

1: Identify the Characteristics of a Project

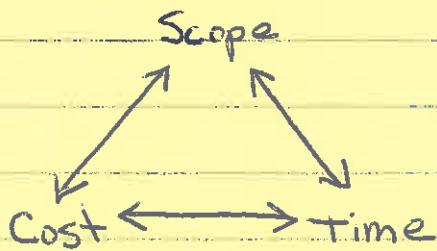
Projects

- temporary in nature
- definite start and end date
- creates a unique product, service, or result

Project vs. Operations

- Project
 - Meets a specific business need
 - Always temporary
 - Must have clearly defined and measurable goals
- Operations or processes
 - Ongoing effort
 - Repetitive

The Project Management Triangle

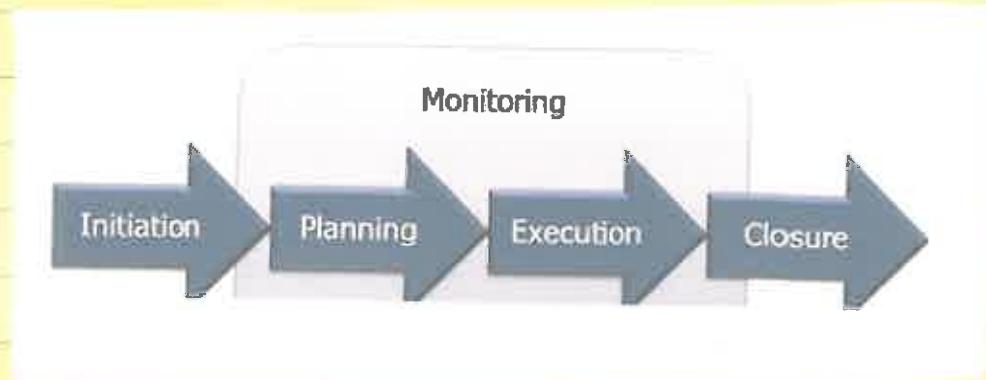


* Changing one value causes the other two values to change, sometimes drastically.

Constraints

- Time
 - The amount of time available to complete a project.
- Cost
 - The budgeted amount available for the project.
- Scope
 - what must be done to produce the project's end result

The Five Project Process Groups



The Project Processes

- Careful planning and monitoring
- Realistic and measurable output
- Transfer or handoff of each phase

1. Initiation Phase

- Recognizes the beginning of the project
- Define and authorize the project
- Name the project and project manager
- Define scope
- Identify the deliverables
- Ascertain the duration and resources
- Phase output : the project charter

2. Planning Phase

- Develop the schedule
- Define the budget
- Identify risks
- Identify resources
- Phase output • the overall management plan

3. Execution Phase

- The real work begins
- Execute your plan
- Coordinate staff
- Phase output: deliverables finished and accepted.

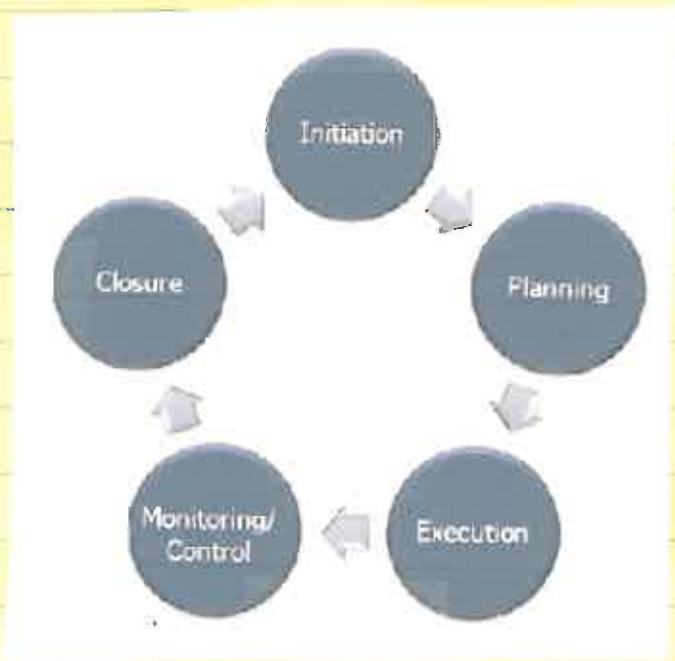
4. Monitoring and Controlling

- Continuously monitor the project
- Analyze the issues associated with the deviations
- Execute approved changes
- Phase output: take corrective action

5. Closure

- Turn over deliverables
- Closure of the project
- Release resources
- Close contracts
- Review project
- Create a final report
- Phase output: formal acceptance and sign-off

The Project Life Cycle



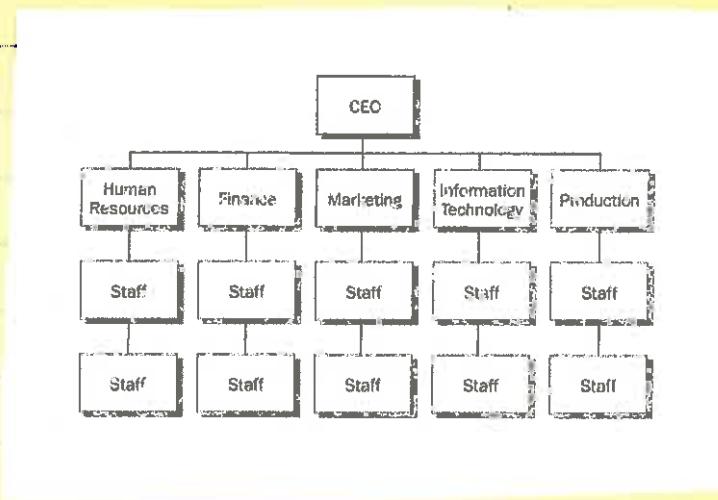
IT Project Management

- Any project that is related to IT
 - Software development
 - Infrastructure updates
 - Datacenter creation / improvements
 - Server / system deployment
 - Automated systems
- Iterative
- Intangible, e.g. application development
- Design and implementation
- Simultaneous linked projects — program

Organizational Structures:

Functional

- Staff organized by department
- Report only to their manager
- Silos of work
- Resources often part-time
- Project manager
 - Little or no control/authority
 - No control over the budget



Matrix (Blend of Functional & Projectized)

- Team members report to their manager and the project manager

Balanced Matrix

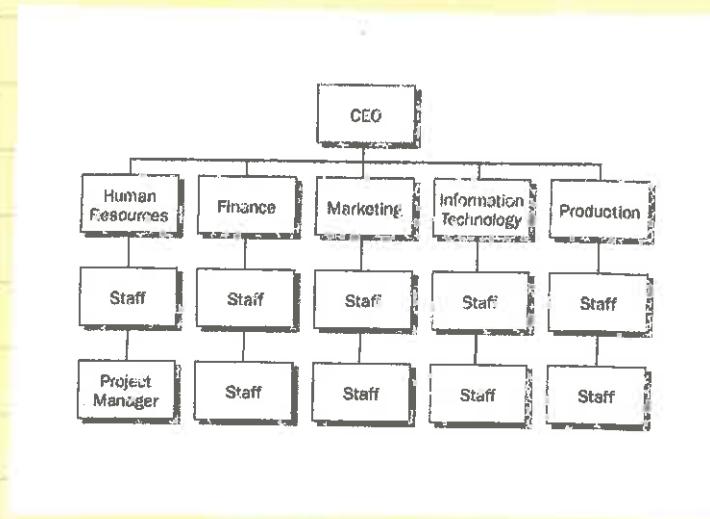
- Project manager
 - Full-time
 - Low to moderate authority
 - Low to moderate resources availability
 - Mixed control of budget

Weak Matrix

- Project manager
 - Part-time
 - Limited authority
 - Limited resources availability
 - No control over the budget

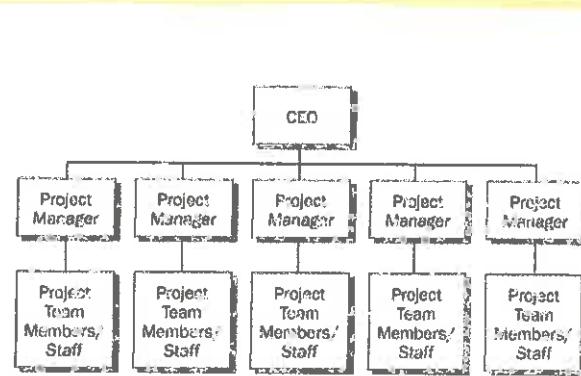
Strong Matrix

- Project manager
 - Full-time
 - Moderate to high authority
 - Moderate to high resource availability
 - Full control of budget



Projectized

- Team members have no department
- Dedicated full time to the project
- Project manager
 - Full-time
 - High to almost total authority
 - High to almost total resource availability
 - Full control of the budget



2 : Project Initiation

Identify the Project

- Receive the project request
- Who is requesting this?
 - Internal or external customers
 - Business analysts

What Exactly Do They Want?

- What is the project?
 - Service
 - Product
 - Information
- What are the goals?
- What is the final result?
- How do you define success?

The Business Need

- Why do we need this?
 - Problem must be clearly defined and understood
 - Regulatory or legal requirements?
 - Market or industry driven?
 - Increased revenue?
 - Decrease in spending?
 - Research?

Validate the Project - The Business Case

- Does the project align to our strategic plan?
- Does it add value to the business?
- Is it really necessary?
- Will it help us in the future?

What Do We Need?

- Define the business requirements
 - What do the stakeholders need?
- Gather information
 - Beware of misinformation

Requirements

- Technical requirements
- Functional requirements
- Timing
- Historical data

Measuring Success

- Goals and objectives should be clear and attainable
- Do they mean something?
 - Address the business need
- Can they be measured?
 - Quantitative or qualitative
- Is it attainable?
 - Can we reasonably expect success?

Stakeholders

- Someone who is actively involved in the project
- Someone impacted by the project
- Have something to gain or lose
- May be involved during different phases of the project
- Have influence over the project
- Expectations need to be met
- Appropriate communication
- Internal and external
- Not all stakeholders will support your project

Identify the Stakeholders

- Who will be affected by the project?
- Who might have influence over our project?
- What kind of influence?
- Involvement in the project

Key Stakeholders

- Project sponsor
 - Initiates the work
 - Provides the resources
 - Champion of the project
 - Decision maker

- Project manager

- Manages the project
- Develops the project management plan
- Keep the project on track
- Identify and monitor risk
- Accurate and timely reporting

- Customer / Client

- Receives the output of the project
- Group or an organization
- Internal or external

- End-user

- Directly uses the product or service

- Sellers / Vendors

- Provide services or components for the project
- Business partners

- Project team

- Carry out the work
- Specific skill sets
- Specialized knowledge

Stakeholder Matrix

		Influence			
		Great	Some	Little	None
Involvement	High				
	Some	Sponsor	Functional manager		
	Little			End-user	
	None				

Stakeholder Requirements

- Needs and expectations
- How they feel about the project
- Their definition of success
- Politics and personalities
- Clear and precise

Assumptions About the Project

- Collect and organize
- Sign-off
- Retain for future discussion and review

When Requirements Collide

- List and evaluate requirements
- Rank in order of importance
- Devise alternate solutions
- Long-term goals
- Present to the stakeholders

Getting Vendors Involved

- Request for Proposal (RFP)
 - What the project requires
- Statement of Work (SOW)
 - What the vendor will deliver

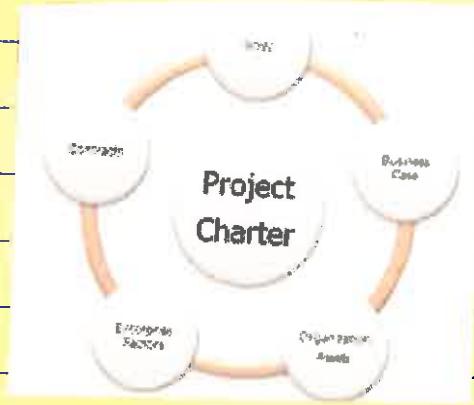
3: The Project Charter

What is the Project Charter?

- Formal authorization of the project
- Project blueprint
- Defines the business need
- Names the sponsor
- Names the project manager
- May vary for different organizations

Inputs to the Project Charter

- Statement of work (Sow)
 - Description of products or services
 - Business need
 - Strategic plan
- Business case
 - Justification for the project
 - Cost/benefit analysis
- Contracts
 - Project for an external customer
- Enterprise environmental factors
 - Issues that may influence the charter
- Organizational process assets
 - Processes, templates, historical data



Elements of the Project Charter

- The project name
- The project sponsor
- The project manager
- Project description
- The business case
- The business need
- The project deliverables
- High level timeline with major milestones
- High-level budget
- High-level risk assessment
- High-level assumptions and constraints
- Stakeholders

Consensus

- Necessary between stakeholders and project manager
 - Consensus decision
 - Agreement on scope
- Lack of consensus
 - Stakeholders working against one another
 - Project timeline and budget in peril
 - Scope creep

Building Consensus

- Develop new, mutually advantageous approaches
- Present clearly, concisely, and convincingly
- Narrow down to a single decision
- Achieve consensus and approval

Customer Expectations

- Written confirmation
 - Problem statement
 - Description of the product
 - Anticipated budget
 - Completion date
 - Availability of resources
 - Acceptable or unacceptable risk

4 : The Scope Statement

The Planning Phase

- How we will meet the business requirements
- Identify the resources needed
- Organize the work
- Who's doing what when
- Analyze risk
- Alert when potential problems arise

Defining Scope

- The work that needs to be accomplished
- Requirements
- Clearly defined boundaries
- Project scope baseline

Tools and Techniques

- Expert judgment
 - Consultants
 - Stakeholders
 - Professional associations
 - Subject matter experts
- Product analysis
- Alternatives

The Scope Statement

- Product scope description (objectives)
 - Functional requirements
- Product acceptance criteria
 - Key performance indicators (KPI)
- Project deliverables
 - Milestones
- Project boundaries
 - What work will and won't be included
- Project constraints
 - Restrictions of time, cost, and quality
- Project assumptions
 - Assumptions made
 - Consequences if false

Acceptance and Approval

- Involve stakeholders in the process
- Formal presentation
- Stakeholders understand and agree

5: The Work Breakdown Structure (WBS)

What is a Work Breakdown Structure (WBS)?

- Decomposition of the scope statement
- Break down of the deliverables
- Smaller, easily managed components
- Work package
 - Assigned to a single resource
 - Realistic estimate of time and cost
 - < 80 hrs
- Not a task list

WBS Dictionary

- Generated by the WBS process
- Provides more detail
 - Resources required
 - Cost estimates
 - Quality requirements
 - Acceptance criteria
 - Contract information
 - Responsible individual

Importance of the WBS

- Necessary and important for:
 - Estimating costs and budgeting
 - Scheduling
 - Activity definition
 - Risk management planning
 - Resource planning

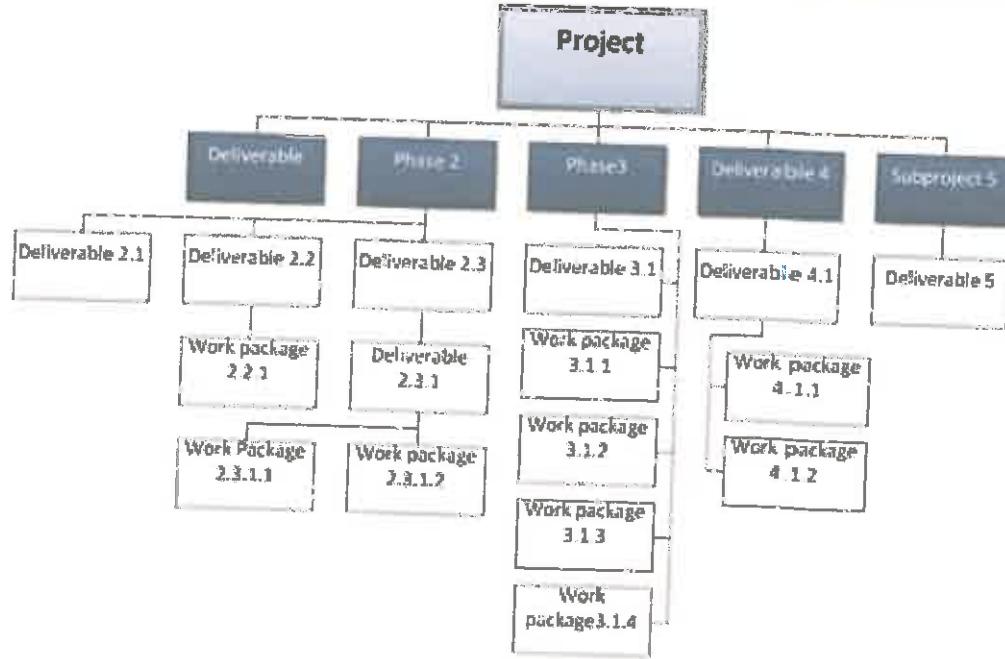
WBS Methods

- Top-down
 - General to specific
- Bottom-up
 - Specific to general
- Analogous
 - Previous similar projects
 - Historical data
- Guidelines
 - Organizational processes

Developing WBS

- Scope Statement
 - Identify the major business goals
 - Functional requirements
 - Major tasks
- Decompose those tasks
- Create hierarchical outline
 - Cost
 - Time
 - Monitor

WBS Chart



WBS Recommendations

- The 100% rule
- Mutually exclusive elements
- Outcomes or results, not actions
- Responsibility of a single person
- Buy-in
- WBS dictionary
- WBS is iterative

6: Creating a Budget

Creating a Budget

- Work Breakdown Structure (WBS)
- WBS dictionary
- Divide your project into phases
- Workload required to complete each phase of the project
- Costs for any specialized services
- Costs for equipment
- Production costs
- Quality requirements
- Risk
- Reserve amounts

Estimating Types

- Bottom-up estimators
 - Start at the lowest level of the work breakdown structure
- Analogous (Top-down)
 - Historical data from previous similar projects
 - Quicker - general idea of cost
 - Less accurate
- Parametric modeling
 - Mathematical
 - Values

Bottom-up Estimating

- Allowance for change
- Best and worst case scenario
- Most likely scenario

Three Point Estimate

$e = \text{estimate}$
three point

$o = \text{best case estimate}$

$m_l = \text{most likely estimate}$

$p = \text{worst case estimate}$

$$\star \quad e = \frac{(o + m_l + p)}{3}$$

Program Evaluation and Review Technique (PERT)

$o = \text{best case estimate}$

$m_l = \text{most likely estimate}$

$p = \text{worst case estimate}$

Most likely estimate is

"weighted" four times more

than the other two.

$$\star \quad e = \frac{(o + (4 \times m_l) + p)}{6}$$

Estimating Work Hours

- Realistic estimates
- Effort time
 - Effort, not duration
 - Based on actual uninterrupted effort
 - Independent of availability
 - Skills
 - Named vs average resource
 - Resource availability
 - 75% - 80%
- Elapsed time
- Calendar based
- Availability
 - Work with your team members
 - Off-time
 - Log time
 - Holidays
 - Vacations

Cost Estimates

- Cost of goods and services
- Some methods
- Direct costs
 - Labor
 - Equipment
 - Facilities
- Indirect costs
 - Support
 - Incidental
 - Rent etc...

Estimating Techniques

- Experience of the estimator
- Based on activities and tasks
- Function point
 - The International Function Point Users Group (IFPUG) Counting Manual

Estimating Recommendations

- Involve your project team
- Brainstorming
- Document estimates and calculations
- Software tools
- Combine estimates to create a cost baseline

Allocation

- Timing of expenditures
- High cost can affect cash flow
- How will the money be spent and when
- Carefully planned and monitored
- Assess planned vs. actual spending
- Indications of possible overruns

Associated Risks

- Dealing with unknowns
 - Accuracy
 - Resource availability
 - Fluctuation in pricing
 - Changing technology
 - Inflation
 - Changes to the project scope

Contingency

- Project reserve fund
 - Should be included in the project budget
 - Set aside to cover unexpected costs
 - Usually a percentage of total budget
 - Controlled by the project manager
- Management reserve fund
 - Same rules apply
 - Controlled by senior management

Cost Management Plan

- Defines how you will complete the project cost estimating
- Input costs estimates
 - Amount being spent
- Cost output estimates
 - Amount being received
- Planning needed to control costs

Elements of the Cost Management Plan

- Control limits
- Assign costs
- Chart of accounts
- Project budget
- Cost estimates
- Cost baseline

7: Developing a Project Schedule

What is a Schedule?

- Defines key project dates
- Identify resource requirements
- Create the critical path

Why Do We Need a Schedule?

- Integrate with other activities
- Coordinate project activities
- Coordinate project resources
- Identify schedule conflicts
- Schedule baseline

What We Need to Create a Schedule

- Work Breakdown Structure (WBS)
- Task estimates
- Resource assignments
 - Preferably named
- Task dependencies
- Patience
 - Expect to iterate

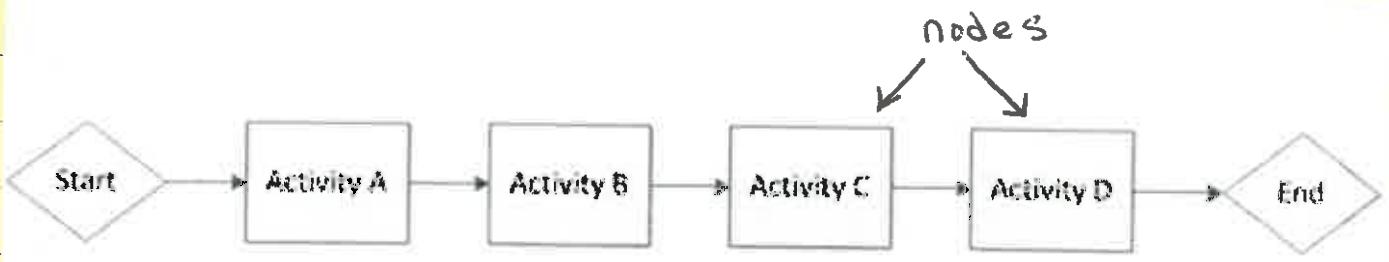
Resource Assignments

- Identify existing resource availability
 - Based on resource calendar
- Assess skills
 - Identify training needs
 - Outsourcing
- Assign resources to tasks
 - Let resource availability define the schedule
 - Let software do the work
- Re-assign critical resources

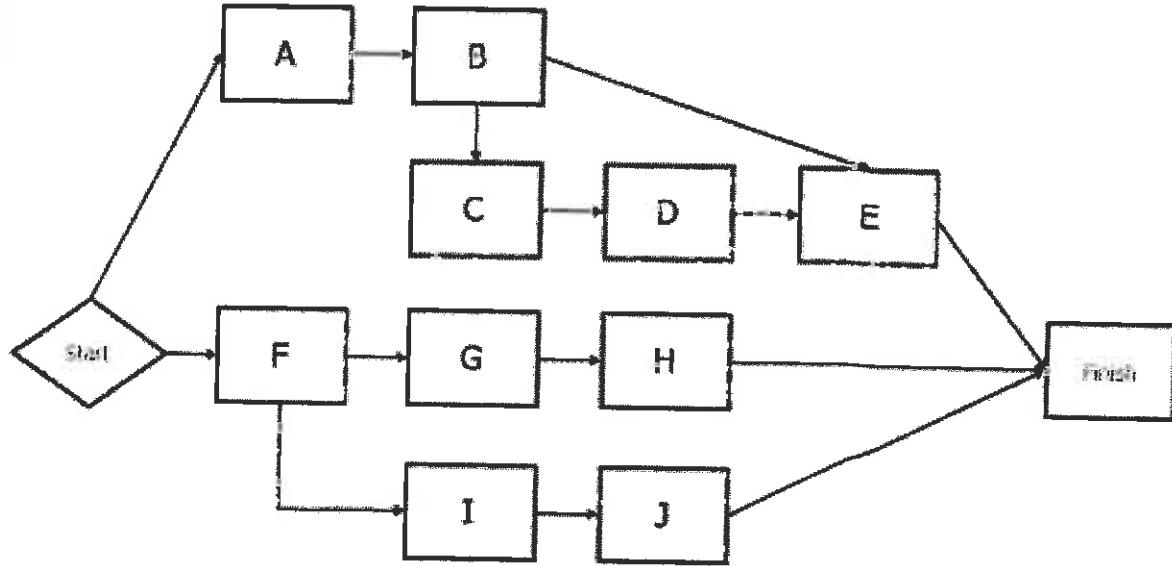
Scheduling Methods

- Network diagram
 - Precedence Diagram Method (PDM)
 - Successors and predecessors
 - Activity nodes
 - Activity on Node (AON)

Network Diagram



Successors and Predecessors

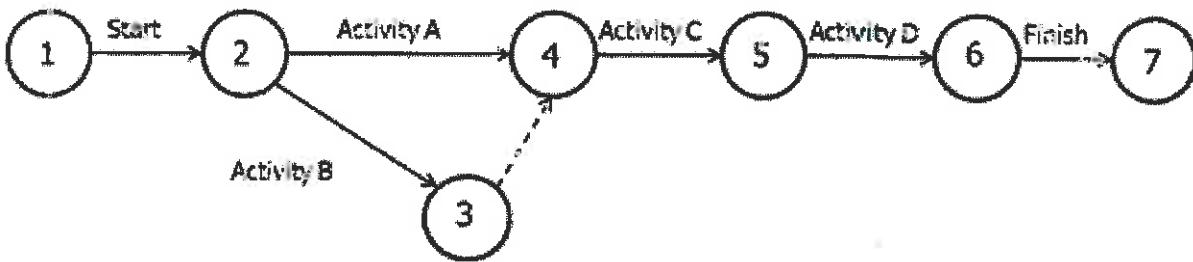


Dependencies

- Finish to start
 - Task B doesn't start until Task A completes
- Start to start
 - Task B doesn't start before Task A starts
- Finish to finish
 - Task B doesn't finish before Task A is finished
- Start to finish
 - Task B doesn't finish before Task A starts.

Scheduling Methods

- Arrow Diagram Method (ADM)
 - Activity on Arrow (AOA)
 - Arrow length reflects duration
 - Only Finish to Start dependency



Dotted line = "dummy activity"; no dependence

Other Diagramming Tools

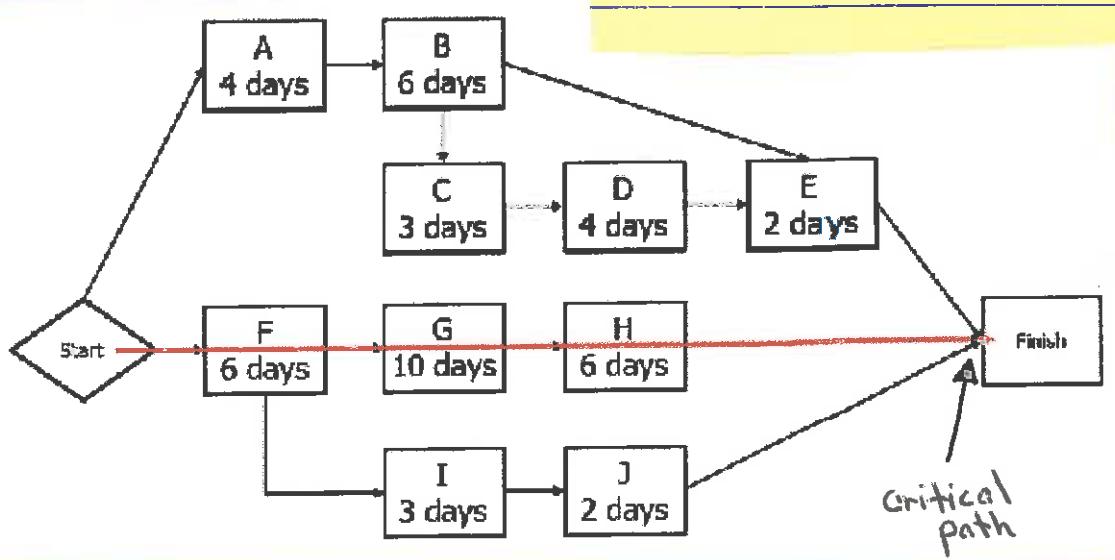
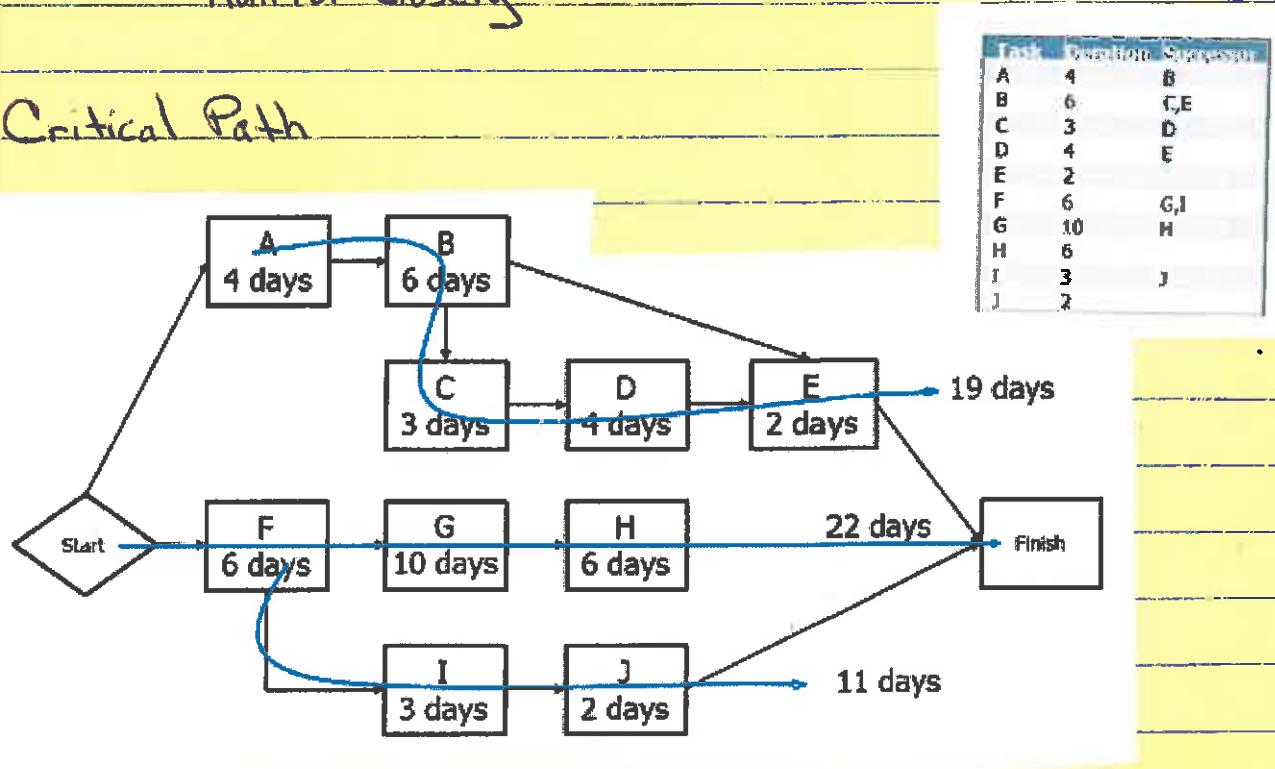
- Graphical Evaluation and Review Technique (GERT)
 - Network analysis tool
 - Allows for "what if?" analysis
 - Conditions, branches, loopbacks
 - Forward, backwards, sideways

Scheduling Methods

- Critical Path Method (CPM)

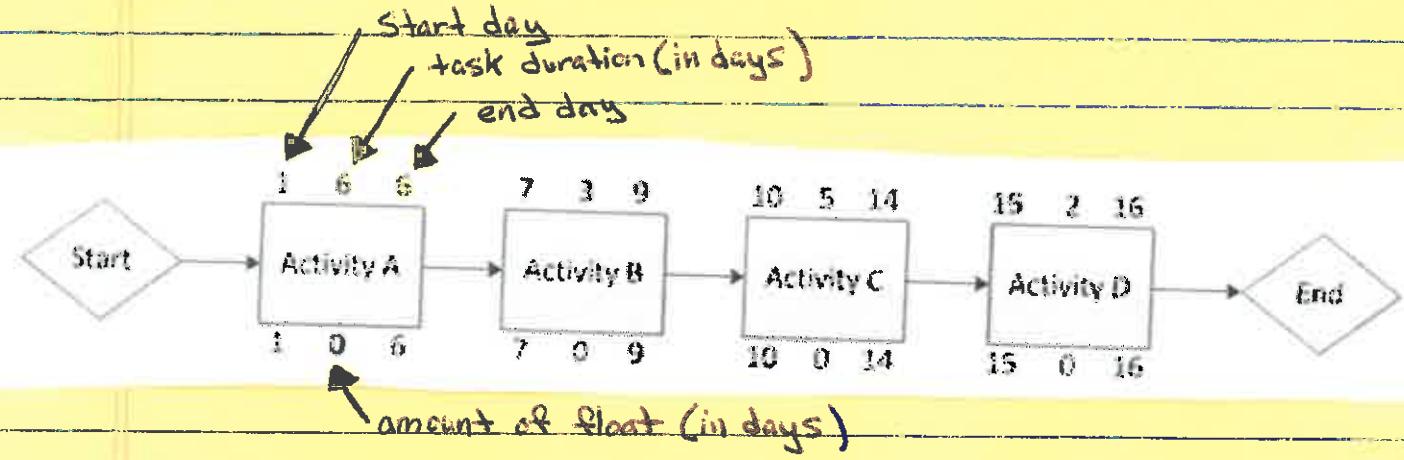
- Based on dependencies
- Determines the project endpoint
- Any change impacts the endpoint
- Monitor closely

Critical Path

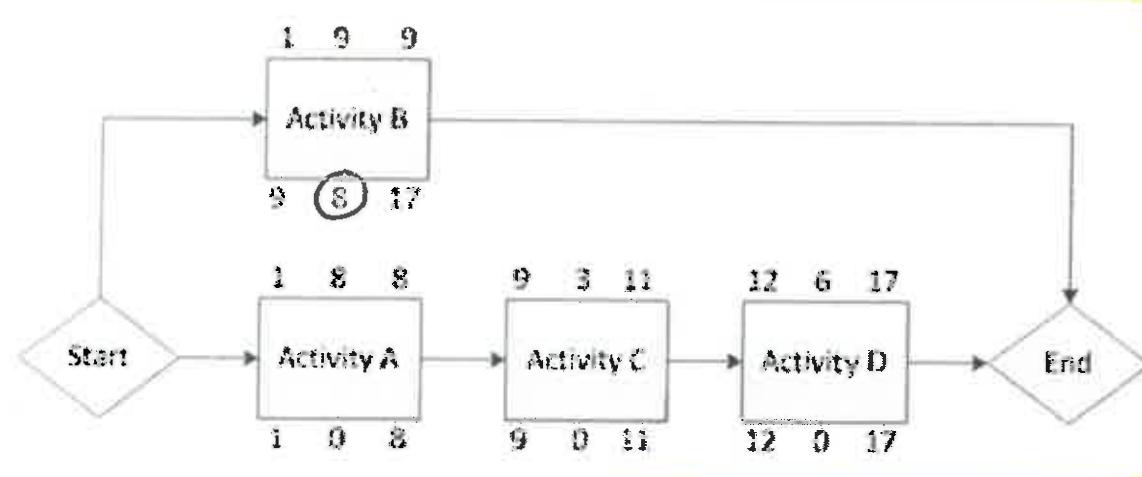


Float

- Schedule flexibility



In this example, there is no float available.



In this example, Activity B has 8 days of float.

Calculating Float

- Forward pass, Backward pass
 - work from beginning to end (Forward Pass)
 - work backward from end to beginning (Backward Pass)

Forward Pass

Early Start (ES)

- Earliest a task can begin

Early Finish (EF)

- Earliest a task can finish

★ $EF = ES + \text{duration} - 1$

Task	Duration	ES	EF
A	4	1	4
B	6	5	10
C	3	11	13
D	4	14	17
E	2	18	19
F	6	1	6
G	10	7	16
H	6	17	22
I	3	7	9
J	2	10	11

Backward Pass

Late Finish (LF)

- Latest a task can finish

Late Start (LS)

- Latest a task can start

★ $LS = LF - \text{duration} + 1$

Float: LS - ES or LF - EF

Task	Duration	ES	EF	LF	LS	Float
A	4	1	4	7	4	3
B	6	5	10	13	8	3
C	3	11	13	16	14	3
D	4	14	17	20	17	3
E	2	18	19	22	21	3
F	6	1	6	6	1	0
G	10	7	16	16	7	0
H	6	17	22	22	17	0
I	3	7	9	20	18	11
J	2	10	11	22	21	11

Scheduling Methods

- Milestone Chart

- Displays milestones as diamonds
- Gives completion dates

- Summary Chart

- Shows activities as bars
- Begin and end date
- Duration

- Gantt Chart

- Shows activities as bars
- Begin and end date
- Duration
- Dependencies

Resource Leveling

- Demand does not exceed availability
- More resources at the beginning
- Less resources at the end
- Are the resources dedicated or shared?
- More resources for a shorter time?
- Less resources over a longer period?

Resource Leveling

- Optimizing the distribution of work among resources
- Delaying
 - Avoid over allocation
 - Spread out tasks
 - Lengthen the scheduled time
 - Could affect project

Schedule Compression

- Crashing
 - Assigning more resources to task
 - Usually incurs additional costs
 - Familiarity with task/project
 - Qualifications
 - May take more time ultimately
- Fast Tracking
 - Sequential activities
 - Perform them partially parallel
 - Involves some risk

8 : The Communications Plan

The Communications Plan

- Why do we need a communications plan?
 - Smooth flow of information to the stakeholders

The Purpose of the Communications Plan

- Gather, organize, store, and disseminate information
- Appropriate information to the appropriate people
- How the information will be distributed
- What level of detail is expected
- When communication should occur
- How to retrieve information when needed
- How to update the plan
- Correct misinformation

Preparing the Plan

- Who
 - The key stakeholders
 - Other stakeholders
- What
 - what they need to know
 - Too much is as bad as not enough
- When
 - Significant variation

Preparing the Plan

- How
 - Push
 - Email, memo, presentation
 - Pull
 - Web-site, intranet
- Formal vs. informal
- Cut through the clutter

Meetings

- Must have
- Everybody hates going
- Have an agenda
- Only necessary attendees
- Start on time
- Follow up on action items
- Record minutes

Special Communication Needs

- Time zones
- Communication preferences
- Functional or hierarchical barriers
- Language barriers
- Technology barriers
- Cultural differences

9: The Procurement Process

The Procurement Process

- Procurement planning
- Purchase planning
- Vendor selection
- Contract development

Procurement Planning Inputs

- Scope statement
- Work Breakdown Structure (WBS)
- WBS dictionary
- Market analysis
- Project schedule

Procurement Planning

- Do we need to buy?
 - Make or buy?
- How do we buy?
 - Where and from whom?
- What to buy?
 - As is or customized?
- How much to buy?
 - All or some?
- When to buy?
 - All at once? Piece by piece?

Expert Judgment

- Internal experts
 - Familiar with the organization
 - Industry and competitors
- External experts
 - Potential vendor
 - Technical
 - Business
 - Legal

Make or Buy Analysis

- Make or buy analysis
 - Produce internal
 - Purchase from a vendor
- Estimate cost of both
 - Overhead, maintenance, support, and management
- Consider risk
- Impact on internal resources

Purchase Planning

- Procurement documents
 - Request for Information (RFI)
 - Request for Proposal (RFP)
 - Request for Quote (RFQ)

Request For Information (RFI)

- Gather information
- Solicit potential vendors
- Comes before RFP or RFQ

Request For Proposal (RFP)

- This is what I want
- How will you meet my needs?
- Requires negotiation
- Seller may propose solutions
- Consult your experts
- Ask vendors what they need

Elements of an RFP

- Introduction and background
 - Organization's background
- Purpose of the RFP
 - Business objectives
- Basic requirements
 - System, user requirements
- Project scope
 - Details
- Administrative information
 - Contact information
- Guidelines for proposal preparation
 - Preferred proposal format
- Award criteria
 - Evaluation process

Request For Quote (RFQ)

- Solicit bids
- Little or no negotiation

Proposal Evaluation

- Evaluation criteria
 - Develop in advance
 - Weighted criterion
- Vendors past performance
 - Reputation
 - Industry knowledge
- Score the responses
 - Involve team members
 - Create short list, top 3
- Vendor presentation

Request Seller Response

- Bidder conferences
 - Project requirements are clear
 - Forum for discussion
- Advertising
 - Industry publications
- Preferred vendor list

Vendor Selection

- Quantitative criteria
 - Overall or life-cycle cost
- Qualitative criteria
 - Technical capability
 - Past performance
 - References

Selection Methods

- Questionnaire
- Assess capabilities
- Confirm questionnaire response
- Analyze quality practices and requirements
- Obtain references
- Review previous work

Contracts

- Statement of work (SOW)
 - Scope of the work
 - Price and delivery dates
 - Performance reporting
 - Acceptance criteria
- Legal and binding

Contract Types

- Fixed price

- Agreed price for contracted product
- Vendor assumes most of the risk
- vendor will control cost

- Cost Plus

- Vendor cost plus profit
- Fixed fee or percentage of cost
- High risk for buyer
- Total cost unknown
- Vendor doesn't need to control cost

- Time and materials

- Labor plus material costs
- Should have a "not to exceed" clause
- Could lead to overruns

10: Risk Management Planning

Managing Risk

- Positive (opportunities)
- Negative (threats)
- Identify risk
 - Qualitative and quantitative
- Strategize
 - Risk response
- Risk management plan

Identify Risk

- Source of the risk
 - Technology
 - Human resources
 - Legislative risk
 - Business risks
 - Competitive risks
 - Environmental
- Which are relevant?
- Brain storming
 - Involve team members
 - Stakeholders
 - Subject matter experts (SME)
- Risk register
 - Contains information about risk
 - Amount will increase
 - Iterative

Risk Register

- Dates
- Risk types
- Description
- Probability
- Impact
- Counter measures
- Owner
- Status

Qualitative Risk Analysis

- Review and understand the risk
- Understand the probability
- Understand the impact of the risk
- Prioritize risk
- Probability and impact
 - Meet with team members
 - SMEs
- Risk probability and impact matrix

Risk Probability and Impact Matrix

		Risk Matrix				
		Impact				
		Insignificant	Minor	Moderate	Major	Catastrophic
Probability	Level	1	2	3	4	5
	Rare	1	2	3	4	5
	Unlikely	2	4	6	8	10
	Possible	3	5	9	12	15
	Likely	4	8	12	16	20
Certain	5	10	15	20	25	

Quantitative Risk Analysis

- Examine the more serious risks
- Results of the qualitative analysis
- True probability and impact
- Create a risk ranking
- Quantify the risk event value
- Usually a dollar amount
- Probability in % \times Impact in \$

★ $\text{Prob \%} \times \text{Impact \$} = \text{Risk (\$)}$

Risk rankings

Examples: $.8 \times 5,000 = \$4,000$ Rank = 4

$.6 \times 10,000 = \$6,000$ Rank = 6

$.1 \times 7,500 = \$7,500$ Rank = 7.5

$.9 \times 5,000 = \$4,500$ Rank = 4.5

Risk Response

- Avoidance
- Transfer
- Acceptance
- Mitigation

Risk Avoidance

- Eliminate the risk

Risk Transfer

- Shift the risk to someone else
- Outsourcing
- Insurance

Risk Mitigation

- Reduce the probability of the risk
- Reduce the impact of the risk

Risk Acceptance

- Unlikely probability
- Low impact

Risk Response

- Risk response owner
 - Responsible for managing the risk
- Risk triggers
 - Event that precedes the risk
- Residual Risk
 - Remaining risk

11: The Quality Management Plan

Quality Planning

- Satisfying requirements
- Fulfill the promise to the customer
- Cost and time effective

Quality Management Plan Overview

- Define quality requirements
 - what is acceptable?
 - What do the customers want?
 - Scope baseline
- How will we plan for quality?
 - Build quality in
 - Allocate time and resources
- How to ensure quality exists?
 - Monitoring

Define Quality Requirements

- Acceptance criteria
 - Bug free?
 - No serious bugs?
 - Minor faults?
 - Possible or impossible?

Quality Control

- what needs to be measured
 - Identify quality standards
 - Define how to meet them
- Quality metrics
 - Quantify results
 - Performance metrics
 - Customer acceptance
 - Project metrics
 - Business metrics

Toll-gate Review

- Don't keep moving forward
- After each project phase
- Toll-gate review
- Pay the toll
- Clearly defined measurable metrics
- Independent review

Quality Assurance

- Quality measuring process
- Fit for purpose
- Right first time
- Inspections
- Peer reviews
- Testing
- Focus groups
- Quality audit (review)

Standards Compliance

- Local
- State
- Federal
- ISO
- ITIL

Cost of Quality

- Preventative costs
 - Planning
 - Training
 - Testing
- Appraisal costs
 - Inspection
 - User acceptance testing
 - Quality audits
- Failure costs
 - Downtime
 - User support
 - Rework
 - Recalls
 - Damage to reputation

Quality Measurement Tools

- Process flow chart
 - Define and analyze processes
 - Find areas for improvement
- Run charts
 - Line graph
 - Display process performance over time
- Histogram
 - Display large amounts of data
 - Variation in the data

Pareto Diagram

- Pareto principle
- Vilfredo Pareto
- 80/20 Rule
 - 80% of problems usually stem from 20% of the causes
- Chart which contains both bars and a line graph
 - Values represented by bars
 - Cumulative total by the line
- Identifies the most common problems
 - Does not identify causes, only problems
- Prioritize competing or conflicting problems
 - Problems of greatest importance
- Identify process improvement
 - Greatest impact

Ishikawa Diagram

- Kaoru Ishikawa
 - Fishbone diagram
 - Cause and effect diagram
- Show the causes of certain events
 - Grouped into major categories
- Discover key sources of the problem
 - Major contributors
 - Targeted for improvement
- Relationship between contributors

Dispute Resolution

- Reviewer finds fault
- Buyer or customer unsatisfied
- Difference of opinion
- How do we resolve?
- Pre-defined approach
- Resolve quickly in non-threatening manner

Methods of Resolution

- Individual and group evaluation
 - Written criteria
 - Checklists
 - Rating scales
- Discussions
 - Arrive at a consensus
- Voting
 - Majority rule
- Final decision made by select group
 - Pre-selected team members
- Project Manager
 - Sole discretion
- Sponsor or customer
 - Sole discretion

12 : The Project Management Plan

Project Management Plan Overview

- Formal and approved
- Executed, monitored, and controlled
- Summary or detailed
- Collection of plans
- Created by the project manager
- Approved by the team and stakeholders
- Output of the planning phase
- Signals the end of the planning phase

Administration Information (Inputs to the Project Plan)

- Names and contact information
- Table of Contents (ToC)
 - Easier to find what you're looking for
- Change control information
 - Plan is iterative
 - Continually updated
 - Revision dates
 - Revision numbers
 - Responsibility for changes
 - Where the plan can be found

Outputs of the Planning Process (Inputs to the Project Plan)

- High level summary / overview
 - Non-technical
 - Business requirements
 - Project goals
 - Project budget
 - Project end date
- Sponsor
- Team members
- The project charter
- The scope statement
- The work breakdown structure (WBS)
- Requirements
 - Technical, functional, and business
- Constraints
- Assumptions
- Resources
 - Equipment
 - Facilities
 - Software
 - Hardware
 - Vendor information
- Environmental issues
 - Physical
 - Social
 - Political
 - Cultural

Outputs of the Planning Process (Inputs to the Project Plan)

- Plans
 - Procurement plan
 - Communications plan
 - Quality plan
 - Risk management plan
 - Human resources plan
- Milestones
- Deliverables
- High level summary

More Inputs

- Checklists and templates
 - Used in planning documents
- Reference materials
 - Standards supporting documents
 - Corporate, local, federal
 - Industry, ISO, ITIL
- Appendix
 - Additional details
 - Project baseline

Transition Plan

- Transfer ownership
- Key transition staff
- Logistics
- Transition schedule
- Transfer of knowledge
 - End-user training
- Support
- Warranties

Change Control Process

- Specify how revisions are made
- Explain version control system
- Define revision update process
- Determine revision distribution
- Easy to use
- Easily reference affected areas
 - Color coding
- Electronically or manually

Table of Contents (ToC)

- Gather all your pieces
 - Plans, checklists, budget, schedule, etc
- Create the ToC
- ToC review
 - Sponsor & key stakeholders
- Get feedback
 - Revise ToC if necessary
- Achieve agreement

Write the Plan

- Don't simply throw it together
- Incorporate plan components
- Follow the outline
- Include graphics, transitions, exhibits
- Make the document flow

Distribute the Plan

- Distribute plan to stakeholders
- Let them review
- Changes made through the change control process
- Support for your plan
- Confirm with executives
- Plan addresses their needs

Formal Plan Review

- Organize a formal plan review
- All stakeholders
- During the review determine
 - Is the plan complete?
 - Does it meet stakeholder expectations?
 - Make any revisions
- Approval of the plan

Kick-off Meeting

- Proper agenda
- Take charge
- Project goals
- Introduce team members
- Project plan
- Questions

13: The Project Team

Creating the Project Team

- Identify required resources
- Finding qualified resources
 - Skills assessment
 - Negotiate with functional managers
- Roles and responsibilities
- Team orientation

Identifying Resource Requirements

- Review the work breakdown structure (WBS)
 - Map resources to the WBS
- Determine the skills needed
- Can the skills be divided?
- Low skill level may require more review
- Do we need training?

Assessing Skills

- Previous experience
- Interview potential team members
 - Résumé
- Complete a skills assessment
- Recommendations
 - Other team members
 - Management

Skills Alone Are Not Enough

- Work independently
 - Need supervision?
- Work on a team
 - Collaborate
 - Share knowledge
- Personal desire or interest
 - Enjoy the work?
- Personality & work style
 - Good fit?

Team Members Availability

- Work with the functional manager
- Obtain written commitment
- If conflicts arise
 - Negotiate with functional manager
 - Schedule a meeting
 - Present your case logically
 - Can he use a different resource?
 - Escalate to a higher level
 - If absolutely necessary
 - Have to have
 - Failed with manager
 - Clear, concise, rational
 - Just the facts
 - Replace the team member
 - Provide necessary training
 - Welcome him to the team

Team Orientation

- Explain responsibilities and expectations
 - Allow for questions
- Explain your management process
 - Leadership
 - Measure progress
 - Evaluate performance
 - Deal with issues
- Open door policy
 - Two way communication

Leadership Qualities

- Organize
 - Follow through
- Don't underestimate
- You are a leader
- Enthusiasm
- Calm
- Problem Solver
- Delegate

Developing the Team

- Improve knowledge and skills
 - Improve quality
 - Lower cost
- Develop trust amongst the team
 - Increase morale
 - Decrease conflict
- Create a team culture
 - Increase productivity and cooperation
 - Teamwork

Teamwork

- Adequate work environment
 - Necessary tools
- Challenges and opportunities
 - Opportunities for growth
 - Gratifying work
- Training
 - Formal or informal
 - Classroom, computer-based
 - On-the-job, mentoring

Teamwork

- Feedback and support
 - Timely
- Recognize and reward
 - Individual
 - Compensation
 - Team
 - Appropriate for all
 - Consider team member's interests
- Team building activities
 - Simple activity
 - off-site event
 - Solving problems as a team
- Co-location
 - Active team members
 - Same physical location
 - Enhance team performance
 - Temporary

Virtual / Dispersed Teams

- Electronic communication
- Teams from widespread geographic areas
- Expertise from different locations
- Employees working from home
- Teams with different hours
- People with disabilities
- Reduce travel costs
- Sub-teams
 - One group per location
- Existing relationships
- Local leader

Managing Virtual Teams

- Good communication
- Web-based management tools
 - Central location
- Face to face whenever possible
- Special focus on important events
 - Kick-off and milestones
- Team building activities
- Clarification of roles and responsibilities

Performance Appraisals

- Provide constructive feedback
- Clarification of roles and responsibilities
- Discover unknown issues
- Develop individual training plans
- Set goals
- Formal or informal
- Depends on project
- Duration
- Complexity
- Organization
- Labor contract requirements

Individual Performance Issues

- Address in private
- Focus on the positives
- Motivate, don't denigrate
- Stress team success
- Understand expectations
- What is the cause of the problem?
- Develop a plan for improvement

Team Performance Issues

- Look at yourself
- How have you influenced the team?
- Does the team realize?
- Do they know why?
- What is the cause of the problem?
- Do they have enough resources?
- Find solutions

Sources of Conflict

- Schedule conflict
 - Sequence of activities
 - Need for some activities
- Cost conflict
 - cost estimates, allocations, and contingency
- Conflict of priorities
 - what's more important
- Resource conflict
 - Not enough resources
 - Staffing
 - who does what
- Technical conflict
 - Specifications and technical trade-offs
- Conflict over administration
 - How the project should be managed
 - Communication
- Personality conflict
 - Incompatible temperaments
 - Personal work styles

Confronting (Problem Solving)

- Head on approach
- Meet face to face to reach an agreement
- Satisfies both parties
- Win-win
- Use when
 - Both parties need to win
 - Trust is present
 - Time is sufficient

Smoothing (Accommodating, Obliging)

- Minimize the problem
- Conflicts not always resolved
- Someone may have to sacrifice their interests
- Lose-lose
- Use when
 - The goal is primary
 - Create obligation
 - Stakes are low
 - Any solution will do
 - Want to gain time

Compromising (Give and Take)

- Bargain to reach an agreement
- Parties give up something
- Each has some degree of satisfaction
- Use when
 - Both parties need to win
 - Deadlocked
 - Nothing without compromise
 - Want to maintain the relationship

Forcing (Competing; Controlling)

- Forcing one's agenda, ignoring all others
- Win-lose
- At the expense of others
- Use when
 - Do or die
 - Stakes are high
 - Relationship isn't important
 - Quick decision

Withdrawing (Avoiding)

- Postponing for later
- Withdrawing altogether
- Temporary
- Use when
 - You can't win
 - You're not prepared, gain time
 - Remain neutral
 - Assume the problem will go away

Collaborating

- Conflict is due to differences
- Views differences as strengths
- All parties working together
- Everyone is satisfied
- Win-win
- Use when
 - Parties have similar goals
 - Time is sufficient

Wavering Project Support

- Why?
- Explain your concerns
- Be diplomatic
- What are their concerns?
- Don't accuse or judge
- Gauge their commitment
- Seek help from other executives

Managing the Customer / Sponsor

- Communication
 - Status reports
- Gain consensus
 - Continue throughout the project
- Manage expectations
 - Keep tracking with the project
- Be informed
 - The project
 - The customer / sponsor

14 : Change Management

The Need for Change Management

- Ensure project remains under control
- Manage each request for change
- Change control process
- Evaluate changes
- Each request is assessed by affected parties
- Decision is reached (for or against)
- Implement changes

Scope Creep

- Uncontrolled changes to the project scope
- Added requirements
- No added resources
 - Time
 - Budget
- Can cause project overruns
 - Cost
 - Schedule

Causes of Scope Creep

- Poor change management
 - No change control process
- Project scope unclear
 - Lack of project objectives
 - Project deliverables undefined
- Changing stakeholder expectations
 - No scope statement sign-off
- Ineffective project manager
 - Spenser
- Enthusiasm unchecked
 - Development of new possibilities

The Change Control Process

- Formal process that ensures changes are controlled
- Stress the need for change management
- Update the project plan to reflect changes as needed
- Adopt change orders
 - Change request form
- Agree who pays for the changes

The Change Control Process

- Identify the change
 - Change request form
- Evaluate the impact of the change
 - Impact analysis
 - Scope
 - Timeline
 - Budget
 - Quality
 - Risk
 - Human resources
 - Project goals
- Obtain the required approval
 - Project manager
 - Customer / Sponsor
 - Change control board (CCB)
- Accept or reject changes
 - Evaluate the changes
 - Are there alternatives?
- Establish quick turnaround times

The Change Control Process

- Inform affected parties of the impact of the changes
 - Communication flow
- Document the changes
 - Change control log
- Execute the changes
- Update your plans
 - Cost
 - Schedule
 - Scope

The Change Request Form

- Requestor's name and contact info
- Date of the request
- Tracking or control no.
- Description of the change
- Reason for the change
- Work required
- Initial impact analysis
- Estimated impact of the change to the project
 - Scope
 - Timeline
 - Budget
 - Quality
 - Risk
 - Human resources
 - Project goals

The Change Request Form

- Resolution
 - Approval
 - Rejection
 - Deferred
- Signatures
- Change implementation
 - Action plan
 - Who is responsible

Evaluating the Impact of change

- Types of changes
 - Necessary changes
 - Beneficial changes (unnecessary)
- Scope
 - What about the deliverables?
- Timeline
 - Will it change our end date?
- Budget
 - How much will this cost?
- Quality
 - Will this affect our performance indicators?
- Risk
 - Does this increase or decrease?
- Procurement
 - Will resource availability be a factor?
- Project goals
 - Will this change them?

Making a Decision

- Assess the changes and offer alternatives.
- Budget
 - Outsourcing
 - Reassign tasks
- Schedule
 - Fast tracking
 - Take advantage of any float that we have
- Quality
 - Add more testing
 - Different materials
- Buy-in from the stakeholders.
 - What is most important to them?
 - What are their priorities?
 - Make sure expectations are being met
 - Need buy-in for most changes

Communicating Changes to the Affected Parties

- Create a summary of the change
- Impact to project
 - Scope
 - Budget
 - Schedule
- Follow your communication plan
 - Communication flow
 - Use proper document routing
 - Send to a distribution list (one by one or all at once)
 - Tracking of document status

Communicating Changes to the Affected Parties

- Notify everyone
 - The scope statement
 - Schedule
 - Work breakdown structure (WBS)
- Notify selectively
 - Budget
- Customer / sponsor
- Specific other stakeholders

Documenting Changes

- Change control log
 - Description of the change
 - Reason for the change
 - Priority
 - Dates
 - Identified
 - Reviewed
 - Resolution
 - Action plan
 - Owner
 - Status

Executing Changes

- Follow through with the change
- Person responsible (owner)
- Turnaround time is defined

Updating Plans and Components

- Project management plan
- The scope statement
- Budget
- Schedule
- work Breakdown Structure (wBS)
- Quality management plan
- Risk management plan
- Communications plan

Corrective Action

- Taken to eliminate the cause of an undesirable situation
- Change is not always requested
- Result of a problem
- Change in direction
- Apply corrective actions at anytime
 - Brainstorming
 - Monitoring
- Document the changes
- Follow the change control process
- Turn the project in the right direction

15: Tracking and Reporting

Monitoring the Project

- Monitoring
 - Collecting, recording, reporting
 - Measure actual performance against the plan
- Current, accurate information
- Status reporting is organizational
- Daily, weekly, monthly
- Key tracking information
- Document the progress of the work
- Measure actual performance
- Review accomplishments
- Review activities, status, and results
- Check the project cost
- Check the project schedule
- Identify and evaluate the effects deviations
- Identify problems in the plan for performing the process
- Report project status to the stakeholders
- Track corrective action to closure

What Do we Monitor?

- Inputs
 - Time
 - Money (budget)
 - Resources
 - Tasks
 - Quality
- Outputs
 - Progress
 - Costs
 - Work starts
 - Work completion
 - Changes

When Do we Monitor?

- Regularly
- As soon as possible
- While there is still time to react
- At task completion
- At pre-planned decision points (milestones)
- Continuously
- End of the project

How Do we Monitor?

- Through meetings
 - Team, clients, contractors, supplier, etc..
- Milestones
- Reports
 - Regularly scheduled
- Tests and inspections
- Using Earned Value Analysis

Dashboard

- Red light / Green light method
- Green
 - On schedule and on budget
- Yellow
 - Slightly behind schedule and/or over budget
 - Evaluate and determine course of action
 - Request additional funding and/or adjust the schedule
- Red
 - Greatly behind schedule and/or over budget
 - Additional funds necessary
 - New end date
 - Reduce the project scope

How Do We Monitor?

- Don't rely solely on formal monitoring
- Information is delayed
- Reactive
- Focuses on existing problems
- Learn to anticipate problems
- Also use informal communication

Cancelling a Project

- Sometimes projects have to be cancelled
- Loss of support
- Loss of funding
- Changing business need
 - No longer necessary
- Irreversibly off track
 - Alert the customer / sponsor
 - Recommend cancellation
- If there is still hope
 - Inform the customer / sponsor
 - what steps are being taken

Monitoring the Schedule

- Manage resources
- Monitor the schedule closely
- Schedule slippage
 - Inadequate skills
 - Poor or no training
 - Insufficient resources
 - Lack of well defined expectations
 - No clear goals or objectives
- In the event of slippage
 - Negotiate

Negotiation

- To obtain extra resources
 - Human
 - Money
 - Equipment, hardware, Software
- Adjust the schedule
- Reduce the scope
 - Adjust requirements
 - Take out the nice to haves
- Satisfy the business requirements
- Negotiate with everybody
 - Customer or Sponsor
 - Team members
 - Users
 - Vendors
 - Internal & external Service organizations
 - Service, support, maintenance

Performance Reporting

- Collect information
 - Information needs to be timely
 - Information should be appropriate
- Report the findings
- Distribute to the stakeholders
- View of work performance to date

Performance Reviews

- Meetings
- Review project status
- How often depends on:
 - Size of the project
 - How the project is progressing
- Include the entire team
- Update the team of any changes
- Identify problems
- Invite team member questions and concerns
- Use it to promote teamwork

Performance Reports

- Progress report
 - Summary of a period of time
 - Week, month, etc.
- Status report
 - Cumulative summary
 - Year to date
 - From project start

Performance Meetings

- Individual meetings
 - Can be more informative
 - Build relationship
- Team status meetings
 - Regularly scheduled
 - Have an agenda
 - Start and end on time
 - Encourage participation
 - Improve team communication
 - Take minutes, distribute them

Issue Logs

- Issue
 - Concern raised by a stakeholder that needs to be addressed
- Issue log
 - Used to record issues and a plan to address them
 - What the issue is
 - Who is working on it
 - What is being done
 - Estimated time for completion
- Team meetings are a good time to review
 - Prioritize issues

Earned Value Analysis (EVA)

- Used to measure actual versus planned
 - Time, costs
- Calculating a dollar amount to every activity
- What will it do for me?
 - Measure a project's progress
 - Forecast its completion date and final cost
 - Provide schedule and budget variances along the way

Measuring Performance

- Variance analysis
 - Comparison of planned results with actual results
- Trend analysis
 - Using past results to predict the future

Calculating Earned Value

- Earned Value (EV)
 - Value of work performed so far
- Planned Value (PV)
 - Planned cost of work
- Actual Cost (AC)
 - Actual cost of the work completed
- Budget at completion (BAC)
 - Amount budgeted for the entire project

★ $EV = BAC \times \text{Value (\%)} \text{ of work completed}$

example : \$2000 (BAC) \times 65% = \$1300 (EV)

Variance Analysis

- Cost Variance (CV)

$$\star \quad CV = EV - AC$$

- Schedule Variance (SV)

$$\star \quad SV = EV - PV$$

- Cost Performance Index (CPI)

$$\star \quad CPI = EV / AC$$

- Schedule Performance Index (SPI)

$$\star \quad SPI = EV / PV$$

CPI

- If $CPI > 1.0$, cost is less than budgeted
- If $CPI < 1.0$, cost is greater than budgeted

SPI

- If $SPI > 1.0$, project is ahead of schedule
- If $SPI < 1.0$, project is behind schedule

Trend Analysis

- Predict the future
- What is expected
- Project progress to date
- Estimate at Completion (EAC)
- Estimate to Completion (ETC)
- Variance at Completion (VAC)

Estimate At Completion (EAC)

- Actual cost (AC) plus an estimate of costs for the remaining work.
- $EAC = BAC / CPI$

Estimate To Completion (ETC)

- Estimated cost of completing the remaining work
- $ETC = EAC - AC$

Variance At Completion (VAC)

- Estimate of the variance between BAC and EAC
- $VAC = BAC - EAC$

16: Closing the Project

Project Closure

- Assess the project deliverables
- Release of resources
- Closing contracts
- Project documentation
- Archiving project records
- Lessons learned
- Project review
- Final project report

When Do We Close a Project?

- When the project is completed
- Completion of project phases
 - Process life cycle
- Stage completion
 - Deliverables
 - Milestones
- Project cancellation

Assessing the Deliverables

- Do deliverables meet specifications?
- Final inspection
- Correct any mistakes
- Stakeholder review
- Project sign-off

Customer Acceptance

- Meet with the customer
- Confirm we met our acceptance criteria
 - Standards compliance
- Go through the deliverables
- Obtain customer sign-off
- If the customer is not satisfied
 - Agree in writing how to proceed
- Document results.

Transition Plan

- Transition dates
- Ownership
 - who is responsible now?
- Training
 - Project team training support team
- Support
 - From the project team
- Warranties
 - From a vendor

Releasing Resources

- Team members
- Work with functional managers
- Equipment, facilities, etc.
- Early release
- Performance appraisals

Closing Contracts

- Contract closeout
- Gather supporting documentation
- Review contract
- Review the deliverable
- Acceptance of the deliverable
- Sign-off
- Final payment
- Archive the contract records

Collecting Project Documentation

- Plans
 - Baseline and updated
- Historical information
- Project records
 - Reports, minutes
- Acceptance and sign-off
- Schedule and budget
 - Baseline and updated
- Contracts
- Change requests
 - Decisions and follow through
- Lessons learned

Lessons Learned

- Track strengths and weaknesses
- Generate new ideas
- Recorded through the life of the project
- Reviewed at phase completion
- Detailed analysis
- Document and archive

Project Review (Post-Mortem)

- Hold a review meeting
- Invite key stakeholders, sponsor, team members
- Feedback questionnaire
- Focus on learning
- Share lessons learned with the organization
- Prepare a final assessment
- Did the deliverables meet the project requirements and objectives?
- Was the project completed on budget?
- Was the project schedule met?
- Were risks identified and mitigated?
- How well was the project planned?
- How well was the project managed?
- How did the final product compare against quality goals?
- What went right?
- What went wrong?
- What could be done to improve the process?
- Recommendations

Project Archive

- Save for future reference
- Historical documentation
- Document retention compliance
- Different methods
 - Electronically
 - Project binder
 - Centralized archive

Final Project Report

- A history of the project
- A description of the project
- Successes and failures
- Information regarding any variances
 - Scope, time, cost
- Recommendations for future projects

Recognizing Success

- Celebrate the success of completing a project
- Informal recognition
 - Informal after-work gathering, team lunch, etc
 - T-shirts, mugs
- Formal recognition
 - Management recognition and praise
 - Formal dinner
 - Other rewards

Formulas

Estimating :

(length of project activities)

o = best case estimate

m = most likely estimate

p = worst case estimate

e = estimate

1) Three Point Estimate

$$e = \frac{(o + m + p)}{3}$$

2) PERT (Program Evaluation and Review Technique)

PERT is a
better calculation
method

$$e = \frac{(o + (4 \cdot m) + p)}{6}$$

Float :

ES = early start

LF = late finish

EF = early finish

LS = late start

1) Forward Pass

Float :

$$EF = ES + \text{duration} - 1$$

$$LS - ES$$

or

$$LF - EF$$

2) Backward Pass

$$LS = LF - \text{duration} + 1$$

Risk Analysis:

$$\text{Risk} = \text{Probability} \cdot \text{Impact}$$

Risk (\$)

Probability (%)

Impact (\$)

Earned Value Analysis:

$$EV = BAC \cdot \text{Value of work completed \%}$$

EV (Earned value)

PV (Planned Value)

AC (Actual Cost)

BAC (Budget at Completion)

Variance Analysis:

$$CV = EV - AC \quad \text{Cost variance (CV)}$$

$$SV = EV - PV \quad \text{Schedule Variance (SV)}$$

$$CPI = EV / AC \quad \text{Cost Performance Index (CPI)}$$

$$SPI = EV / PV \quad \text{Schedule Performance Index (SPI)}$$

$CPI > 1.0$, cost is less than budgeted

$SPI > 1.0$, project is ahead of schedule

Trend Analysis:

Estimate at Completion (EAC)

$$EAC = BAC / CPI$$

Estimate to Completion (ETC)

$$ETC = EAC - AC$$

Variance at Completion (VAC)

$$VAC = BAC - EAC$$