System Analysis and Design

Project Management

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Projects and Project Managers

Project – a [temporary] sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by specific time, within budget, and according to specification.

Project manager - the person responsible for supervising a systems project from initiation to conclusion

Project Management and Process Management

Project management – the process of scoping, planning, staffing, organizing, directing, and controlling the development of an acceptable system at a minimum cost within a specified time frame.

Process management – the activity of documenting, managing, and continually improving the process of systems development.

Measures of Project Success

- The resulting information system is acceptable to the customer.
- The system was delivered “on time.”
- The system was delivered “within budget.”
- The system development process had a minimal impact on ongoing business operations.

Causes of Project Failure

- Failure to establish upper-management commitment to the project
- Lack of organization's commitment to the methodology
- Taking shortcuts through or around the methodology
- Poor expectations management
  - **Feature creep**– uncontrolled addition of technical features to a system.
  - **Scope creep** – unexpected and gradual growth of requirements during an information systems project.

Causes of Project Failure (cont.)

- Premature commitment to a fixed budget and schedule
- Poor estimating techniques
- Overoptimism
- The mythical man-month (Brooks, 1975)
- Inadequate people management skills
- Failure to adapt to business change
- Insufficient resources
- Failure to “manage to the plan”

Project Manager Competencies

- Business awareness
- Business partner orientation
- Commitment to quality
- Initiative
- Information gathering
- Analytical thinking
- Conceptual thinking
- Interpersonal awareness
- Organizational awareness
- Anticipation of impact
- Resourceful use of influence
- Motivating others
- Communication skills
- Developing others
- Monitoring and controlling
- Self-confidence
- Stress management
- Concern for credibility
- Flexibility

(Adapted from Wysocki, Beck, and Crane, *Effective Project Management: How to Plan, Manage, and Deliver Projects on Time and within Budget.)*

Project Management Functions

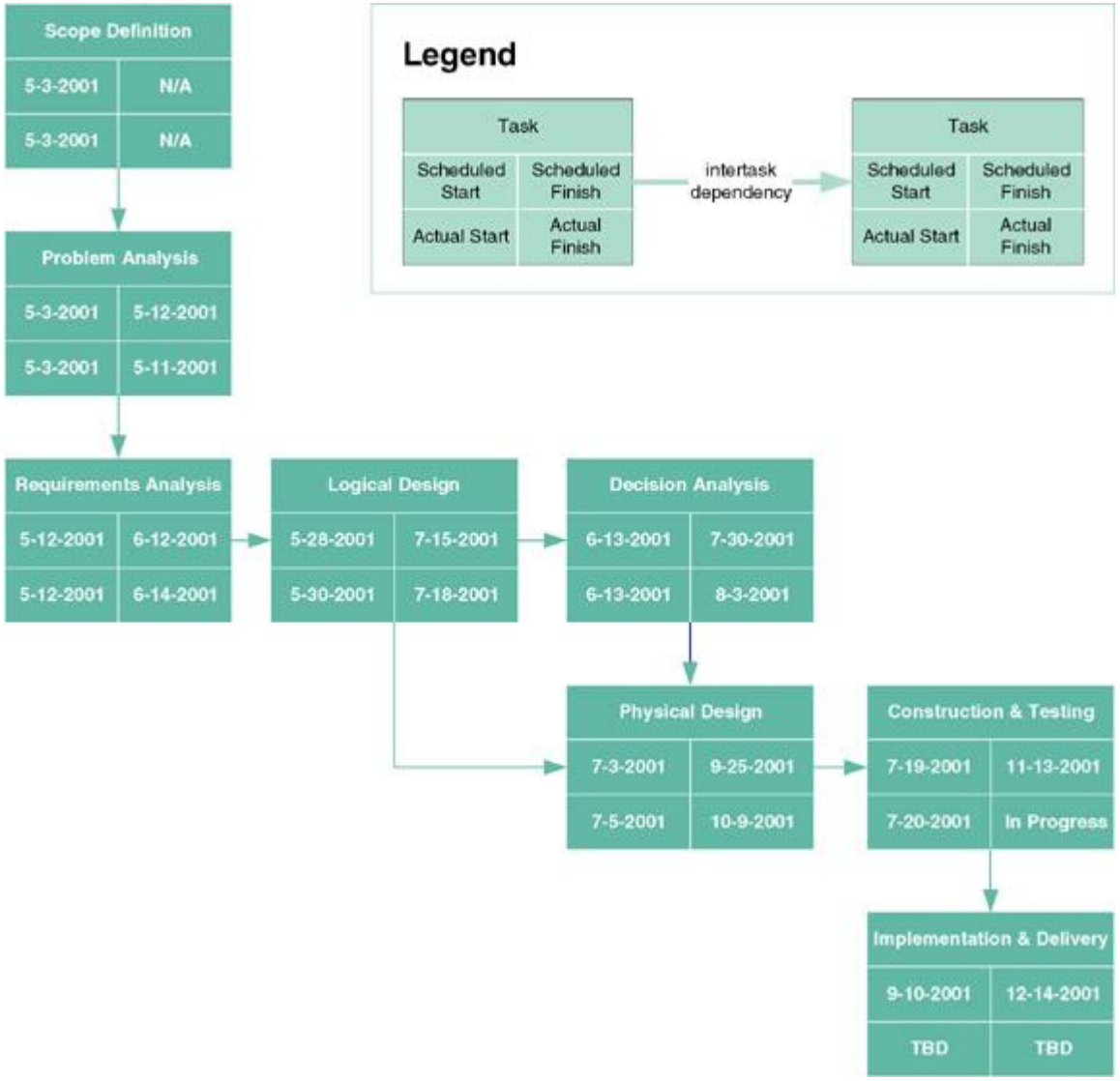
- **Scoping** – setting the boundaries of the project
- **Planning** – identifying the tasks required to complete the project
- **Estimating** – identifying the resources required to complete the project
- **Scheduling** – developing the plan to complete the project
- **Organizing** – making sure members understand their roles and responsibilities
- **Directing** – coordinating the project
- **Controlling** – monitoring progress
- **Closing** – assessing success and failure

Project Management Tools & Techniques

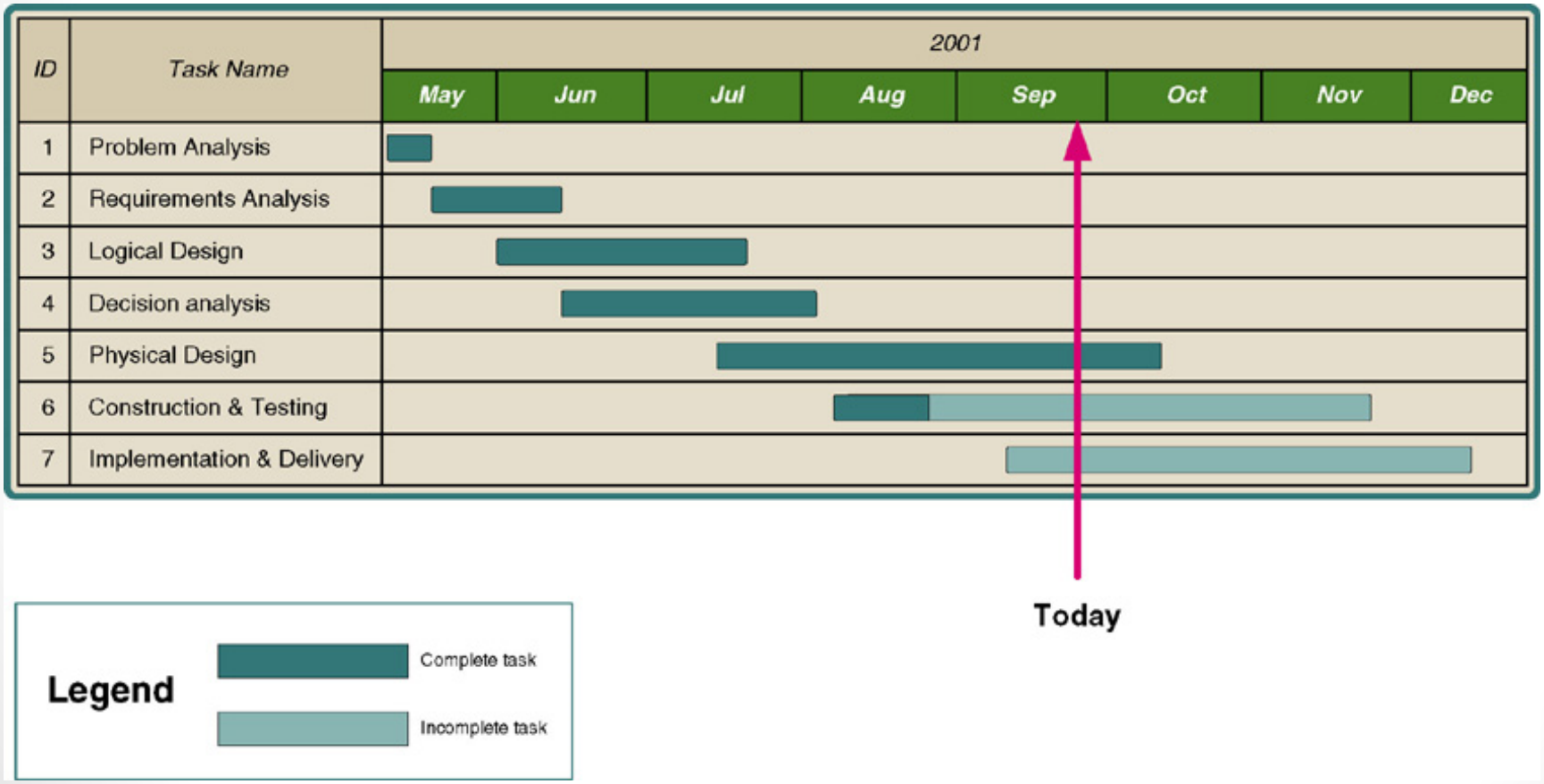
PERT chart – a graphical network model used to depict the interdependencies between a project's tasks.

Gantt chart – a bar chart used to depict project tasks against a calendar.

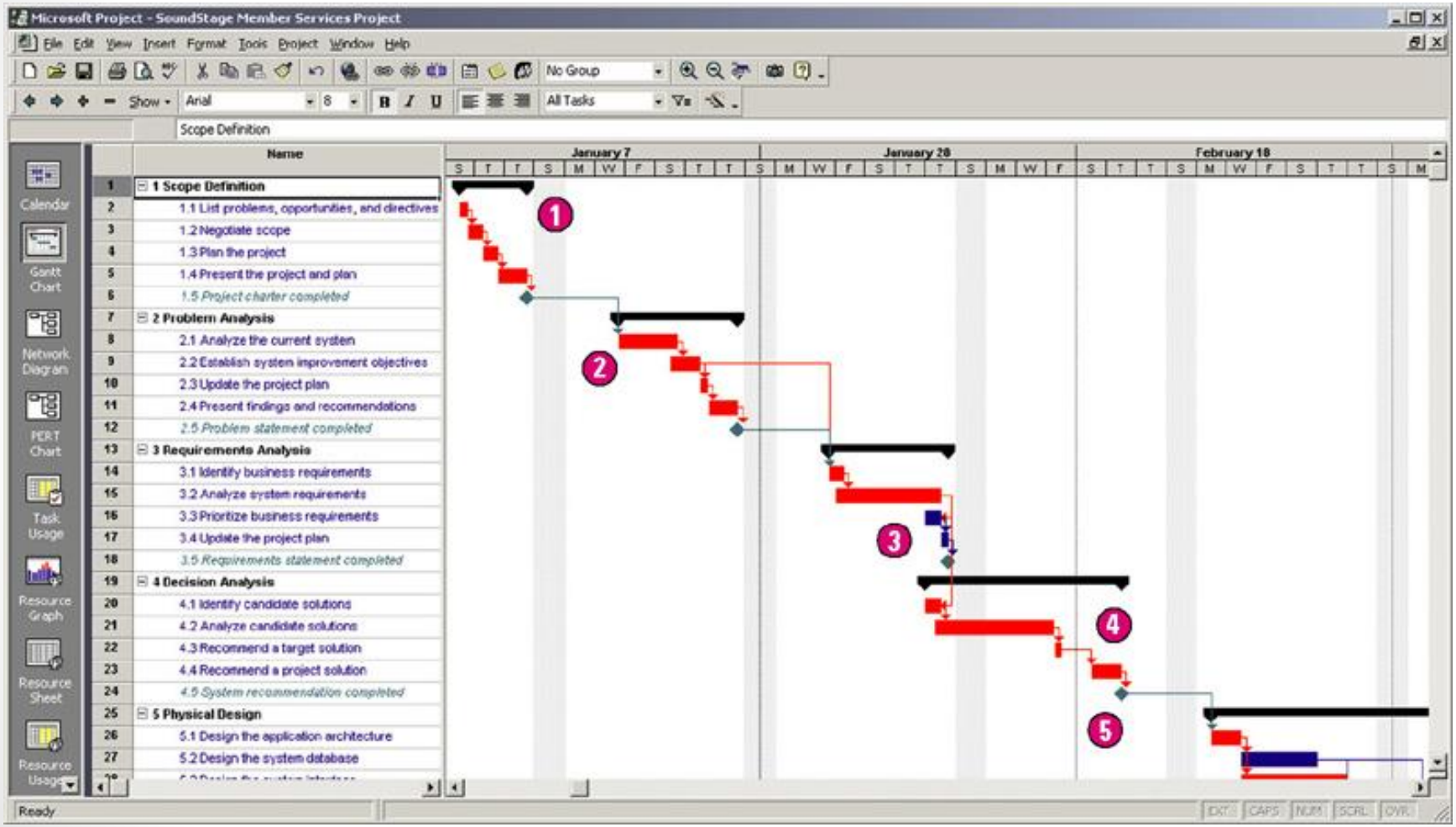
PERT Chart


Scope Definition
5-3-2001
N/A
5-3-2001
N/A
Problem Analysis
5-3-2001
5-12-2001
5-3-2001
5-11-2001
Requirements Analysis
5-12-2001
6-12-2001
5-12-2001
6-14-2001
Logical Design
5-28-2001
7-15-2001
5-30-2001
7-18-2001
Decision Analysis
6-13-2001
7-30-2001
6-13-2001
8-3-2001
Physical Design
7-3-2001
9-25-2001
7-5-2001
10-9-2001
Construction & Testing
7-19-2001
11-13-2001
7-20-2001
In Progress
Implementation & Delivery
9-10-2001
12-14-2001
TBD
TBD
Legend
Task
Scheduled Start
Scheduled Finish
Actual Start
Actual Finish
intertask dependency
Task
Scheduled Start
Scheduled Finish
Actual Start
Actual Finish

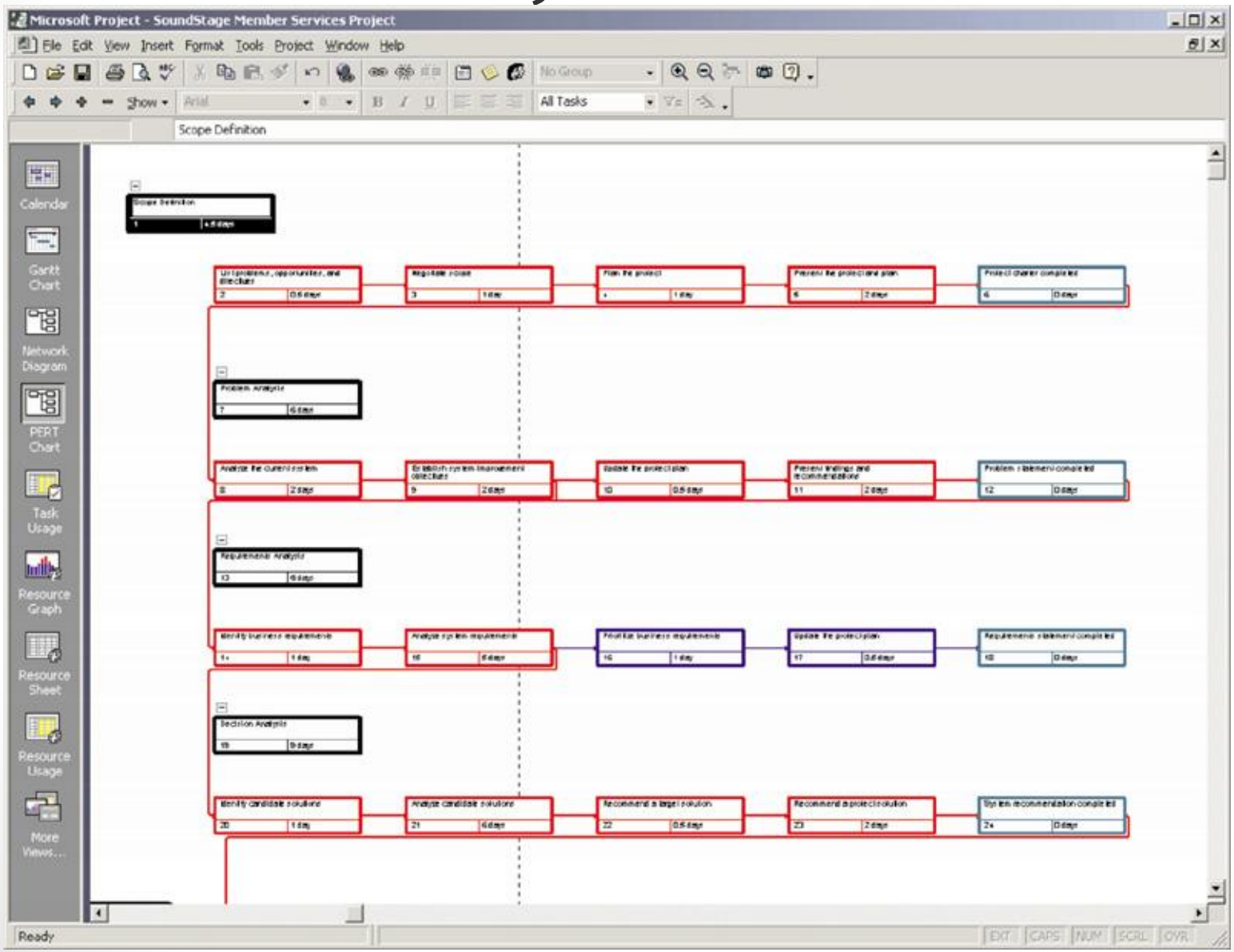
Gantt Chart


ID
Task Name
2001
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
1 Problem Analysis
2 Requirements Analysis
3 Logical Design
4 Decision analysis
5 Physical Design
6 Construction & Testing
7 Implementation & Delivery
Today
Legend
Complete task
Incomplete task

Microsoft Project Gantt Chart



Microsoft Project PERT Chart



Joint Project Planning Strategy

Joint project planning (JPP) – a strategy in which all stakeholders attend an intensive workshop aimed at reaching consensus on project decisions.

Activity 1 – Negotiate Scope

Scope – the boundaries of a project – the areas of a business that a project may (or may not) address. Includes answers to five basic questions:

- **Product**
- **Quality**
- **Time**
- **Cost**
- **Resources**

Statement of work – a narrative description of the work to be performed as part of a project. Common synonyms include *scope statement*, *project definition*, *project overview*, and *document of understanding*.

Statement of Work

I. Purpose

II. Background

A. Problem, opportunity, or directive statement
B. History leading to project request
C. Project goal and objectives
D. Product description

III. Scope

A. Stakeholders
B. Data
C. Processes
D. Locations

IV. Project Approach

A. Route
B. Deliverables

V. Managerial Approach

A. Team building considerations
B. Manager and experience
C. Training requirements

(continued)

Statement of Work (concluded)

V. Managerial Approach (continued)
- D. Meeting schedules
- E. Reporting methods and frequency
- F. Conflict management
- G. Scope management

VI. Constraints
- A. Start date
- B. Deadlines
- C. Budget
- D. Technology

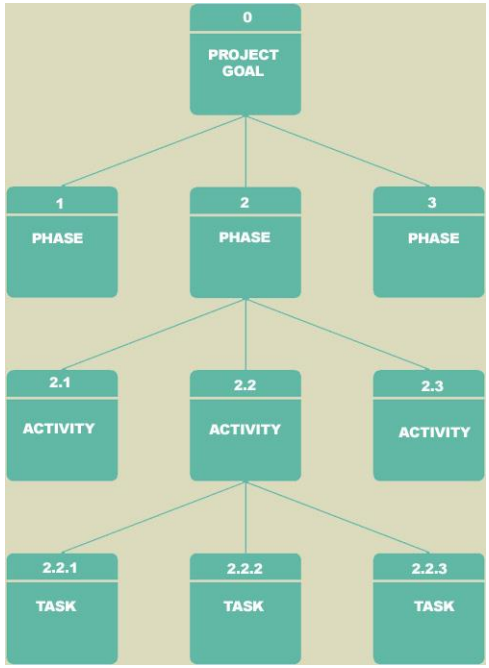
VII. Ballpark Estimates
- A. Schedule
- B. Budget

VIII. Conditions of Satisfaction
- A. Success criteria
- B. Assumptions
- C. Risks

IX. Appendices

Activity 2 – Identify Tasks

Work breakdown structure (WBS) – a graphical tool used to depict the hierarchical decomposition of the project into phases, activities, and tasks.



Milestone – an event signifying the completion of a major project deliverable.

Activity 3 – Estimate Task Durations

- Elapsed time takes into consideration:
  - **Efficiency** - no worker performs at 100% efficiency
    - Coffee breaks, lunch, e-mail, etc.
    - Estimate of 75% is common
  - **Interruptions**
    - Phone calls, visitors, etc.
    - 10-50%

Activity 3 – Estimate Task Durations

1. Estimate the minimum amount of time it would take to perform the task – the **optimistic duration** (OD).
2. Estimate the maximum amount of time it would take to perform the task – the **pessimistic duration** (PD).
3. Estimate the **expected duration** (ED) that will be needed to perform the task.
4. Calculate a weighted average of the **most likely duration** (D) as follows:

$$D = \frac{(1 \times OD) + (4 \times ED) + (1 \times PD)}{6}$$

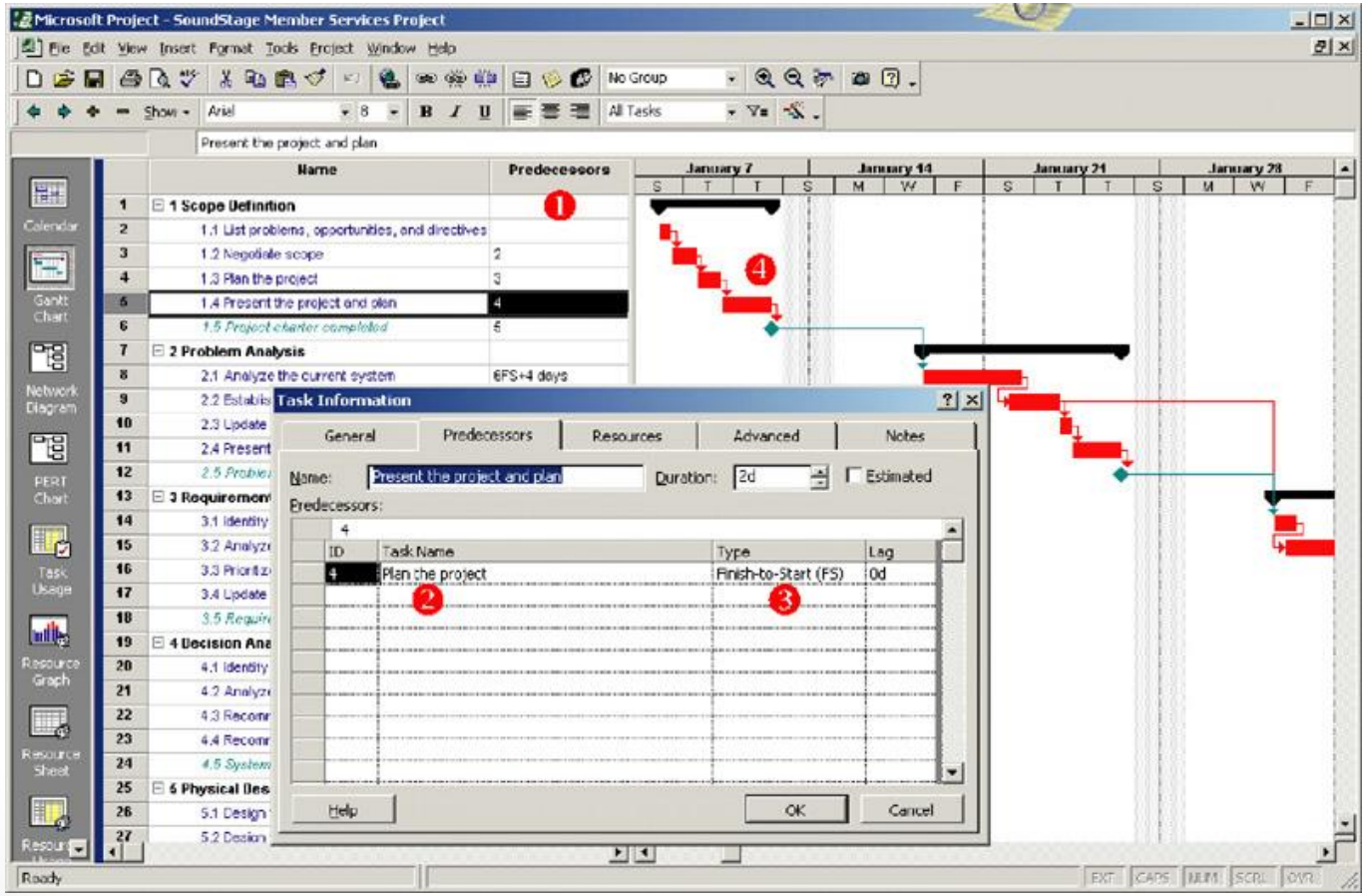
OD ED PD

$$3.33 \text{ days} = \frac{(1 \times 2 \text{ days}) + (4 \times 3 \text{ days}) + (1 \times 6 \text{ days})}{6}$$

Activity 4 – Specify Intertask Dependencies

- Finish-to-start (FS)—The finish of one task triggers the start of another task.
- Start-to-start (SS)—The start of one task triggers the start of another task.
- Finish-to-finish (FF)—Two tasks must finish at the same time.
- Start-to-finish (SF)—The start of one task signifies the finish of another task.

Entering Intertask Dependencies

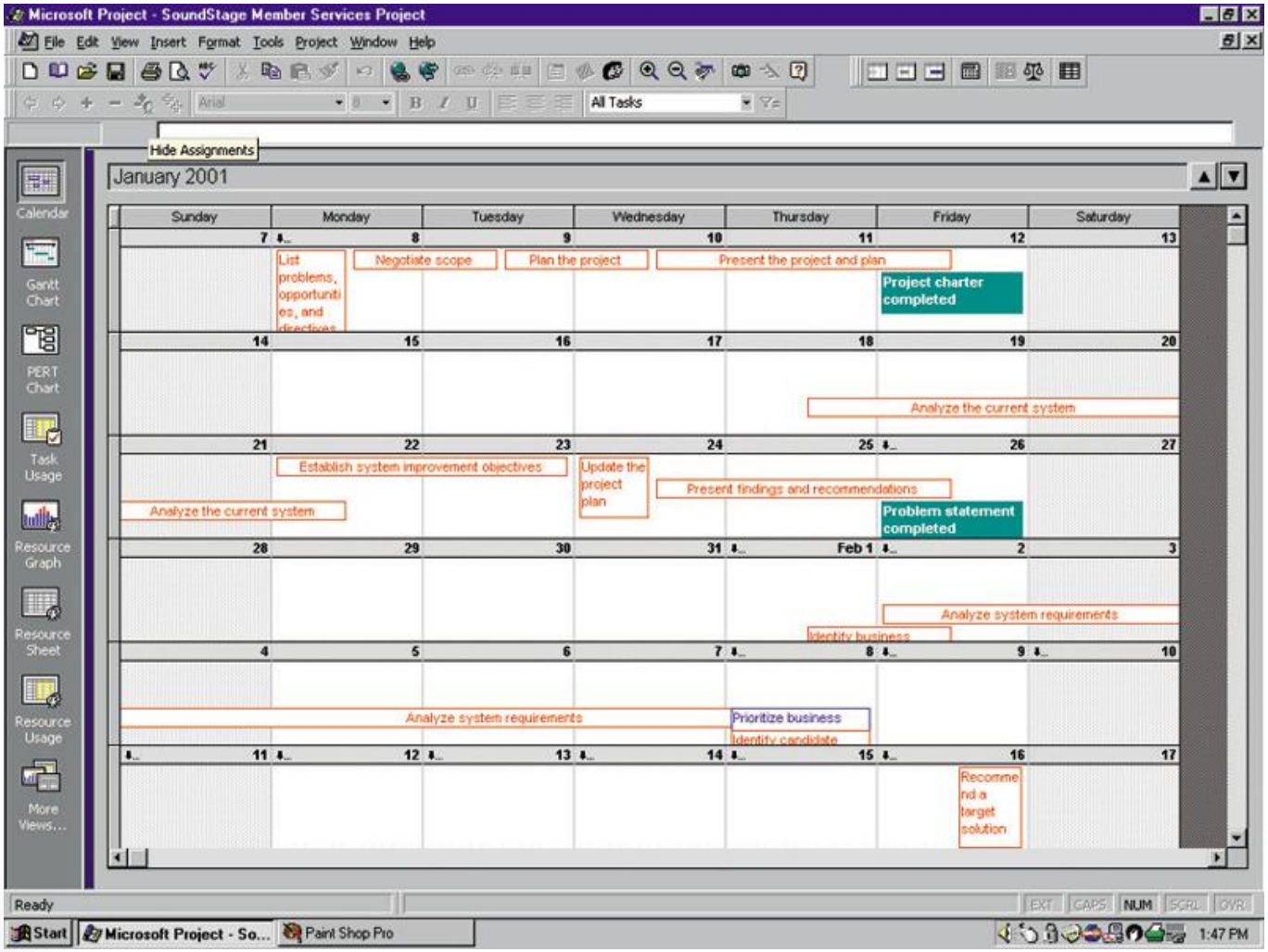


Scheduling Strategies

Forward scheduling – a project scheduling approach that establishes a project start date and then schedules forward from that date.

Reverse scheduling – a project scheduling strategy that establishes a project deadline and then schedules backward from that date.

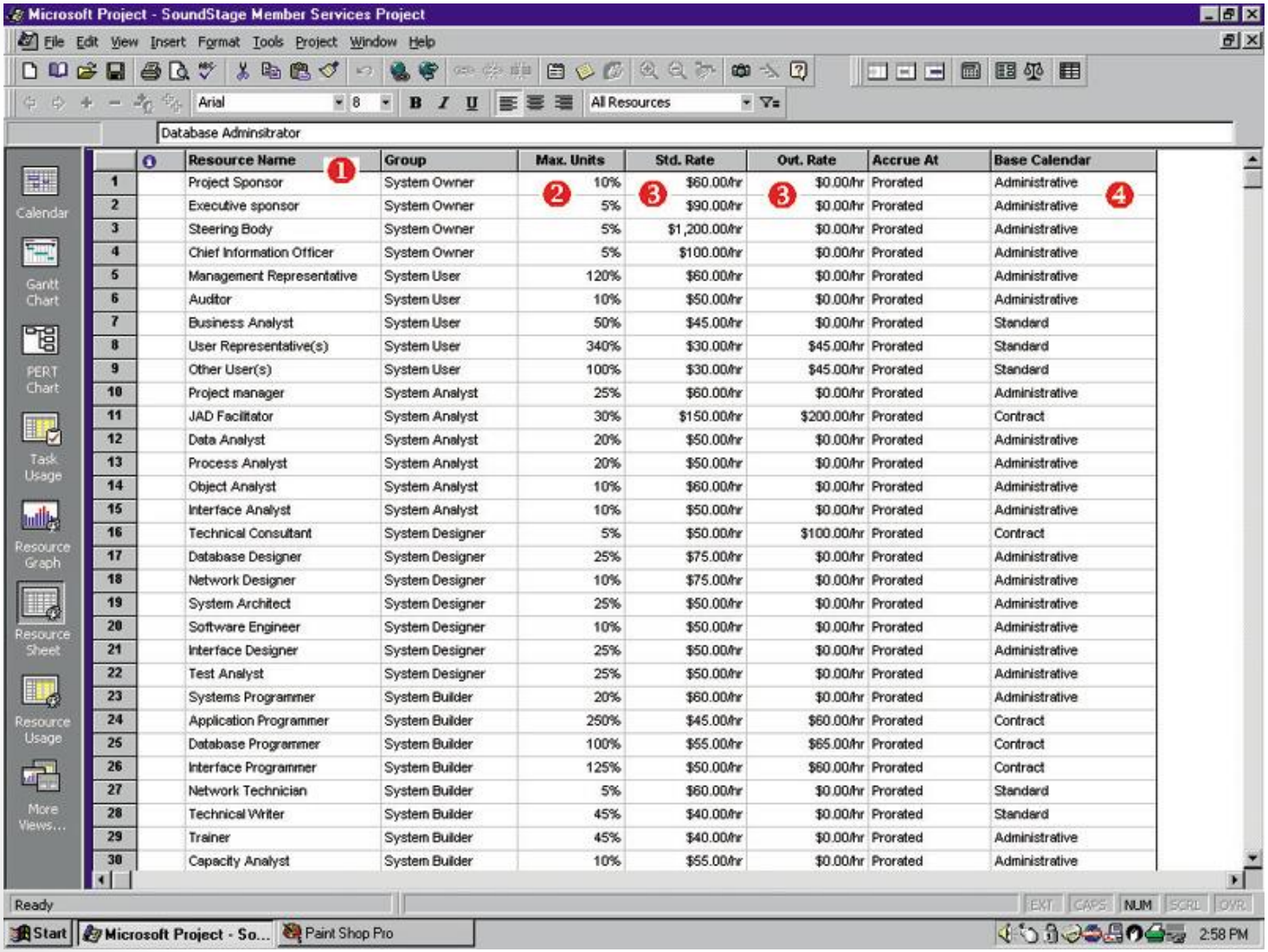
A Project Schedule in Calendar View



Activity 5 – Assign Resources

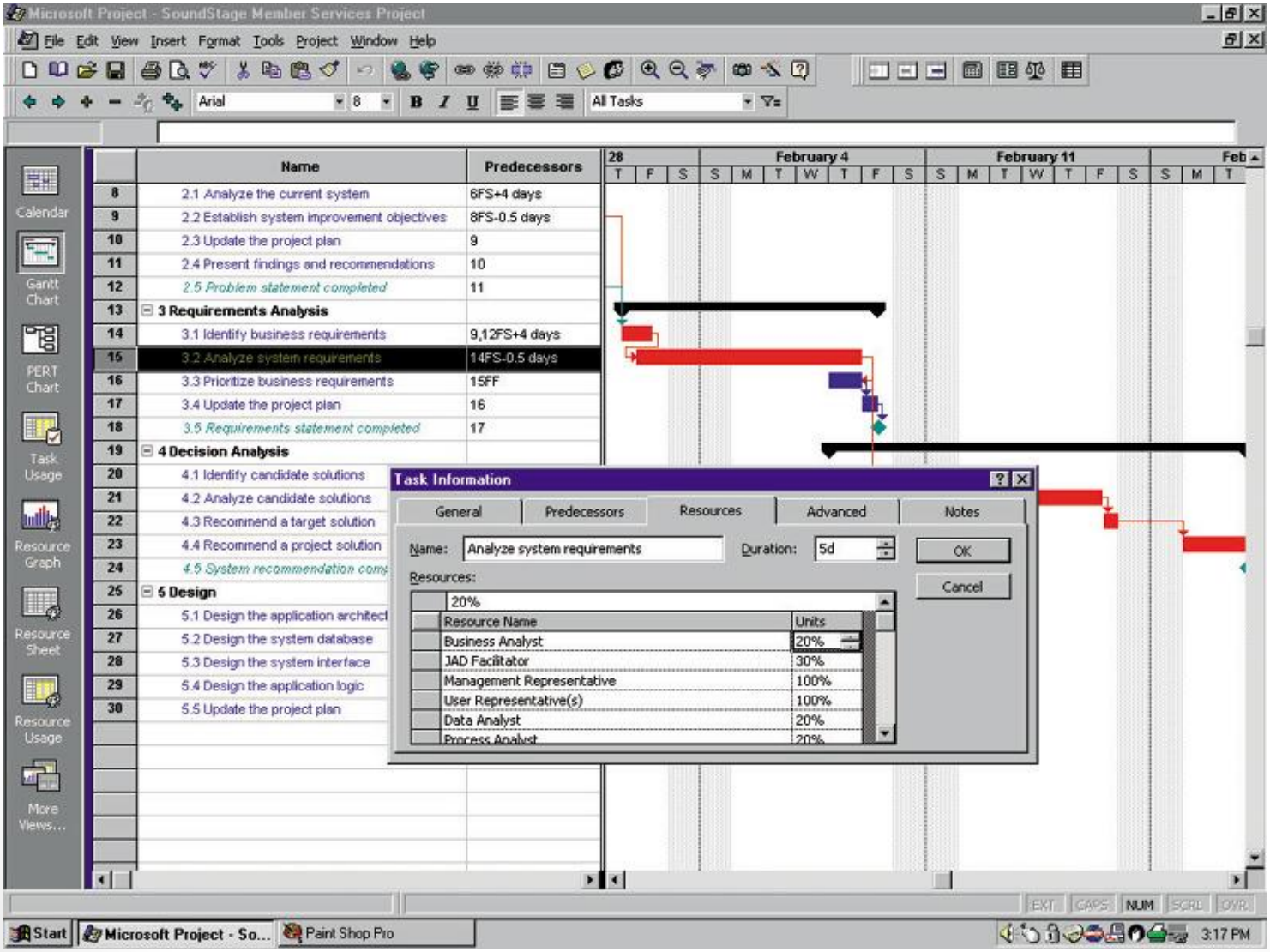
- **People** – includes all system owners, users, analysts, designers, builders, external agents, and clerical help involved in the project in any way.
- **Services** – includes services such as a quality review that may be charged on a per use basis.
- **Facilities and equipment** – includes all rooms and technology that will be needed to complete the project.
- **Supplies and materials** – everything from pencils, paper, notebooks to toner cartridges, and so on.
- **Money** – includes a translation of all of the above into budgeted dollars!

Defining Project Resources



	Resource Name	Group	Max. Units	Std. Rate	Ovt. Rate	Accrue At	Base Calendar
1	Project Sponsor	System Owner	10%	$60.00/hr	$0.00/hr	Prorated	Administrative
2	Executive sponsor	System Owner	5%	$90.00/hr	$0.00/hr	Prorated	Administrative
3	Steering Body	System Owner	5%	$1,200.00/hr	$0.00/hr	Prorated	Administrative
4	Chief Information Officer	System Owner	5%	$100.00/hr	$0.00/hr	Prorated	Administrative
5	Management Representative	System User	120%	$60.00/hr	$0.00/hr	Prorated	Administrative
6	Auditor	System User	10%	$50.00/hr	$0.00/hr	Prorated	Administrative
7	Business Analyst	System User	50%	$45.00/hr	$0.00/hr	Prorated	Standard
8	User Representative(s)	System User	340%	$30.00/hr	$45.00/hr	Prorated	Standard
9	Other User(s)	System User	100%	$30.00/hr	$45.00/hr	Prorated	Standard
10	Project manager	System Analyst	25%	$60.00/hr	$0.00/hr	Prorated	Administrative
11	JAD Facilitator	System Analyst	30%	$150.00/hr	$200.00/hr	Prorated	Contract
12	Data Analyst	System Analyst	20%	$50.00/hr	$0.00/hr	Prorated	Administrative
13	Process Analyst	System Analyst	20%	$50.00/hr	$0.00/hr	Prorated	Administrative
14	Object Analyst	System Analyst	10%	$60.00/hr	$0.00/hr	Prorated	Administrative
15	Interface Analyst	System Analyst	10%	$50.00/hr	$0.00/hr	Prorated	Administrative
16	Technical Consultant	System Designer	5%	$50.00/hr	$100.00/hr	Prorated	Contract
17	Database Designer	System Designer	25%	$75.00/hr	$0.00/hr	Prorated	Administrative
18	Network Designer	System Designer	10%	$75.00/hr	$0.00/hr	Prorated	Administrative
19	System Architect	System Designer	25%	$50.00/hr	$0.00/hr	Prorated	Administrative
20	Software Engineer	System Designer	10%	$50.00/hr	$0.00/hr	Prorated	Administrative
21	Interface Designer	System Designer	25%	$50.00/hr	$0.00/hr	Prorated	Administrative
22	Test Analyst	System Designer	25%	$50.00/hr	$0.00/hr	Prorated	Administrative
23	Systems Programmer	System Builder	20%	$60.00/hr	$0.00/hr	Prorated	Administrative
24	Application Programmer	System Builder	250%	$45.00/hr	$60.00/hr	Prorated	Contract
25	Database Programmer	System Builder	100%	$55.00/hr	$65.00/hr	Prorated	Contract
26	Interface Programmer	System Builder	125%	$50.00/hr	$60.00/hr	Prorated	Contract
27	Network Technician	System Builder	5%	$60.00/hr	$0.00/hr	Prorated	Standard
28	Technical Writer	System Builder	45%	$40.00/hr	$0.00/hr	Prorated	Standard
29	Trainer	System Builder	45%	$40.00/hr	$0.00/hr	Prorated	Administrative
30	Capacity Analyst	System Builder	10%	$55.00/hr	$0.00/hr	Prorated	Administrative

Assigning Project Resources



Assigning People to Tasks

- Recruit talented, highly motivated people
- Select the best task for each person
- Promote team harmony
- Plan for the future
- Keep the team size small

Resource Leveling

Resource leveling – a strategy for correcting resource over-allocations.

Two techniques for resource leveling:

- *task delaying*
- *task splitting*

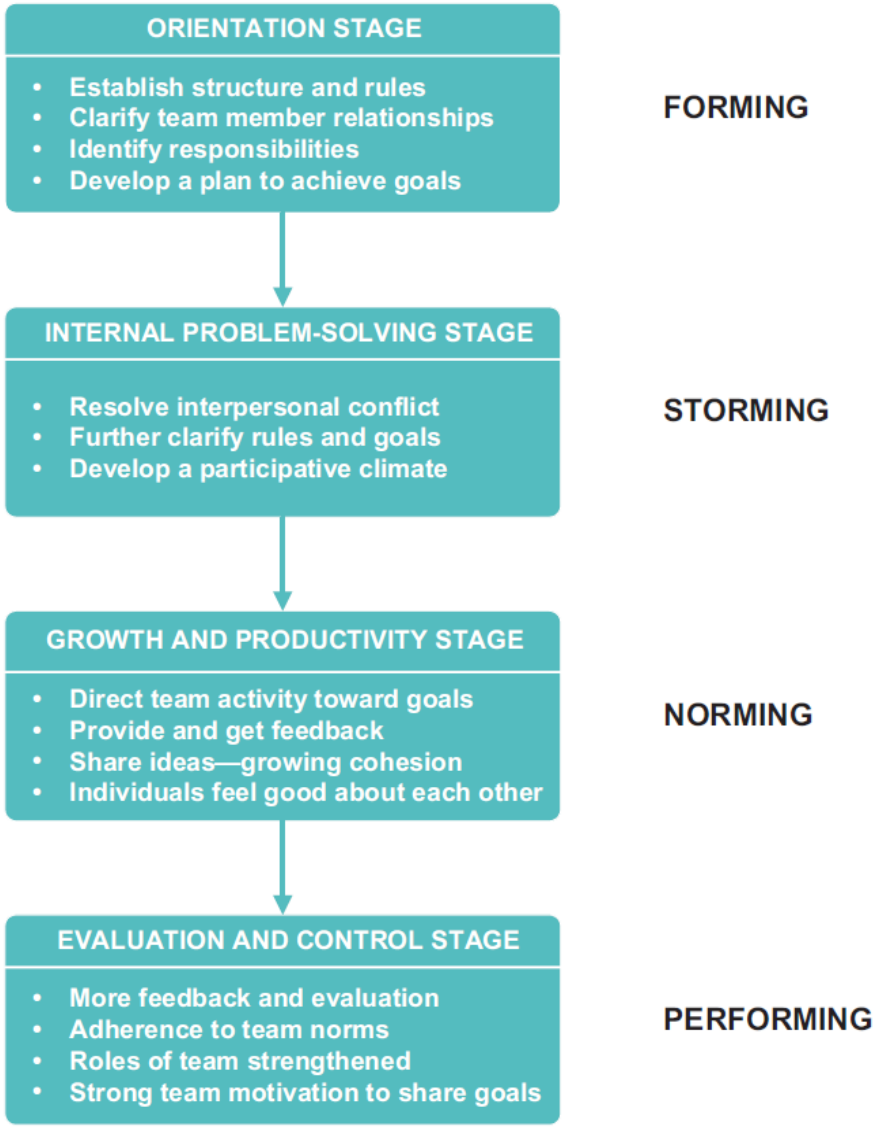
Task Splitting and Task Delaying

- **Critical path** – the sequence of dependent tasks that determines the earliest possible completion date of the project.
  - Tasks on the critical path cannot be delayed without delaying the entire project. Critical tasks can only be split.
- **Slack time** – the amount of delay that can be tolerated between the starting time and completion time of a task without causing a delay in the completion date of the entire project.
  - Tasks that have slack time can be delayed to achieve resource leveling

Activity 6 – Direct the Team Effort

- Supervision resources
  - The Deadline: A Novel about Project Management
  - The People Side of Systems
  - The One Minute Manager
  - The One Minute Manager Meets the Monkey

Stages of Team Maturity



10 Hints for Project Leadership

1. Be Consistent.
2. Provide Support.
3. Don’t Make Promises You Can’t Keep.
4. Praise in Public; Criticize in Private.
5. Be Aware of Morale Danger Points.
6. Set Realistic Deadlines.
7. Set Perceivable Targets.
8. Explain and Show, Rather Than Do.
9. Don’t Rely on Just Status Reports.
10. Encourage a Good Team Spirit.

Activity 7 – Monitor and Control Progress

- Progress reporting
- Change management
- Expectations management
- Schedule adjustments—critical path analysis (CPA)

Sample Outline for Progress Report

I. Cover Page

A. Project name or identification
B. Project manager
C. Date or report

II. Summary of progress

A. Schedule analysis
B. Budget analysis
C. Scope analysis
(changes that may have an impact on future progress)
D. Process analysis
(problems encountered with strategy or methodology)
E. Gantt progress chart(s)

III. Activity analysis

A. Tasks completed since last report
B. Current tasks and deliverables
C. Short term future tasks and deliverables

(continued)

Sample Outline for a Progress Report (continued)

IV. Previous problems and issues

A. Action item and status

B. New or revised action items

1. Recommendation
2. Assignment of responsibility
3. Deadline

V. New problems and issues

A. Problems
(actual or anticipated)

B. Issues
(actual or anticipated)

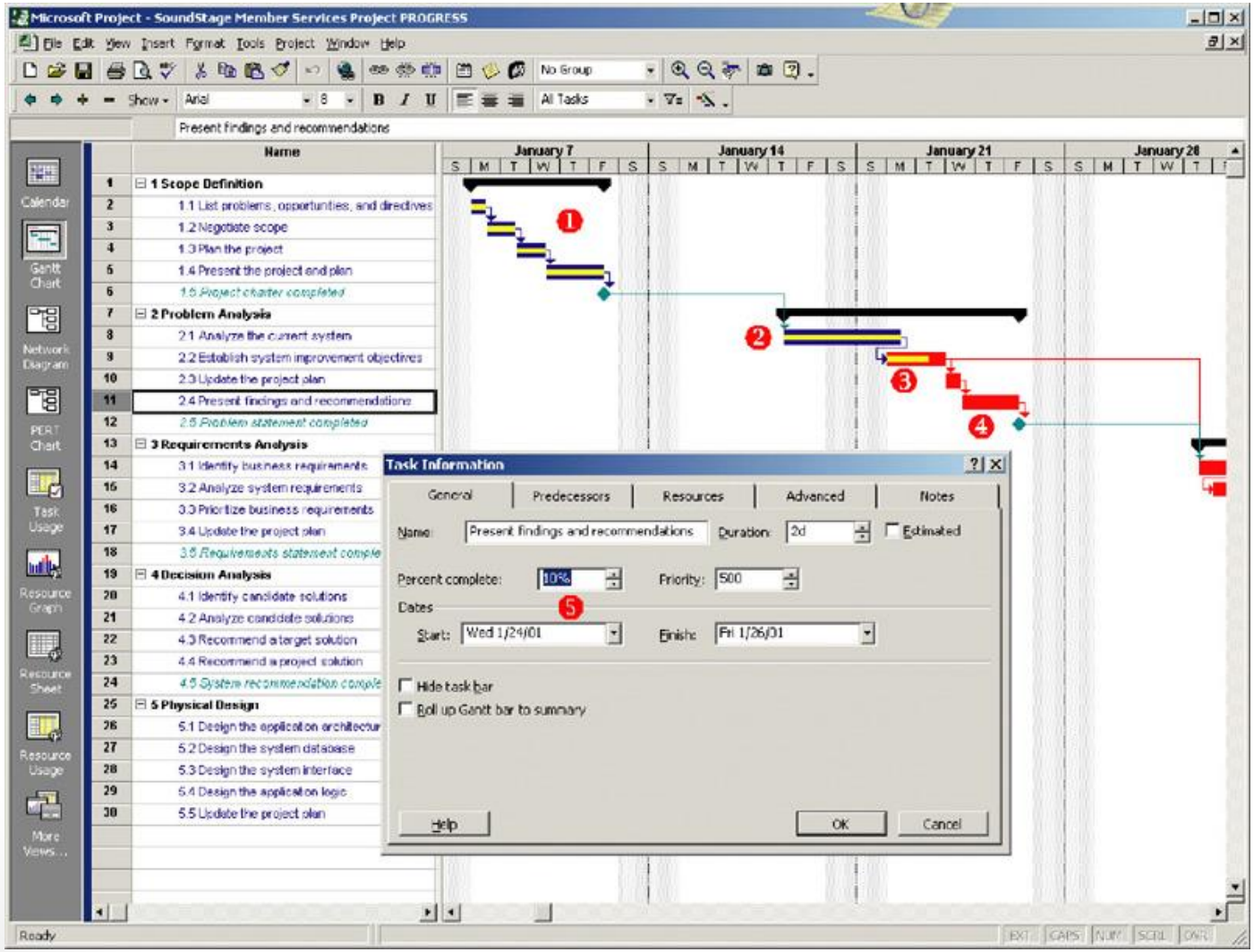
C. Possible solutions

1. Recommendation
2. Assignment of responsibility
3. Deadline

VI. Attachments

(include relevant printouts from project management software)

Progress Reporting on a Gantt Chart



Change Management

Change management – a formal strategy in which a process is established to facilitate changes that occur during a project.

Changes can be the result of various events and factors including:

- An omission in defining initial scope
- A misunderstanding of the initial scope
- An external event such as government regulations that create new requirements
- Organizational changes
- Availability of better technology
- Shifts in planned technology that force changes to the business organization, culture, and/or processes
- Management's desire to have the system do more
- Reduced funding for project or imposition of an earlier deadline.

Expectations Management

Expectations management matrix – a tool used to understand the dynamics and impact of changing the parameters of a project.

The most important

The second most important

PRIORITIES → ↓MEASURES OF SUCCESS	Max or Min	Constrain	Accept
Cost			
Schedule			
Scope and/or Quality			

The least important

Can have only one X in each row and each column

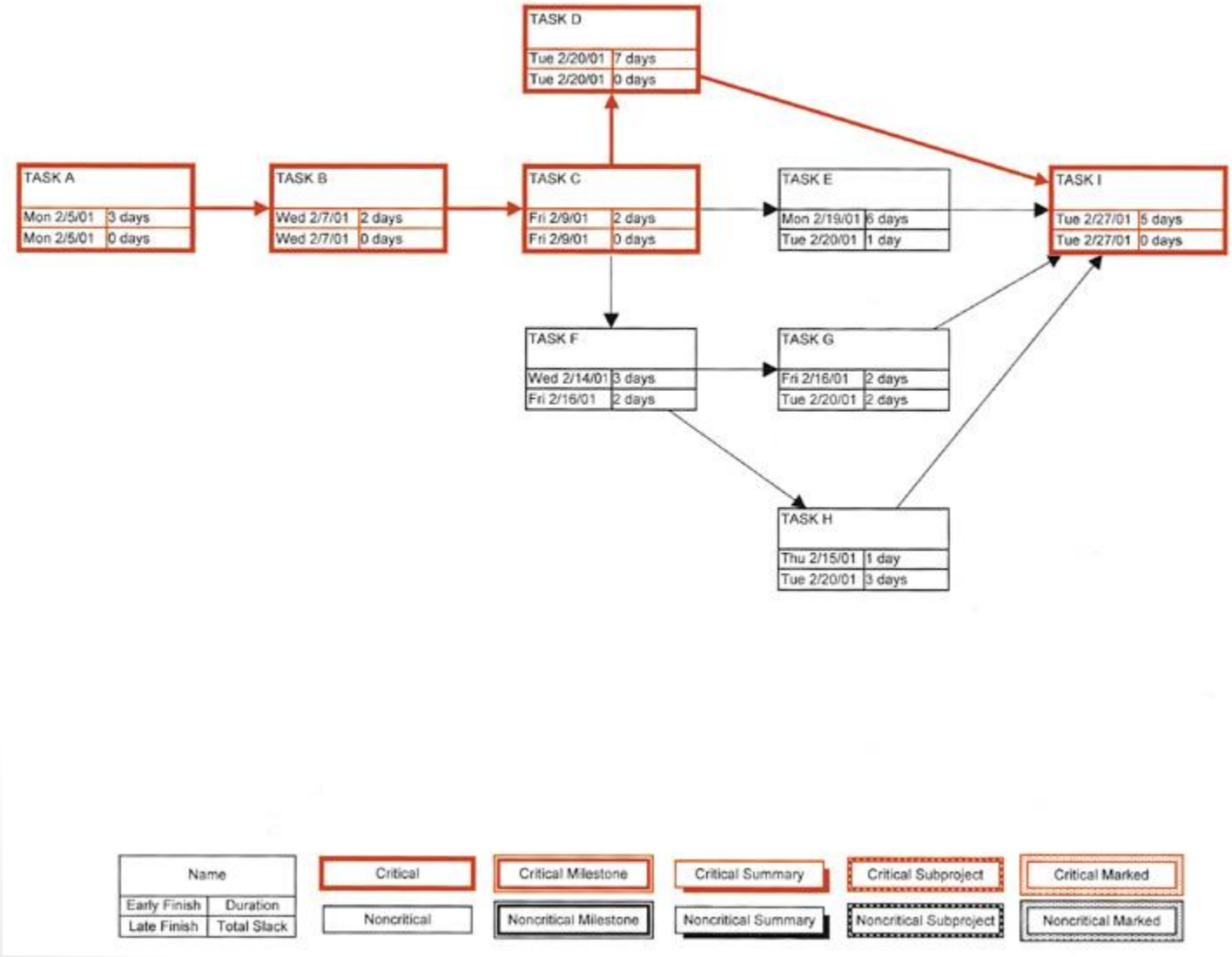
Lunar Project Expectations Management

PRIORITIES → ↓MEASURES OF SUCCESS	Max or Min	Constrain	Accept
Cost • $20 billion (estimated)			X
Schedule • Dec 31, 1969 (deadline)		X	
Scope and/or Quality • Land a man on the moon • Get him back safely	X		

Schedule Adjustments - Critical Path Analysis

1. Using intertask dependencies, determine every possible path through the project.
2. For each path, sum the durations of all tasks in the path.
3. The path with the longest total duration is the critical path.
   - The **critical path** is the sequence of tasks with the largest sum of *most likely durations*. The critical path determines the earliest completion date of the project.
   - The **slack time** for any non-critical task is the amount of delay that can be tolerated between starting and completion time of a task without causing a delay in the entire project.

Critical Path Analysis



Activity 8 – Assess Project Results and Experiences

- Did the final product meet or exceed user expectations?
  - Why or why not?
- Did the project come in on schedule?
  - Why or why not?
- Did the project come in under budget?
  - Why or why not?

Any Questions?

Always question the "why"; don't be satisfied with only knowing the "how"

Catherine Pulsifer