Introduction to Project Management

Chapter 2
The Project Management Life Cycle

Information Systems Project Management: A Process and Team Approach, 2e
Fuller/Valacich/George

What is the Project Management Life Cycle?

- A project life cycle simply includes the necessary steps, from beginning to end, needed to complete a project. The end of each phase is referred to as a stage gate, phase exit, or kill point, and usually marks the completion of deliverables.

- A phase defines work to be done and personnel required

- Life cycles vary by industry and organization

Common Life Cycle Characteristics

- Cost and staffing resemble a bell curve

- Risk and uncertainly are highest at the beginning

- Stakeholder influence is highest at the beginning; lowest at the end

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Systems Development Life Cycle (SDLC)

- A common methodology for systems development that marks the phases or steps of information systems development

- SDLC Phases
  1. Plan
  2. Analyze
  3. Design
  4. Implement
  5. Maintain

SDLC Phase Activities

1. ## Systems Planning
   - The need for a new or enhanced system is identified and the proposed system's scope is determined

2. ## Systems Analysis
   - Systems requirements are determined and an alternative is chosen among a set of alternatives to best meet these requirements within the cost, labor, and technical levels to which the organization is willing to commit

3. ## Systems Design
   - Descriptions of the recommended alternative are converted into logical and then physical system specifications

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SDLC Phase Activities (cont.)

4. Systems Implementation

    - The system specifications are turned into a working system that is tested and then put into use

5. Systems Maintenance

    - Programmers make the changes that users request and modify the system to reflect changing business conditions


Time, cost, and scope triangle

- The Time-Cost-Scope triangle is a fundamental concept in project management that refers to the interdependent nature of time, cost, and scope, with quality being the central goal that the project manager must balance against these constraints.

- Project managers must balance the constraints of time, cost, and scope against the goal of achieving high-quality project deliverables.

- By doing so, they can effectively manage projects and ensure that stakeholders are satisfied with the outcomes.

Time

Quality

Scope   Cost
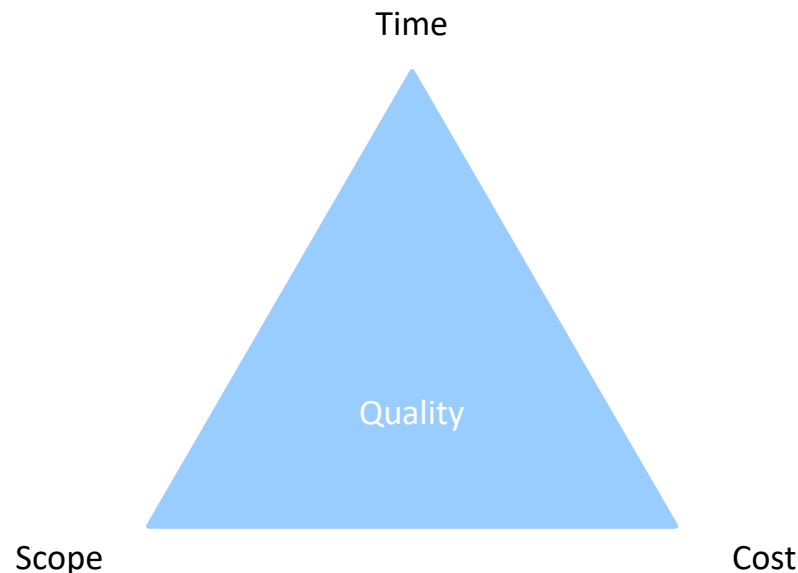
Predictive Information Systems Development Life Cycle (ISDLC)

Planning

Analysis

Design

Implementation
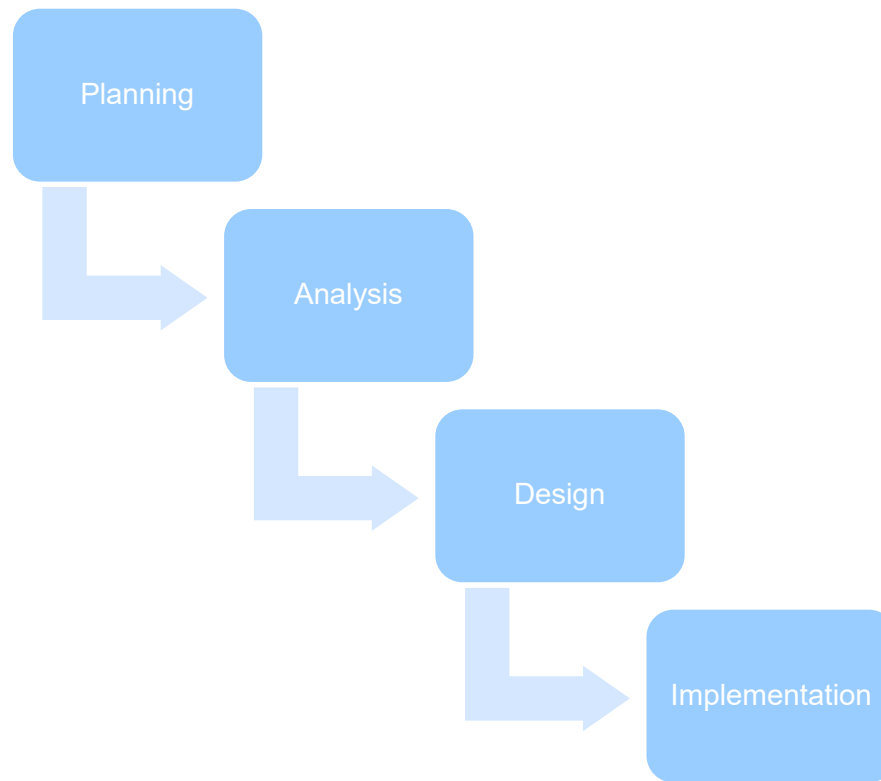
Agile (spiral) information systems development life cycle
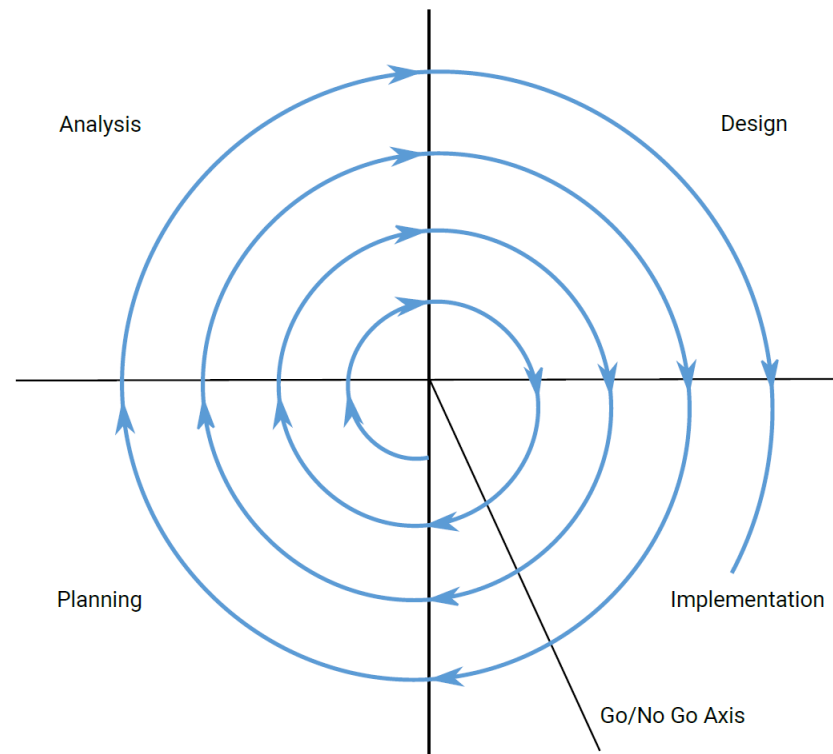
Predictive ISDLC vs. Agile

- The predictive ISDLC is a structured and sequential approach that is useful in situations where the project requirements are well-defined, while Agile is a flexible and adaptive approach that is useful in situations where the requirements are dynamic or evolving.

- The main differences between the predictive ISDLC and Agile include:
  - **Flexibility**: The predictive ISDLC is less flexible than Agile because it requires the project requirements to be well-defined upfront. Agile, on the other hand, allows for changes to be made throughout the development process, and it encourages flexibility and adaptability.
  - **Customer involvement:** The predictive ISDLC involves less customer involvement than Agile because the requirements are defined upfront, and the project follows a sequential process. Agile, on the other hand, emphasizes collaboration and continuous feedback with the customer to ensure that the software meets their needs.
  - **Risk management:** The predictive ISDLC focuses on risk management by identifying risks upfront and developing mitigation strategies. Agile, on the other hand, focuses on risk management through frequent testing and continuous improvement.
  - **Documentation**: The predictive ISDLC requires extensive documentation, including detailed specifications and design documents. Agile, on the other hand, emphasizes working software over documentation, although it does require documentation for the project backlog and other project artifacts.

Software Project Behind Schedule?

- *Mythical Man-Month: Adding personnel to an information system behind schedule will NOT speed up the process*

- "Brook's law": states that adding more people to a late software project only makes the project later.

  – This is because adding more people to a project increases the communication overhead and the need for coordination, which can slow down the development process.

Outsourcing / Offshoring

- **Outsourcing** is the practice of contracting a business function to an external provider, to reduce costs, improve quality, or gain access to specialized expertise.
    - The outsourced function can be performed locally or offshore, but the location is not the defining factor.
    - For example, a company may outsource its accounting function to a local accounting firm, or it may outsource its IT help desk to a provider in a different state.
- **Offshoring**, on the other hand, is the practice of relocating a business function to a foreign country to take advantage of lower labor costs or other benefits.
    - Offshoring typically involves moving jobs from a high-cost country to a low-cost country, such as moving call center jobs from the United States to India.
- For software:
    - 60% of work performed in-house
    - 30% sent offshore
    - 10% outsourced

Stakeholders

- Individuals which will benefit, participate, or be impacted by proposed system

  – Project sponsor

  – Project manager

  – Project team members

  – Customers

  – Influencers

  – Project Management Office (PMO)

Information Systems Influences

- Stakeholders

- Organizational structure

- Organizational culture

- Social environment

- Economic conditions

- Others?

Organizational culture

- Organizational culture refers to the shared values, beliefs, attitudes, customs, behaviors, and practices that characterize an organization.
    - It is the set of unwritten rules and assumptions that guide how employees think, act, and interact with each other, stakeholders, and the environment.
- Organizational culture is important because it influences how employees perceive their work and their relationship with the organization.
    - A strong, positive culture can foster employee engagement, collaboration, innovation, and productivity, while a negative culture can lead to low morale, conflicts, and turnover.
- Organizational culture is not something that can be created or changed overnight.
    - Organizational culture is shaped by various factors, including the organization's history, mission, leadership, work environment, and social norms.
    - It is a complex and dynamic phenomenon that evolves over time and requires sustained effort and commitment from the organization's leaders and employees.

Organization Structure Types

- An organizational structure refers to the formal system of authority, communication, and roles that defines how an organization functions and operates.
  - It determines how people are grouped together and how resources are allocated to achieve the organization's goals and objectives.
  - An organization's structure can influence its culture, decision-making, and overall effectiveness.
- There are three main types:
  - **Functional**: A traditional hierarchical organization, sometimes thought of as resembling a pyramid, with top management at the fulcrum, direct workers at the bottom, and middle managers in between
  - **Projectized**: A type of organization structure where people from different functional backgrounds work with each other throughout the lifetime of the project
  - **Matrix**: A type of organization structure that typically crosses functional design (on one axis) with some other design characteristic (on the other axis)

A functional organization structure

Project Coordination →

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                    ┌─────────────┐
                    │    Chief    │
                    │  Executive  │
                    └─────────────┘
       ┌───────────────────┼───────────────────┐
┌─────────────┐     ┌─────────────┐     ┌─────────────┐
│  Functional │     │  Functional │     │  Functional │
│   Manager   │     │   Manager   │     │   Manager   │
└─────────────┘     └─────────────┘     └─────────────┘
       │                   │                   │
┌─────────────┐     ┌─────────────┐     ┌─────────────┐
│    Staff    │     │    Staff    │     │    Staff    │
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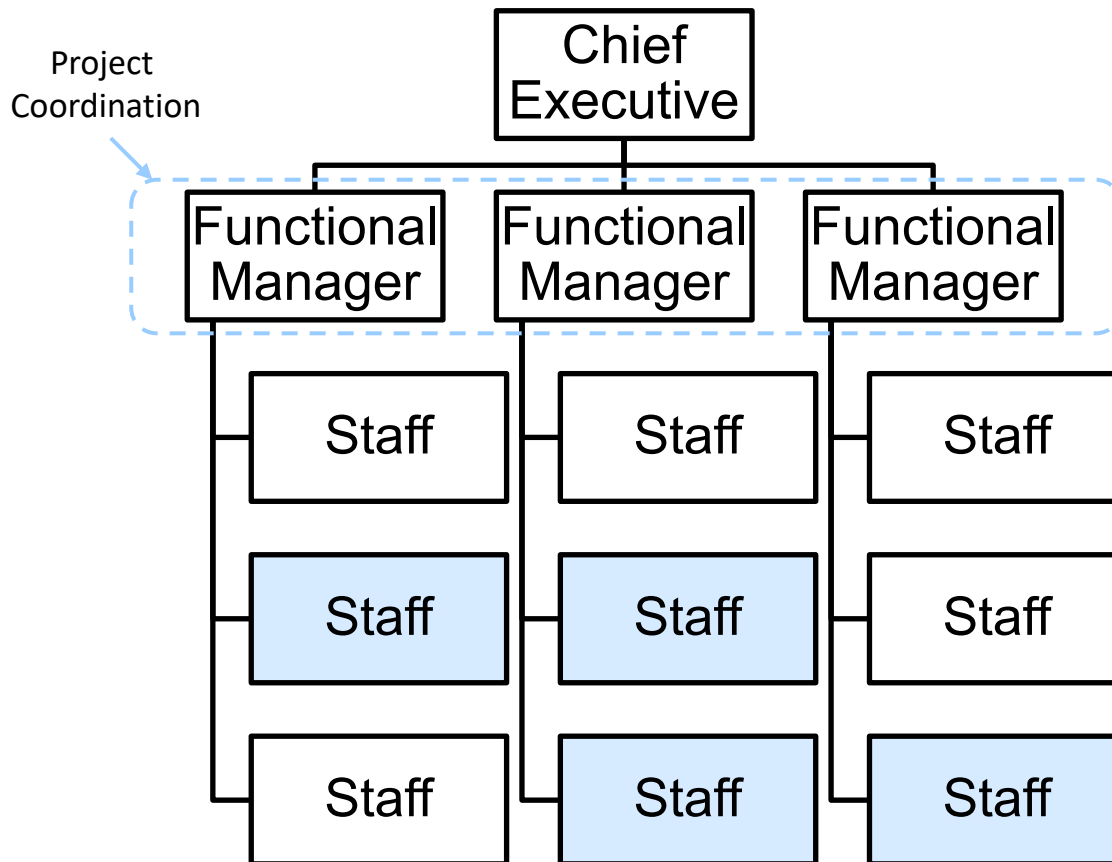
(Shaded boxes represent staff engaged in project activities)

Project-oriented organization structure
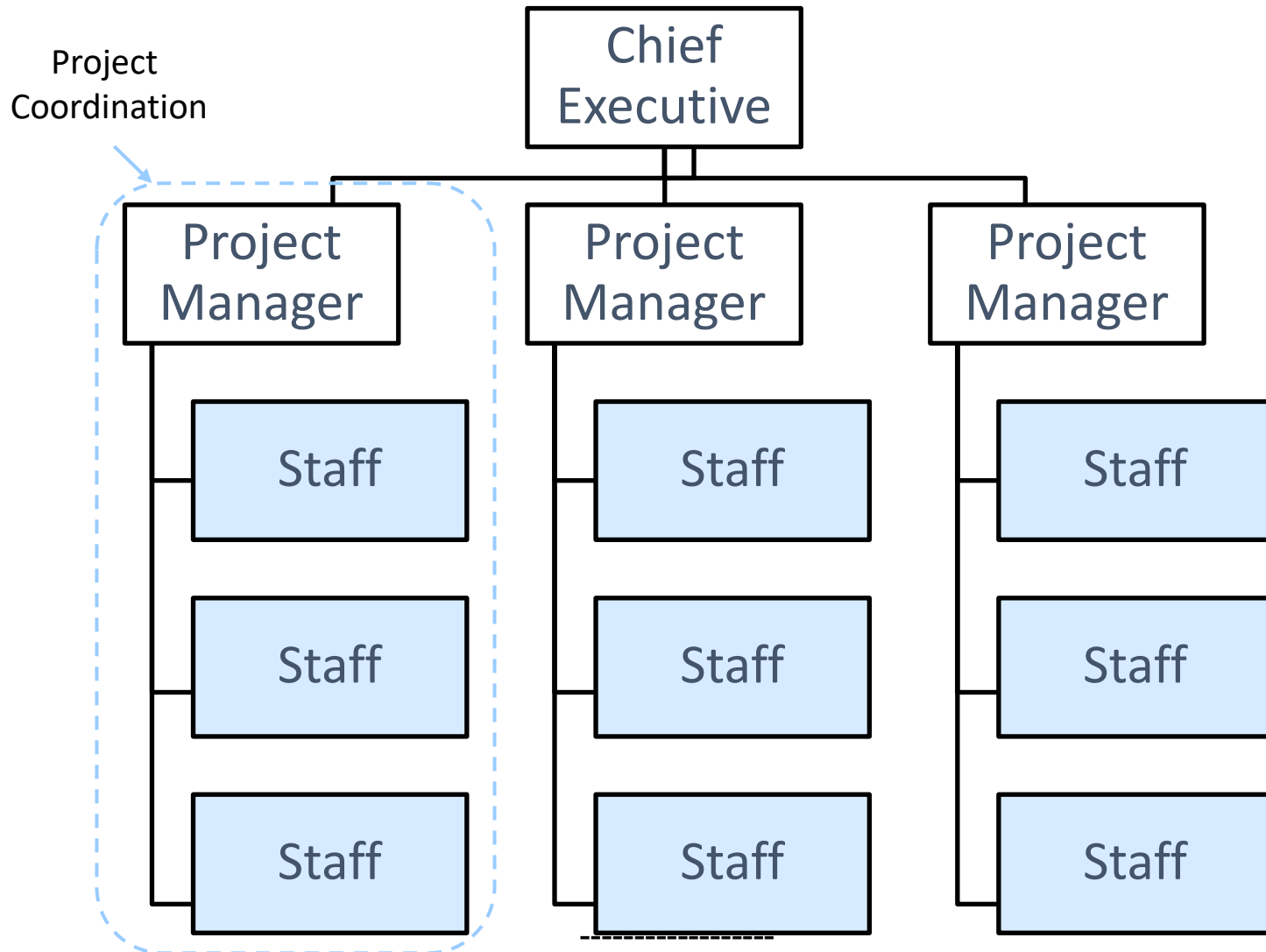
(Shaded boxes represent staff engaged in project activities)

Strong matrix organization structure

(Shaded boxes represent staff engaged in project activities)

Organization Structure Comparison

Organization Structure / Project Characteristics	Functional	Matrix			Projectized
		Weak Matrix	**Balanced Matrix**	**Strong Matrix**	
Project Manager's Authority	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total
Resource Availability	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total
Who Controls the Project Budget	Functional Manager	Functional Manager	Mixed	Project Manager	Project Manager
Project Manager's Role	Part-time	Part-time	Full-time	Full-time	Full-time
Project Management Administrative Staff	Part-time	Part-time	Part-time	Full-time	Full-time

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Project Management Processes

- Process – "*a series of continuous actions that bring about a particular result, end or condition*"

- PMBOK Process Groups
  - Initiate
  - Plan
  - Execute
  - Monitor and Control
  - Close

Project Management Processes

- **Initiating:** This process involves defining the project objectives, scope, and stakeholders. It also involves identifying the resources needed to complete the project and creating a high-level project plan.

- **Planning:** This process involves creating a detailed project plan that includes the scope, schedule, budget, quality requirements, and risk management plan. It also involves identifying the resources needed to complete the project and developing a communication plan.

- **Executing:** This process involves implementing the project plan and completing the work required to deliver the project. It involves managing the project team, communicating with stakeholders, and monitoring progress.

- **Monitoring and Controlling:** This process involves tracking the project's progress against the project plan, identifying any deviations from the plan, and implementing corrective actions. It also involves managing changes to the project scope, schedule, and budget.

- **Closing:** This process involves formally closing the project and ensuring that all deliverables have been completed, stakeholders have been satisfied, and all project documentation has been archived.

Links among process groups in a project phase
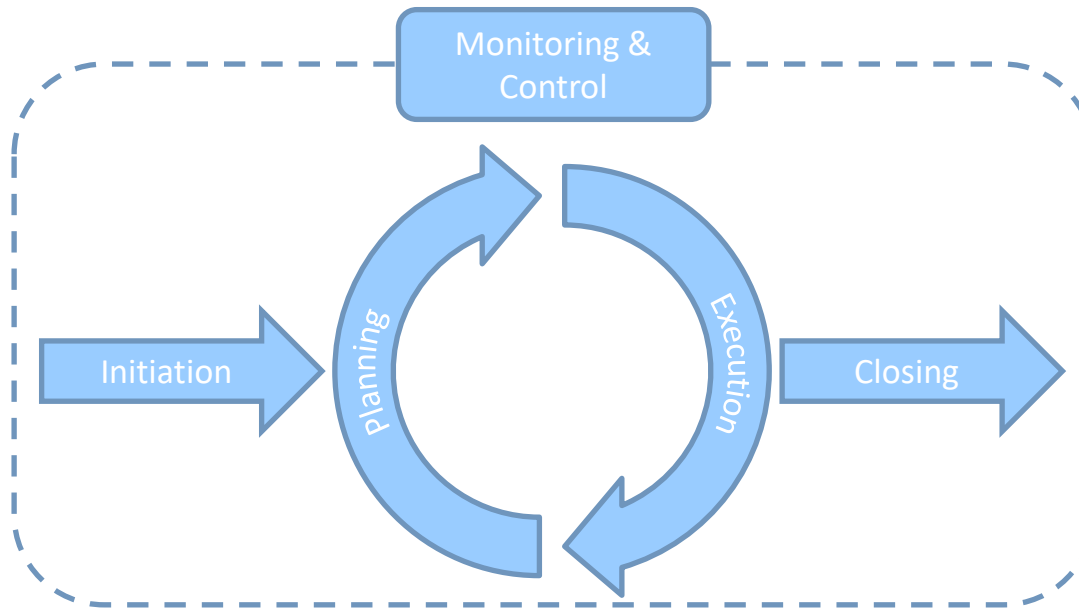
Generic life cycle
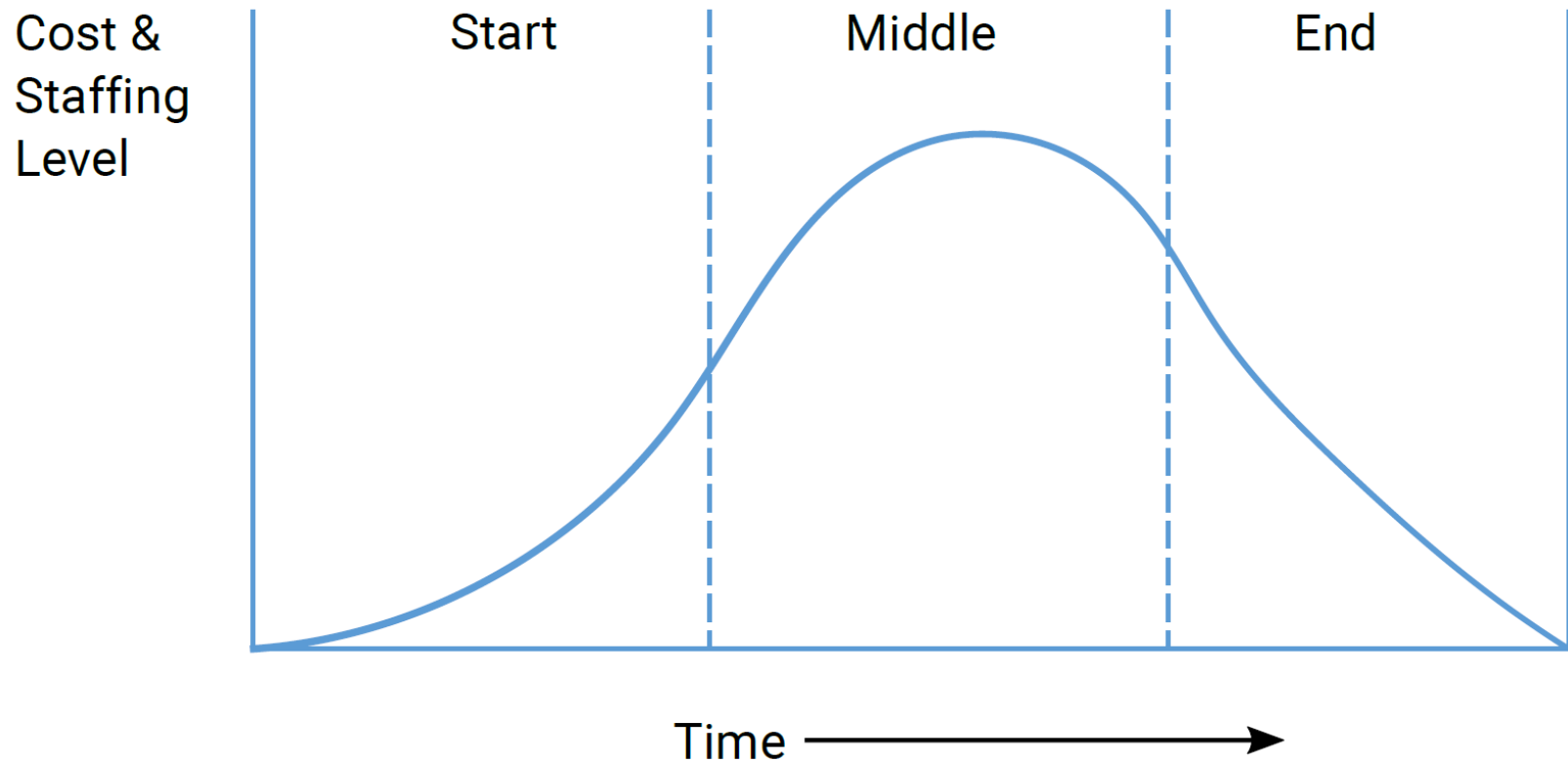
Overlap of process groups in a project phase
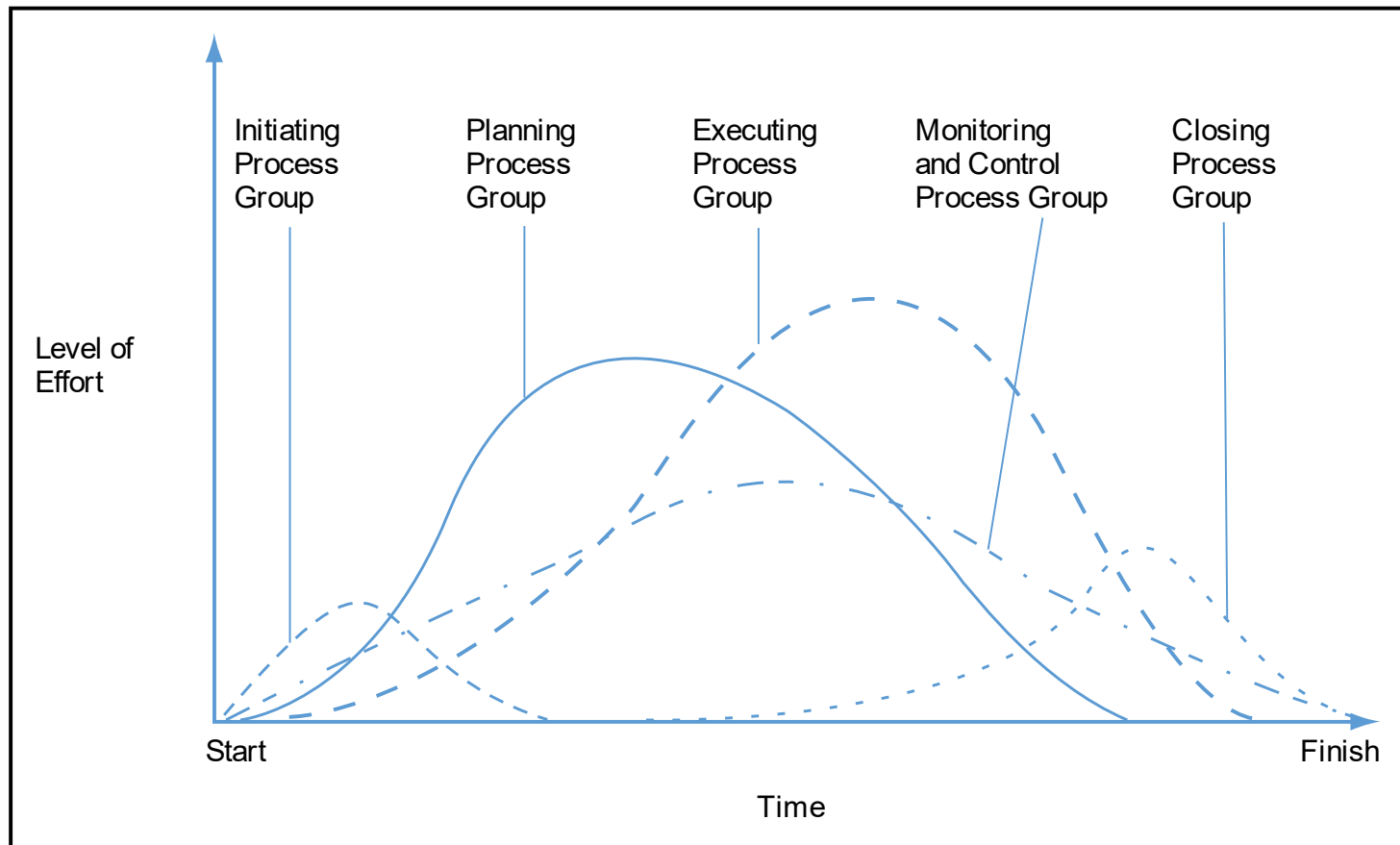
Project Manager Roles
(Desired Traits)

- Leader
- Communicator
- Negotiator
- Problem solver
- Influencer
- Motivator

Project Management Tools & Techniques

- Gantt Charts
  - Duration, beginning and ending of tasks
  - Overlap of tasks
  - Slack time

- Network Diagrams
  - Sequence of activities
  - Task dependencies
  - Slack time

Gantt Chart

- A Gantt chart shows the start and end dates of project tasks, as well as their dependencies, which means that some tasks can only be started after others have been completed.
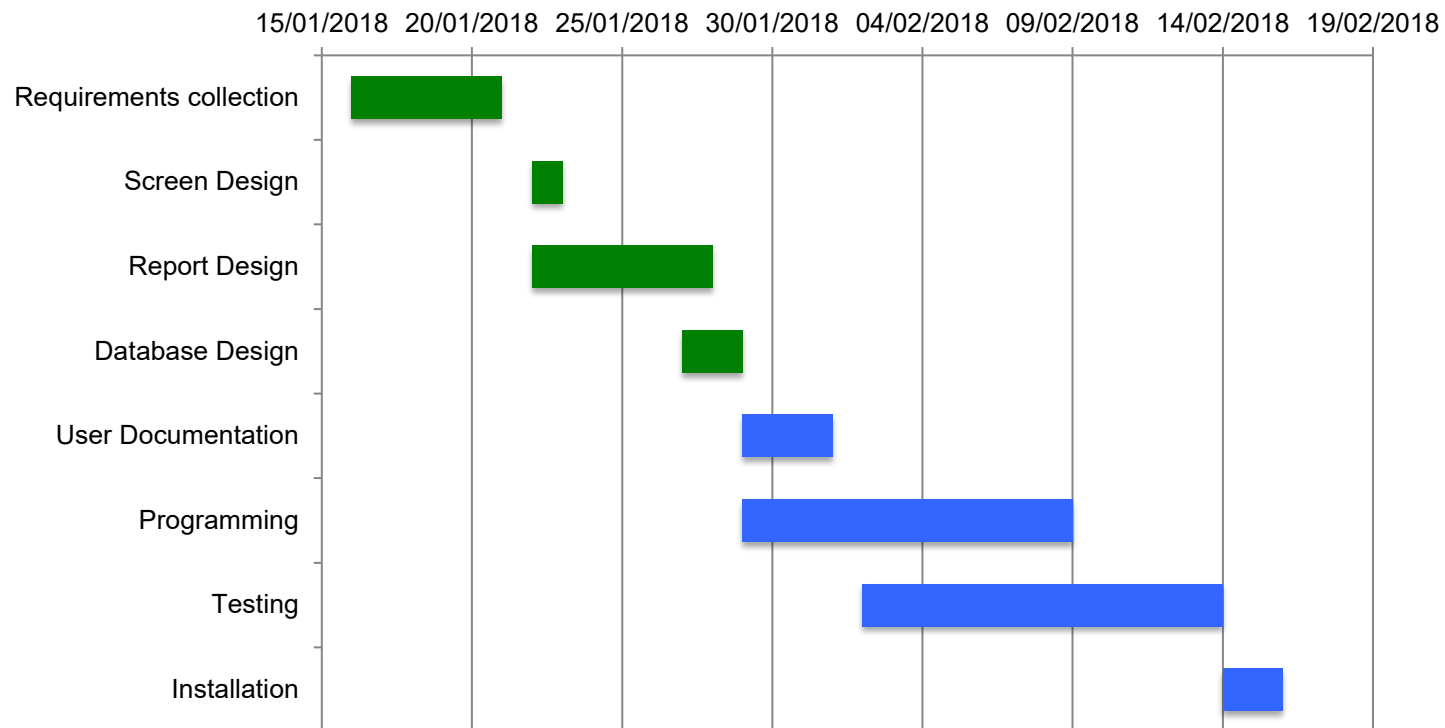
Network Diagram

- A network diagram is a graphical representation of the project schedule that uses boxes or nodes to represent project tasks and arrows to represent the dependencies between the tasks. The purpose of a network diagram is to help project managers visualize the sequence of tasks and their relationships in a project.
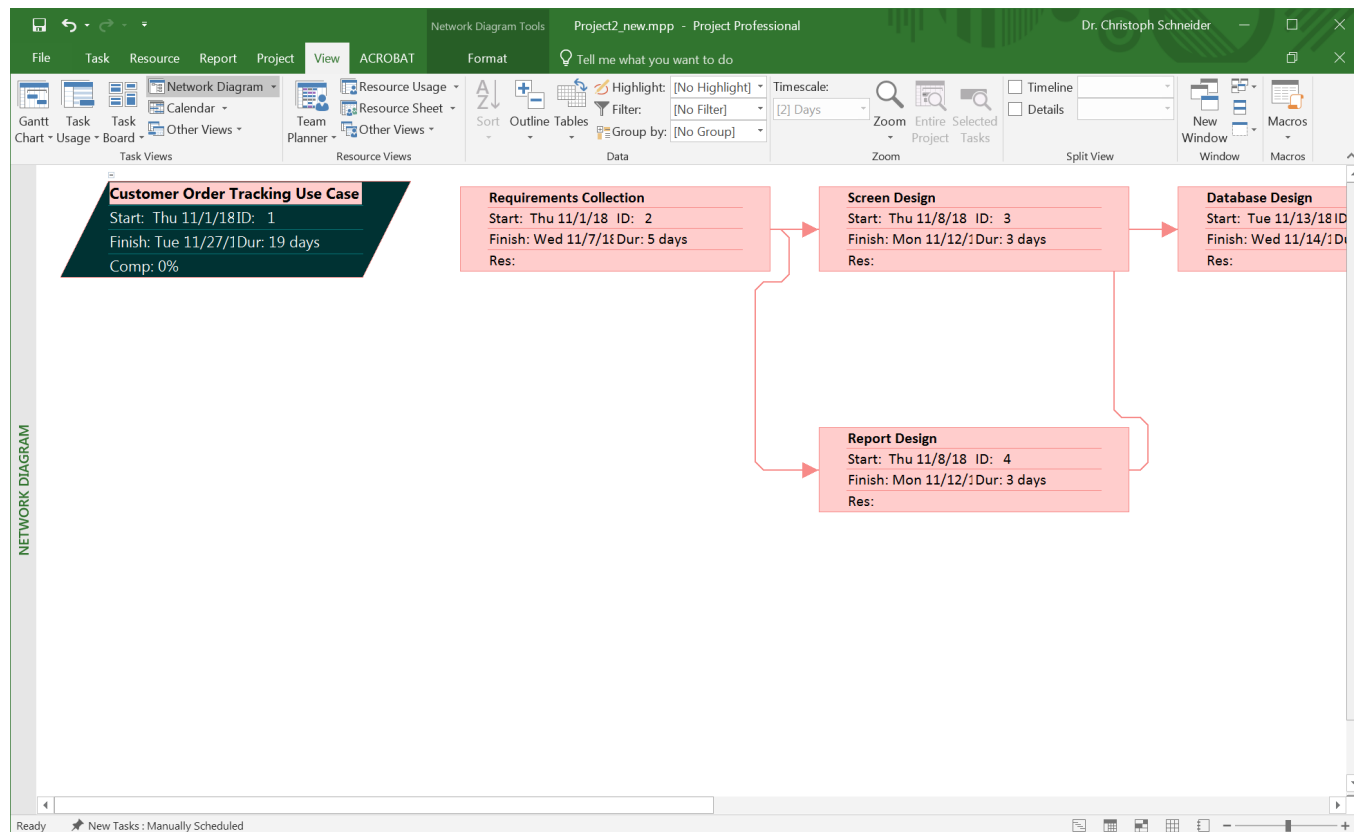
Critical Path Method (CPM)

- The sequence of task activities whose order and durations directly affect the completion date of a project

- The critical path represents the *shortest* time in which a project can be completed

- Forward/backward passes used to determine slack time

Critical Path Method (CPM) Steps

1. Identify project tasks: Identify all the tasks that are required to complete the project.

2. Determine task dependencies: Determine the relationships between the tasks and identify the predecessors and successors of each task.

3. Determine task duration: Estimate the time required to complete each task.

4. Create the network diagram: Use the task information to create a network diagram that represents the project schedule.

5. Calculate the critical path: Determine the critical path of the project by identifying the longest sequence of tasks that must be completed on time.

6. Determine the project duration: Calculate the project duration based on the critical path and the estimated duration of the tasks.

Slack Time

- Free slack – amount of time a task can be delayed without delaying the early start of subsequent task(s)

- Total slack – amount of time a task can be delayed without delaying the completion of the project

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Network Diagram
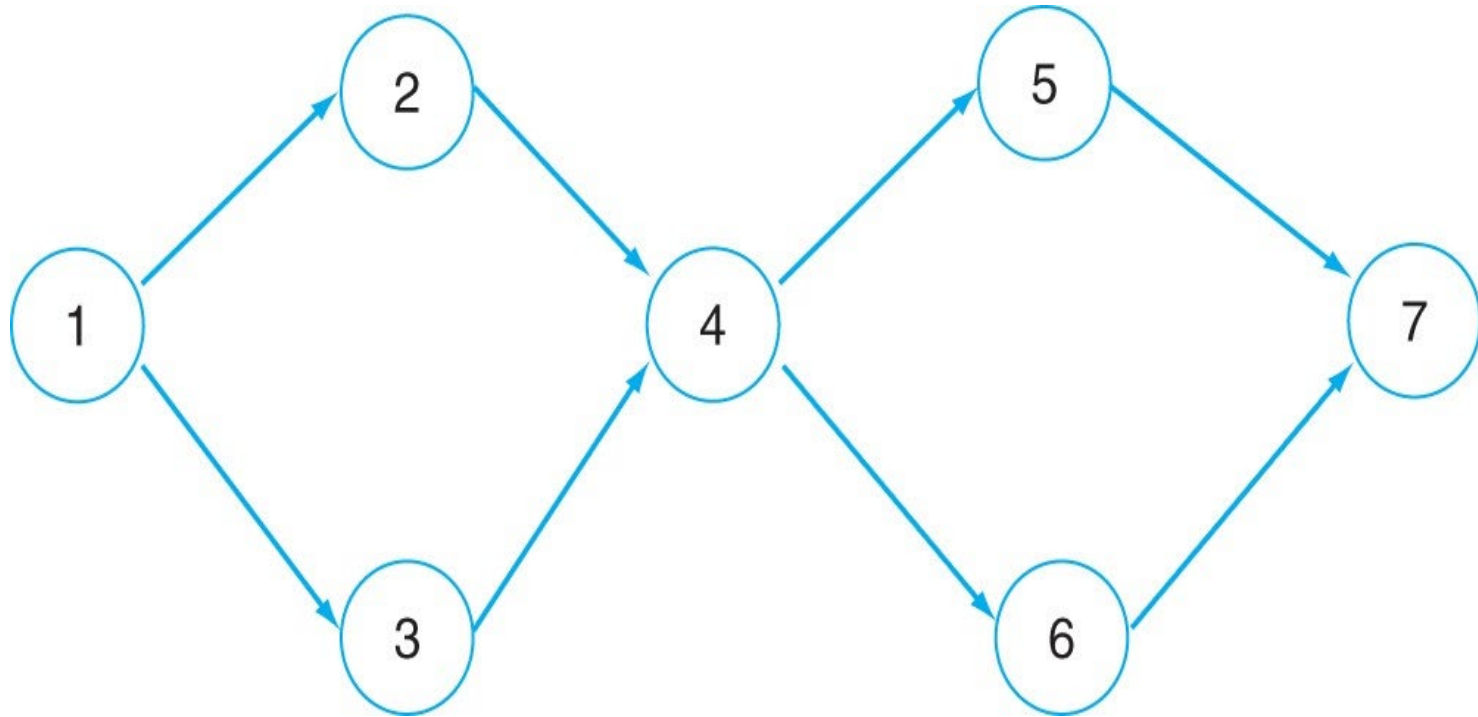
Network Diagram's Critical Path

ET = 2

ET = 2

ET = 1

2

5

ET = 3

ET = 1

$T_E = 3$
$T_L = 3$

4

$T_E = 8$
$T_L = 9$

7

1

$T_E = 1$
$T_L = 1$

ET = 2

$T_E = 6$
$T_L = 6$

ET = 3

$T_E = 10$
$T_L = 10$

3

6

$T_E = 3$
$T_L = 3$

$T_E = 9$
$T_L = 9$

Noncritical Path ⟶
Critical Path ⟶
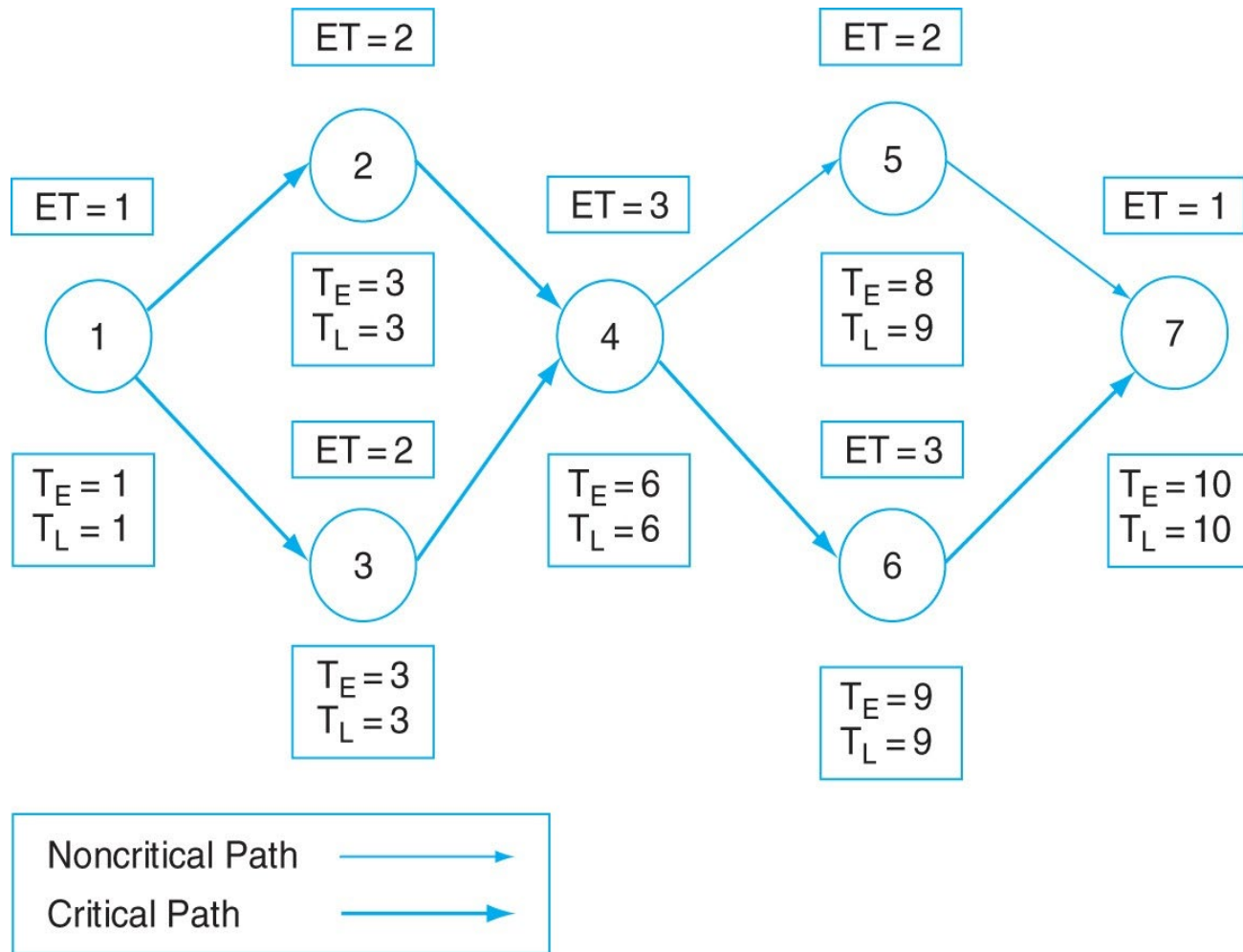
Program Evaluation Review Technique (PERT)

- Technique that calculates the expected time of a task

- Uses optimistic, pessimistic and realistic time estimates

- ET = (o + 4r + p)/6

Program Evaluation Review Technique (PERT)

Activity	Predecessor	Time estimates			Expected time
		Optimistic (o)	Real (r)	Pessimistic (p)	
A	—	2	4	6	4.00
B	—	3	5	9	5.33
C	A	4	5	7	5.17
D	A	4	6	10	6.33
E	B, C	4	5	7	5.17
F	D	3	4	8	4.50
G	E	3	5	8	5.17

Microsoft Project

- Most popular of project management tools

- Required
  - Project start and/or end date
  - Project tasks and task relationships
  - Preferred schedule method

Setting the Starting Date in Microsoft Project

Entering Tasks in Microsoft Project

Gantt Chart in Microsoft Project
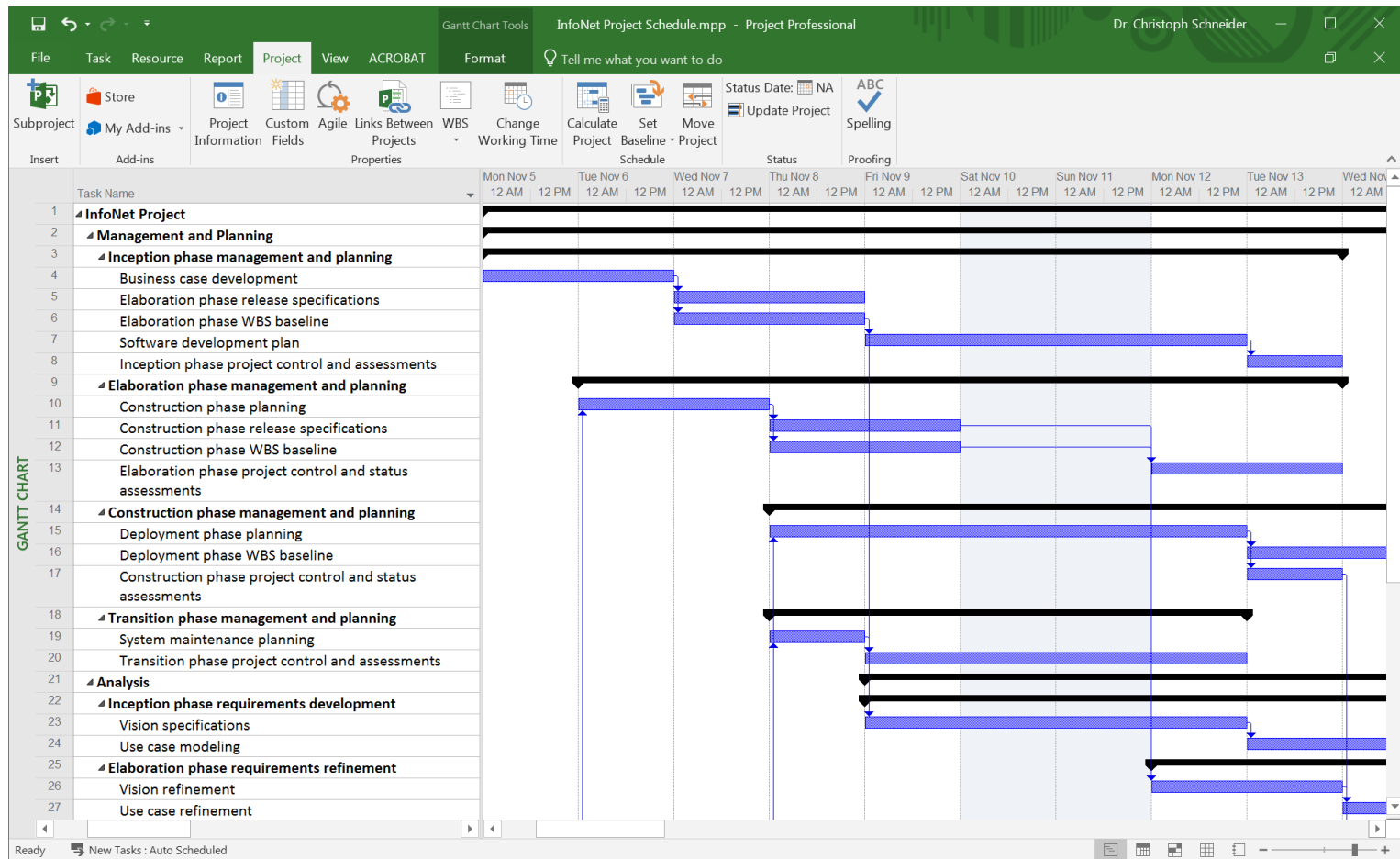
Network Diagram in Microsoft Project
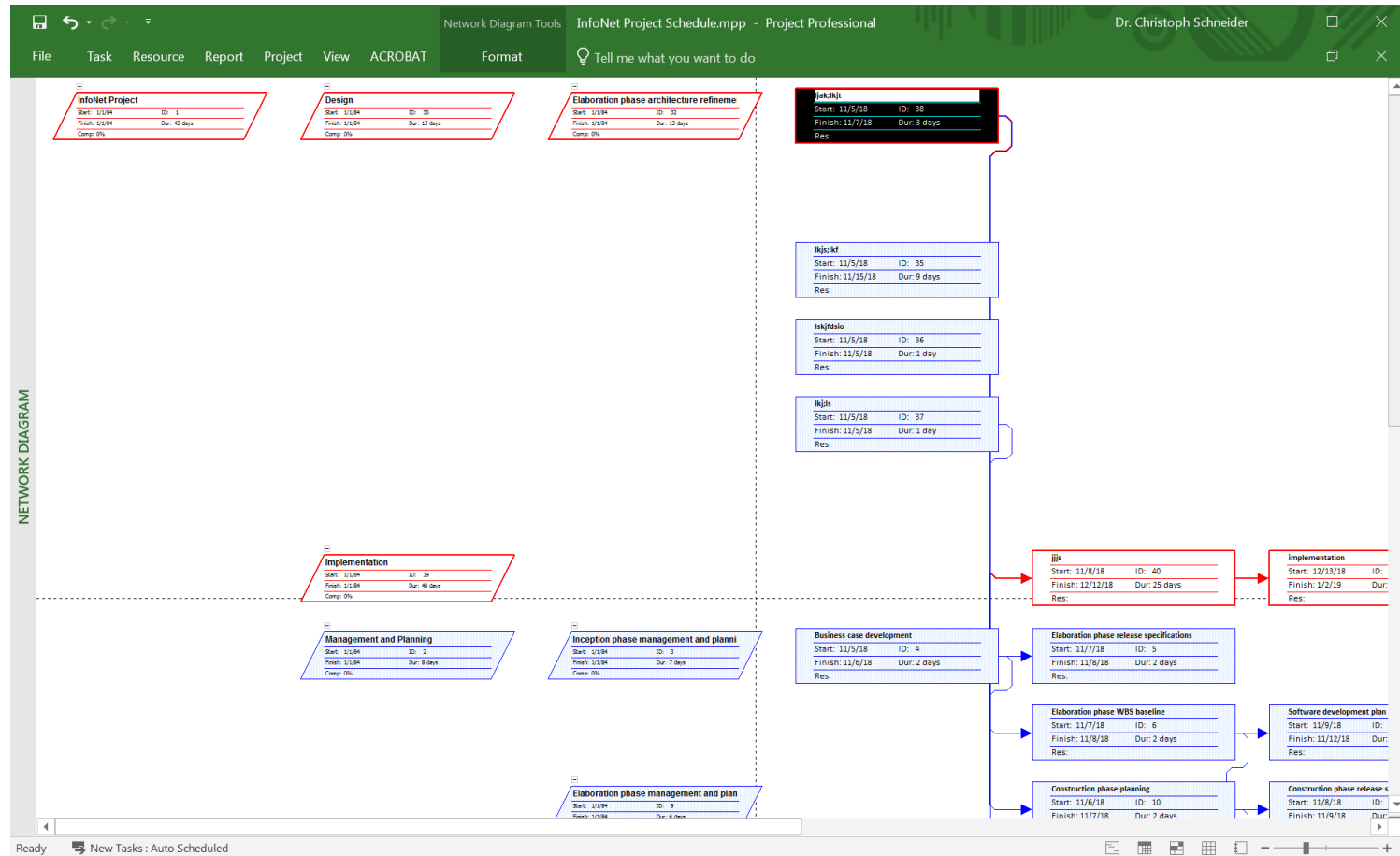
Project Management Office (PMO)

- An organizational unit created to centralize and coordinate the projects within an organization

- Function varies among organizations

Project Management Body of Knowledge (PMBOK)

- Standards and Regulations

  - Standard: "document approved by a recognized body, that provides, for common and repeated use, rules, guidelines, or characteristics for products, processes, or services with which compliance is *not mandatory*"*

  - Regulation: "document, which lays down product, process, or service characteristics, including the applicable administrative provisions, with which compliance is *mandatory*"*

    *ISO 1994

PMBOK

- Internationalization
  - Dispersed project team members
  - Time zones
  - Political differences

PMBOK (cont.)

- Cultural Differences
  - Politics
  - Economics
  - Ethnic origins
  - Demographics
  - Religion

PMBOK (cont.)

- Social-Economic-Environmental Sustainability

  - Lasting positive/negative system's impact

  - Accountability by organization

Questions?