The Project Times and Costs
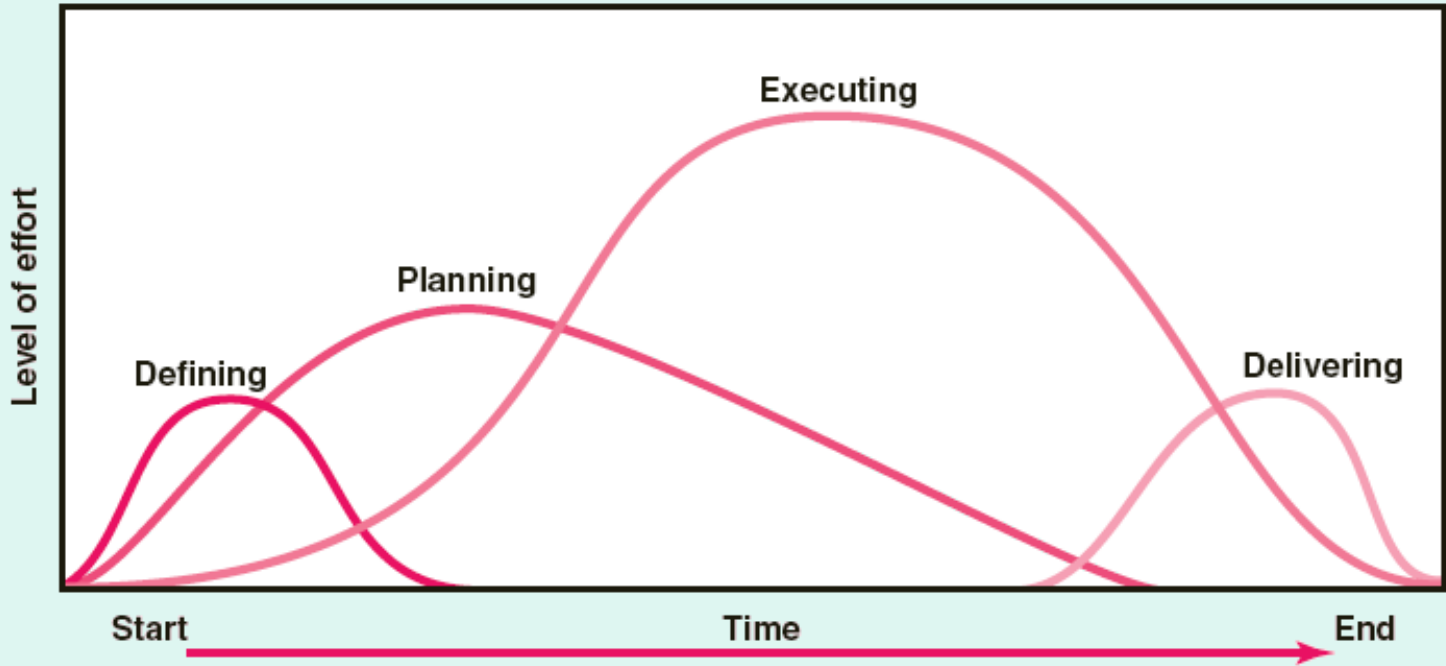
Not to underestimate the estimate

Chapter 5

Defining
1. Goals
2. Specifications
3. Tasks
4. Responsibilities

Planning
1. Schedules
2. Budgets
3. Resources
4. Risks
5. Staffing

Executing
1. Status reports
2. Changes
3. Quality
4. Forecasts

Delivering
1. Train customer
2. Transfer documents
3. Release resources
4. Release staff
5. Lessons learned

Defining the Project

Step 1: Defining the Scope

Step 2: Establishing Priorities

Step 3: Creating the Work Breakdown Structure

Step 4: Integrating with the Organization

Step 5: Coding the Information System
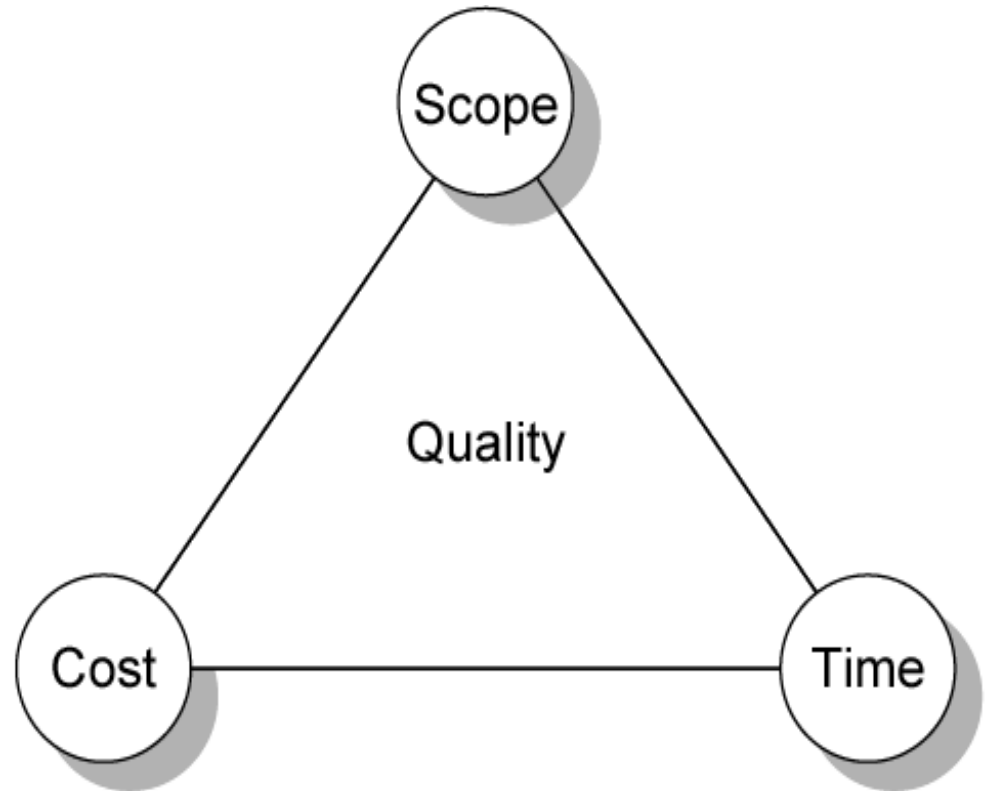
Step 1: Scope Checklist

1. Project objective

2. Deliverables

3. Milestones

4. Technical requirements

5. Limits and exclusions

6. Reviews with customer

Step 2: Project Priorities

Relative importance

- Budget–Cost
- Schedule–Time
- Performance–Scope

Project Priority Matrix

	Time	Performance	Cost
Constrain		⬤	
Enhance	⬤		
Accept			⬤

Step 3: Work Breakdown Structure WBS

- Facilitates evaluation of cost, time, and technical performance
- Provides management with information
- Helps the Organization Breakdown Structure (OBS), which assigns project responsibilities to organizational units and individuals
- Helps manage plan, schedule, and budget
- Defines communication channels and assists in coordinating

Work Breakdown Structure WBS
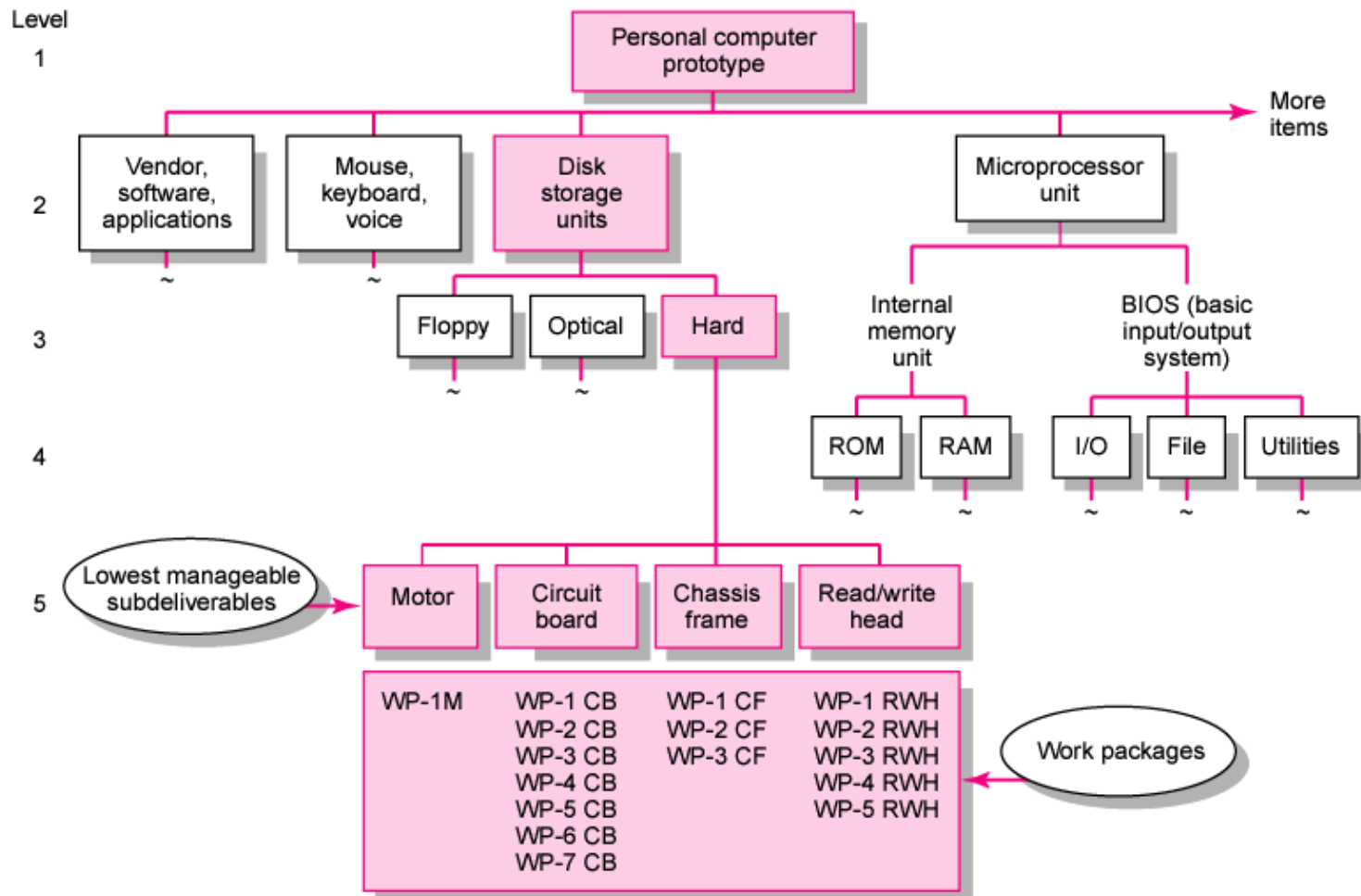
Step 4: Organizational Breakdown Structure

OBS depicts how the firm is organized to discharge its work responsibility for a project

- Provides a framework to summarize organization work unit performance

- Identifies organization units responsible for work

- Ties the organizational units to cost control accounts

Integrating WBS with OBS
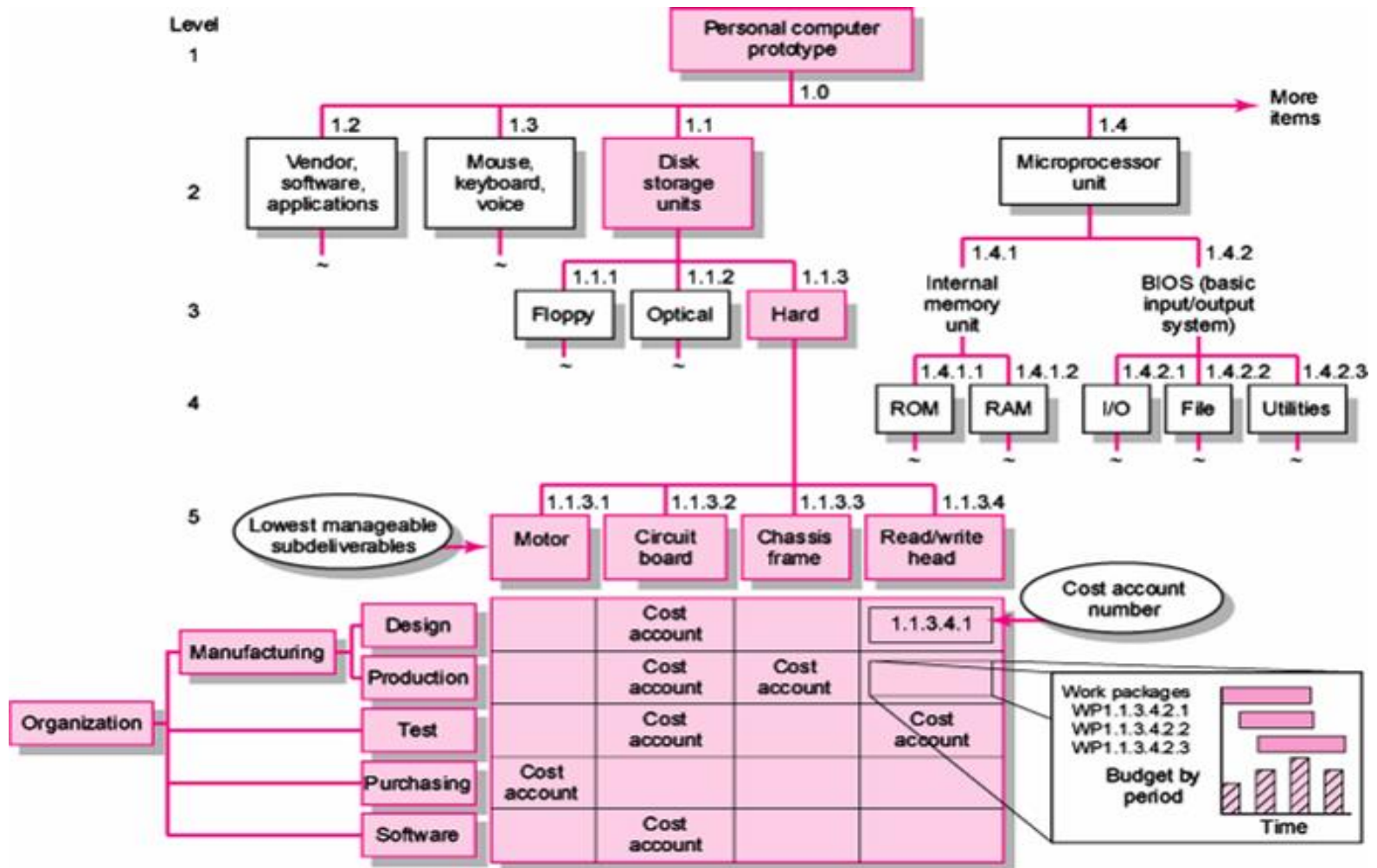
Step 5: WBS Coding System

- Defines:
  - Levels and elements of the WBS
  - Organization elements
  - Work packages
  - Budget and cost information
- Allows reports to be consolidated at any level in the organization structure

Estimating Projects

- The process of forecasting or approximating the time and cost of completing project deliverables

- The task of balancing the expectations of stakeholders and the need for control while the project is implemented

Why Estimating Time and Cost

- to support good decisions
- to schedule work
- to determine how long the project should take
- to determine its cost
- to decide whether the project is worth doing
- to estimate cash flow needs
- to control the progress of the project
- to develop time-phased budgets
- to establish project baseline

Types of Estimates

- Top-down (macro) estimates: analogy, group consensus, or mathematical relationships

- Bottom-up (micro) estimates: estimates of elements of the work breakdown structure

Factors Influencing Quality of Estimates
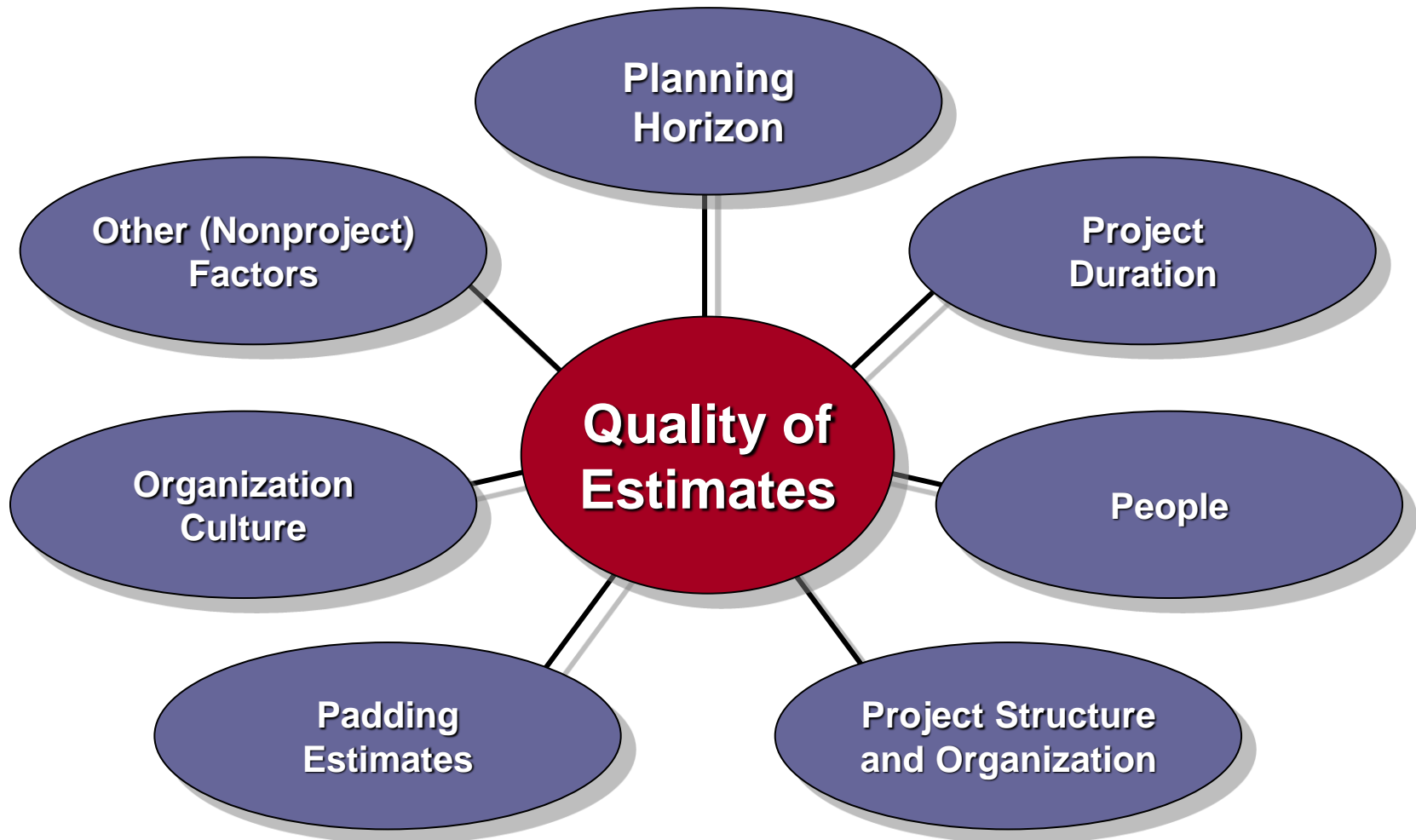
Estimating Guidelines for Times, Costs, and Resources

1. Have people familiar with the tasks to estimate
2. Use several people to make estimates
3. Base estimates on normal conditions and resources
4. Use consistent time units in estimating task times
5. Treat each task as independent, never aggregate
6. Do not allow contingencies
7. Risk assessment to avoid surprises to stakeholders

Estimating Projects

- **Make rough top-down estimates**

- **Make bottom-up estimates**

- **Develop schedules and budgets**

- **Reconcile differences between top-down and bottom-up estimates**

Estimating at the Strategic Level

- Top-Down Approaches
  - Consensus
  - Ratio Methods (Parametric)
  - Apportion Methods
  - Function Point Methods for Software and System Project (table 5.2, 5.3)
  - Learning Curves

- Disadvantage
  - time and cost for specific tasks not considered

Estimating at Work Package Level

- Bottom-Up Approaches
  - Template Methods (Past Projects in Database)
  - Parametric Procedures to Specific Tasks
  - Detailed Estimates for Work Breakdown Structure
  - Phase Estimating (refine Top-Down)

- Advantages
  - More accurate, reduce uncertainty, support efficiency
  - Check on cost elements in the WBS
  - Check on resource requirements

Types of Costs

- **Direct Costs**
  - clearly chargeable to a specific work package.
    - Labor, materials, equipment, and other

- **Project Overhead Costs**
  - directly tied to an identifiable project.
    - Salary, rents, supplies, specialized machinery

- **General and Administrative Overhead Costs**
  - organization costs indirectly linked to and apportioned to the project

Break-even analysis

volume	fixed cost	variable	price	total cost	total revenue	result
0	2 000	500	1 000	2000	0	-2000
1	2 000	500	1 000	2500	1000	-1500
2	2 000	500	1 000	3000	2000	-1000
	2 000	500	1 000	3500	3000	-500
4	**2 000**	**500**	**1 000**	**4000**	**4000**	**0**
5	2 000	500	1 000	4500	5000	500
6	2 000	500	1 000	5000	6000	1000
7	2 000	500	1 000	5500	7000	1500
8	2 000	500	1 000	6000	8000	2000
9	2 000	500	1 000	6500	9000	2500
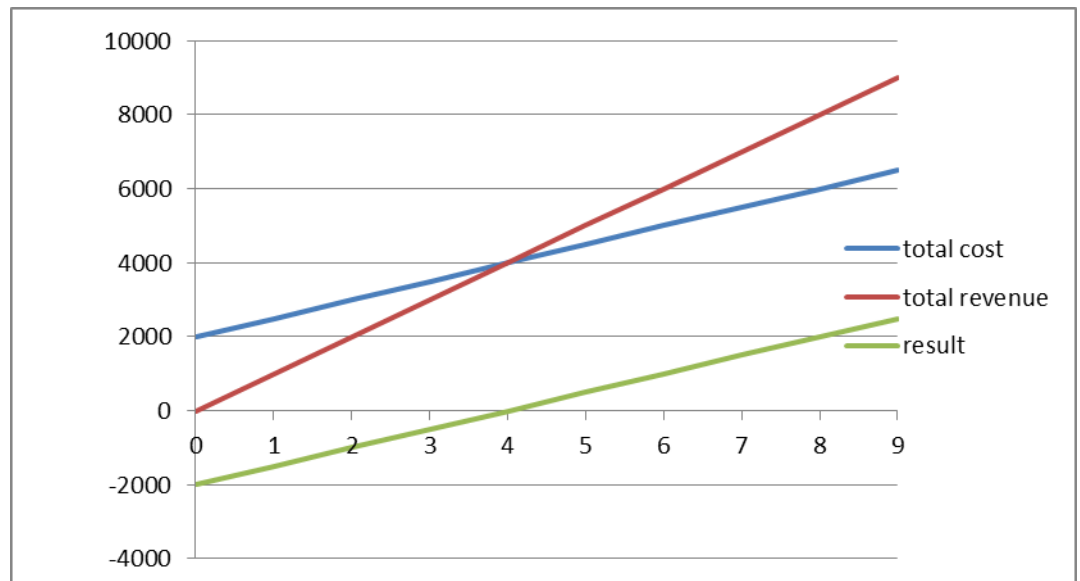
Three Views of Cost
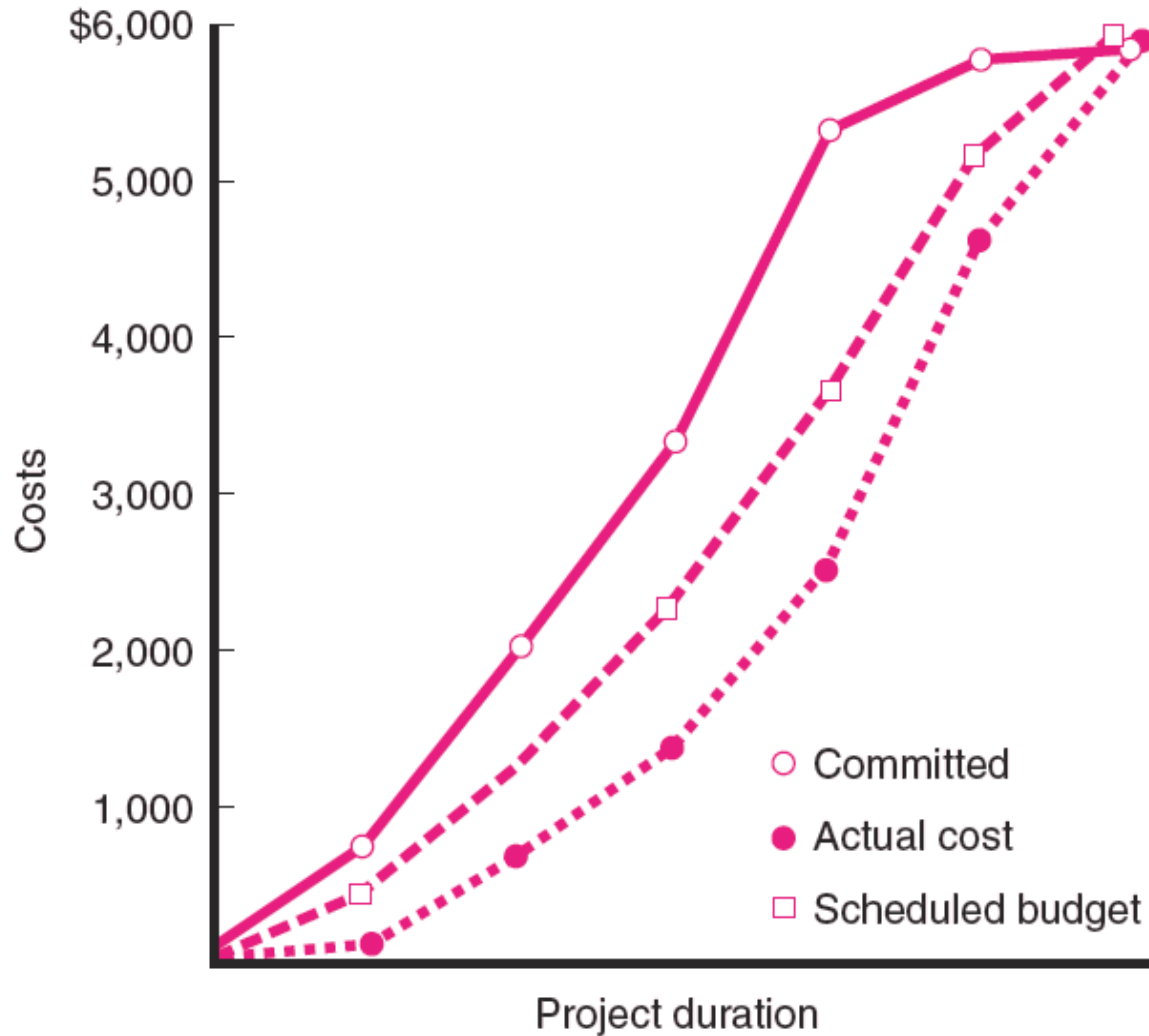
Get the team to buy into time and cost

- **Highly motivated team**
- **Culture that allows errors without incriminations**
- **Top-down estimates**
- **Bottom-up estimates**
- **Estimates for each work package**
- **Learning curves**
- **Time and costs estimating database**
- **Defining objectives, scope, and specifications**
- **Team climate**
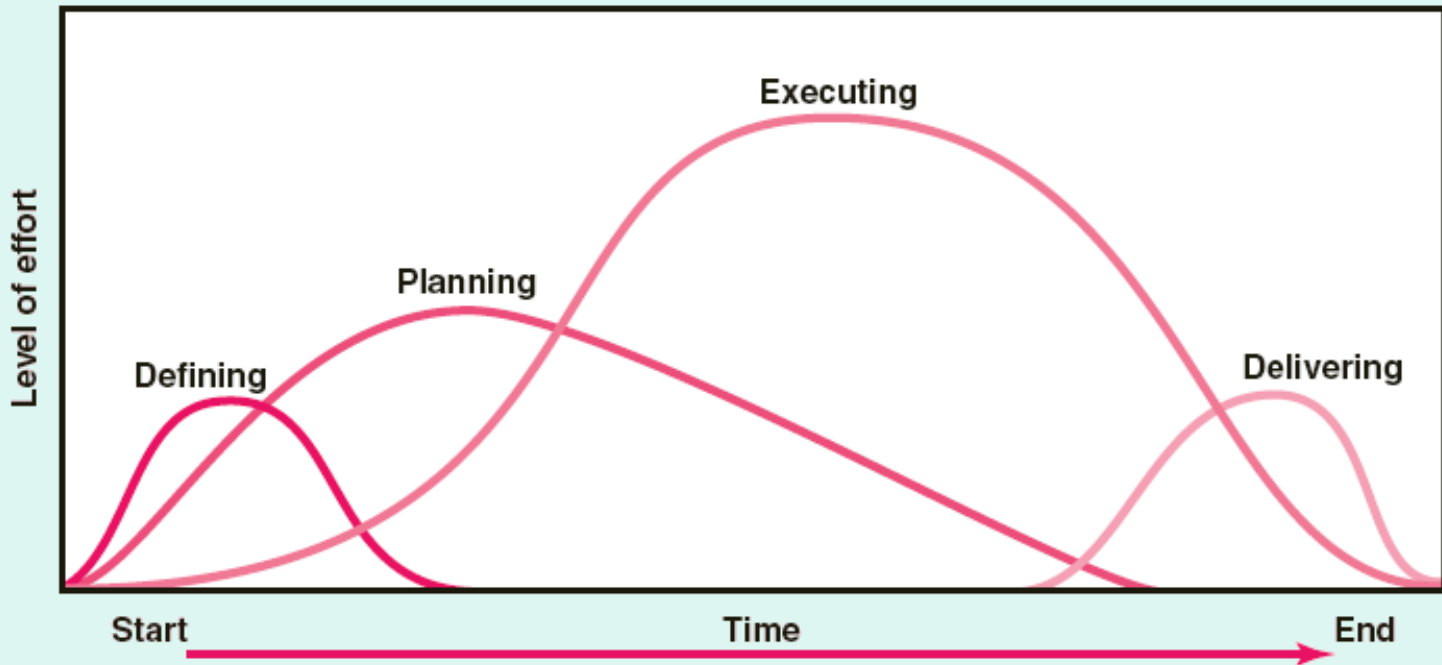- **Organization culture and structure**

Developing a Project Plan

and Managing Risks

Chapter 6

The Project Life Cycle

Defining
1. Goals
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The Project Network

The **critical path** graphically depicts the sequence, interdependencies, and start and finish times of the project job plan of activities

- Provides the basis for scheduling labor and equipment

- Provides an estimate of the project's duration

- Provides a basis for budgeting cash flow

- Highlights activities that are "critical" and should not be delayed

- Help managers get and stay on plan

Constructing a Project Network

– **Activity:** an element of the project that requires time.

– **Merge activity:** an activity that has two or more preceding activities on which it depends.

– **Parallel (concurrent) activities:** Activities that can occur independently and, if desired, not at the same time.
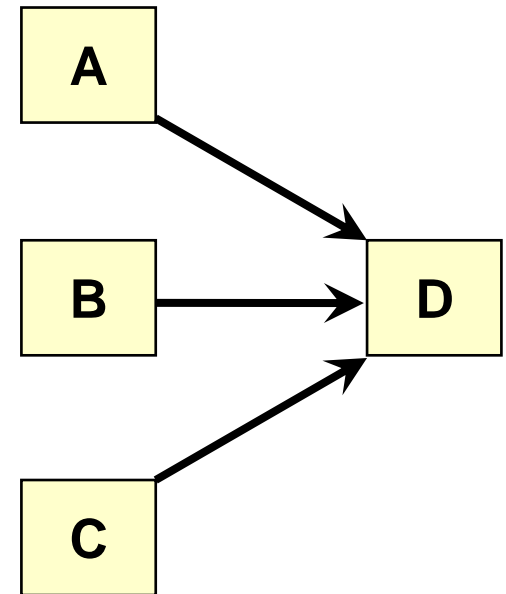
# Rules in Developing Project Networks

- Networks typically flow from left to right.

- An activity cannot begin until all of its activities are complete.

- Arrows indicate precedence and flow and can cross over each other.

- Identify each activity with a unique number; this number must be greater than its predecessors.

- Looping is not allowed.

- Conditional statements are not allowed.

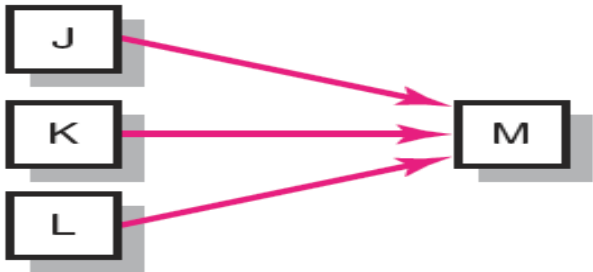- Use common start and stop nodes.

Activity-on-node   AON

A is preceded by nothing
B is preceded by A
C is preceded by B

(A)
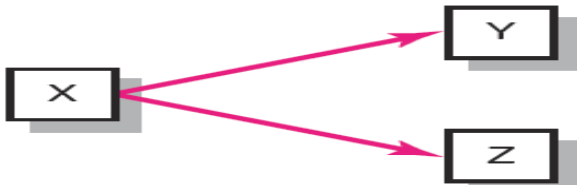
Y and Z are preceded by X
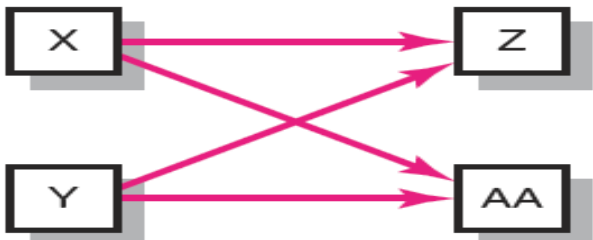
Y and Z can begin at the same time, if you wish

(B)

J, K, & L can all begin at the same time, if you wish (they need not occur simultaneously)

but

All (J, K, L) must be completed before M can begin
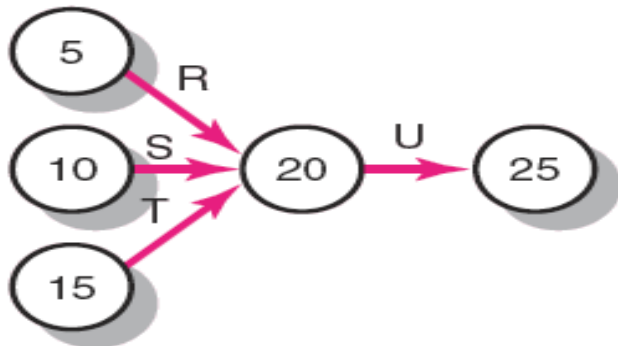
(C)

Z is preceded by X and Y

AA is preceded by X and Y

(D)

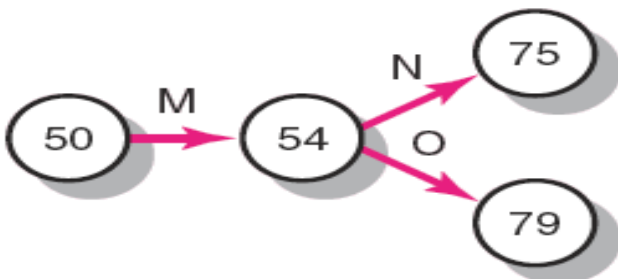# Activity-on-arrow   AOA

Y is preceded by X

(A)

U is preceded by R, S, T

R, S, T can occur concurrently, if you wish

(B)

N and O are preceded by M

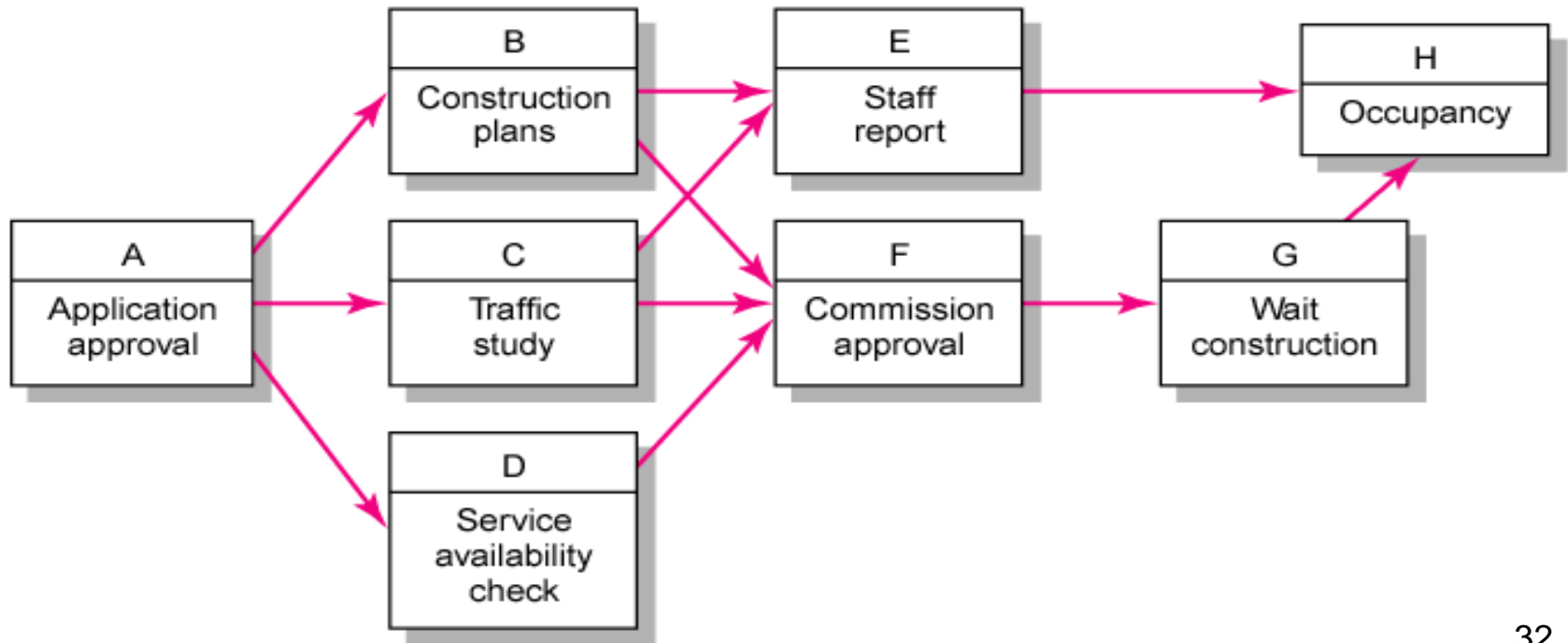When M is complete, N and O can occur concurrently, if you wish

(C)

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Network Information

KOLL BUSINESS CENTER
County Engineers Design Department

Activity	Description	Preceding Activity	Activity Time
A	Application approval	None	5
B	Construction plans	A	15
C	Traffic study	A	10
D	Service availability check	A	5
E	Staff report	B, C	15
F	Commission approval	B, C, D	10
G	Wait for construction	F	170
H	Occupancy	E, G	35

Complete Network

Activity-on-Node Network

B		
	Construction plans	
	15	

E		
	Staff report	
	15	

H		
	Occupancy	
	35	

A		
	Application approval	
	5	

C		
	Traffic study	
	10	

F		
	Commission approval	
	10	

G		
	Wait for construction	
	170	

D		
	Service check	
	5	

Legend

ES	ID	EF
SL	Description	
LS	Dur	LF

EF

KOLL BUSINESS CENTER
County Engineers Design Department

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