Chapter 3

Project Management

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

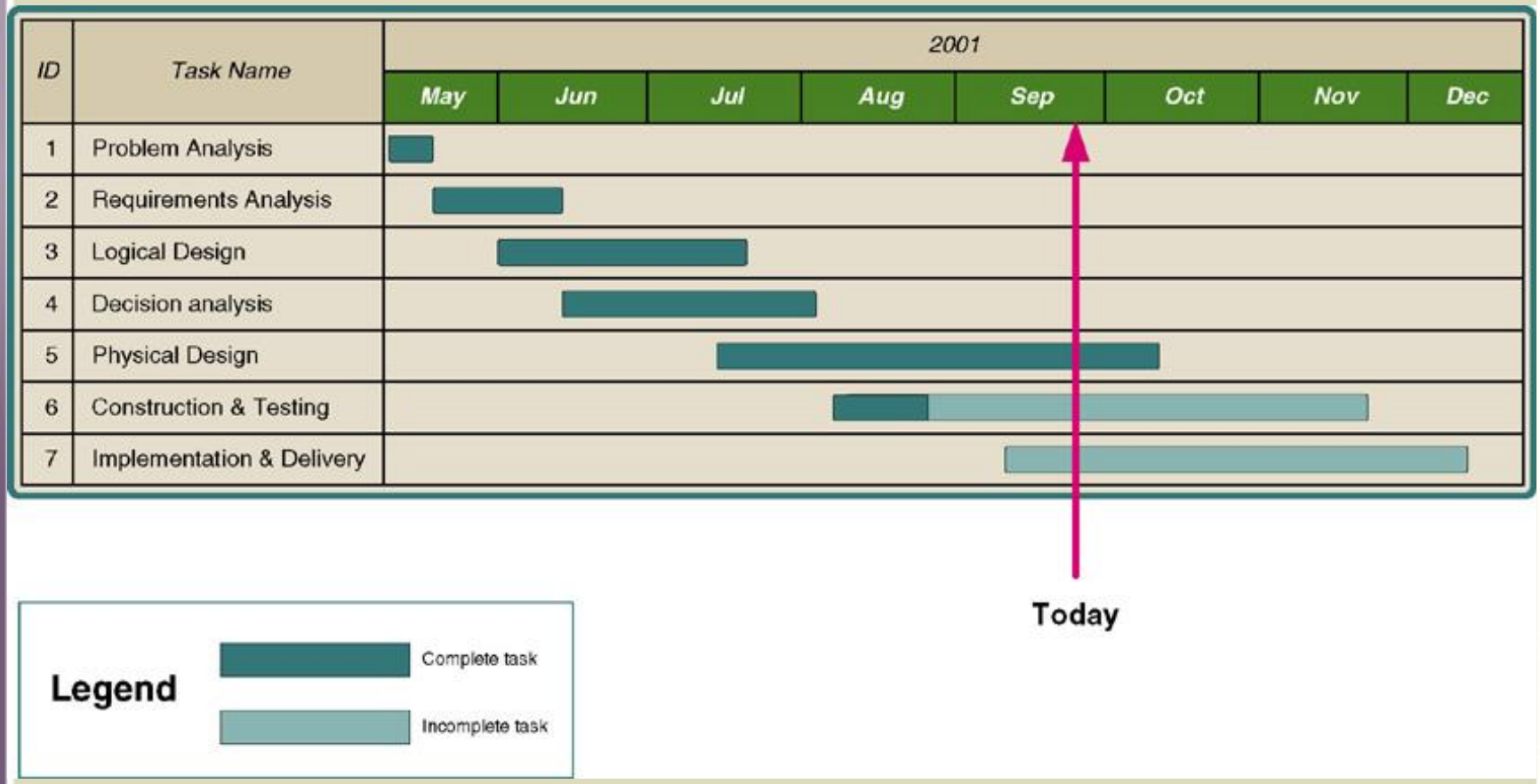
- **Scoping** – setting the boundaries of the project
- **Planning** – identifying the tasks required to complete the project
- **Estimating** – identifying the resources required to complete the project
- **Scheduling** – developing the plan to complete the project
- **Organizing** – making sure members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

Project Management Tools & Techniques

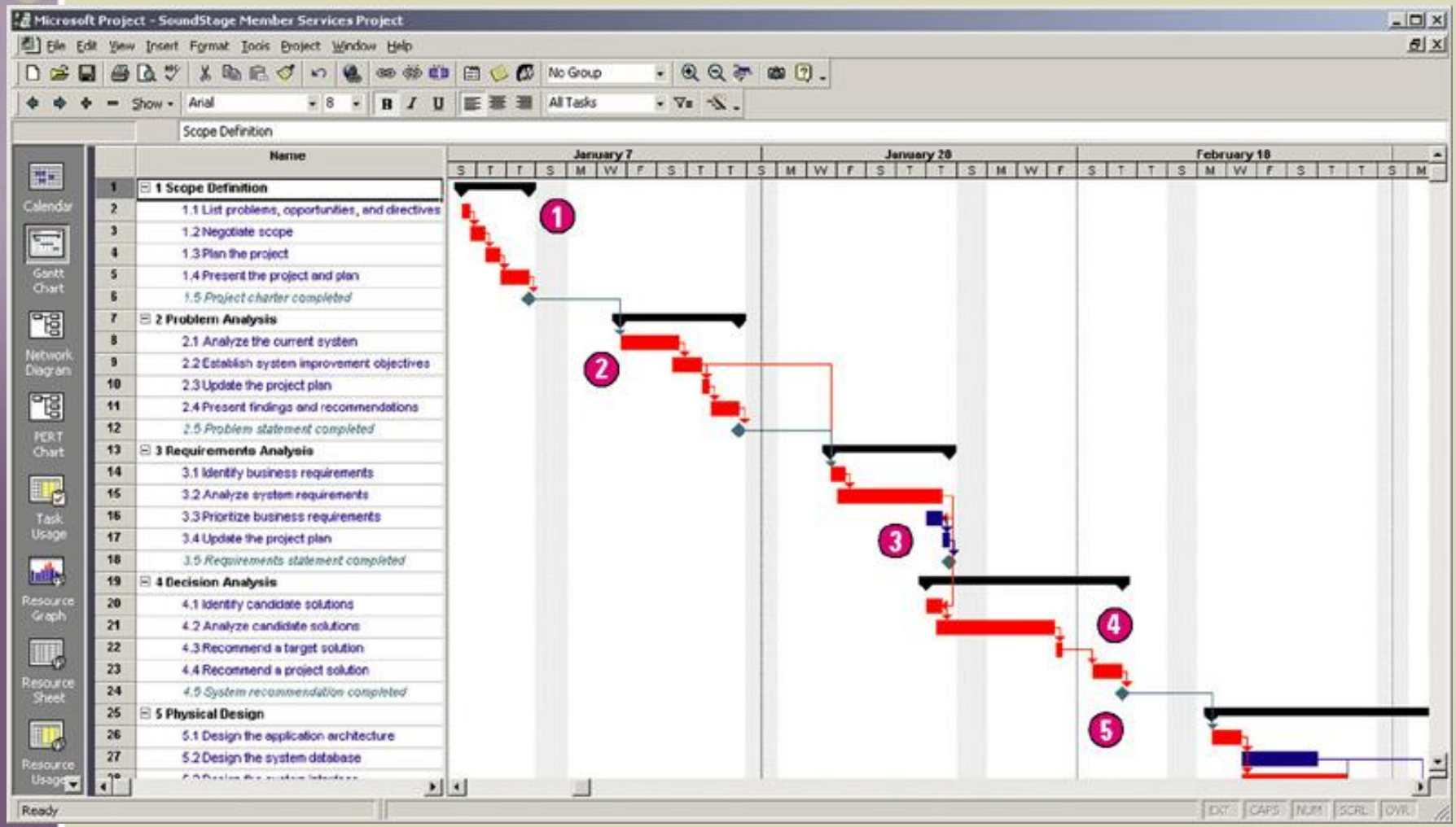
Gantt chart – a bar chart used to depict project tasks against a calendar.

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

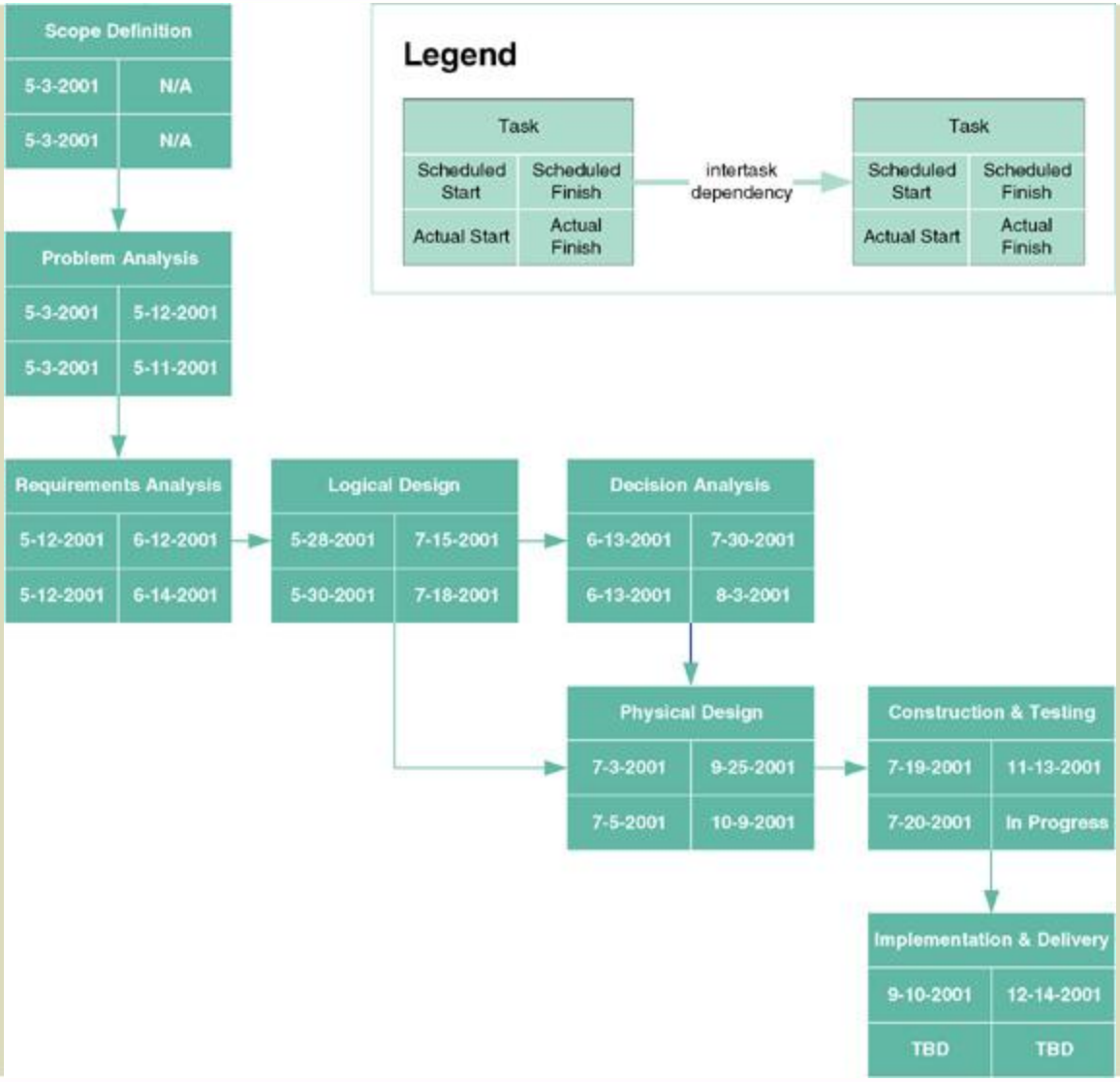
Gantt Chart


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

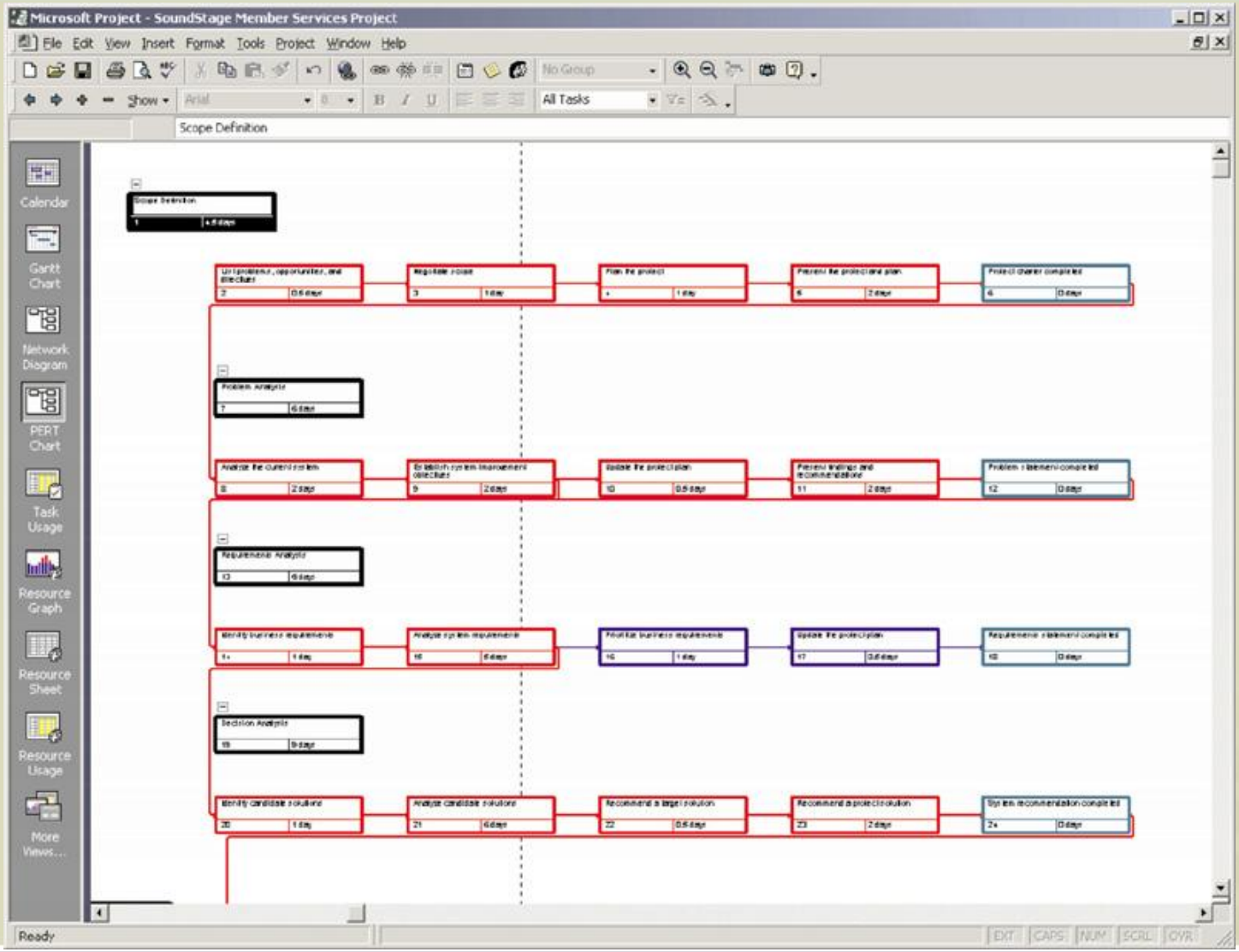
Microsoft Project Gantt Chart



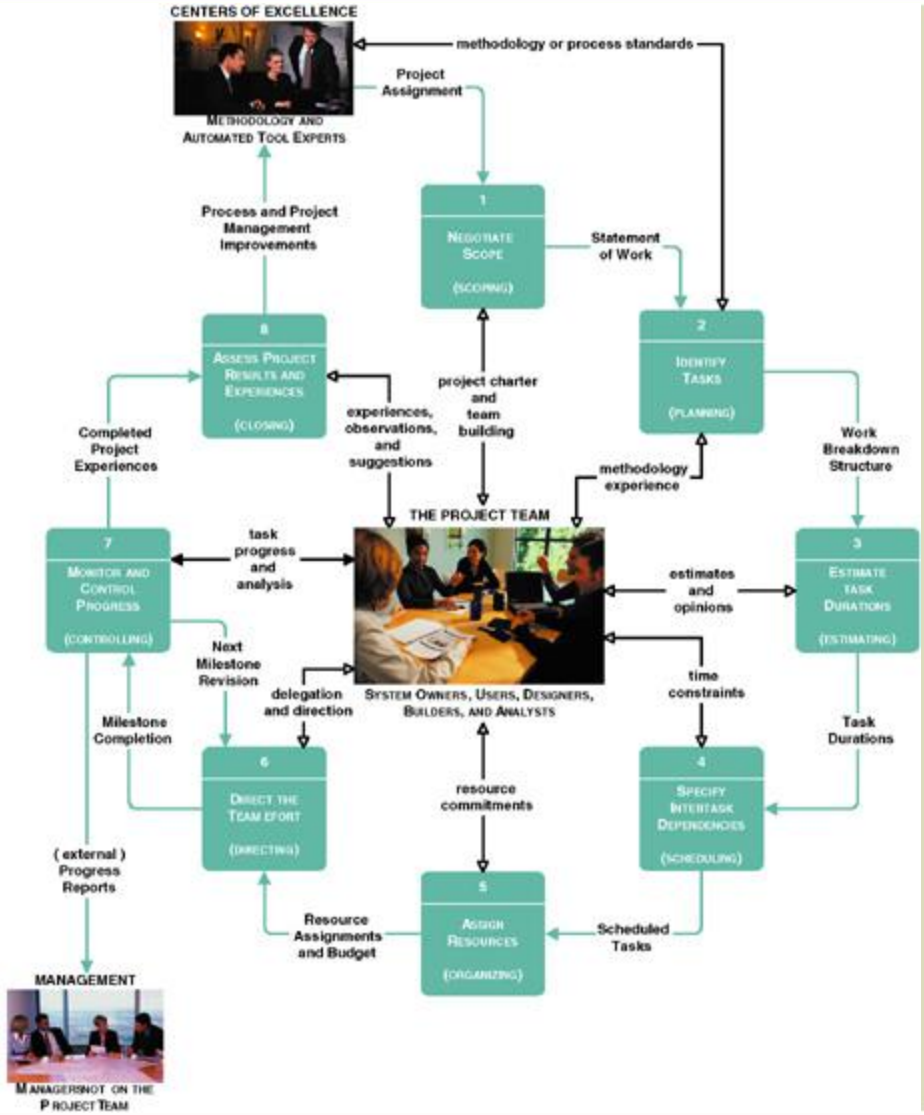
PERT Chart


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

Microsoft Project PERT Chart



Project Management Life Cycle



PMLC Activities

- **Activity 1** – Negotiate Scope
- **Activity 2** – Identify Tasks (Work BreakDown)
- **Activity 3** – Estimate Task Duration
- **Activity 4** – Specify Intertask Dependencies
- **Activity 5** – Assign Resources
- **Activity 6** – Direct Team Effort
- **Activity 7** – Monitor and Control Progress
- **Activity 8** – Assess Project Results and Experiences

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:

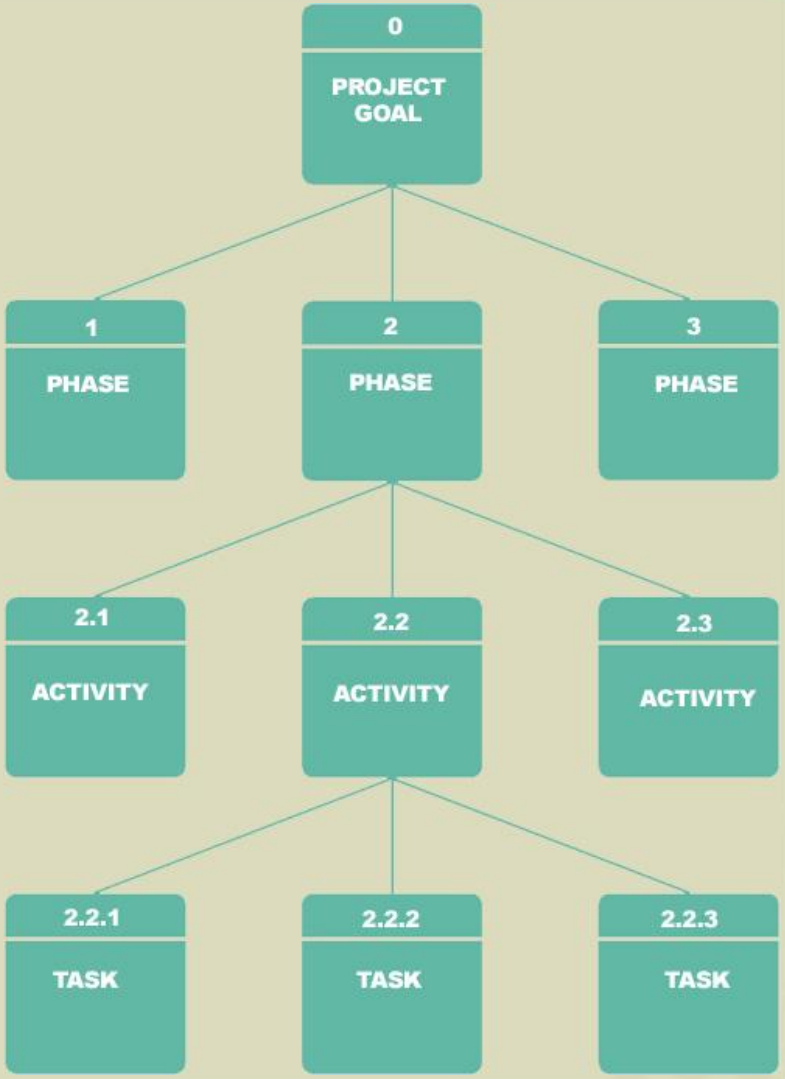
- **Product**
- **Quality**
- **Time**
- **Cost**
- **Resources**

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*.

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 (cont.)

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

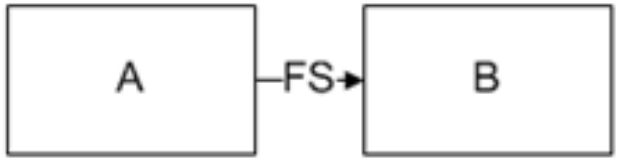
$$3.33 \text{ days} = \frac{(1 \times 2 \text{ days}) + (4 \times 3 \text{ days}) + (1 \times 6 \text{ days})}{6}$$

Activity 4 – Specify Intertask Dependencies (1/3)

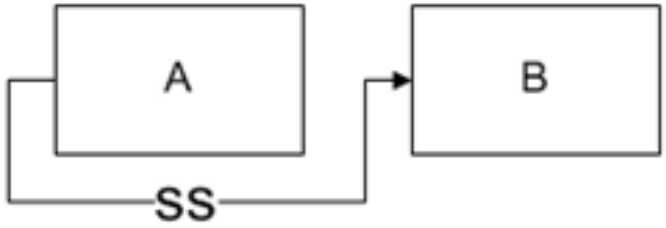
- Finish-to-start (FS)—The finish of one task triggers the start of another task.
- Start-to-start (SS)—The start of one task triggers the start of another task.
- Finish-to-finish (FF)—Two tasks must finish at the same time.
- Start-to-finish (SF)—The start of one task signifies the finish of another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

Activity 4 – Specify Intertask Dependencies (2/3)

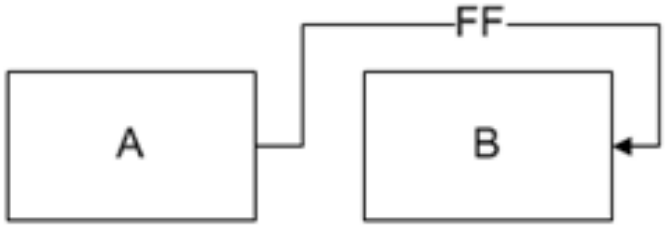
Finish to Start
Task B can't start until Task A has finished



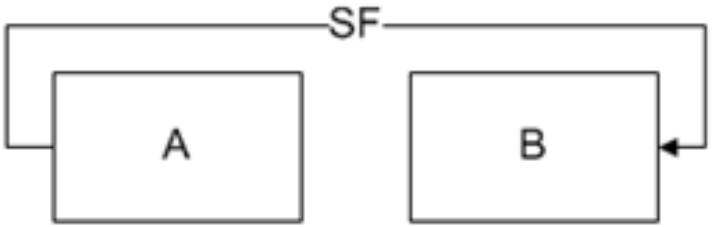
Start to Start
Task B can't start until Task A has started



Finish to Finish
Task B can't finish until Task A has finished

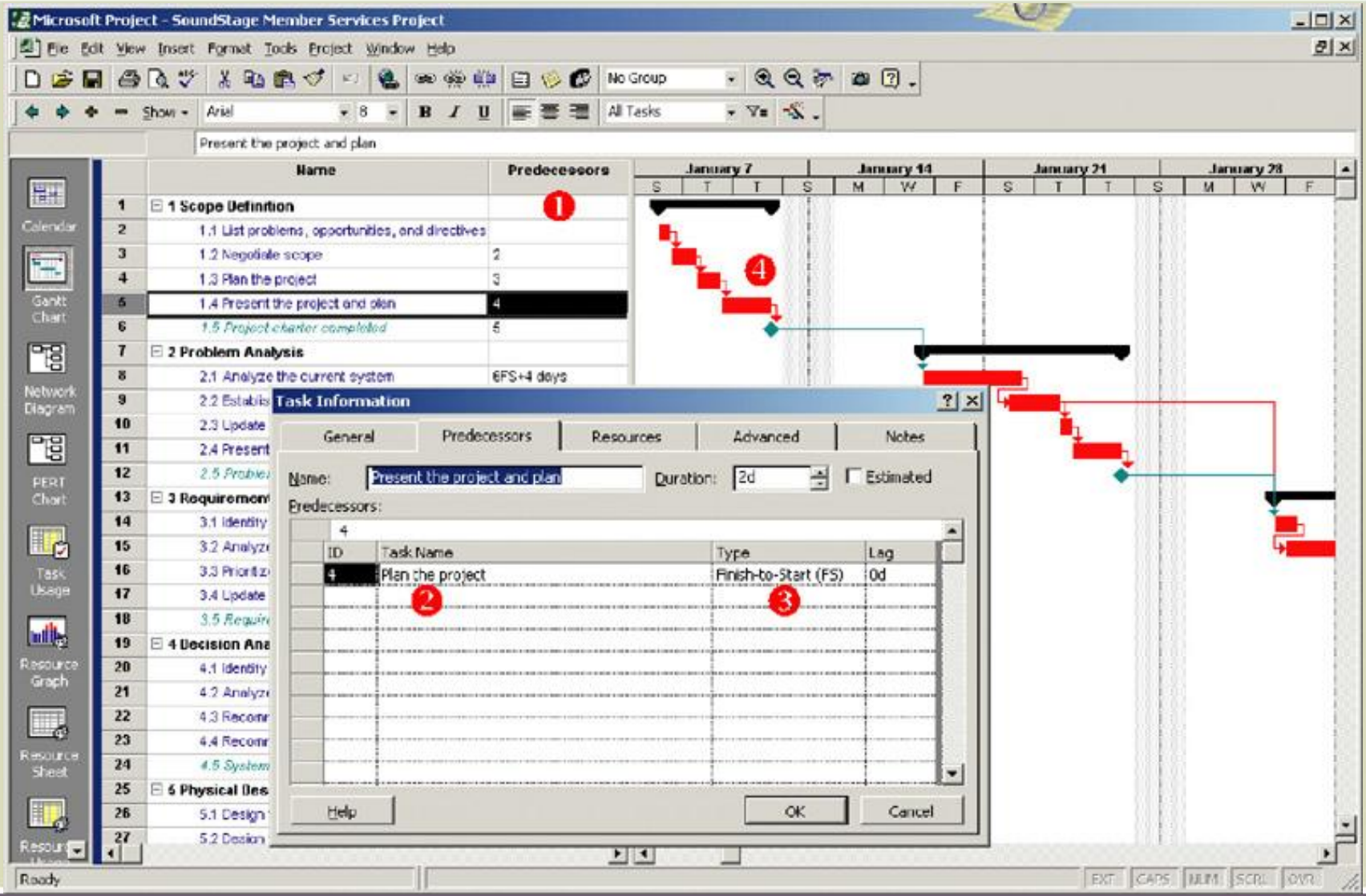


Start to Finish
Task B can't finish until Task A has Started

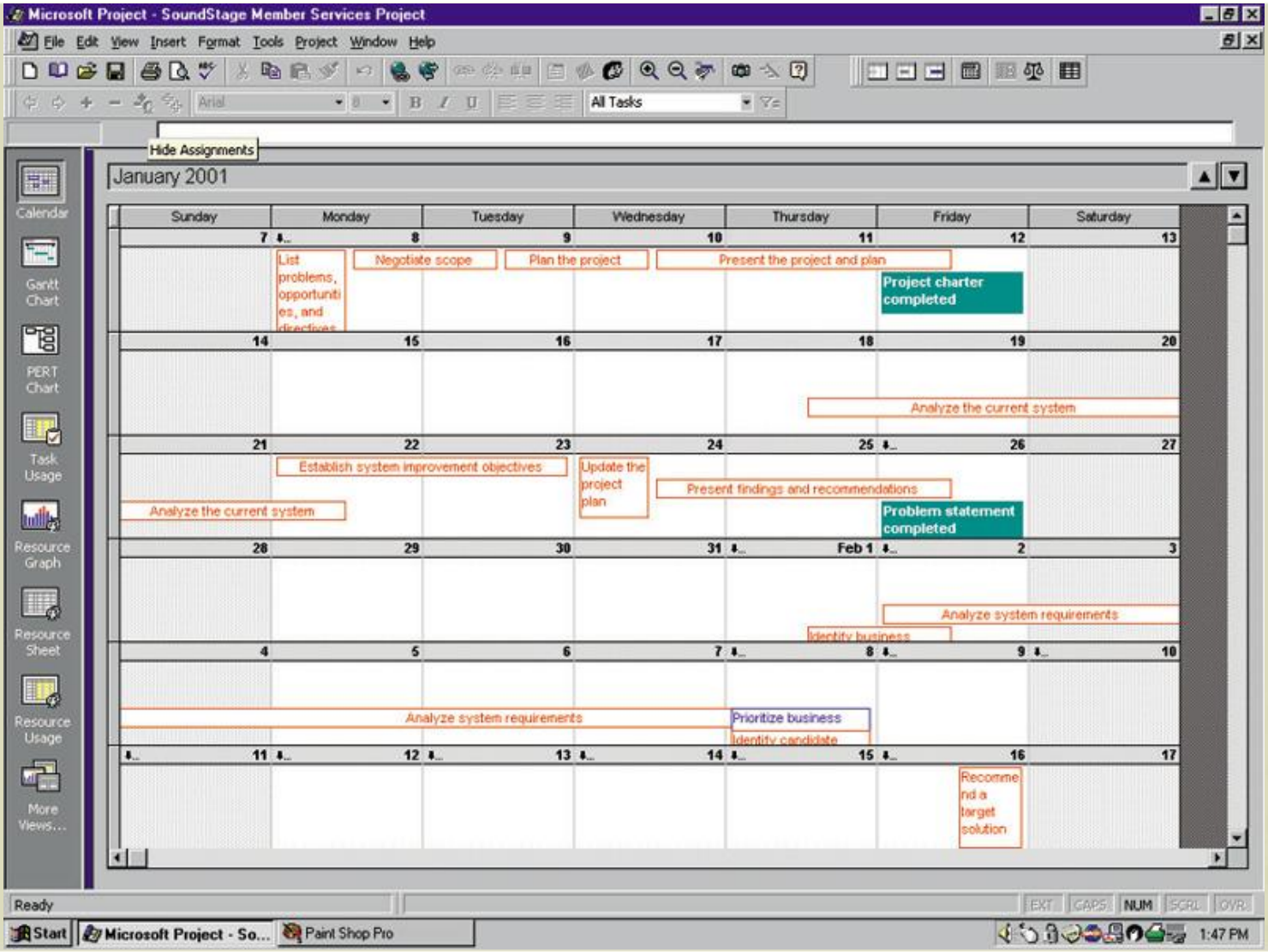


Activity 4 – Specify Intertask Dependencies (3/3)

Entering Intertask Dependencies



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!

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:

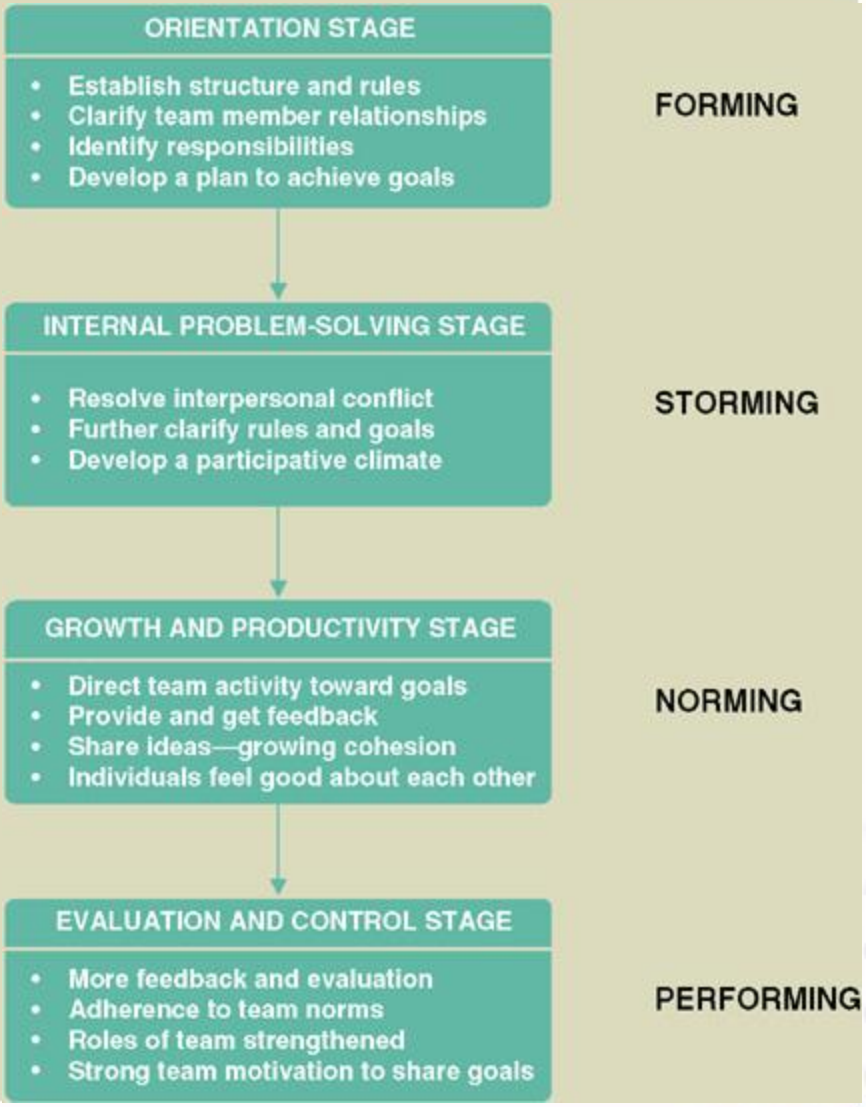
- *task delaying*
- *task splitting*

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

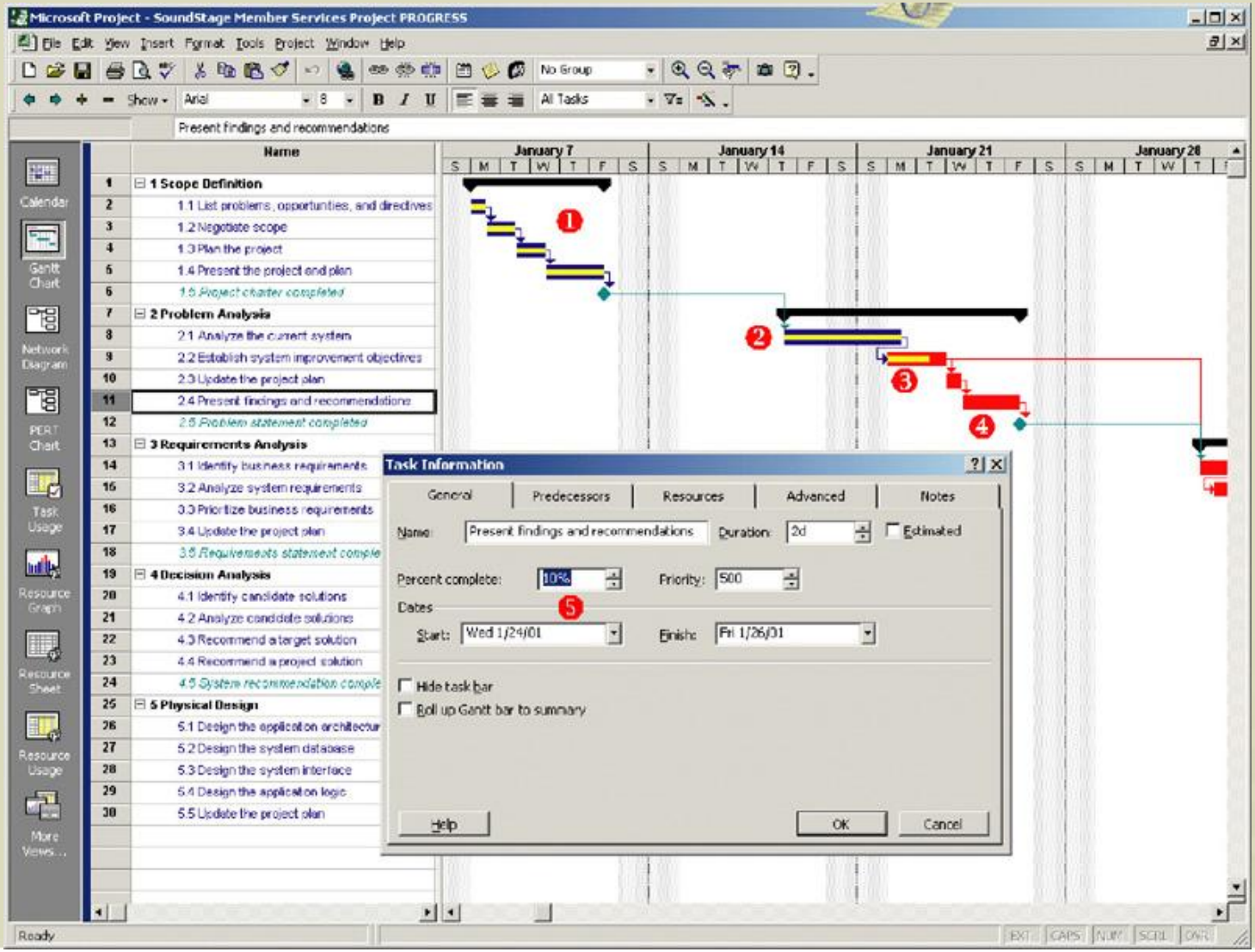
- Supervision resources
  - The Deadline: A Novel about Project Management
  - The People Side of Systems
  - The One Minute Manager
  - The One Minute Manager Meets the Monkey
- Stages of Team Maturity
  (see figure to the right)



Activity 7 – Monitor and Control Progress

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

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

The least important

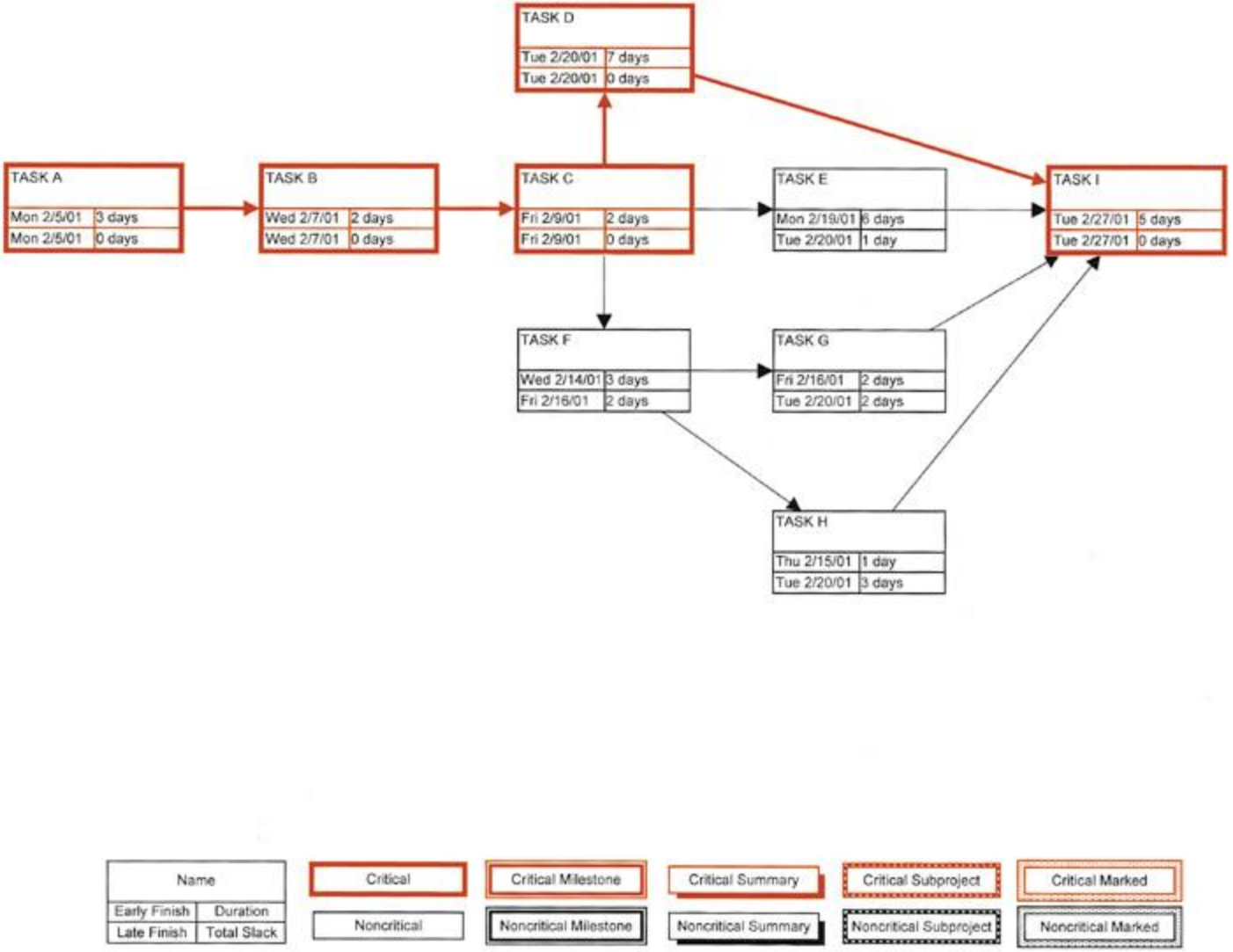
PRIORITIES → / ↓MEASURES OF SUCCESS	Max or Min	Constrain	Accept
Cost			
Schedule			
Scope and/or Quality			

Can have only one X in each row and each column

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?