TT2
3	Meet with marketing dept	8 hrs	Tue 1/24/12	2	TT1,TT2
4	Define information requireme	8 hrs	Wed 1/25/12	3	TT1,TT2
5	Model user activities	2 days	Wed 1/25/12	2,3	TT1,TT2
6	Design database schema	4 days	Fri 1/27/12	5,4	TT1[26%],TT2[26%]
7	Design Screen layouts	4 days	Fri 1/27/12	5	TT1[50%],TT2[50%]
8	Identify programs and method	4 days	Fri 1/27/12	5	TT1[26%],TT2[26%]
9	Build Database	4 hrs	Thu 2/2/12	6	TT1
10	Write program code	4 days	Fri 2/3/12	9,7,8	TT1,TT2
11	Set up user environment	1 day	Thu 2/2/12	5FS+4 days	TT2
12	Integrate 3D imaging code	2 days	Thu 2/9/12	10,11	TT2
13	Build test data	4 days	Thu 2/9/12	10,12FF	TT1[50%],TT2[50%]
14	Perform acceptance with use	2 days	Wed 2/15/12	13	TT1,TT2
15	Prepare and release code	4 hrs	Fri 2/17/12	14	TT1
16	Perform team introspection	4 hrs	Fri 2/17/12	15	TT1,TT2
					TT1, TT2 are Tiger Teams

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Staff and Allocate Resources

- Staffing activity tasks consists of 5 tasks:
  - Developing a resource plan for the project
  - Identifying and requesting specific technical staff
  - Identifying and requesting specific user staff
  - Organizing the project team into work groups
  - Conducting preliminary training and team-building exercises

Evaluate Work Processes:
## How are we doing?
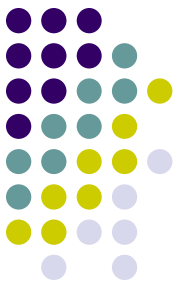
- Are our communication procedures adequate? How can they be improved?

- Are our working relationships with the user effective?

- Did we hit our deadlines? Why or why not?

- Did we miss any major issues? How can we avoid this in the future?

- What things went especially well? How can we ensure it continues?

- What were the bottlenecks or problem areas? How can we eliminate them?

Monitor Project Progress and Make Corrections
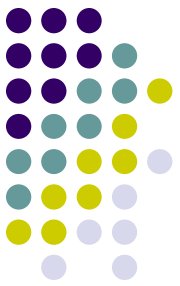
- Process to monitor and control project execution
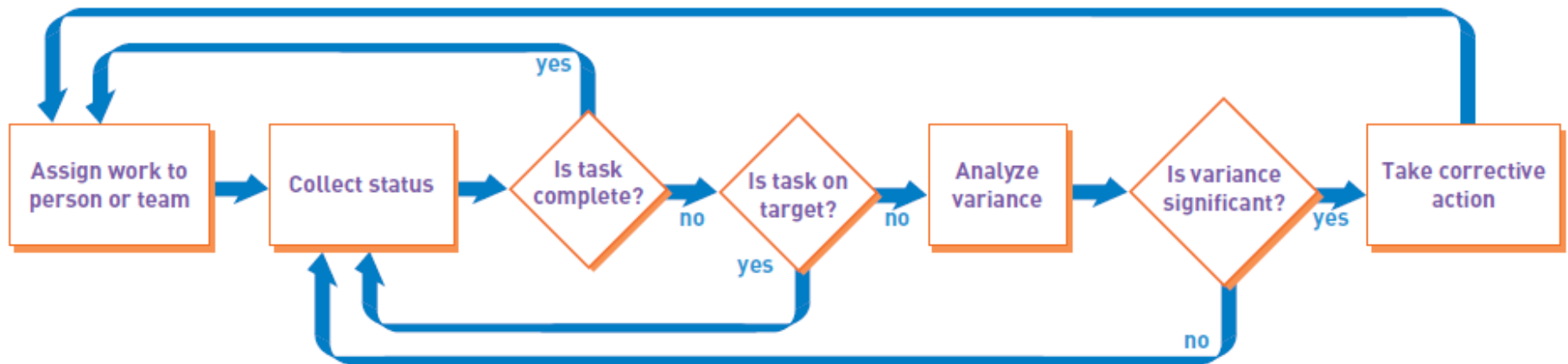
Monitor Project Progress and Make Corrections

- Sample Issues-Tracking Log

	A	B	C	D	E	F	G	H	I
1	Issue log#	Issue date	Issue description	Priority	Issue impact	Person responsible	Target fix date	Resolution description	Actual fix date
2		1/18/2012	Commission structure for sales promotion is undefined	Urgent	Database structure may need to be modified	William Henry	2/1/2012		
3									
4									
5									

Summary

- Project management is an important and challenging career role. Information systems projects do not have a great success rate, and project management knowledge and skills are valued and needed to improve this record.

- Project management is directing other people to achieve a planned result on schedule and on budget. Project managers have internal and external responsibilities.

- Project managers work with clients, who fund the project, an oversight committee which approves and reviews progress, and users who will directly interact with the system.

- The discipline of project management is organized into the Project Management Body of Knowledge (PMBOK) that includes nine knowledge areas. Project managers should study and digest this body of knowledge.

Summary (continued)

- Managing a project can be at a high or low level of ceremony, meaning the degree that the project management processes are formal and documented. Agile project management is usually used with adaptive life cycles and low ceremony.

- The SDLC in this text includes two Core Processes that involve the project manager: 1) Identify the problem and obtain approval and 2) Plan and monitor the project. This chapter discusses the activities or both Core Process.

- The core process *Identify the problem and obtain approval* includes the following activities: 1) identify the problem, 2) quantify project approval factors, 3) perform risk and feasibility analysis, and 4) review with client and obtain approval.

Summary (continued)

- A key deliverable is the System Vision Document, which includes a problem description, an overview of system capabilities, and a list of business benefits. Key project approval factors include time estimate, cost estimate, and cost/benefit analysis. Additionally, risk and feasibility factors are organizational, technological, resource, and schedule.

- The core process *Plan and monitor the project* includes the following activities: 1) establish the project environment, 2) schedule the work, 3) staff and allocate resources, 4) evaluate work processes, and 5) monitor progress and make corrections.

- Scheduling the work includes a project iteration schedule and detailed work schedules. A work breakdown structure (WBS) lists tasks to be completed. Dependencies and time estimates are also considered and shown in a Gantt chart.