HNDIT4032
IT Project Management

Introduction _week 1

Course Details

- Course Code : HNDIT4032
- Course Title : IT Project Management
- Diploma Program : HNDIT Semester : 4
- Course Status : Compulsory
- Number of Credits : 3
- Mode of Delivery : In Person; at ATI Lectures, Discussion, Presentations, Assignment, Practical, LMS, independent learning, Guided learning

Assumed Background:

- This course module, IT Project Management provides an introductory level understanding of major concepts, principles, theories and techniques to students which they require in their career. It is assumed that the students have gained understanding of basic project management.

Timetable allocation (per week)

- Lectures : 02 hours
- Tutorials /practical : 02 hours
- Student activities : 06 hours
- Notional hours : 10 hours

Course Aims

- The aim of the course module is to provide necessary basic knowledge to students which they require in their carrier.
- This course containing both basic theory and practice, relate to project management.
- Hence, this course examines the knowledge of project management and knowledge areas, project phases and processes, project network scheduling, resource scheduling and risk Management, agile project management, challenges and modern approaches to IT project management.
- The knowledge and skills gained from this course are also essential for IT diplomats to gain accreditation from some external degrees in the leading universities in Sri Lanka

Learning Outcomes

After successful completion of this course the student should be able to:

- LO1: Manage the selection and initiation of individual projects, and of portfolios of projects in the enterprise.
- LO2: Conduct project planning activities that accurately forecast project costs, timelines, and quality.
- LO3: Implement processes for successful resource, communication, and risk and change management.
- LO4: Demonstrate effective project execution and control techniques that result in successful projects, and conduct project closure activities and obtain formal project acceptance.
- LO5: Demonstrate a strong working knowledge of ethics and professional responsibility.
- LO6: Demonstrate effective organizational leadership and change skills for managing projects, project teams, and stakeholders

References

- "Information Technology Project Management", Kathy Schwalbe, sixth Edition, THOMSON Course Technology
- Wysocky, 2014, R.K. Effective Project Management: Traditional, Agile, Extreme. 7th Edition, Wiley.
- Harold Kerzner, Project Management: A System Approach to Planning, Scheduling and Controlling, Wiley: 8th Edition

WHAT IS A PROJECT?

- A project is "a temporary endeavor undertaken to create a unique product, service, or result."
- Operations, on the other hand, is work done in organizations to sustain the business.
- Projects are different from operations in that they end when their objectives have been reached or the project has been terminated.

What is a Project?

- A project can be considered to be any series of activities and tasks that:
- Have a specific objective to be completed within certain specifications.
- Have defined start and end dates. Have funding limits (if applicable)
- Consume human and nonhuman resources (i.e., money, people, equipment).
- Are multifunctional (i.e., cut across several functional lines).

Examples of IT Projects

- Projects can be large or small and involve one person or thousands of people.
- They can be done in one day or take years to complete. As described earlier, IT projects involve using hardware, software, and networks to create a product, service, or result.

Examples of IT projects

- A team of students creates a smartphone application and sells it online.
- A company develops a driverless car.
- A small software development team adds a new feature to an internal software application for the finance department.
- A college upgrades its technology infrastructure to provide wireless Internet access across the whole campus.
- A company develops a new system to increase sales force productivity and customer relationship management that will work on various laptops, smartphones, and tablets.
- A television network implements a system to allow viewers to vote for contestants and provide other feedback on programs via social media sites.
- A government group develops a system to track child immunizations.
- A large group of volunteers from organizations throughout the world develops standards for environmentally friendly or green IT.
- A global bank acquires a smaller financial institution and needs to reconcile systems and procedures into a common entity.
- Government regulations require new reporting of commercial business data for a manufacturing company.
- A multinational firm decides to consolidate its information systems into an integrated enterprise resource management approach.

Project Attributes

- The following attributes help to define a project further
- A project has a unique purpose.
- A project is temporary.
- A project is developed using progressive elaboration.
- A project requires resources, often from various areas.
- A project should have a primary customer or sponsor.
- A project involves uncertainty.

The Triple Constraint

The Triple Constraint

- Every project is constrained in different ways by its scope, time and cost goals.
- These limitations are sometimes referred to in project management as the triple constraint : –
  - ✓ Scope goals: What is the project trying to accomplish?
  - ✓ Time goals: How long should it take to complete? What is the project's schedule.
  - ✓ Cost goals: What should it cost to complete the project? What is the project's budget?
- It is the project manager's duty to balance these three often competing goals

The Triple Constraint

- Successful project management means meeting all three goals (scope, time, cost) –and satisfying the project's sponsor.

The Triple Constraint of PM

- Although the triple constraints describes how the basic elements of a project scope, time and cost – interrelate, other elements can also play significant roles.
- Quality is often a key factor in projects.
- Some people, in fact, refer to the quadruple constraint' of PM, including quality along with scope, time, and cost.

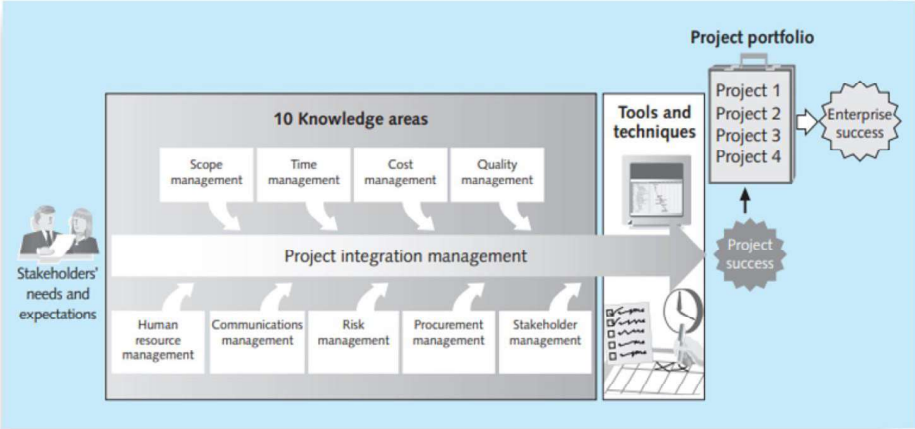
What is Project Management?

- Project management is “the application of knowledge, skills, tools, and techniques to project activities in order to meet project requirements”
- (PMI* , Project Management Body of Knowledge (PMBOK® Guide), 2000, p. 6)

What is Project Management?

- Project managers must strive not only to meet specific scope, time, cost, and quality goals of projects, they must also facilitate the entire process.
- a framework to help you understand project management. Key elements of this framework include the project stakeholders, project management knowledge areas, project management tools and techniques, and the contribution of successful projects to the enterprise.

Project management framework



Project Stakeholders

- Stakeholders are the people involved in or affected by project activities.
- Includes the project sponsor, project team, support staff, customers, users, suppliers,
- Even opponents of the project.

Project Management Knowledge Areas

- 1. Project scope management involves defining and managing all the work required to complete the project successfully.
- 2. Project time management includes estimating how long it will take to complete the work, developing an acceptable project schedule, and ensuring timely completion of the project. 11 Introduction to Project Management Copyright 2012 Cengage Learning. All Rights Reserved. May not be copied, scanned, or duplicated, in whole or in part.
- 3. Project cost management consists of preparing and managing the budget for the project.
- 4. Project quality management ensures that the project will satisfy the stated or implied needs for which it was undertaken.
- 5. Project human resource management is concerned with making effective use of the people involved with the project.
- 6. Project communications management involves generating, collecting, disseminating, and storing project information.
- 7. Project risk management includes identifying, analyzing, and responding to risks related to the project.
- 8. Project procurement management involves acquiring or procuring goods and services for a project from outside the performing organization.
- 9. Project stakeholder management includes identifying and analyzing stakeholder needs while managing and controlling their engagement throughout the life of the project.
- 10. Project integration management is an overarching function that affects and is affected by all of the other knowledge areas

Project Management Tools and Techniques

- Project management tools and techniques assist project managers and their teams in carrying out work in all 10 knowledge areas.

Project Management Tools and Techniques

Knowledge Area/Category	Tools and Techniques
Integration management	Project selection methods, project management methodologies, stakeholder analyses, work requests, project charters, project management plans, **project management software**, **change requests**, change control boards, project review meetings, **lessons-learned reports**
Scope management	**Scope statements**, **work breakdown structures**, statements of work, **requirements analyses**, scope management plans, scope verification techniques, scope change controls
Time management	**Gantt charts**, project network diagrams, critical path analysis, crashing, fast tracking, schedule performance measurements
Cost management	Project budgets, net present value, return on investment, payback analysis, earned value management, project portfolio management, cost estimates, cost management plans, cost baselines

Project Management Tools and Techniques

	lessons-learned reports
Scope management	**Scope statements**, **work breakdown structures**, statements of work, **requirements analyses**, scope management plans, scope verification techniques, scope change controls
Time management	**Gantt charts**, project network diagrams, critical path analysis, crashing, fast tracking, schedule performance measurements
Cost management	Project budgets, net present value, return on investment, payback analysis, earned value management, project portfolio management, cost estimates, cost management plans, cost baselines
Quality management	Quality metrics, checklists, quality control charts, Pareto diagrams, fishbone diagrams, maturity models, statistical methods, test plans
Human resource management	Motivation techniques, empathic listening, responsibility assignment matrices, project organizational charts, resource histograms, team building exercises
Communications management	Communications management plans, **kick-off meetings**, conflict management, communications media selection, status and **progress reports**, virtual communications, templates, project Web sites

Project management process

• Project management is accomplished through the use of the processes such as: –

- Project initiation
- Project planning
- Project execution
- Project monitoring and control
- Project closure

Project initiation

- Select of the best project given resource limits.
- Recognizing the benefits of the project
- Preparation of the documents to approve the project.
- Assigning of project manager

Project planning

- Definition of the work requirements.
- Definition of the quality and quality of work
- Definition of the resources needed
- Scheduling the activities
- Evaluation of the various risks

Project execution

- Negotiating for the project team members
- Directing and managing the work
- Working with the team members to help them improve

Project Monitoring and control

- Tracking progress
- Comparing actual outcome to predicted outcome .
- Analyzing variances and impacts
- Making adjustments

Project closure

- Verifying that all of the work has been accomplished
- Contractual closure of the contract
- Financial closure of the charge number
- Administrative closure of the paperwork

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week 2

Project Success

- The list that follows outlines a few common criteria for measuring the success of a project
  - The project met scope, time, and cost goals
  - The project satisfied the customer/sponsor.
  - The results of the project met its main objective.

Successful Project Management

- Successful project management can then be defined as having achieved the project objectives:
  - Within time
  - Within cost
  - At the desired performance/technology level
  - While utilizing the assigned resources effectively and efficiently
  - Accepted by the customer

Advantages of Using Formal Project Management

- Better control of financial, physical, and human resources
- Improved customer relations
- Shorter development times
- Lower costs
- Higher quality and increased reliability
- Higher profit margins
- Improved productivity
- Better internal coordination
- Higher worker morale

The Context of IT Projects

- IT projects can be very diverse in terms of size, complexity, products produced, application area, and resource requirements
- IT project team members often have diverse backgrounds and skill sets
- IT projects use diverse technologies that change rapidly. Even within one technology area, people must be highly specialized

Special characteristics of IT projects

- **Invisibility**: When physical artefacts such as bridge or road is being constructed the progress being made can actually be seen. With software progress is not immediately visible
- **Complexity**: More complex then other engineering works
- **Conformity** : Software developers have to confirm to the requirement of human clients.
- **Flexibility**: That software is easy to change in seen as a strength. Software Systems are particularly subject to change

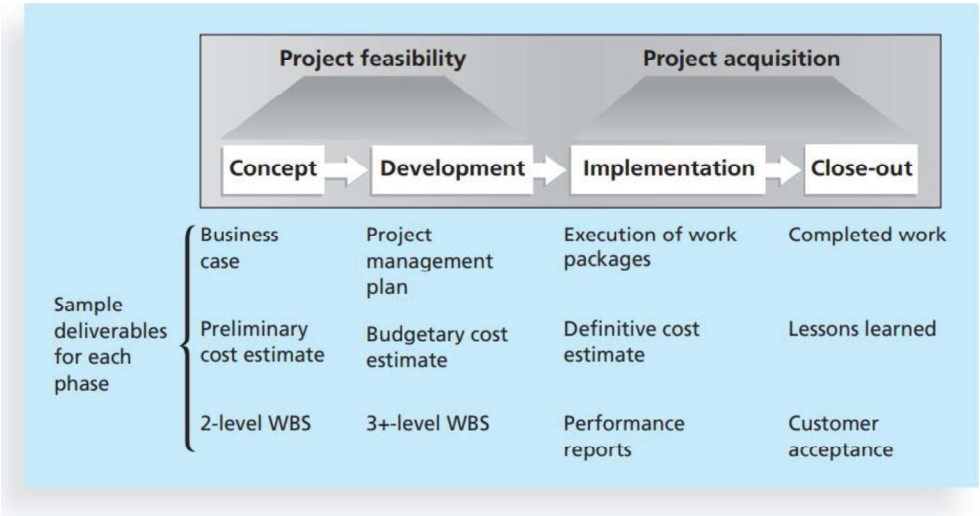
Importance of Software Project Management

- Software projects have more failure rate
- Final project is invisible until it ends
- Software Project use lot of effort, time , recourses & money
- The need for Software projects keeps increasing

PROJECT PHASES AND THE PROJECT LIFE CYCLE

- Due to uncertainty, Projects divide into several phases.
- A project life cycle is a collection of project phases.
- project life cycles define
  - what work will be performed in each phase,
  - what deliverables will be produced and
  - when, who is involved in each phase, and
  - how management will control and approve work produced in each phase.

Phases of the traditional project life cycle



Phases of the traditional project life cycle

- Concept phase :- managers usually develop some type of business case, which describes the need for the project and basic underlying concepts.
- Development phase:- the project team creates more detailed project management plans, a more accurate cost estimate, and a more thorough WBS.

Phases of the traditional project life cycle

- Implementation phase:- The project team creates a definitive or very accurate cost estimate, delivers the required work, and provides performance reports to stakeholders.
- Close-out phase:- All of the work is completed, and customers should accept the entire project.

product life cycle

- developing a product often involves many projects.
- All products follow some type of life cycle.
- A systems development life cycle (SDLC) is a framework for describing the phases of developing information systems.
- Some popular models of an SDLC include the waterfall model, the spiral model, the incremental build model, the prototyping model, and the Rapid Application Development (RAD) model.

project life cycle VS product life cycle

- A **Project Life Cycle can be a subset of Product Life Cycle**.
- In a project life cycle, you only develop or enhance a product, but Product life cycle includes anything and everything done related to the product. So categorically, Project Life Cycle is a subset of Product Life Cycle.
- A Project Life Cycle has a definite end, but a Product life cycle may not.
- **Product Life Cycle phases are sequential** and does not overlap, while **Project Life cycle phases may or may not be** sequential as they can overlap.
- In Product life cycle once a phase is over it is over, it will not repeat. In Project Life Cycle its phases may repeat depending upon the requirements.

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Project Integration Management

Project Integration Management

- Project integration management involves coordinating all of the other project management knowledge areas throughout a project's life cycle.
- Ensures that all the elements of a project come together at the right times to complete a project successfully..

- Main processes include:
  - Project selection methods,project management methodologies, stakeholder analyses, work requests, project charters, project management plans, project management software, change requests, change control boards, project review meetings, lessons-learned reports

Project Integration Management some Processes

- **Develop the project charter**: Work with stakeholders to create the document that formally authorizes a project—the charter.
- **Develop the preliminary project scope statement**: Work with stakeholders, especially users of the project's products, services, or results, to develop the high-level scope requirements and create a preliminary project scope statement.
- **Develop the project management plan**: Coordinate all planning efforts to create a consistent, coherent document—the project management plan.

Project Integration Management Processes (cont'd)

- **Direct and manage project execution**: Carry out the project management plan by performing the activities included in it.
- **Monitor and control the project work**: Oversee project work to meet the performance objectives of the project.
- **Perform integrated change control**: Coordinate changes that affect the project's deliverables and organizational process assets.
- **Close the project**: Finalize all project activities to formally close the project.

The Key to Overall Project Success: Good Project Integration Management

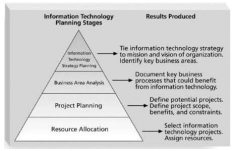
- Coordinating all of the people, plans, and work required to complete a project
- Focus on the big picture of the project and steer the project team toward successful completion
- Make final decision when there are conflicts among project goals or people involved
- Communicate key project information to top management

Interface Management

- Interface management involves identifying and managing the points of interaction between various elements of the project.
- The number of interfaces can increase exponentially as the number of people involved in the project increase.
- The most important jobs of a project manager is to establish and maintain good communication and relationships across organizational interfaces

Strategic Planning and Project Selection

- project managers should not be involved in strategic planning and project selection
- Top management is usually responsible for these types of business decisions. Identifying Potential Projects



Strategic Planning

- Strategic planning involves determining long-term objectives
- by analyzing (SWOT analysis)
  - the strengths and weaknesses of an organization, studying opportunities
  - and threats in the business environment
- As part of strategic planning, organizations should:
  - Identify potential projects.
  - Use realistic methods to select which projects to work on.
  - Formalize project initiation by issuing a project charter.

Strategic Planning and Project Selection

- **Strategic planning** involves determining long-term objectives, predicting future trends, and projecting the need for new products and services.
- Organizations often perform a **SWOT analysis**:
  - **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats
- As part of strategic planning, organizations should:
  - Identify potential projects.
  - Use realistic methods to select which projects to work on.
  - Formalize project initiation by issuing a project charter.

Methods for Selecting Projects

- There is usually not enough time or resources to implement all projects.
- Methods for selecting projects include:
  - Focusing on broad organizational needs.
  - Categorizing information technology projects.
  - Performing net present value or other financial analyses.
  - Using a weighted scoring model.
  - Implementing a balanced scorecard.

Focusing on Broad Organizational Needs

- It is often difficult to provide strong justification for many IT projects, but everyone agrees they have a high value.
- Three important criteria for projects:
  - There is a **need** for the project.
  - There are **funds** available for the project.
  - There is a strong **will** to make the project succeed.

Categorizing IT Projects

- One categorization assesses whether the project provides a response to:
  - A problem
  - An opportunity
  - A directive
- Another categorization is based on the time it will take to complete a project or the date by which it must be done.
- Another categorization is the overall priority of the project.

Financial Analysis of Projects

- Financial considerations are often an important aspect of the project selection process.
- Three primary methods for determining the projected financial value of projects:
  - Net present value (NPV) analysis
  - Return on investment (ROI)
  - Payback analysis

Net Present Value Analysis

- **Net present value** (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time.
- Projects with a positive NPV should be considered if financial value is a key criterion.
- The higher the NPV, the better.

Net Present Value Example

	A	B	C	D	E	F	G
1	Discount rate	10%					
2							
3	PROJECT 1	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
4	Benefits	$0	$2,000	$3,000	$4,000	$5,000	$14,000
5	Costs	$5,000	$1,000	$1,000	$1,000	$1,000	$9,000
6	Cash flow	($5,000)	$1,000	$2,000	$3,000	$4,000	$5,000
7	NPV →	$2,316					
8		Formula =npv(b1,b6:f6)					
9							
10	PROJECT 2	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
11	Benefits	$1,000	$2,000	$4,000	$4,000	$4,000	$15,000
12	Costs	$2,000	$2,000	$2,000	$2,000	$2,000	$10,000
13	Cash flow	($1,000)	$0	$2,000	$2,000	$2,000	$5,000
14	NPV →	$3,201					
15		Formula =npv(b1,b13:f13)					
16							

Note that totals are equal, but NPVs are not because of the time value of money.

JWD Consulting NPV Example

Multiply by the discount factor each year, then subtract costs from cumulative benefits to get NPV.

Discount rate	8%					
Assume the project is completed in Year 0		Year				
	0	1	2	3	Total	
Costs	140,000	40,000	40,000	40,000		
Discount factor →	1	0.93	0.86	0.79		
Discounted costs	**140,000**	**37,200**	**34,400**	**31,600**	**243,200**	
Benefits	0	200,000	200,000	200,000		
Discount factor	1	0.93	0.86	0.79		
Discounted benefits	**0**	**186,000**	**172,000**	**158,000**	**516,000**	
Discounted benefits - costs	(140,000)	148,800	137,600	126,400	**272,800**	← NPV
Cumulative benefits - costs →	(140,000)	8,800	146,400	272,800		
ROI →	112%					
	Payback In Year 1					

NPV Calculations

- Determine estimated costs and benefits for the life of the project and the products it produces.
- Determine the discount rate (check with your organization on what to use).
- Calculate the NPV (see text for details).
- Some organizations consider the investment year as year 0, while others consider it year 1. Some people enter costs as negative numbers, while others do not. Make sure to identify your organization's preferences.

Return on Investment

- **Return on investment** (ROI) is calculated by subtracting the project costs from the benefits and then dividing by the costs.

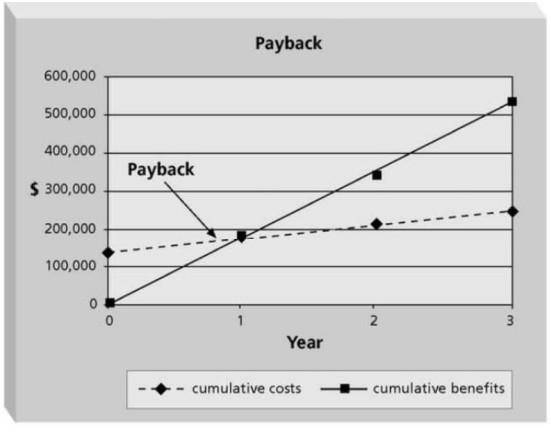
ROI = (total discounted benefits - total discounted costs) *100
discounted costs

- The higher the ROI, the better.
- Many organizations have a required rate of return or minimum acceptable rate of return on investment for projects.
- Internal rate of return (IRR) can by calculated by setting the NPV to zero.

Payback Analysis

- Another important financial consideration is payback analysis.
- The **payback period** is the amount of time it will take to recoup, in the form of net cash inflows, the total dollars invested in a project.
- Payback occurs when the cumulative discounted benefits and costs are greater than zero.
- Many organizations want IT projects to have a fairly short payback period.

Charting the Payback Period



Weighted Scoring Model

- A weighted scoring model is a tool that provides a systematic process for selecting projects based on many criteria.
- Steps in identifying a weighted scoring model:
  1. Identify criteria important to the project selection process.
  2. Assign weights (percentages) to each criterion so they add up to 100 percent.
  3. Assign scores to each criterion for each project.
  4. Multiply the scores by the weights to get the total weighted scores.
- The higher the weighted score, the better.

Sample Weighted Scoring Model for Project Selection

	A	B	C	D	E	F
1	**Criteria**	**Weight**	**Project 1**	**Project 2**	**Project 3**	**Project 4**
2	Supports key business objectives	25%	90	90	50	20
3	Has strong internal sponsor	15%	70	90	50	20
4	Has strong customer support	15%	50	90	50	20
5	Realistic level of technology	10%	25	90	50	70
6	Can be implemented in one year or less	5%	20	20	50	90
7	Provides positive NPV	20%	50	70	50	50
8	Has low risk in meeting scope, time, and cost goals	10%	20	50	50	90
9	**Weighted Project Scores**	**100%**	**56**	**78.5**	**50**	**41.5**

Implementing a Balanced Scorecard

- Drs. Robert Kaplan and David Norton developed this approach to help select and manage projects that align with business strategy.
- A **balanced scorecard** is a methodology that converts an organization's value drivers, such as customer service, innovation, operational efficiency, and financial performance, to a series of defined metrics.

Project Charters

- After top management decides which projects to pursue, it is important to let the rest of the organization know about these projects.
- A **project charter** is a document that formally recognizes the existence of a project and provides direction on the project's objectives and management.
- Key project stakeholders should sign a project charter to acknowledge agreement on the need and intent of the project; a signed charter is a key output of project integration management.

Input for Developing a Project Charter

- **A contract**: includes much of the information needed for creating a good project charter
- **Statement of work**: describe business need for the project, summary of the requirements and characteristics of the products or services, and organizational information
- **Enterprise environmental factors**: organization's structure, culture, infrastructure, human resources, personnel policies, marketplace conditions, stakeholder risk tolerances, industry risk information

Input for Developing a Project Charter

- **Organizational process assets information**: formal and informal plan, policies, procedures, guidelines, information systems, financial systems, management systems, lessons learned, and historical information

Project Charters

- The project's title and date of authorization
- The project manager's name and contact information
- A summary schedule, including the planned start and finish dates
- A summary of the project's budget or reference to budgetary documents
- A brief description of the project objectives, including the business need or other justification for authorizing the project
- A roles and responsibilities matrix
- A sign-off section for signatures of key project stakeholders
- A comments section in which stakeholders can provide important comments related to the project

Preliminary Scope Statements

- A **scope statement** is a document used to develop and confirm a common understanding of the project scope.
- It is an important tool for preventing **scope creep**:
  - The tendency for project scope to keep getting bigger.
- A good practice is to develop a preliminary or initial scope statement during project initiation and a more detailed scope statement as the project progresses.

Project Management Plans

- A **project management plan** is a document used to coordinate all project planning documents and help guide a project's execution and control.
- Plans created in the other knowledge areas are subsidiary parts of the overall project management plan.

Attributes of Project Plans

- Just as projects are unique, so are project plans.
- Plans should be:
  - Dynamic
  - Flexible
  - Updated as changes occur
- Plans should first and foremost guide project execution by helping the project manager lead the project team and assess project status.

Common Elements of a Project Management Plan

- Introduction or overview of the project.
- Description of how the project is organized.
- Management and technical processes used on the project.
- Work to be done, schedule, and budget information.

Integrated Change Control

- Three main objectives are:
  - Influence the factors that create changes to ensure that changes are beneficial.
  - Determine that a change has occurred.
  - Manage actual changes as they occur.
- A **baseline** is the approved project management plan plus approved changes.

Change Control System

- A formal, documented process that describes when and how official project documents and work may be changed.
- Describes who is authorized to make changes and how to make them.

Change Control Boards (CCBs)

- A formal group of people responsible for approving or rejecting changes on a project.
- CCBs provide guidelines for preparing change requests, evaluate change requests, and manage the implementation of approved changes.
- CCBs include stakeholders from the entire organization.

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Project Scope Management

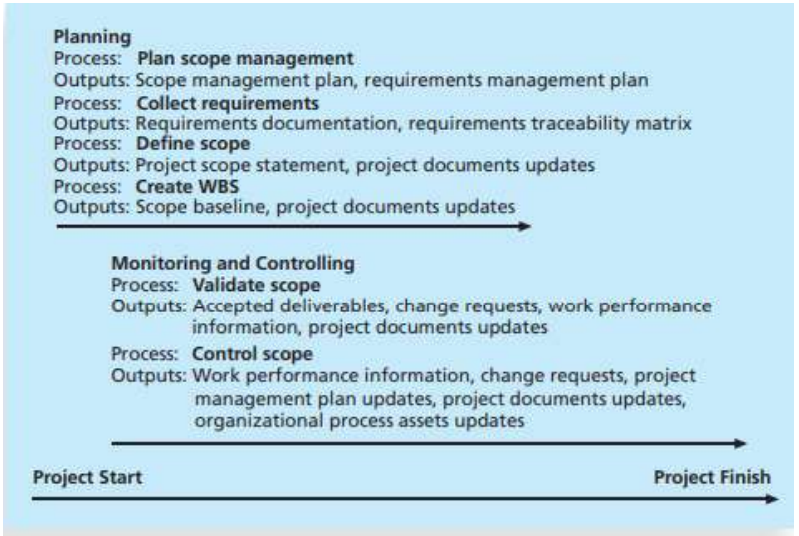
Project Scope Management

- Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully.
- The processes involved in defining and controlling what work is or is not included in a project
- *Major project scope management processes:*
  - Initiation
  - Scope Planning
  - Scope Definition
  - Scope Verification
  - Scope Change Control

What is Project Scope Management?

- **Scope** refers to *all* the work involved in creating the products of the project and the processes used to create them.
- A **deliverable** is a product produced as part of a project, such as hardware or software, planning documents, or meeting minutes.
- Project scope management includes the processes involved in defining and controlling what is or is not included in a project.

Project scope management summary



Project Scope Management Processes

- **Scope planning**: Deciding how the scope will be defined, verified, and controlled.
- **Scope definition**: Reviewing the project charter and preliminary scope statement and adding more information as requirements are developed and change requests are approved.
- **Creating the WBS**: Subdividing the major project deliverables into smaller, more manageable components.
- **Scope verification**: Formalizing acceptance of the project scope.
- **Scope control**: Controlling changes to project scope.

Scope Planning and the Scope Management Plan

- The **scope management plan** is a document that includes descriptions of how the team will prepare the project scope statement, create the WBS, verify completion of the project deliverables, and control requests for changes to the project scope.
- Key inputs include the project charter, preliminary scope statement, and project management plan.

Project Charters

- After deciding what project to work on, it is important to formalize projects
- **A project charter is a document that formally recognizes the existence of a project and provides direction on the project's objectives and management**
- Key project stakeholders should sign a project charter to acknowledge agreement on the need and intent of the project

Project Charter - Sample

Project Title :
Project Start Date : Project Finish Date:
Project Manager :
Project Objectives :
Approach :
ROLES AND RESPONSIBILITES

Name	Role	Responsibility

Sign-off :
Comments :

Scope Definition and the Project Scope Statement

- The preliminary scope statement, project charter, organizational process assets, and approved change requests provide a basis for creating the project scope statement.
- As time progresses, the scope of a project should become clearer and more specific.

Scope Planning and the Scope Statement

- A scope statement is a document used to develop and confirm a common understanding of the project scope. It should include
  - a project justification
  - a brief description of the project's products
  - a summary of all project deliverables
  - a statement of what determines project success

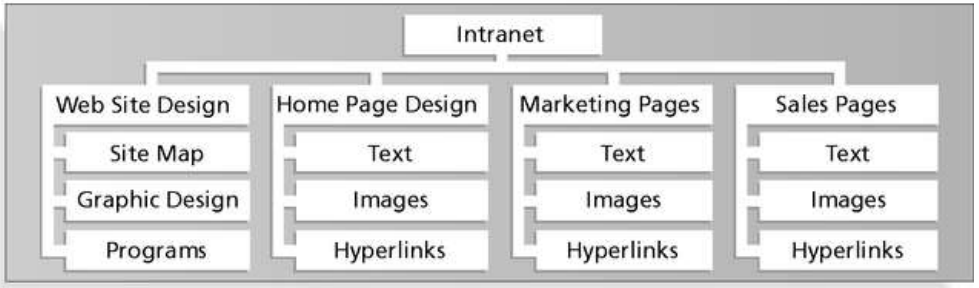
Scope Statement - Sample

- Project Name :
- Date : Prepared by:
- Project Justification :
- Product characteristics and requirements :
- Product user acceptance criteria :
- Summery of project deliverables :

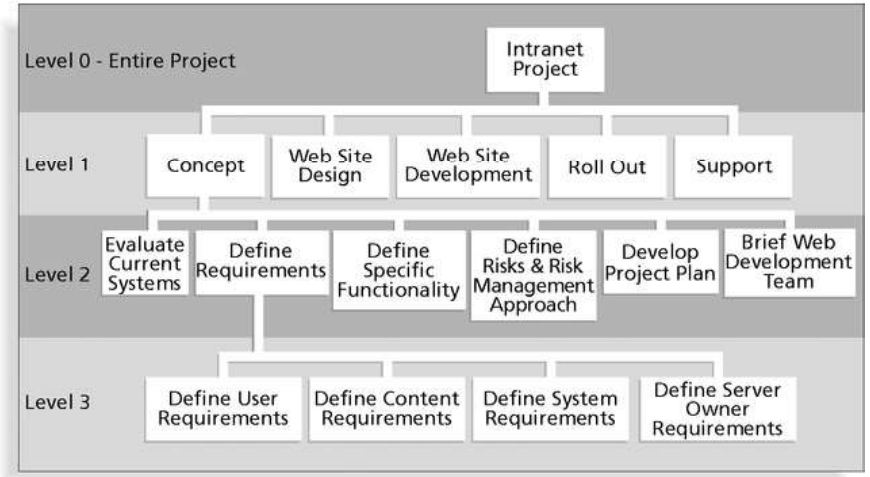
Creating the Work Breakdown Structure (WBS)

- A **WBS** is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project.
- A WBS is a foundation document that provides the basis for planning and managing project schedules, costs, resources, and changes.
- **Decomposition** is subdividing project deliverables into smaller pieces.

Sample Intranet WBS Organized by Product



Sample Intranet WBS Organized by Phase



Intranet WBS in Tabular Form

1.0 Concept
- 1.1 Evaluate current systems
- 1.2 Define requirements
  - 1.2.1 Define user requirements
  - 1.2.2 Define content requirements
  - 1.2.3 Define system requirements
  - 1.2.4 Define server owner requirements
- 1.3 Define specific functionality
- 1.4 Define risks and risk management approach
- 1.5 Develop project plan
- 1.6 Brief Web development team

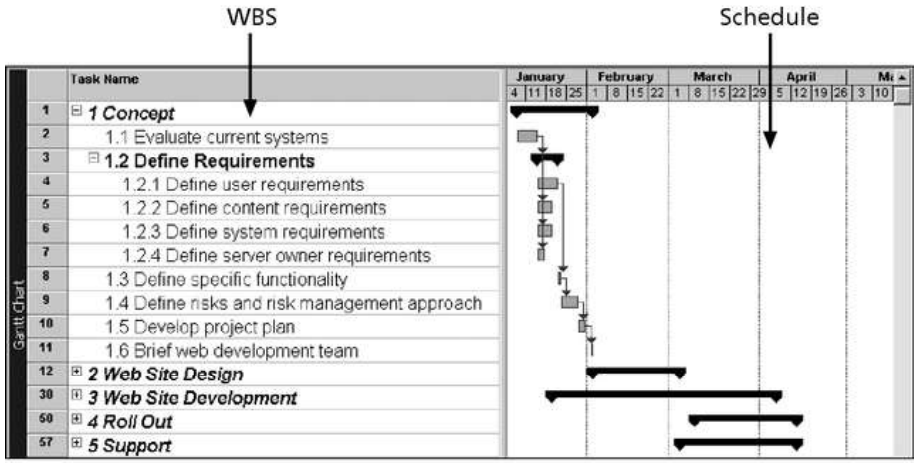
2.0 Web Site Design

3.0 Web Site Development

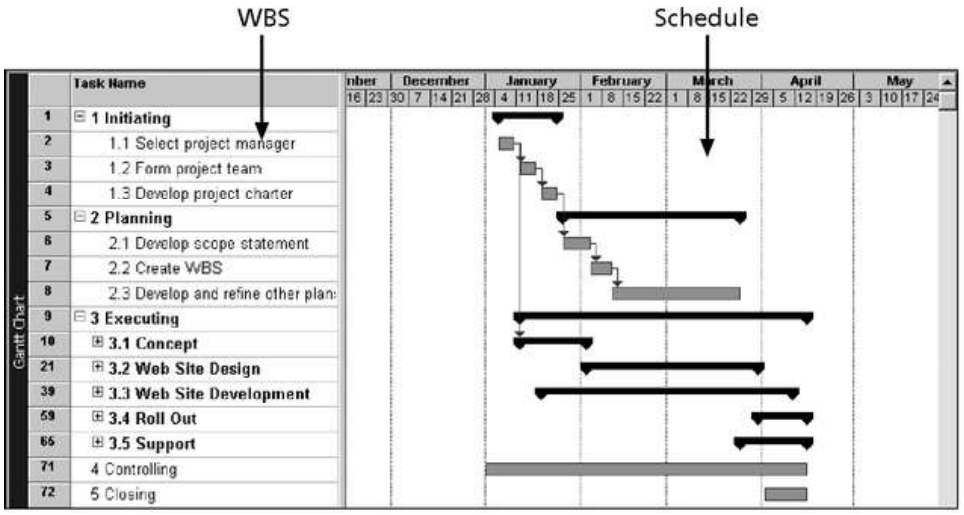
4.0 Roll Out

5.0 Support

Intranet WBS and Gantt Chart



Intranet Gantt Chart Organized by Project Management Process Groups



Executing Tasks for JWD Consulting's WBS

3.0 Executing

- 3.1 Survey
- 3.2 User inputs
- 3.3 Intranet site content
  - 3.3.1 Templates and Tools
  - 3.3.2 Articles
  - 3.3.3 Links
  - 3.3.4 Ask the Expert
  - 3.3.5 User requests feature
- 3.4 Intranet site design
- 3.5 Intranet site construction
- 3.6 Site testing
- 3.7 Site promotion
- 3.8 Site roll out
- 3.9 Project benefits measurement

Approaches to Developing WBSs

- **Guidelines**: Some organizations, such as the DOD, provide guidelines for preparing WBSs.
- **Analogy approach**: Review WBSs of similar projects and tailor to your project.
- **Top-down approach**: Start with the largest items of the project and break them down.
- **Bottom-up approach**: Start with the specific tasks and roll them up.
- **Mind-mapping approach**: Write tasks in a non-linear, branching format and then create the WBS structure.

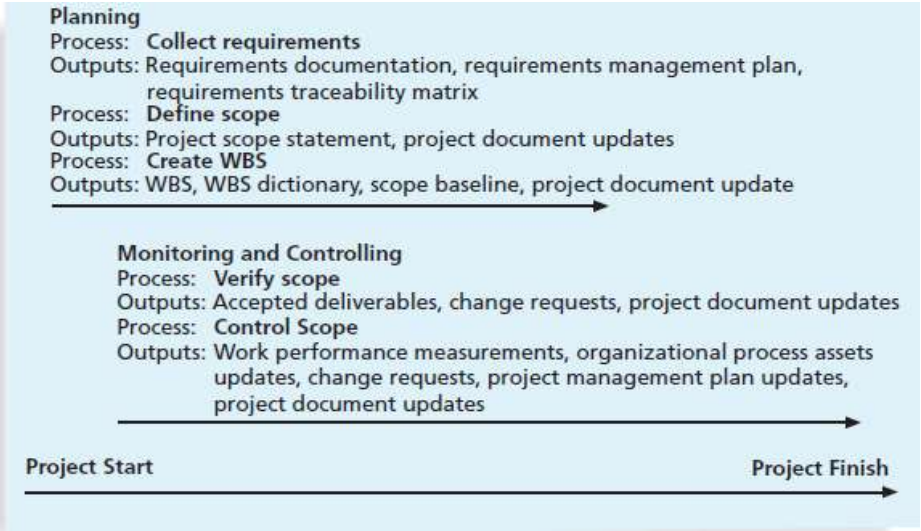
Scope Verification

- *Verifying scope* involves formalizing acceptance of the project deliverables.
- Key project stakeholders, such as the customer and sponsor for the project, inspect and then formally accept the deliverables during this process. If the deliverables are not acceptable, the customer or sponsor usually requests changes.
- The main outputs of this process, therefore, are accepted deliverables and change requests.

Scope Control

- **Scope control** involves controlling changes to the project scope.
- Goals of scope control are to:
  - Influence the factors that cause scope changes.
  - Ensure changes are processed according to procedures developed as part of integrated change control.
  - Manage changes when they occur.
- **Variance** is the difference between planned and actual performance.

Project Scope Management Summary



Suggestions for Improving User Input

- Develop a good project selection process and insist that sponsors are from the user organization.
- Place users on the project team in important roles.
- Hold regular meetings with defined agendas, and have users sign off on key deliverables presented at meetings.
- Deliver something to users and sponsors on a regular basis.
- Don't promise to deliver when you know you can't.
- Co-locate users with developers.

Suggestions for Reducing Incomplete and Changing Requirements

- Develop and follow a requirements management process.
- Use techniques such as prototyping, use case modeling, and JAD to get more user involvement.
- Put requirements in writing and keep them current.
- Create a requirements management database for documenting and controlling requirements.

Suggestions for Reducing Incomplete and Changing Requirements (cont'd)

- Conduct adequate testing throughout the project life cycle.
- Review changes from a systems perspective.
- Emphasize completion dates to help focus on what's most important.
- Allocate resources specifically for handling change requests and enhancements (as NWA did with ResNet).

Using Software to Assist in Project Scope Management

- Word-processing software helps create scope-related documents.
- Spreadsheets help perform financial calculations and weighed scoring models, and help develop charts and graphs.
- Communication software, such as e-mail and the Web, helps clarify and communicate scope information.
- Project management software helps create a WBS, the basis for tasks on a Gantt chart.
- Specialized software is available to assist in project scope management.

References

- "Information Technology Project Management", Kathy Schwalbe, sixth Edition, THOMSON Course Technology

HNDIT4032
IT Project Management

Project Time Management

Project Time Management

- Project time management involves the processes required to ensure timely completion of a project.
- The **major processes** in developing the project time schedule are:
  - Activity definition
  - Activity sequencing
  - Activity duration estimating
  - Schedule development
  - Schedule control

Tools and technique in time management

- Gantt charts,
- project network diagrams,
- critical path analysis,
- crashing,
- fast tracking,
- schedule performance measurements etc

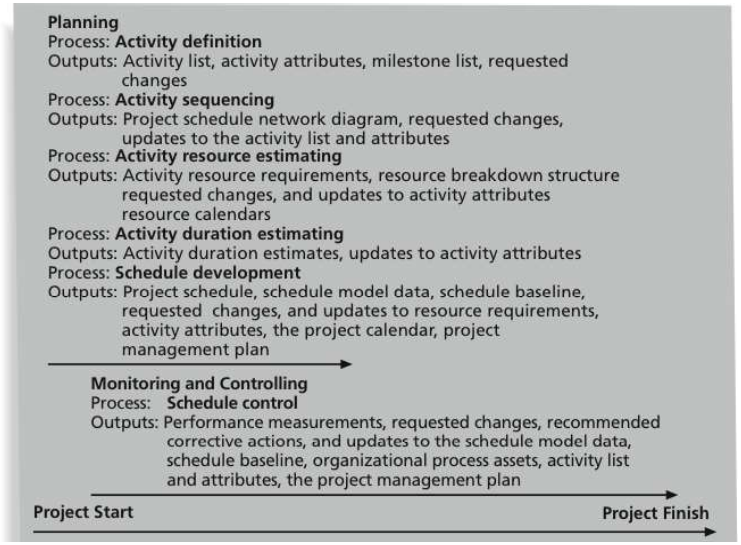
Importance of Project Schedules

- Managers often cite delivering projects on time as one of their biggest challenges
- Time has the least amount of flexibility; it passes no matter what happens on a project
- Schedule issues are the main reason for conflicts on projects, especially during the second half of projects

Project Time Management Processes

- **Activity definition**: identifying the specific activities/tasks that the project team members and stakeholders must perform to produce the project deliverables
- **Activity sequencing**: identifying and documenting the relationships between project activities
- **Activity resource estimating**: estimating how many **resources** a project team should use to perform project activities
- **Activity duration estimating**: estimating the number of work periods that are needed to complete individual activities
- **Schedule development**: analyzing activity sequences, activity resource estimates, and activity duration estimates to create the project schedule
- **Schedule control**: controlling and managing changes to the project schedule

Project Time Management Summary



Activity Definition

- Project schedules grow out of the basic documents that initiate a project
  - Project charter includes start and end dates and budget information
  - Scope statement and WBS help define what will be done
- Activity definition involves developing a more detailed WBS and supporting explanations to understand all the work to be done so you can develop realistic cost and duration estimates

Activity Definition

- The basis for creating a project schedule is derived from four project time management processes
  - Activity definition – further defining the scope
  - Activity sequencing – further defining the time
  - Activity resource and activity duration (further defining the time and cost)
- The main outputs of this process are an activity list, activity attributes, and milestone list.

Activity Lists and Attributes

- An **activity list** is a tabulation of activities to be included on a project schedule that includes:
  - The activity name
  - An activity identifier or number
  - A brief description of the activity
- **Activity attributes** provide more information such as predecessors, successors, logical relationships, leads and lags, resource requirements, constraints, imposed dates, and assumptions related to the activity

Milestones

- A **milestone** is a significant event that normally has no duration
  - Not every deliverable or output created for a project is a milestone
- It often takes several activities and a lot of work to complete a milestone
- They're useful tools for setting schedule goals and monitoring progress
- Examples include obtaining customer sign-off on key documents or completion of specific products such as software modules or the installation of new hardware

Activity Sequencing

- After defining project activities, the next step is activity sequencing
  - Involves reviewing the activity list and attributes, project scope statement, milestone list and approved change requests to determine the relationships between activities
- A **dependency** or **relationship** is the sequencing of project activities or tasks
- You *must* determine dependencies in order to use critical path analysis

Task Dependencies

- A dependency or relationship pertains to the sequencing of project activities or tasks.
- There are **three basic reasons** for creating dependencies among project activities.
  - Mandatory dependencies.
  - Discretionary dependencies.
  - External dependencies.

Three basic reasons

- **Mandatory dependencies** are inherent in the nature of the work being performed on a project. They are sometimes referred to as hard logic.
  - For example, you cannot test code until after the code is written.
- **Discretionary dependencies** are defined by the project team.
  - For example, a project team might follow good practice and not start the detailed design of a new information system until the users sign off on all of the analysis work. Discretionary dependencies are sometimes referred to as soft logic and should be used with care because they may limit later scheduling options.
- **External dependencies** involve relationships between project and non-project activities.
  - For example, the installation of a new operating system and other software may depend on delivery of new hardware from an external supplier. Even though delivery of the hardware may not be included in the scope of the project, you should add an external dependency to it because late delivery will affect the project schedule

Network Diagrams

- Network diagrams are the preferred technique for showing activity sequencing
- A **network diagram** is a schematic display of the logical relationships among, or sequencing of, project activities
- Two main formats are the arrow and precedence diagramming methods

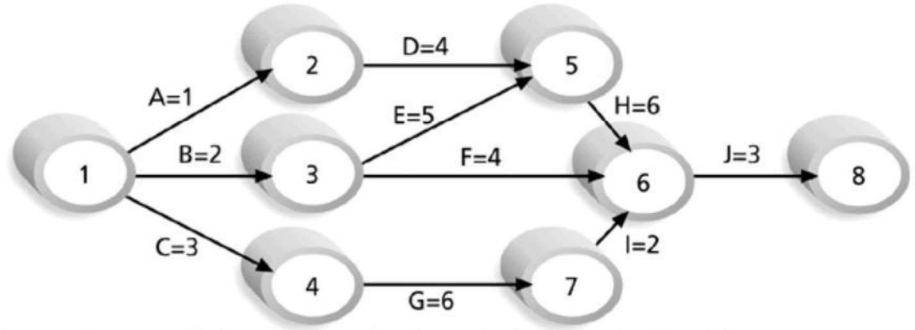
Methods of developing Project Network Diagram

- There are 2 methods are used for developing Network Diagrams.
  1. Arrow Diagramming Method (ADM) or Activity-on-Arrow (AOA)
  2. Precedence Diagramming Method (PDM)

Arrow Diagramming Method (ADM)

- Also called activity-on-arrow (AOA) project network diagrams
- Activities are represented by arrows
- Nodes or circles are the starting and ending points of activities
- Can only show finish-to-start dependencies

Activity-on-Arrow (AOA) Network Diagram for Project X

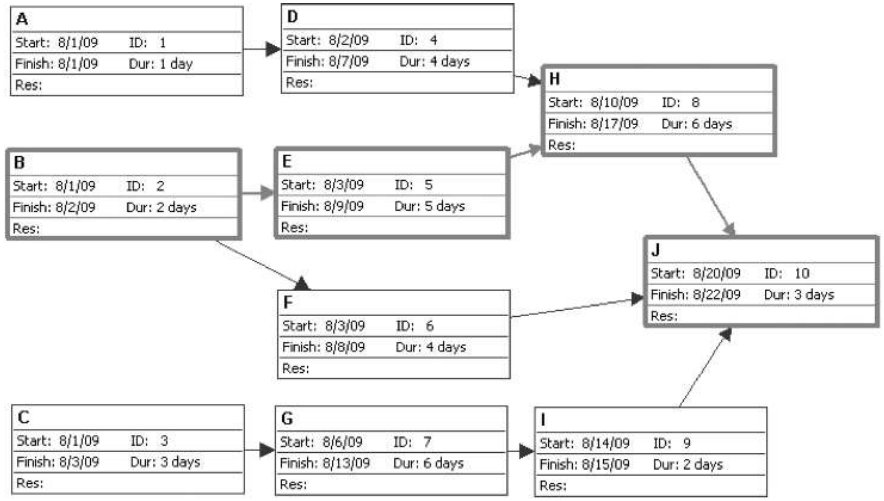


Note: Assume all durations are in days; A=1 means Activity A has a duration of 1 day.

Precedence Diagramming Method (PDM)

- Activities are represented by boxes
- Arrows show relationships between activities
- More popular than ADM method and used by project management software
- Better at showing different types of dependencies

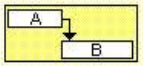
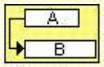
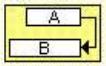
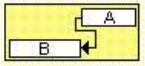
Sample PDM Network Diagram for Project X



Task Dependency Types MS Projects

Task dependencies

The nature of the dependencies between linked tasks. You link tasks by defining a dependency between their finish and start dates. For example, the "Contact caterers" task must finish before the start of the "Determine menus" task. There are four kinds of task dependencies in Microsoft Project:

Task dependency	Example	Description
Finish-to-start (FS)		Task (B) cannot start until task (A) finishes.
Start-to-start (SS)		Task (B) cannot start until task (A) starts.
Finish-to-finish (FF)		Task (B) cannot finish until task (A) finishes.
Start-to-finish (SF)		Task (B) cannot finish until task (A) starts.

Activity Duration Estimating

- Duration includes the actual amount of time worked on an activity *plus* elapsed time
- Effort is the number of workdays or work hours required to complete a task. Effort does not equal duration
- People doing the work should help create estimates, and an expert should review them

Schedule Development

- Schedule development uses results of the other time management processes to determine the start and end date of the project and its activities
- Ultimate goal is to create a realistic project schedule that provides a basis for monitoring project progress for the time dimension of the project
- Important tools and techniques include Gantt charts, PERT analysis, critical path analysis, and critical chain scheduling

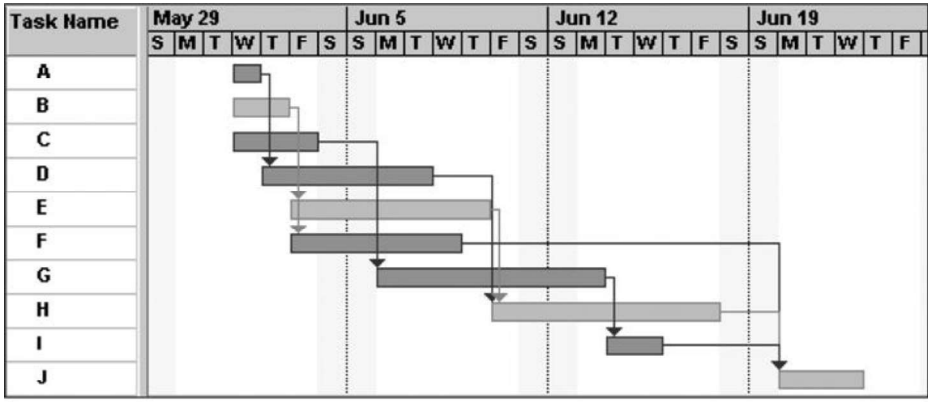
Gantt Charts

- Gantt charts provide a standard format for displaying project schedule information by listing project activities and their corresponding start and finish dates in a calendar format

Gantt Charts

- Symbols include:
  - A black diamond: milestones or significant events on a project with zero duration
  - Thick black bars: summary tasks
  - Lighter horizontal bars: tasks
  - Arrows: dependencies between tasks

Gantt Chart for Project X



Note: Darker bars would be red in Project 2007 to represent critical tasks

Gantt Chart for Software Launch Project

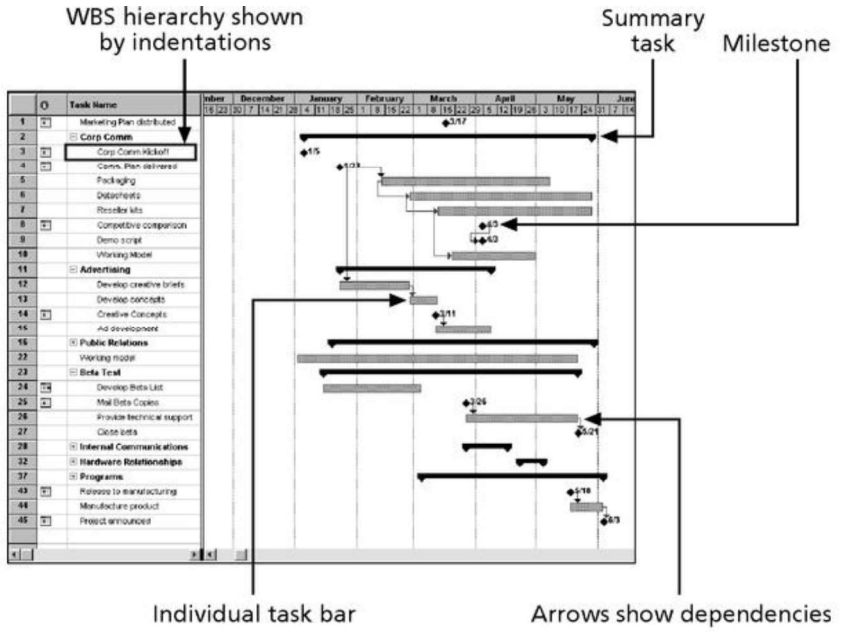


Figure 6-6. Gantt Chart for Software Launch Project

Milestones

- Milestones are significant events on a project that normally have zero duration
- You can follow the SMART criteria in developing milestones that are:
  - Specific
  - Measurable
  - Assignable
  - Realistic
  - Time-framed

Critical Path Method (CPM)

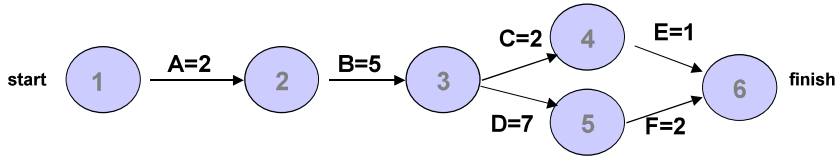
- CPM is a project network analysis technique used to predict total project duration
- A critical path for a project is the series of activities that determines the *earliest time* by which the project can be completed
- The critical path is the *longest path* through the network diagram and has the least amount of slack or float

Finding the Critical Path

- First develop a good project network diagram
- Add the durations for all activities on each path through the project network diagram
- The longest path is the critical path

Simple Example of Determining the Critical Path

- Consider the following project network diagram. Assume all times are in days.



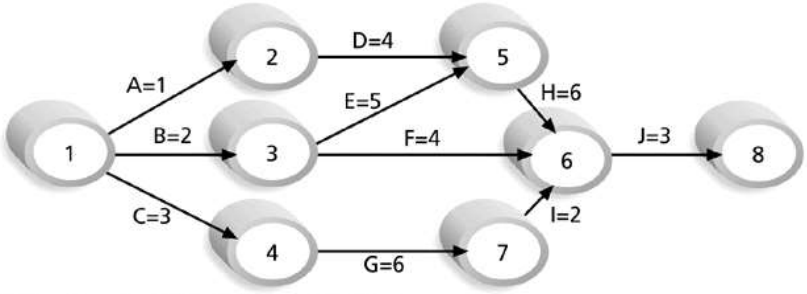
a. How many paths are on this network diagram?

b. How long is each path?

c. Which is the critical path?

d. What is the shortest amount of time needed to complete this project?

Determining the Critical Path for Project X



Note: Assume all durations are in days.

Path 1:	A-D-H-J	Length = 1+4+6+3 = 14 days
Path 2:	**B-E-H-J**	**Length = 2+5+6+3 = 16 days**
Path 3:	B-F-J	Length = 2+4+3 = 9 days
Path 4:	C-G-I-J	Length = 3+6+2+3 = 14 days

Since the critical path is the longest path through the network diagram, Path 2, B-E-H-J, is the critical path for Project X.

Calculating Early and Late Start and Finish Dates

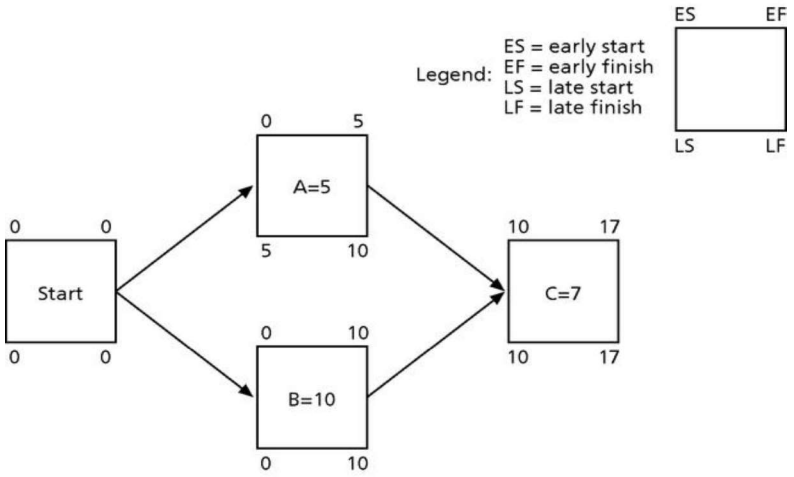


Figure 6-9. Calculating Early and Late Start and Finish Dates

Free and Total Float or Slack for Project X

Task Name	Start	Finish	Late Start	Late Finish	Free Slack	Total Slack
A	8/1/09	8/1/09	8/3/09	8/3/09	0d	2d
B	8/1/09	8/2/09	8/1/09	8/2/09	0d	0d
C	8/1/09	8/3/09	8/3/09	8/7/09	0d	2d
D	8/2/09	8/7/09	8/8/09	8/9/09	2d	2d
E	8/3/09	8/9/09	8/3/09	8/9/09	0d	0d
F	8/3/09	8/8/09	8/14/09	8/17/09	7d	7d
G	8/8/09	8/13/09	8/8/09	8/15/09	0d	2d
H	8/10/09	8/17/09	8/10/09	8/17/09	0d	0d
I	8/14/09	8/15/09	8/18/09	8/17/09	2d	2d
J	8/20/09	8/22/09	8/20/09	8/22/09	0d	0d

Program Evaluation and Review Technique (PERT)

- PERT is a network analysis technique used to estimate project duration when there is a high degree of uncertainty about the individual activity duration estimates
- PERT uses probabilistic time estimates based on using optimistic, most likely, and pessimistic estimates of activity durations

PERT Formula and Example

- PERT weighted average formula:

$$\frac{\text{optimistic time} + 4\text{X most likely time} + \text{pessimistic time}}{6}$$

- Example:

PERT weighted average =

$$\frac{8 \text{ workdays} + 4 \text{ X } 10 \text{ workdays} + 24 \text{ workdays}}{6} = 12 \text{ days}$$

where 8 = optimistic time, 10 = most likely time, and 24 = pessimistic time

Controlling Changes to the Project Schedule

- Perform reality checks on schedules
- Allow for contingencies (an event that may or may not happen)
- Hold progress meetings with stakeholders and be clear and honest in communicating schedule issues

Working with People Issues

- Strong leadership helps projects succeed more than good PERT charts
- Project managers should use:
  - Empowerment
  - Incentives
  - Discipline
  - Negotiation

Using Software to Assist in Time Management

- Software for facilitating communications helps people exchange schedule-related information
- Decision support models help analyze trade-offs that can be made
- Project management software can help in various time management areas

Words of Caution on Using Project Management Software

- Many people misuse project management software because they don't understand important concepts and have not had training
- You must enter dependencies to have dates adjust automatically and to determine the critical path
- You must enter actual schedule information to compare planned and actual progress

References

- "Information Technology Project Management", Kathy Schwalbe, sixth Edition, THOMSON Course Technology

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IT Project Management

Project Cost Management

Project Cost Management

- Cost management is another trouble spot for IT projects
- IT projects have a poor track record for meeting cost goals

Project Cost Management

Project cost management
is the processes required to ensure that the project is completed within an approved budget

A successful project is one delivered "On time, within budget and with the required quality"

Tools and Technique

- Project budgets, net present value, return on investment, payback analysis, earned value management, project portfolio management, cost estimates, cost management plans, cost baselines

Project Cost Management Processes

Cost estimating: Developing an approximation or estimate of the costs of the resources needed to complete a project.

Cost budgeting: Allocating the overall cost estimate to individual work items to establish a baseline for measuring performance.

Cost control: Controlling changes to the project budget.

Basic Principles of Cost Management

- **Profits** are revenues minus expenses

Profits =revenues – expenses

- **Life cycle costing** is estimating the cost of a project plus the maintenance costs of the products it produces

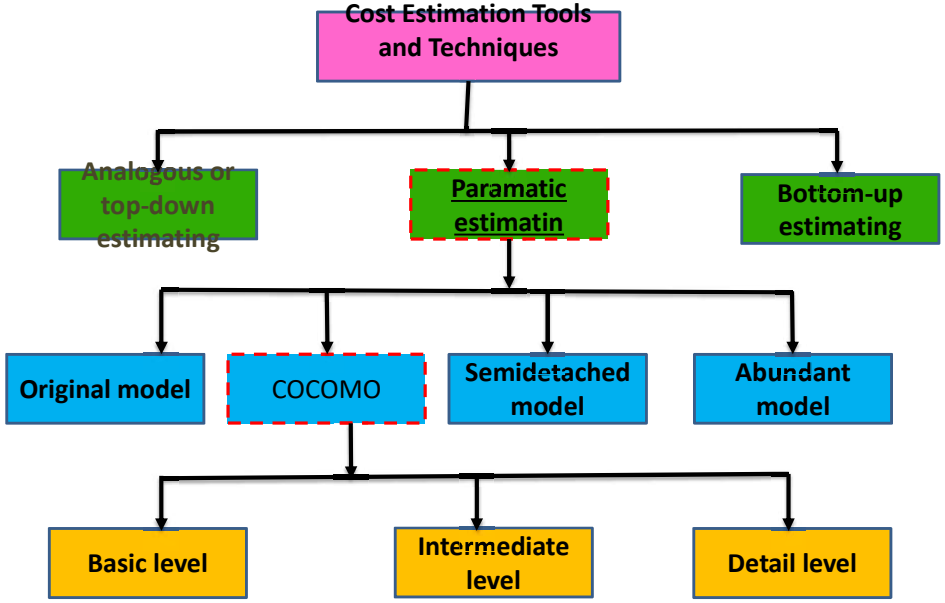
Life cycle costing=cost of a project + maintenance costs of the product it produces

Basic Principles of Cost Management

- **Cash flow analysis** is determining the estimated annual costs and benefits for a project
- Benefits and costs can be tangible or intangible, direct or indirect
- Sunk cost should not be a criteria in project selection

Cost Estimation Tools and Techniques

- 3 basic tools and techniques for cost estimates:
  - **analogous or top-down**: use the actual cost of a previous, similar project as the basis for the new estimate
  - **bottom-up:** estimate individual work items and sum them to get a total estimate
  - **parametric:** use project characteristics in a mathematical model to estimate costs (COCOMO)



Organic, Semidetached and Embedded software projects

- Boehm postulated that any software development project can be classified into one of the following three categories based on the development complexity:
  - organic
  - semidetached
  - embedded.

Organic software projects

- A development project can be considered of organic type, if the project deals with developing a well understood application program, the size of the development team is reasonably small, and the team members are experienced in developing similar types of projects.

Semidetached software projects

- A development project can be considered of semidetached type, if the development consists of a mixture of experienced and inexperienced staff.
- Team members may have limited experience on related systems but may be unfamiliar with some aspects of the system being developed.

Embedded software projects

- A development project is considered to be of embedded type, if the software being developed is strongly coupled to complex hardware, or if the stringent regulations on the operational procedures exist.

Constructive Cost Model (COCOMO)

- COCOMO (Constructive Cost Estimation Model) was proposed by Boehm [1981].
- According to Boehm, software cost estimation should be done through three stages: Basic COCOMO, Intermediate COCOMO, and Detailed COCOMO.
- COCOMO II is a computerized model available on the Web

COCOMO levels - Basic Level

The basic COCOMO model gives an approximate estimate of the project parameters.

Basic Level:

Use : determine size and schedule

Gives: fast, roughs estimate of small to medium size project.

COCOMO levels - Intermediate level

Use: additional variables to determine effort.
Called: Cost drivers

This is related to product, personal and project attributes. This will result in more effort or less effort required for the software project. The product of the cost drives known as Environmental adjustment Factors (EAF)

COCOMO levels - Detail level

- This level build upon intermediary COCOMO model by introducing the additional capabilities of phase sensitive effort multipliers.

The basic COCOMO

- The basic COCOMO estimation model is given by the following expressions:

Effort = a^1 x $(KLOC)^{a2}$ PM

Tdev = b^1 x $(Effort)^{b2}$ Months

Where

KLOC is the estimated size of the software product expressed in Kilo Lines of Code,

a^1, a^2, b^1, b^2 are constants for each category of software products,

The basic COCOMO

Tdev = b^1 x $(Effort)^{b2}$ Months

- Where
- Tdev is the estimated time to develop the software, expressed in months,

- Effort is the total effort required to develop the software product, expressed in person months (PMs).

- Effort for original model:

E= 2.4 x (size) $^{1.05}$

- Semidetached model:

E= 3.0 x (size) $^{1.12}$

- The abundant model

E= 3.6 x (size) $^{1.26}$

Basic COCOMO Project duration Estimate

- original model:

TDEV= 2.5 x (E) $^{0.38}$

- Semidetached model:

TDEV= 2.5 x (E) $^{0.35}$

- The abundant model

TDEV= 2.5 x (E) $^{0.32}$

Basic COCOMO Average Staff Estimate

- Average Staff: SS
- ss= Effort / TDEV

4 Basic COCOMO Productivity Estimate

Productivity = Size / Effort

Example:

- A development project is size of 7.5 kloc and evaluated as being simple. Find the value for average staff, productivity.

- original model:

E= 2.4 x (size) $^{1.05}$

= 2.4 (7.5) $^{1.05}$

TDEV= 2.5 x (E) $^{0.38}$

= 2.5 [2.4 (7.5) $^{1.05}$] $^{.38}$

Average Staff= Effort / TDEV

= (2.4 (7.5) $^{1.05}$)/(2.5 [2.4 (7.5) $^{1.05}$] $^{.38}$)

Productivity = Size / Effort

= 7.5/ (2.4 (7.5) $^{1.05}$)

- Cocomo 11 model estimate the required effort of a project (measured in Person –Month PM) based primarily on your estimate of the software project' size (as measured in thousands of SLOC, ksloc). A project of 1.00 and exponent E of 1.0997 . Assuming that the project is projected to consist of 8,000 Sours Line of Code. Estimate the Person-Month effort required to complete the project by COCOMO 11 model.

Typical Problems with IT Cost Estimates

- Developing an estimate for a large software project is a complex task requiring a significant amount of effort. Also estimates are done at various stages of the project
- Many people doing estimates have little experience doing them. Try to provide training and mentoring

Typical Problems with IT Cost Estimates

- People have a bias toward underestimation. Review estimates and ask important questions to make sure estimates are not biased
- Management wants a number for a bid, not a real estimate. Project managers must negotiate with project sponsors to create realistic cost estimates

Earned Value Management (EVM)

- EVM is a project performance measurement technique that integrates scope, time, and cost data
- Given a baseline (original plan plus approved changes), you can determine how well the project is meeting its goals
- You must enter actual information periodically to use EVM. Figure 7-1 shows a sample form for collecting information

Earned Value Management Terms

- The **planned value (PV),** formerly called the budgeted cost of work scheduled (BCWS), also called the budget, is that portion of the approved total cost estimate planned to be spent on an activity during a given period
- **Actual cost (AC),** formerly called actual cost of work performed (ACWP), is the total of direct and indirect costs incurred in accomplishing work on an activity during a given period
- The **earned value (EV),** formerly called the budgeted cost of work performed (BCWP), is an estimate of the value of the physical work actually completed

Earned Value Calculations

Table 7-7: Earned Value Calculations for One Activity After Week One

ACTIVITY	WEEK 1
Earned Value (EV)	7,500
Planned Value (PV)	10,000
Actual Cost (AC)	15,000
Cost Variance (CV)	–7,500
Schedule Variance (SV)	–2,500
Cost Performance Index (CPI)	50%
Schedule Performance Index (SPI)	75%

Earned Value Formulas

Table 7-8: Earned Value Formulas

TERM	FORMULA
Earned value	EV = PV to date X percent complete
Cost variance	CV = EV – AC
Schedule variance	SV = EV – PV
Cost performance index	CPI = EV/AC
Schedule performance index	SPI = EV/PV
Estimate at completion (EAC)	EAC = BAC/CPI
Estimated time to complete	Original time estimate/SPI

Cost Budgeting

- Cost budgeting involves allocating the project cost estimate to individual work items over time.
- The WBS is a required input for the cost budgeting process because it defines the work items.
- Important goal is to produce a **cost baseline**:

– A time-phased budget that project managers use to measure and monitor cost performance.

Cost Control

- Project cost control includes:

– Monitoring cost performance.

– Ensuring that only appropriate project changes are Included in a revised cost baseline.

– Informing project stakeholders of authorized changes to the project that will affect costs.

- Many organizations around the globe have problems with cost control.

Conclusion

- To summarize some key points:
  - Estimates are really management targets.
  - Collect as much information about previous projects as possible.
  - Use more than one method of estimating.
  - Top-down approaches will be used at the earlier stages of project planning while bottom-up approaches will be more prominent later on.
  - Be careful about using other people's historical productivity data as a basis for your estimates, especially if it comes from a different environment.

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IT Project Management

Project Communications Management

Learning Objectives

- Describe the importance of good communication on projects and major components of a communications management plan
- Discuss various methods for project information distribution
- Determine the number of communications channels needed for a project
- Describe how software can enhance project communications

Project Communication Management

- Project Communications Management includes the processes required to ensure timely and appropriate generation, collection, dissemination, storage and ultimate disposition of project information.

Project Communications Management Processes

- **Communications planning**: Determining the information and communications needs of the stakeholders.
- **Information distribution**: Making needed information available to project stakeholders in a timely manner.
- **Performance reporting**: Collecting and disseminating performance information, including status reports, progress measurement, and forecasting.
- **Managing stakeholders**: Managing communications to satisfy the needs and expectations of project stakeholders and to resolve issues.

Communications planning

- Every project should include some type of **communications management** plan, a document that guides project communications.
- Communication management involves determining the information and communication needs of the stake holders: who needs what information, when they will need it, how it will be given to them, and by whom.
- Creating a stakeholder analysis for project communications also aids in communications planning.

Communications planning

Inputs	Tools and Techniques	Outputs
• Communications Requirements • Communications Technology • Constraints • Assumptions	• Stake holder Analysis	• Communications Management Plan

Sample Stakeholder Analysis for Project Communications

Stakeholders	Document Name	Document Format	Contact Person	Due
Customer management	Monthly status report	Hard copy	Tina Erndt, Tom Silva	First of month
Customer business staff	Monthly status report	Hard copy	Julie Grant, Sergey Cristobal	First of month
Customer technical staff	Monthly status report	E-mail	Li Chau , Nancy Michaels	First of month
Internal management	Monthly status report	Hard copy	Bob Thomson	First of month
Internal business and technical staff	Monthly status report	Intranet	Angie Liu	First of month
Training subcontractor	Training plan	Hard copy	Jonathan Kraus	11/1/2006
Software subcontractor	Software implementation plan	E-mail	Najwa Gates	6/1/2006

Comments: Put the titles and dates of documents in e-mail headings and have recipients acknowledge receipt.

Information Distribution

- Getting the right information to the right people at the right time and in a useful format is just as important as developing the information in the first place.
- Important considerations include:
  - Using technology to enhance information distribution.
  - Formal and informal methods for distributing information.

Information Distribution

Inputs	Tools and Techniques	Outputs
• Work Results • Communications Mgt Plan • Project Plan	• Communications skills • Information retrieval systems • Information distribution methods	• Project Records • Project Reports • Project Presentations

Media Choice Table

KEY: 1 = EXCELLENT 2 = ADEQUATE 3 = INAPPROPRIATE

How well medium is suited to:	Hard Copy	Telephone Call	Voice Mail	E-mail	Meeting	Web Site
Assessing commitment	3	2	3	3	1	3
Building consensus	3	2	3	3	1	3
Mediating a conflict	3	2	3	3	1	3
Resolving a misunderstanding	3	1	3	3	2	3
Addressing negative behavior	3	2	3	2	1	3
Expressing support/appreciation	1	2	2	1	2	3
Encouraging creative thinking	2	3	3	1	3	3
Making an ironic statement	3	2	2	3	1	3
Conveying a reference document	1	3	3	3	3	1
Reinforcing one s authority	1	2	3	3	1	2
Providing a permanent record	1	3	3	1	3	1
Maintaining confidentiality	2	1	2	3	1	3
Conveying simple information	3	2	1	1	2	3
Asking an informational question	3	2	1	1	3	3
Making a simple request	3	3	1	1	3	3
Giving complex instructions	3	3	3	2	1	2
Addressing many people	2	3	3 or 1*	2	3	1

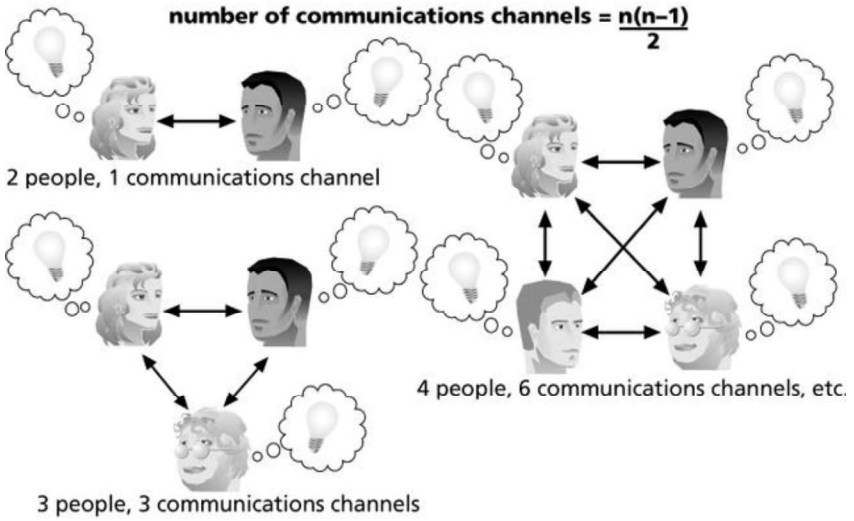
Galati, Tess. Email Composition and Communication (EmC2) Practical Communications, Inc. (www.praccom.com) (2001).
*Depends on system functionality

Determining the Number of Communications Channels

- As the number of people involved increases, the complexity of communications increases because there are more communications channels or pathways through which people can communicate.
- Number of communications channels = $\frac{n(n-1)}{2}$

  where n is the number of people involved.

The Impact of the Number of People on Communications Channels



Performance Reporting

- Performance reporting keeps stakeholders informed about how resources are being used to achieve project objectives.
  - **Status reports** describe where the project stands at a specific point in time.
  - **Progress reports** describe what the project team has accomplished during a certain period of time.
  - **Forecasts** predict future project status and progress based on past information and trends.

Performance Reporting

Inputs	Tools and Techniques	Outputs
• Project plan • Work results • Other project Records	• Performance Reviews • Variance Analysis • Trend Analysis • Earned Value Analysis • Information distribution tools and techniques	• Performance Reports • Change requests

Managing Stakeholders

- Project managers must understand and work with various stakeholders.
- Need to devise a way to identify and resolve issues.
- Two important tools include:
  - Expectations management matrix
  - Issue log

Issue Log

Issue #	Issue Description	Impact on Project	Date Reported	Reported By	Assigned To	Priority (M/H/L)	Due Date	Status	Comments
1	Servers cost 10% more than planned	Slight increase in project cost	5/15	Jean	Oded	M	6/15	Closed	The sponsor agreed to provide additional funds to meet the deadline.
2	Two people left the project	Need to reassign personnel	9/26	Gaurav	Karen	H	10/2	Open	If Karen cannot reassign people within a week, she should talk to Peter directly.
etc.									

Suggestions for Improving Project Communications

- Manage conflicts effectively.
- Develop better communication skills.
- Run effective meetings.
- Use e-mail effectively.
- Use templates for project communications.

Running Effective Meetings

- Determine if a meeting can be avoided.
- Define the purpose and intended outcome of the meeting.
- Determine who should attend the meeting.
- Provide an agenda to participants before the meeting.
- Prepare handouts and visual aids, and make logistical arrangements ahead of time.
- Run the meeting professionally.
- Build relationships.

Using E-Mail Effectively

- Make sure that e-mail is an appropriate medium for what you want to communicate.
- Be sure to send the e-mail to the right people.
- Use meaningful subject lines.
- Limit the content to one main subject, and be as clear and concise as possible.

Using E-Mail Effectively (cont'd)

- Limit the number and size of attachments.
- Delete e-mail you don't need, and don't open e-mail if you question the source.
- Make sure your virus software is current.
- Respond to and file e-mails quickly.
- Learn how to use important features.

Sample Template for a Project Description

Project X Descripton

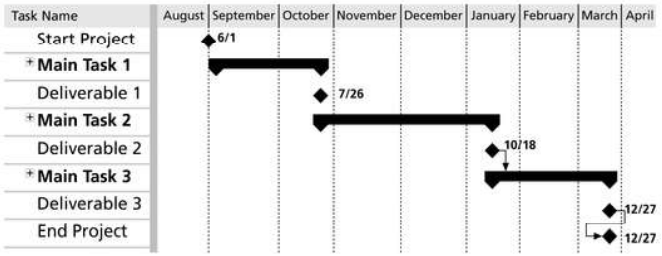
Objective: Describe the objective of the project in one or two sentences. Focus on the business benefits of doing the project.

Scope: Briefly describe the scope of the project. What business functions are involved, and what are the main products the project will produce?

Assumptions: Summarize the most critical assumptions for the project.

Cost: Provide the total estimated cost of the project. If desired, list the total cost each year.

Schedule: Provide summary information from the project s Gantt chart, as shown. Focus on summary tasks and milestones.



Sample Template for a Monthly Progress Report

I. Accomplishments for Month of January (or appropriate month):

- Describe most important accomplishments. Relate to project's Gantt chart.
- Describe other important accomplishments, one bullet for each. If any issues were resolved from the previous month, list them as accomplishments.

II. Plans for February (or following month):

- Describe most important items to be accomplished in the next month. Again, relate tothe project's Gantt chart.
- Describe other important items to accomplish, one bullet for each.

III. Issues: Briefly list important issues that surfaced or are still important. Managers hate surprises and want to help the project succeed, so be sure to list issues.

IV. Project Changes (Date and Description): List any approved or requested changes to the project. Include the date of the change and a brief description.

Final Project Documentation Items

I.	Project description
II.	Project proposal and backup data (request for proposal, statement of work, proposal correspondence, and so on)
III.	Original and revised contract information and client acceptance documents
IV.	Original and revised project plans and schedules (WBS, Gantt charts and network diagrams, cost estimates, communications management plan, etc.)
V.	Design documents
VI.	Final project report
VII.	Deliverables, as appropriate
VIII.	Audit reports
IX.	Lessons-learned reports
X.	Copies of all status reports, meeting minutes, change notices, and other written and electronic communications

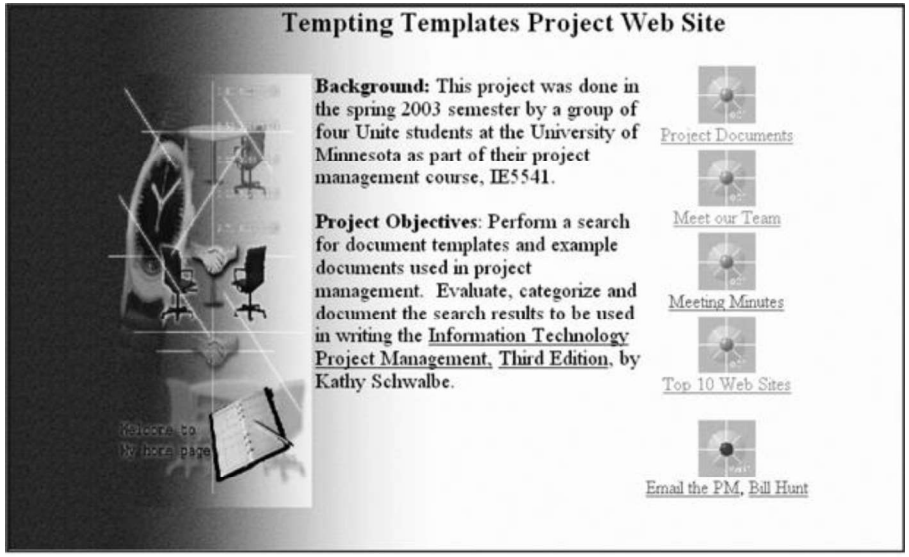
Lessons Learned Reports

- The project manager and project team members should each prepare a **lessons-learned report**.
  - A reflective statement that documents important things an individual learned from working on the project.
- The project manager often combines information from all of the lessons-learned reports into a project summary report.
- See template and sample in Chapter 3.

Project Web Sites

- Many project teams create a project Web site to store important product documents and other information.
- Can create the site using various types of software.

Sample Project Web Site



Developing a Communications Infrastructure

- A **communications infrastructure** is a set of tools, techniques, and principles that provide a foundation for the effective transfer of information.
  - Tools include e-mail, project management software, groupware, fax machines, telephones, teleconferencing systems, document management systems, and word processors.
  - Techniques include reporting guidelines and templates, meeting ground rules and procedures, decision-making processes, problem-solving approaches, and conflict resolution and negotiation techniques.
  - Principles include using open dialog and an agreed upon work ethic.

References

- "Information Technology Project Management", Kathy Schwalbe, sixth Edition, THOMSON Course Technology

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IT Project Management

Project Risk Management

Learning Objectives

- Discuss the importance of good project risk management
- Discuss the risk management processes
- Identify tools and techniques available for risk management.
- Describe different risk response planning strategies.

What is Risk?

- A dictionary definition of risk is “the possibility of loss or injury”
- Project risk involves understanding potential problems that might occur on the project and how they might impede project success
- Risk management is like a form of insurance; it is an investment

Project Risk Management

- Risk Management is the systematic process of identifying, analyzing, and responding to project risk.
- The major processes in Project Risk Management :
  - Risk Management Planning
  - Risk Identification
  - Qualitative Risk Analysis
  - Quantitative Risk Analysis
  - Risk Response Planning
  - Risk Monitoring and Control

Risk Management Planning

- Risk management planning is deciding how to approach and plan the risk management activities for the project.
- Inputs to risk management planning- project charter, WBS, defined roles and responsibilities, stake holder risk tolerances, etc.
- The main output of risk management planning is a risk management plan
- The project team should review project documents and understand the organization's and the sponsor's approach to risk
- The level of detail will vary with the needs of the project

Risk Identification

- Risk identification is the process of understanding what potential unsatisfactory outcomes are associated with a particular project
- Several risk identification tools and techniques include
  - Brainstorming
  - The Delphi technique
  - Interviewing
  - SWOT analysis

Qualitative Risk Analysis

- Performing a qualitative analysis of risk and conditions to prioritize their effects on project objectives.
- Assess the likelihood and impact of identified risks to determine their magnitude and priority.
- Risk quantification tools and techniques include
  - Probability/Impact matrixes
  - The Top 10 Risk Item Tracking technique
  - Expert judgment

Quantitative Risk Analysis

- Often follows qualitative risk analysis, but both can be done together or separately
- Large, complex projects involving leading edge technologies often require extensive quantitative risk analysis
- Main techniques include
  - decision tree analysis
  - simulation

Risk Response Planning

- After identifying and quantifying risks, you must decide how to respond to them
- Four main strategies:
  - Risk avoidance: eliminating a specific threat or risk, usually by eliminating its causes
  - Risk acceptance: accepting the consequences should a risk occur
  - Risk transference: shifting the consequence of a risk and responsibility for its management to a third party
  - Risk mitigation: reducing the impact of a risk event by reducing the probability of its occurrence

General Risk Mitigation Strategies for Technical, Cost, and Schedule Risks

Technical Risks	Cost Risks	Schedule Risks
Emphasize team support and avoid stand-alone project structure	Increase the frequency of project monitoring	Increase the frequency of project monitoring
Increase project manager authority	Use WBS and CPM	Use WBS and CPM
Improve problem handling and communication	Improve communication, project goals understanding, and team support	Select the most experienced project manager
Increase the frequency of project monitoring	Increase project manager authority	
Use WBS and CPM		

Risk Monitoring and Control

- Monitoring risks involves knowing their status
- Controlling risks involves carrying out the risk management plans as risks occur
- Workarounds are unplanned responses to risk events that must be done when there are no contingency plans
- The main outputs of risk monitoring and control are corrective action, project change requests, and updates to other plans

Risk Response Control

- Risk response control involves executing the risk management processes and the risk management plan to respond to risk events
- Risks must be monitored based on defined milestones and decisions made regarding risks and mitigation strategies
- Sometimes workarounds or unplanned responses to risk events are needed when there are no contingency plans

Using Software to Assist in Project Risk Management

- Databases can keep track of risks. Many IT departments have issue tracking databases
- Spreadsheets can aid in tracking and quantifying risks
- More sophisticated risk management software, such as Monte Carlo simulation tools, help in analyzing project risks

References

- "Information Technology Project Management", Kathy Schwalbe, sixth Edition, THOMSON Course Technology

COCOMO - Constructive Cost Modeling

COCOMO - CONSTRUCTIVE COST MODELING

The COCOMO model

- A family of empirical models based on analysis of projects of different companies
- COCOMO developed by Berry Bohem
- Long history from COCOMO-81 (1981) up to COCOMO-II (1999, 2000)
- Extended to cover different development processes and other aspects, such as quality (COQUALMO)

Hierarchy of software estimation model

- Software cost estimation models
  - Basic Models
  - Intermediate models
  - Detail models

Basic model

- It estimates the software in a rough and quick manage
- Mostly useful small and medium sized project
- Three models of development
  - Organic
  - Semi Detached
  - Embedded

Estimation models

Char	Organic	Seme Detached	Embedded
Size	2-50 KLOC	50-300KLOC	300 KLOC and above
Team size	Small	Medium	Large
Developer Experience	Experienced Developers	Average Experienced Developers	Little Experienced Developers
Environment	Familiars	Less familiars	New Enviornment
Innovation	Little	Medium	Major
Dead line	Not tight	Medium	Tight
Example	Payroll system	Utility System	Air traffic monitering

Basic Model

1. Effort/E=a (KLOC) ^{b}
2. Development Time/Tdev =c (Effort)^{d}
3. Average staff size=Effort/Tdev
4. Productivity =KLOC/Effort

Mode	a	b	c	d
Organic	2.4	1,05	2.5	0.38
Semidetached	3.0	1.12	2.5	0.35
Embedded	3.6	1.2	2.5	0.32

Example

- Suppose that a project was estimated to be 400KLOC calculate effort ,Dev time for each of 3 modes
- Organic
  - Effort=2.4x400 $^{1.05}$ =1295 PM
  - Dev Time= 2.5(effort)$^{0.38}$ =38 months
- Semi_Detached
  - Effort=…….
  - …….
- Embedded=
  - Effort=…….
  - …….

COCOMO (Intermediate Model)

- $E=a(KLOC)^b \times EAF$
- $Tdev=c(Effort)^d$
- EAF-Effort Adjustment Factor

EAF-Effort Adjustment Factor

- **Classification of Cost Drivers and their attributes:**
- **Product attributes**
  - Required software reliability extent(RELY)
  - Size of the application database(DATA)
  - The complexity of the product(CPLX)
- **Hardware attributes**
  - Run-time performance constraints(TIME)
  - Memory constraints(STOR)
  - The volatility of the virtual machine environment(VIRT)
  - Required turnabout time(TURN)
- **Personal attributes –**
  - Analyst capability(ACAP)
  - Software engineering capability(AEXP)
  - Applications experience(PCAP)
  - Virtual machine experience(VEXP)
  - Programming language experience(LEXP)
- **Project attributes**
  - Use of software tools(MODP)
  - Application of software engineering methods(TOOL)
  - Required development schedule(SED)

Attributes: –

PRODUCT = RELY * DATA * CPLX
COMPUTER = TIME * STOR * VIRT * TURN
PERSONNEL = ACAP * AEXP * PCAP * VEXP * LEX
PROJECT = MODP * TOOL * SCED

EAF-Effort Adjustment Factor

COST DRIVERS	RATINGS					
PRODUCT ATTRIBUTES	Very Low	Low	Nominal	High	Very High	Extra High
RELY	0.75	0.88	1.00	1.15	1.40	..
DATA	..	0.94	1.00	1.08	1.16	..
CPLX	0.70	0.85	1.00	1.15	1.30	1.65
COMPUTER ATTRIBUTES						
TIME	..	..	1.00	1.11	1.30	1.66
STOR	..	..	1.00	1.06	1.21	1.56
VIRT	..	0.87	1.00	1.15	1.30	..
TURN	..	0.87	1.00	1.07	1.15	..

InterviewBit

EAF-Effort Adjustment Factor

COST DRIVERS	RATINGS					
PRODUCT ATTRIBUTES	Very Low	Low	Nominal	High	Very High	Extra High
RELY	0.75	0.88	1.00	1.15	1.40	..
DATA	..	0.94	1.00	1.08	1.16	..
CPLX	0.70	0.85	1.00	1.15	1.30	1.65
COMPUTER ATTRIBUTES						
TIME	..	..	1.00	1.11	1.30	1.66
STOR	..	..	1.00	1.06	1.21	1.56
VIRT	..	0.87	1.00	1.15	1.30	..
TURN	..	0.87	1.00	1.07	1.15	..

InterviewBit

COCOMO (Intermediate Model)

- A New project with estimated 400KLOC embedded system has to be developed project mangers has a choice of hiring from 2 pools of developers very highly capable with app and very little experience in programming language or developers of low quality but a lot of programing language experience which is better choice in terms of 2 pools?

COCOMO (Intermediate Model)

- $E=a(KLOC)^b$ x EAF
- $E=2.8x(400)^{1.20}$ xEAF
- Case 1
  - EAF=0.82x1.14=0.934
  - $E=2.8x(400)^{1.20}x0.934=$
  - 3470PM
  - $Tdev=2.5x3470^{0.32}$
  - 33.9Month
- Case 2
  - EAF=1.29x0.95=1.22
  - $E=2.8x(400)^{1.20}x1.22=$
  - 4528PM
  - $Tdev=2.5x4528^{0.32}$
  - 36.9Month
- Case1 team is more suitable

COCOMO Detail/advanced Model

- Detail model is Phase sensitive
- It calculates the effect of cost drivers on each phase of SDLC
- IT use phase sensitive effort multipliers for each cost drivers
- Effort multipliers to determine the amount of effort required to complete each phase of SDLC
- It establish module → Sub system→ System Hierarchy.
- The rating cost drivers is done at that level only where the cost drivers is most susceptible to variable

Projects are organized in four phases:

- Requirements Planning and Product Design (PRD)
- Detailed Design (DD)
- Code and Unit Test (CUT)
- Integration Test (IT)

Cost Driver	Rating	RPD	DD	CUT	IT
ACAP	Very Low	1.8	1.35	1.35	1.5
	Low	0.85	0.85	0.85	1.2
	Nominal	1	1	1	1
	High	0.75	0.9	0.9	0.85
	Very High	0.55	0.75	0.75	0.7

- ACT=0.4(DD)+0.3(co)+0.3(I)
  - [dd-design, co-code ,I –Testing]
- ACT = %Added + %Modified /100
- PM = ACTxPMnom x EAF

THANK YOU

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IT Project Management

Agile Project Management

Agile

- Agile means being able to move quickly and easily.
- Agile model of software development means using a method based on iterative and incremental development.
- In the business world, the term agile was first applied to software development projects. In February 2001.
- A group of 17 people that called itself the Agile Alliance developed and agreed on the Manifesto for Agile Software Development,

Manifesto for Agile Software Development

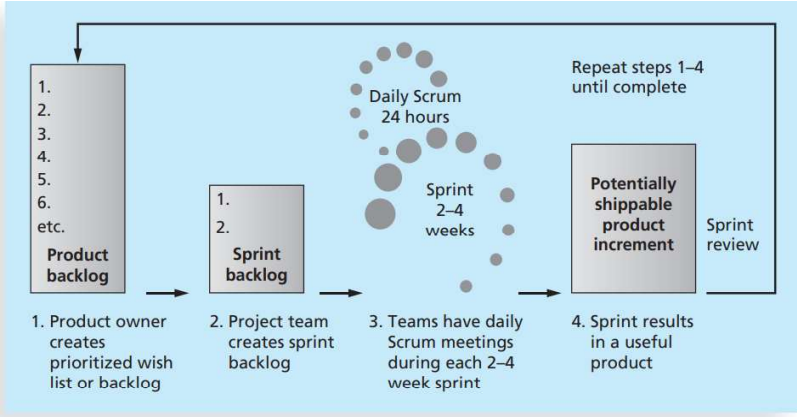
- We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:
  - Individuals and interactions over processes and tools.
  - Working software over comprehensive documentation.
  - Customer collaboration over contract negotiation.
  - Responding to change over following a plan.
- That is, while there is value in the items on the right, we value the items on the left more.

SCRUM

- The person or organization that implements Agile is responsible for interpreting and applying the preceding values.
- Some people associate Agile with specific techniques such as Scrum.
- Scrum is the leading agile development method for completing projects with a complex, innovative scope of work

Scrum framework

- The basic Scrum framework is summarized in the following list and illustrated in Figure 2-6



Scrum framework

- A product owner creates a prioritized wish list called a product backlog.
- During sprint planning, the team pulls a small chunk from the top of that wish list, a sprint backlog, and decides how to implement those pieces
- The team has a certain amount of time, a sprint, to complete its work—usually two to four weeks—but meets each day to assess its progress (daily Scrum).
- Along the way, the ScrumMaster keeps the team focused on its goal.
- At the end of the sprint, the work should be potentially shippable, as in ready to hand to a customer, put on a store shelf, or show to a stakeholder.
- The sprint ends with a sprint review and retrospective.
- As the next sprint begins, the team chooses another chunk of the product backlog and begins working again.

Principles behind the Agile Manifesto

- Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- Business people and developers must work together daily throughout the project.

Principles behind the Agile Manifesto….

- Build projects around motivated individuals. Give them the environment and support they need,and trust them to get the job done.
- The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
- Working software is the primary measure of progress.

Principles behind the Agile Manifesto…

- Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- Continuous attention to technical excellence and good design enhances agility.
- Simplicity--the art of maximizing the amount of work not done--is essential.
- The best architectures, requirements, and designs emerge from self-organizing teams.
- At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.
-

What is Agile Project Management?

- Normally PM does not allow people to work quickly or easily, Because Agile means being able to move quickly and easily.
- Early software development projects often used a waterfall approach
- Agile project management is a methodology that focuses on breaking the larger project lifecycle into more approachable portions of time and smaller tasks.
- Agile project management prioritizes the delivery of a working product throughout the process, rather than delivering project deliverables and products at the conclusion of a project,
- Agile allowing the project team and stakeholders to work closely together during the course of the project execution while providing feedback—not just during the project post-mortem.
- Compared to other more traditional methods of project management, Agile project management is **less rigid**, which gives teams the ability to pivot in new directions as needed and adapt to changing circumstances or project needs

12 principles of Agile project management

- **Customer satisfaction through early and continuous delivery** of valuable software.
- **Welcome changing requirements**, even late in development.
- **Deliver working software frequently**, from a couple of weeks to a couple of months, with a preference for the shorter timescale.
- **Business people and developers must work together daily** throughout the project.
- **Build projects around motivated individuals**. Give them the environment and support they need, and trust them to get the job done.
- **The most efficient and effective method of conveying information** to and within a development team is face-to-face conversation.
- **Working software is the primary measure of progress**.
- **Agile processes promote sustainable development**. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- **Continuous attention to technical excellence and good design** enhances agility.
- **Simplicity**—the art of maximizing the amount of work not done—is essential.
- **The best architectures, requirements, and designs emerge from self-organizing teams**.
- At regular intervals, the team **reflects on how to become more effective**, then tunes and adjusts its behavior accordingly.
- These principles guide agile teams to be adaptive, customer-focused, and deliver high-quality products in a collaborative and efficient manner[12].

References

- "Information Technology Project Management", Kathy Schwalbe, sixth Edition, THOMSON Course Technology