



IEM(21IS602)

UNIT-2

MOTIVATION

- ◆ Motivation is inspiring the subordinates to contribute with zeal and enthusiasm towards organizational goals.
- ◆ Performance of an employee
 - $\text{Performance} = \text{Ability} \times \text{willingness}$
- ◆ Motivation is enhancing the willingness to work which improves the performance.

Role of today's manager is not to control others but to organize the workplace in such a way that each person

- Can learn
- Contribute
- Grow

Giving Meaning to Work

To meet higher-level motivational needs and help people get intrinsic rewards from their work is to instill a sense of **importance and meaningfulness.**

Job Design for Motivation

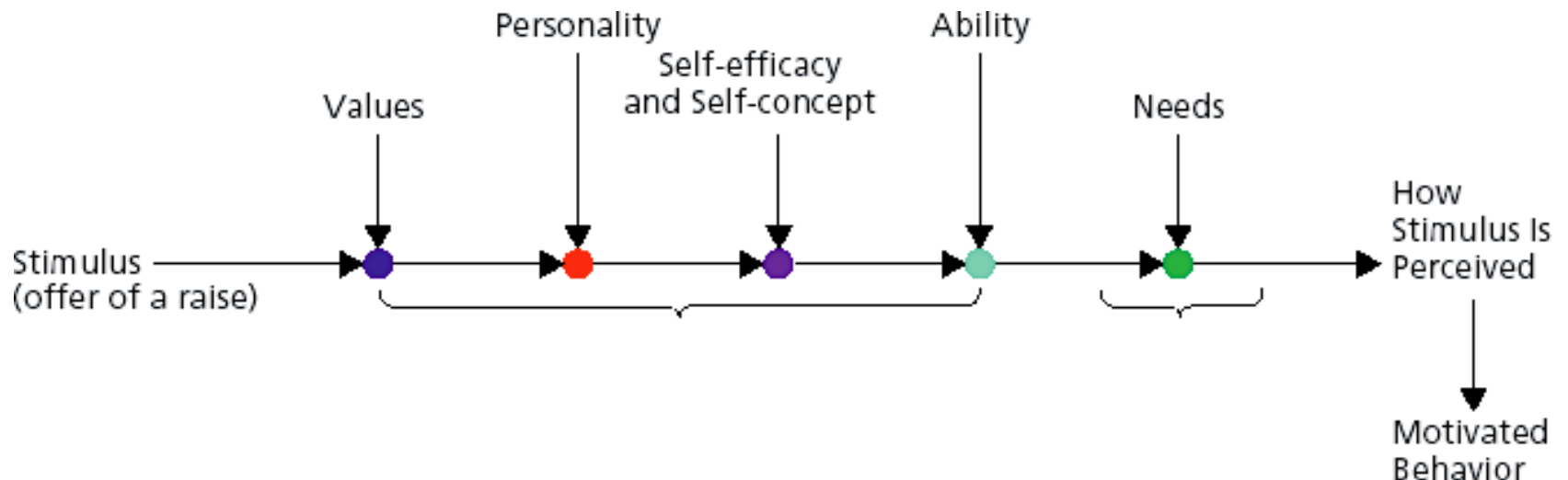
- **Job design** = application of motivational theories to the structure of work for improving productivity and satisfaction.
- **Job simplification** = job design whose purpose is to improve task efficiency by reducing the number of tasks a single person must do.

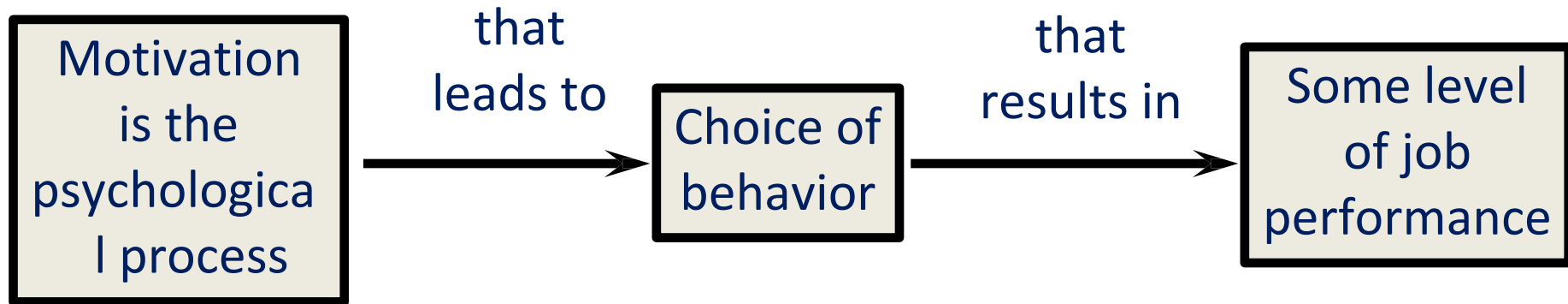
Job Design for Motivation

- **Job Rotation** = job design that systematically moves employees from one job to another to provide them with variety and stimulation
- **Job Enlargement** = job design that combines a series of tasks into one new, broader job to give employees variety and challenge

Motivation is a psychological process that causes the arousal, direction, and persistence of voluntary actions that are goal directed.

Some Individual Determinants of Behavior





The Motivation-Behavior-Job Performance Sequence

- Why know about motivation?
 - Help you understand your behavior and the behavior of others
 - Can help a manager build and manage a “system of motivation.”
 - Offers conceptual tools for analyzing motivation problems in organizations

Theories of Motivation

Early (Content) Theories

“Emphasis on what motivates individuals”

1. Maslow's Hierarchy of Needs
2. ERG Theory of Alderfer
3. Gregor's Theory X and Theory Y
4. Herzberg's Two-Factor Theory
5. McClelland's Theory of Needs

Contemporary (Process) Theories

“Emphasis on actual process of motivation”

1. Cognitive Evaluation Theory
2. Goal-Setting Theory
3. Self-Efficacy Theory
4. Reinforcement Theory
5. Equity Theory
6. Vroom's Expectancy Theory

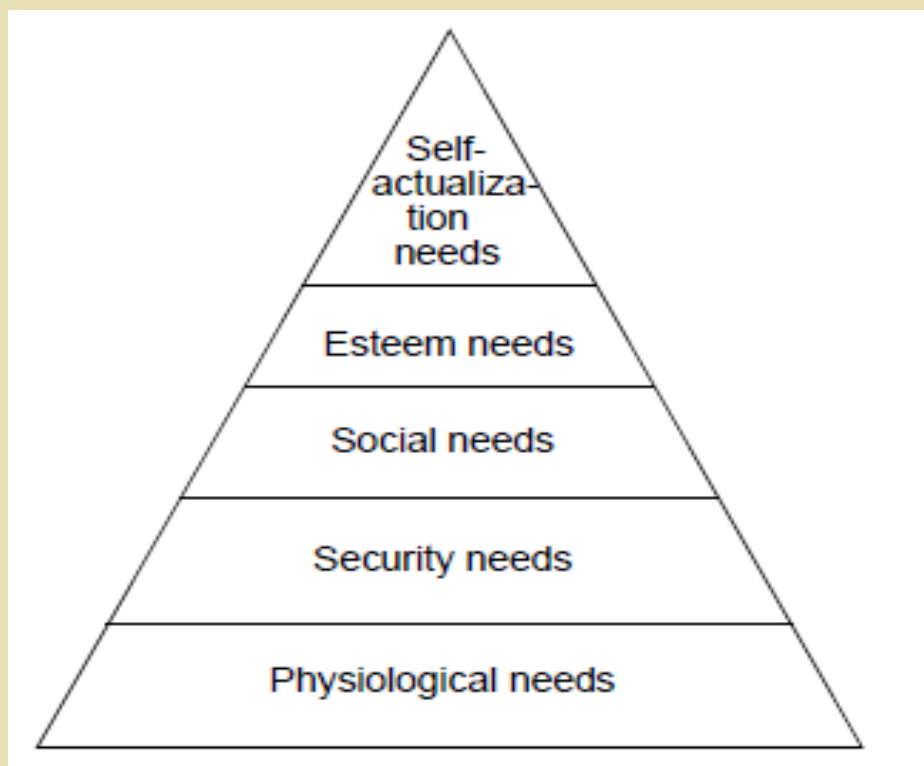
Motivation Theories

- ◆ Maslow's Need Hierarchy Theory
- ◆ Herzberg's Two Factors Theory
- ◆ Gregor's Theory X and Theory Y



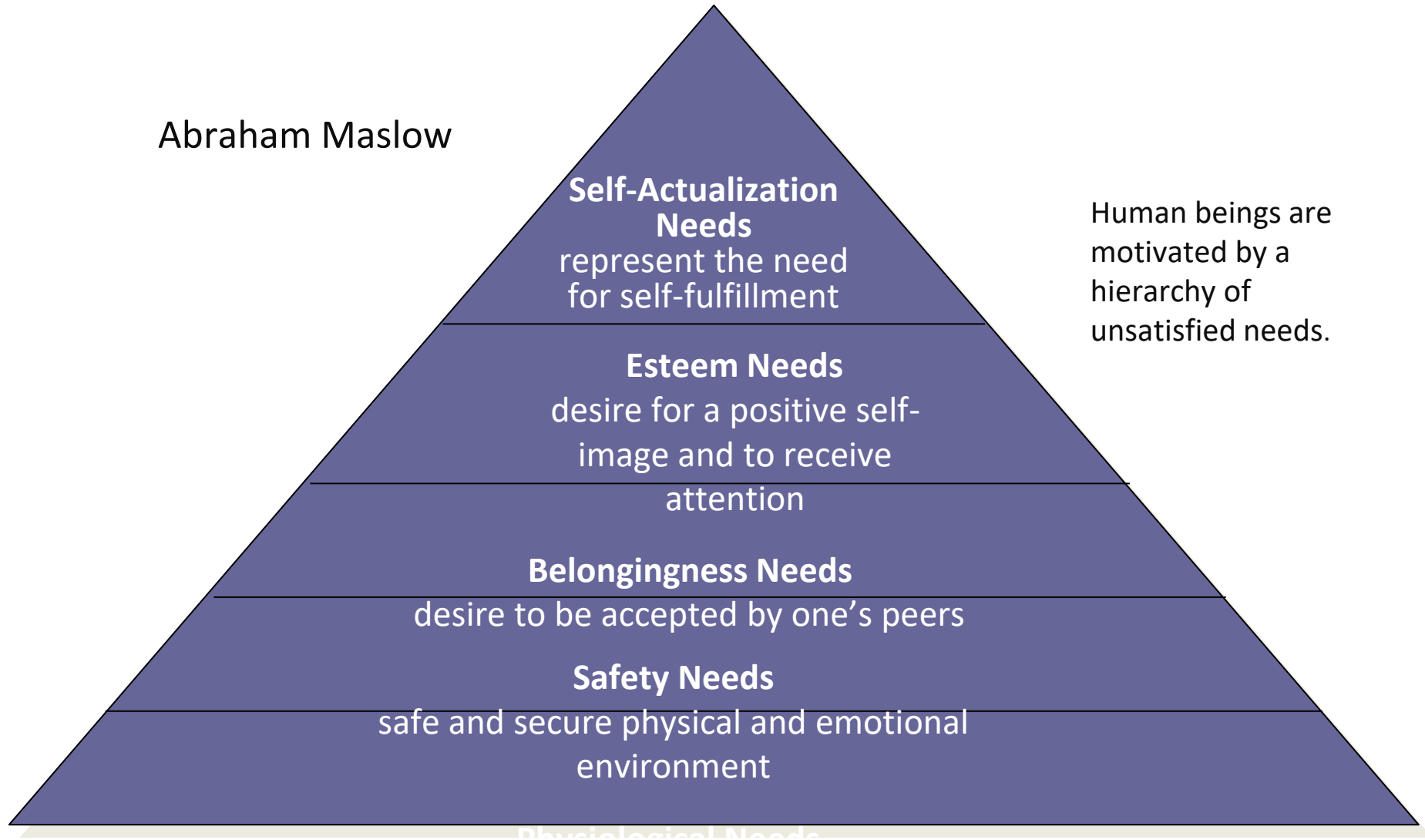
Maslow's Need Hierarchy Theory

- ◆ An unsatisfied need is the starting point in the motivation process.
- ◆ A.H. Maslow in 1943



Hierarchy of Needs Theory

Abraham Maslow



Human beings are motivated by a hierarchy of unsatisfied needs.

Maslow's Need Hierarchy Theory

◆ Physiological needs:

- The basic needs for sustaining human life itself, such as food, water, shelter and sleep.
- Until these needs are satisfied to the reasonable degree necessary to maintain life, other needs will not motivate people.

◆ Security or safety needs:

- People want to be free of physical danger and of the fear of losing job, property or shelter.

◆ Social needs:

- Since people are social being, they need to belong, to be accepted by others.

Maslow's Need Hierarchy Theory

◆ Esteem needs:

- Once people begin to satisfy their need to belonging, they tend to want to be held in esteem both by themselves and by others.
- This kind of need produces such satisfaction as power, prestige and status.

◆ Self-actualization needs:

- It is desire to become what one is capable of becoming to maximize one's potential and to accomplish something.



Hertzberg's Two Factors Theory

- ◆ Fredrick Hertzberg and his associates have proposed a two factors theory of motivation.
- ◆ In one group of needs are such things as company policy and administration, supervision, working conditions, interpersonal relations, salary, job security and personal life. These are called as dis-satisfiers and not motivators. If they exist in a work environment, they yield no dissatisfaction. Their existence does not motivate but their absence result dis-satisfaction. Hertzberg called these factors as hygiene or maintenance factors.
- ◆ The second group he listed certain satisfiers and therefore motivators, which are related to job content. They include achievement, recognition, challenging work, advancement and growth in the job.

Hertzberg's Two Factors Theory

- ◆ The first group of factors (the dissatisfiers) will not motivate in the organization, yet they must be present otherwise dissatisfaction will arise.
- ◆ The second group or the job content factors are real motivators because they have the potential of yielding a sense of satisfaction.
- ◆ It means managers must give considerable attention to upgrading job content.

Hygiene factors	Motivators
Status	Challenging work
Interpersonal relations	Achievement
Quality of supervision	Responsibility
Company policy and administration	Growth in the job.
Working conditions	Advancement
Job security	Recognition
Salary	

Herzberg's Two-Factor Theory

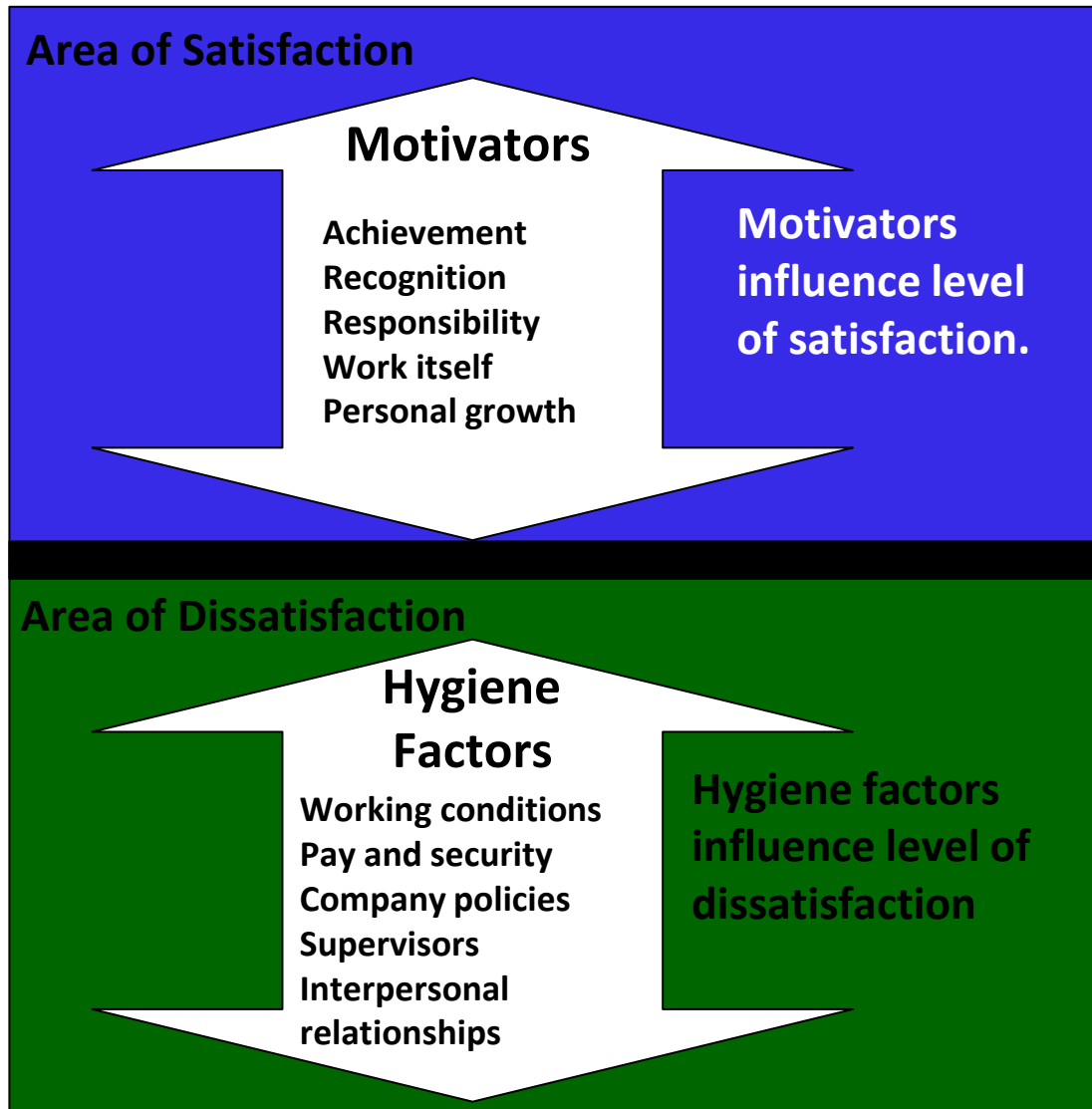
Hygiene Factor - work condition related to dissatisfaction caused by discomfort or pain

- maintenance factor
- contributes to employee's feeling not dissatisfied
- contributes to absence of complaints

Motivation Factor - work condition related to the satisfaction of the need for psychological growth

- job enrichment
- leads to superior performance & effort

Two Factor



Motivation– Hygiene Theory of Motivation

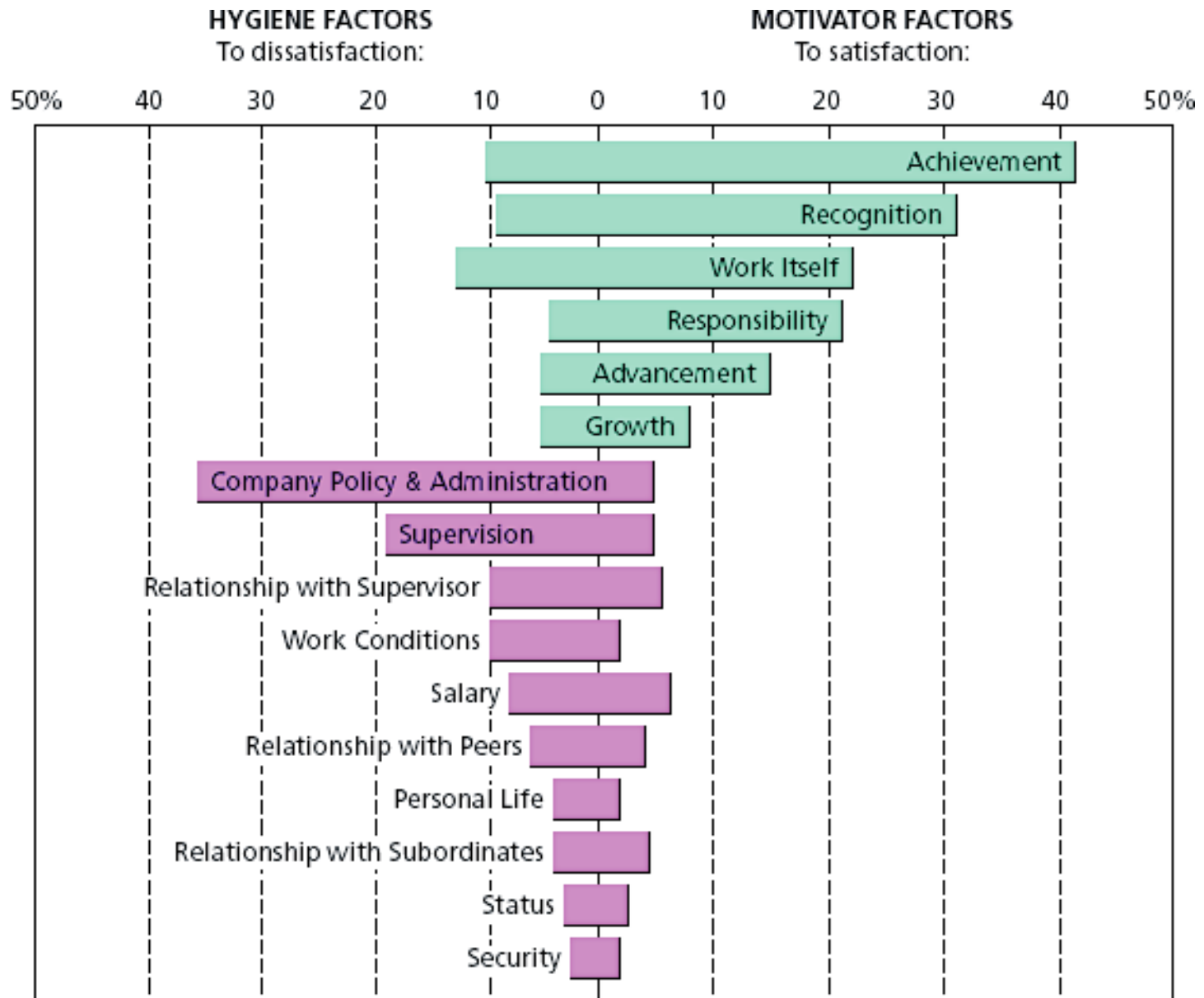


**Hygiene factors
avoid job
dissatisfaction**

**Motivation factors
increase job satisfaction**



Summary of Herzberg's Motivator–Hygiene Findings

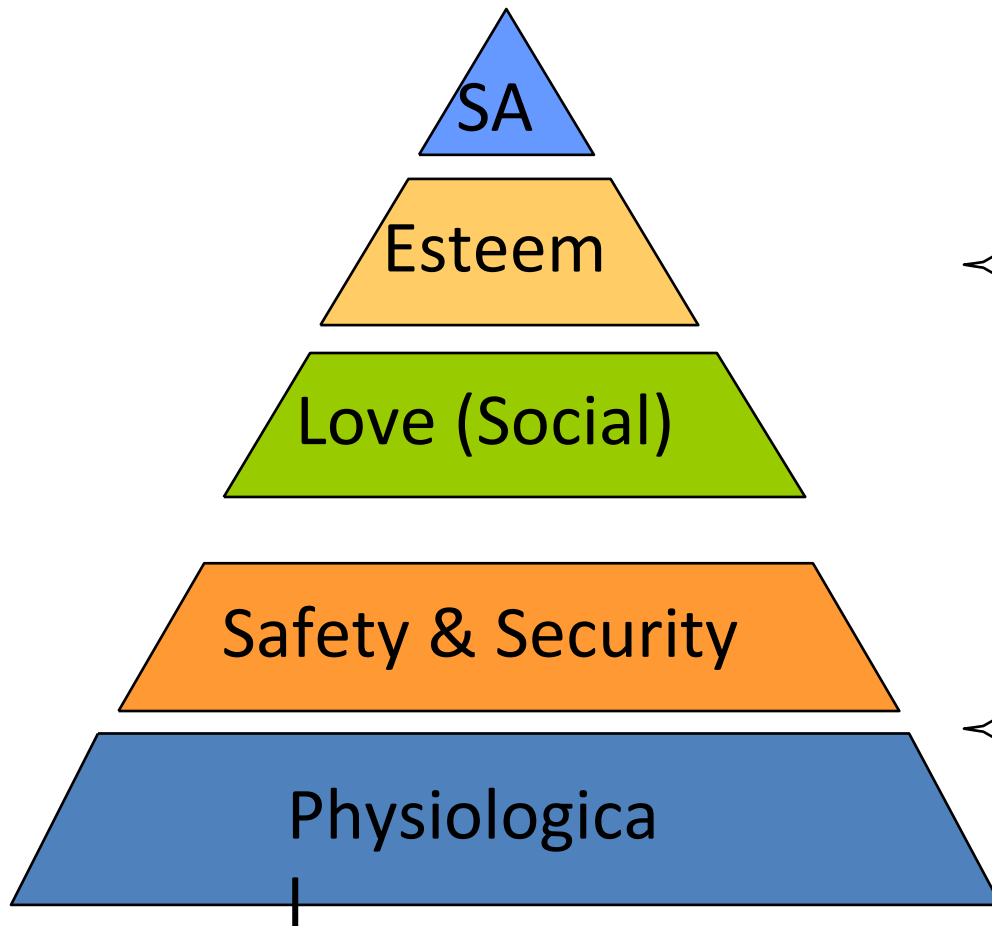


Motivation-Hygiene Combinations

	High M	Low M
High H	high motivation few complaints	low motivation few complaints
Low H	high motivation many complaints	low motivation many complaints

(Motivation = M, Hygiene = H)

Motivational Theories X & Y



Theory Y - a set of assumptions of how to manage individuals motivated by higher order needs

Theory X - a set of assumptions of how to manage individuals motivated by lower order needs



McGregor's Assumptions About People Based on Theory X

- Naturally indolent
- Lack ambition, dislike responsibility, and prefer to be led
- Inherently self-centered and indifferent to organizational needs
- Naturally resistant to change
- Gullible, not bright, ready dupes

McGregor's Assumptions About People Based on Theory Y

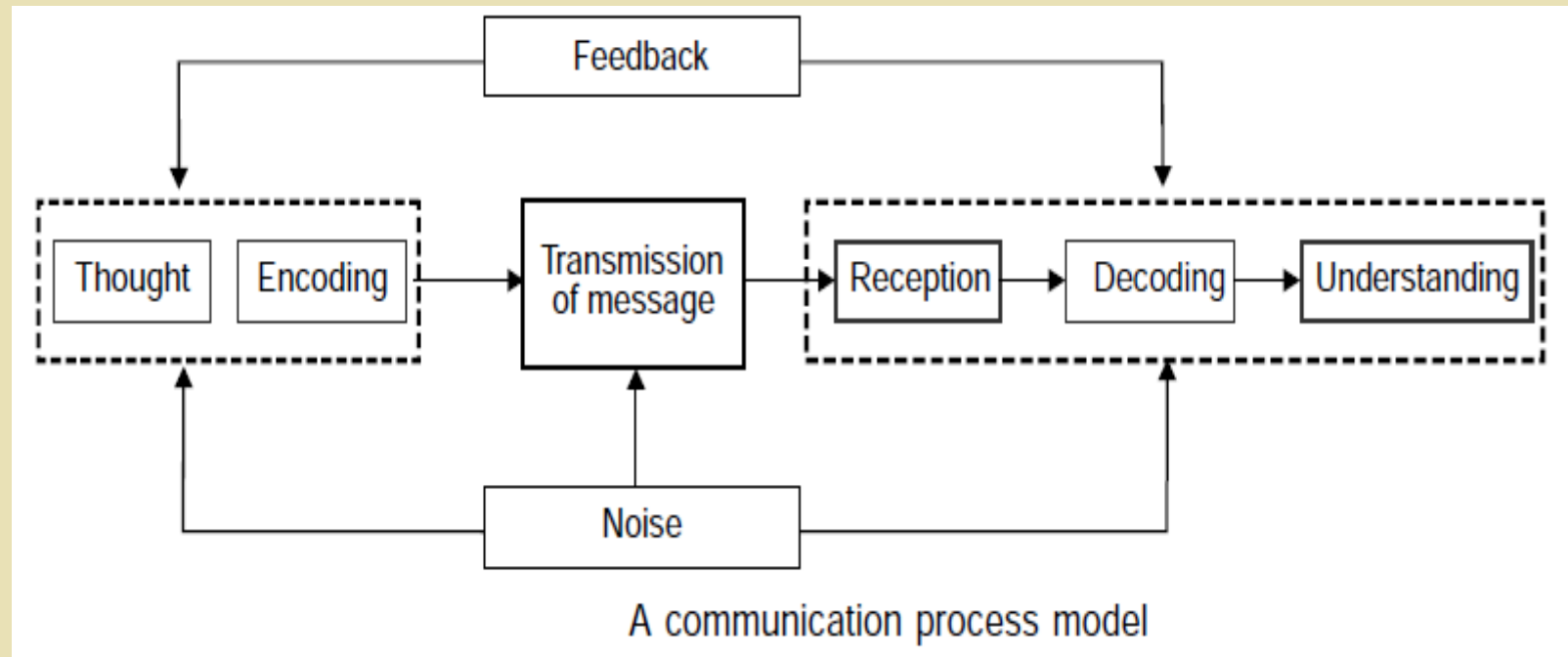
- Experiences in organizations result in passive and resistant behaviors; they are not inherent
- Motivation, development potential, capacity for assuming responsibility, readiness to direct behavior toward organizational goals are present in people
- Management's task—arrange conditions and operational methods so people can achieve their own goals by directing efforts to organizational goals

Communication

- ◆ The process of exchange of information, ideas and opinions which bring about integration of interests aims and efforts among the members of a group organized for achievement of predetermined goals.
- ◆ Process of passing information and understanding from one person to another



Communication Process





The Communication Process

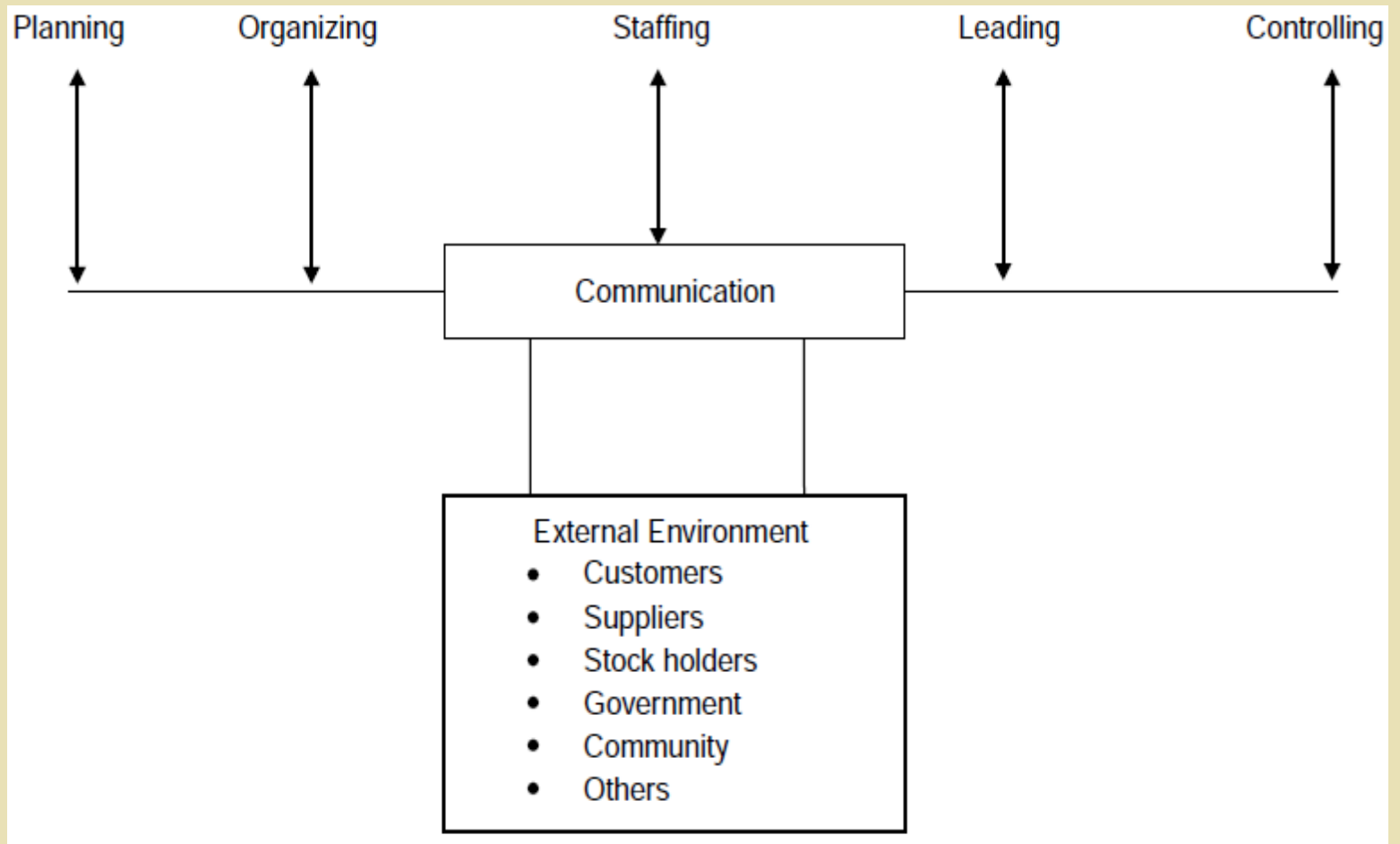
- The thought of the sender must be *encoded* into English or some other language, a computer code, mathematical expression, or drawing with special consideration of the nature of the intended receiver.
- The code must then be *transmitted* via some selected *medium*
- *Reception* of the message may be hindered because of distractions (*noise*) inhibiting the transmission or causing inattention in the reception.



The Communication Process

- The message then must be *decoded*, which is effective only if sender and receiver both attach the same or similar meanings to the symbols used in the message.
- *Understanding* may be obstructed by prejudices, or by a desire not to hear or believe what is actually being said.
- *Feedback* that enables the sender to determine what the receiver actually understood of the message permits the correction of misunderstanding.

Importance of communication



Importance to Engineers

- *Unless the information output is properly communicated, the meticulous engineering performed may be of little utility.*
- Yet many engineers and scientists lose interest in a problem once they have solved it, and do not spend that extra effort in writing an effective report or documenting a computer program that would give their work real utility.

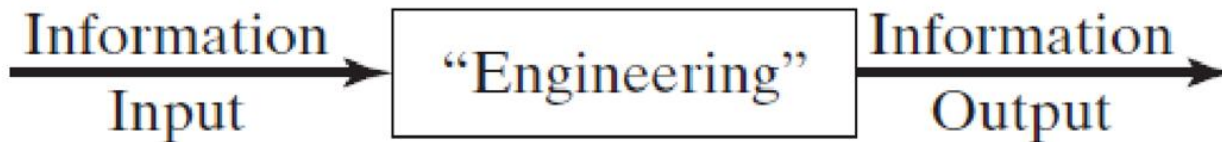


Figure 17-1 Engineering as a transformation process.

Importance to Managers

- Communication is the principal business of the manager, Consuming an estimated 90 percent of his or her time.
- Mintzberg estimates that managers spend 78 percent of their time just in oral communication (59 percent in scheduled and 10 percent in unscheduled meetings, 6 percent on the telephone, and 3 percent “managing by walking around” on tours);
- The remaining 22 percent of their time is deskwork,

Communication Methods

Table 17-1 Characteristics of Common Communication Methods

Communication Method	Speed	Feedback	Record Kept?	Formality	Complexity	Cost
Informal conversation	Fast	High	No	Informal	Simple	Low
Telephone conversation	Fast	Medium	No	Informal	Simple	Low-medium
Formal oral presentation	Medium	High	Varies	Formal	Medium	Medium
Informal note	Medium	Low	Maybe	Informal	Simple	Low
Memo	Medium	Low	Yes	Informal	Low	Low-medium
Letter	Slow	Low	Yes	Formal	Medium	Medium
Formal report	Very slow	Low	Yes	Very formal	Complex	High

Source: Paul R. Timm, *Managerial Communication: A Finger on the Pulse*, 2d ed., 1986, p. 59. Adapted by permission of Prentice-Hall, Inc., Englewood Cliffs, NJ.

Effective Communication

The effectiveness of communication decreases in the following order

- Oral plus written presentation
- Oral only
- Written only
- The grapevine

Other factors in effective communication

- Active Listening
- Nonverbal Communication
 - ✓ 7 percent: Verbal (words used)/What you said
 - ✓ 38 percent: Vocal (pitch, stress, tone, length, and frequency of pauses)/How you said
 - ✓ 55 percent: Facial (expression, eye contact)/nonverbal

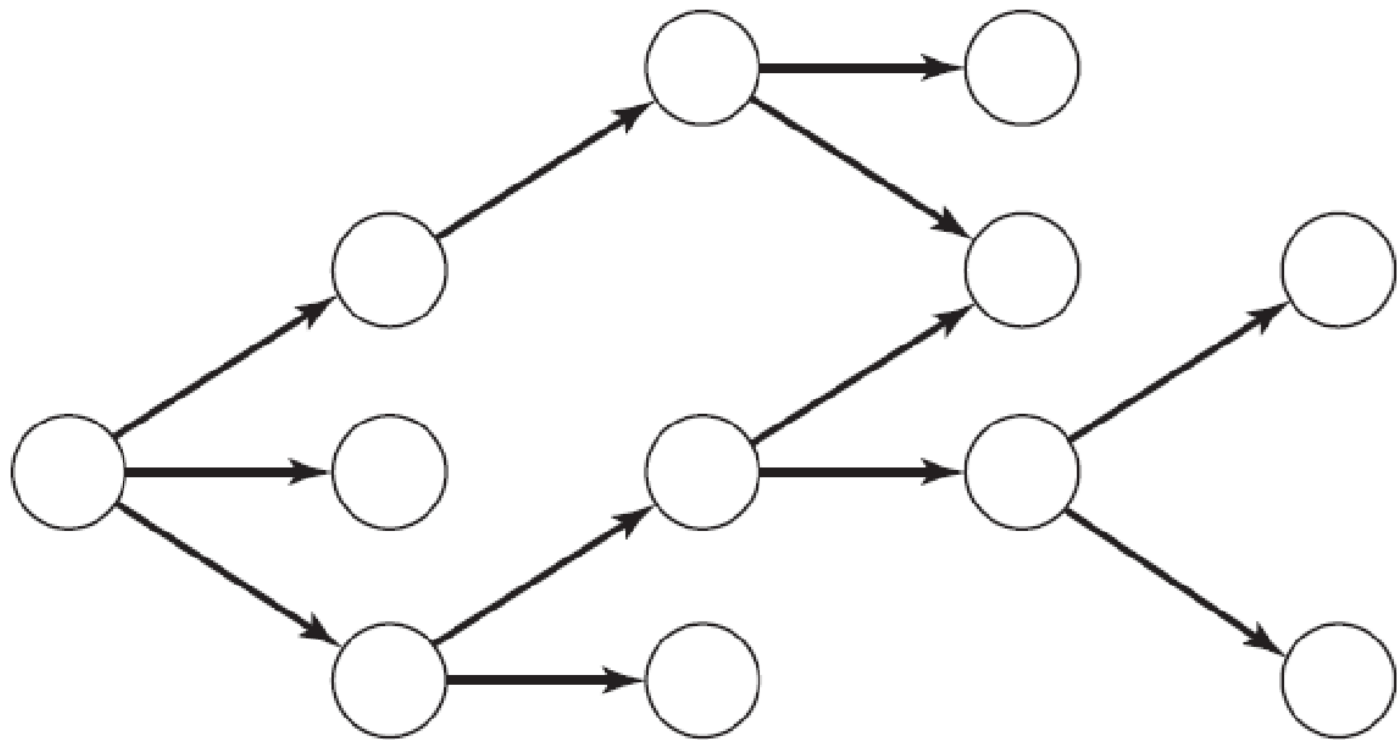


Figure 17-3 Grapevine.

What is a Project?

- ✓ A project is an interrelated **set of activities** that has **definite starting** and **ending** points and that result in a **unique product** or service
- ✓ Cuts across organizational lines – they need varied skills of different profession
- ✓ Uncertainties like new technology & external environment can change the character of the project
- ✓ Personnel, materials, facilities etc. are temporarily assembled to accomplish a goal within a specified time frame and then disbanded
- ✓ Upon finish, a project releases lot of resources which were engaged in execution of the project

Examples of Project

- ✓ Hosting a College Annual Function
- ✓ Plan a Space Shuttle to Mars
- ✓ Construct a Plant to Manufacture Ball Bearings
- ✓ Plan for Wedding
- ✓ Designing and Implement a Computer System
- ✓ Designing a ABS System
- ✓ Executing Environmental Clean-up Of a Contaminated Site
- ✓ Erect a New Lab in the Dept. of Mechanical Engineering

Definition of Project

- A project is a one shot, time limited, goal directed, major undertaking, requiring the commitment of varied skills & resources.
- It also describes project as a combination of human and non human resources pooled together in a temporary organization to achieve specific purpose.

Project Attributes

A project:

- Has a unique purpose.
- Is temporary.
- Is developed using **progressive** elaboration.
- Requires resources, often from various areas.
- Should have a primary customer or sponsor.
 - The **project sponsor** usually provides the direction and funding for the project.
- Involves **uncertainty**.

Project and Program Managers

Project managers work with project sponsors, project teams, and other people involved in projects to meet project goals.

Program: “A group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually.”

Program managers oversee programs and often act as bosses for project managers.

Project management is “the application of knowledge, skills, tools and techniques to project activities to meet project requirements.”

Project Management Tools and Techniques

Project management tools and techniques assist project managers and their teams in various aspects of project management.

Specific tools and techniques include:

- Project charters, scope statements, and WBS (scope).

- Gantt charts, **network diagrams, critical path analysis, critical chain scheduling (time).**

- Cost estimates and earned value management (cost).**

The Purpose of a Gantt Chart:

- To illustrate the relationship between project activities & time.
- To show the multiple project activities on one chart
- To provide a simple & easy to understand representation of project scheduling

Creating a Gantt Chart:

There are two methods to creating a Gantt Chart (Maylor, 2005).

1. Using a **Forward Schedule**: starting with the list of activities and a given start date (6th Sept in previous example) follow them forwards in time until you hit given deadline.
2. Using a **Backward Schedule**: look at the deadline, from that date work in the logical list of activities.

Both of these methods allow you to ensure that all necessary activities can possibly be completed within the given project time frame.

Steps to Creating a Gantt Chart:

1. Determine Project start date and deadline.
2. Gather all information surrounding the list of activities within a project – the Work Breakdown Structure may be useful for this.
3. Determine how long each activity will take
4. Evaluate what activities are dependant on others
5. Create Graph shell including the timeline and list of activities.
6. Using either **Forward Scheduling** or **Backward Scheduling**, Begin to add bars ensuring to include dependencies and the full duration for each activity.

Example:

Consider the following:

Activity	Duration	Dependant On
1. Read Literature	21 days	N/A
2. Conduct Literature Review	14 days	1
3. Arrange Client Visits	7 days	N/A
4. Prepare Surveys	5 days	1 and 3
5. Conduct Surveys	14 days	4
6. Analyse Surveys	10 days	5
7. Write Up	30 days	1,2,3,4,5 and 6

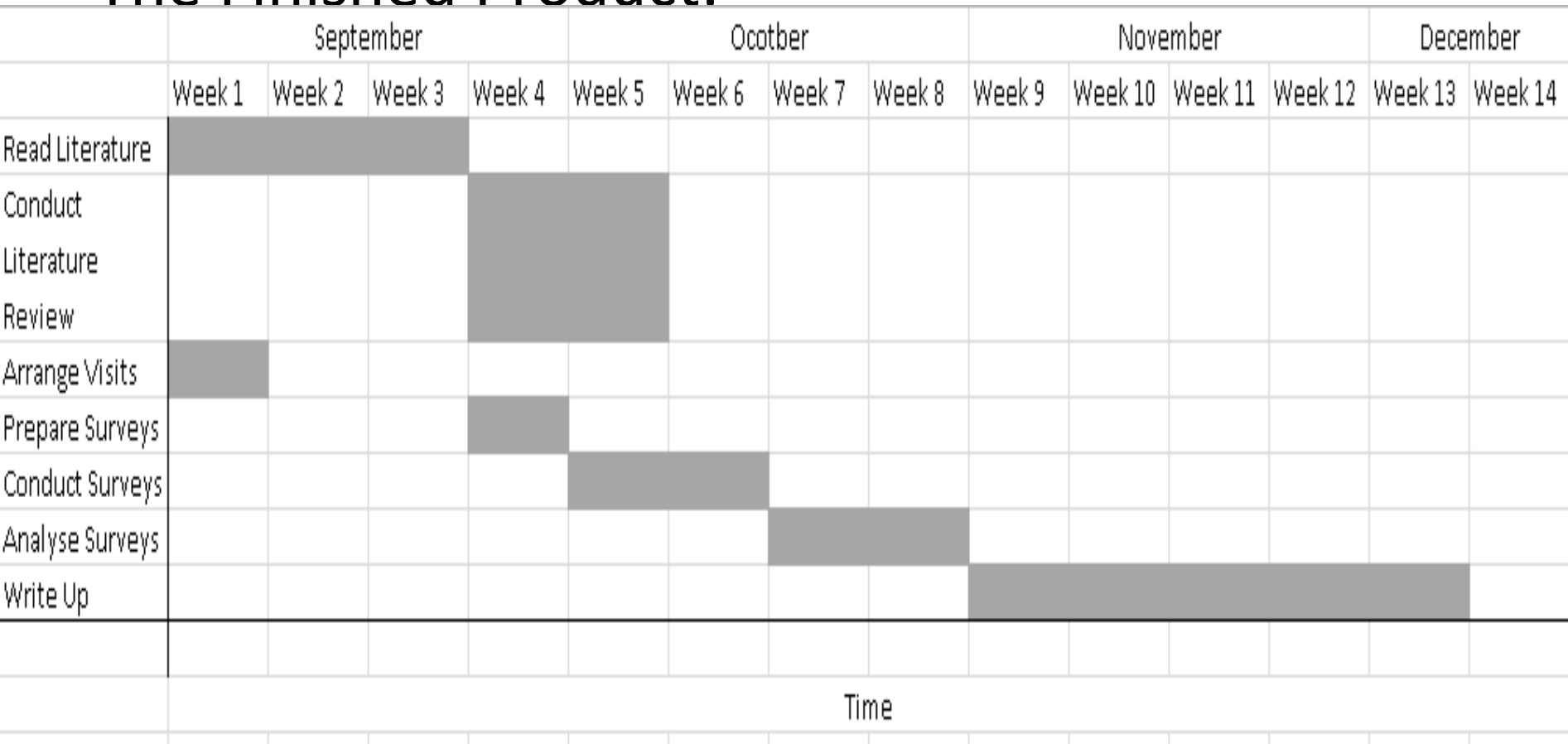
Project Start Date = 1st September

Deadline = 20th Decemeber

- Time

- Step 6 – have a go at using either **Forward Scheduling** or **Backward Scheduling** to populate the graph.

The Finished Product:



Gantt Chart Example

Table 14-1 Information for Planning House Project

Task	Follows Task(s)	Duration (Weeks)	Task Description	Manning Level
A	Start	1.0	Clear site	3
B	Start	0.6	Obtain lumber and other basic materials	1
C	Start	2.0	Obtain other materials and components	1
D	B	2.0	Prefabricate wall panels	4
E	B	0.9	Prefabricate roof trusses	3
F	A, B	1.0	Form and pour footings and floor slab	3
G	D, F	0.3	Erect wall panels	4
H	E, G	0.2	Erect roof trusses	4
J	C, H	0.5	Complete roof	3
K	J	2.0	Finish interior	4
L	J	1.0	Finish exterior	2
M	L	0.4	Clean up site	1
N	K, M	0.2	Final inspection and approval	1

Gantt Chart Example

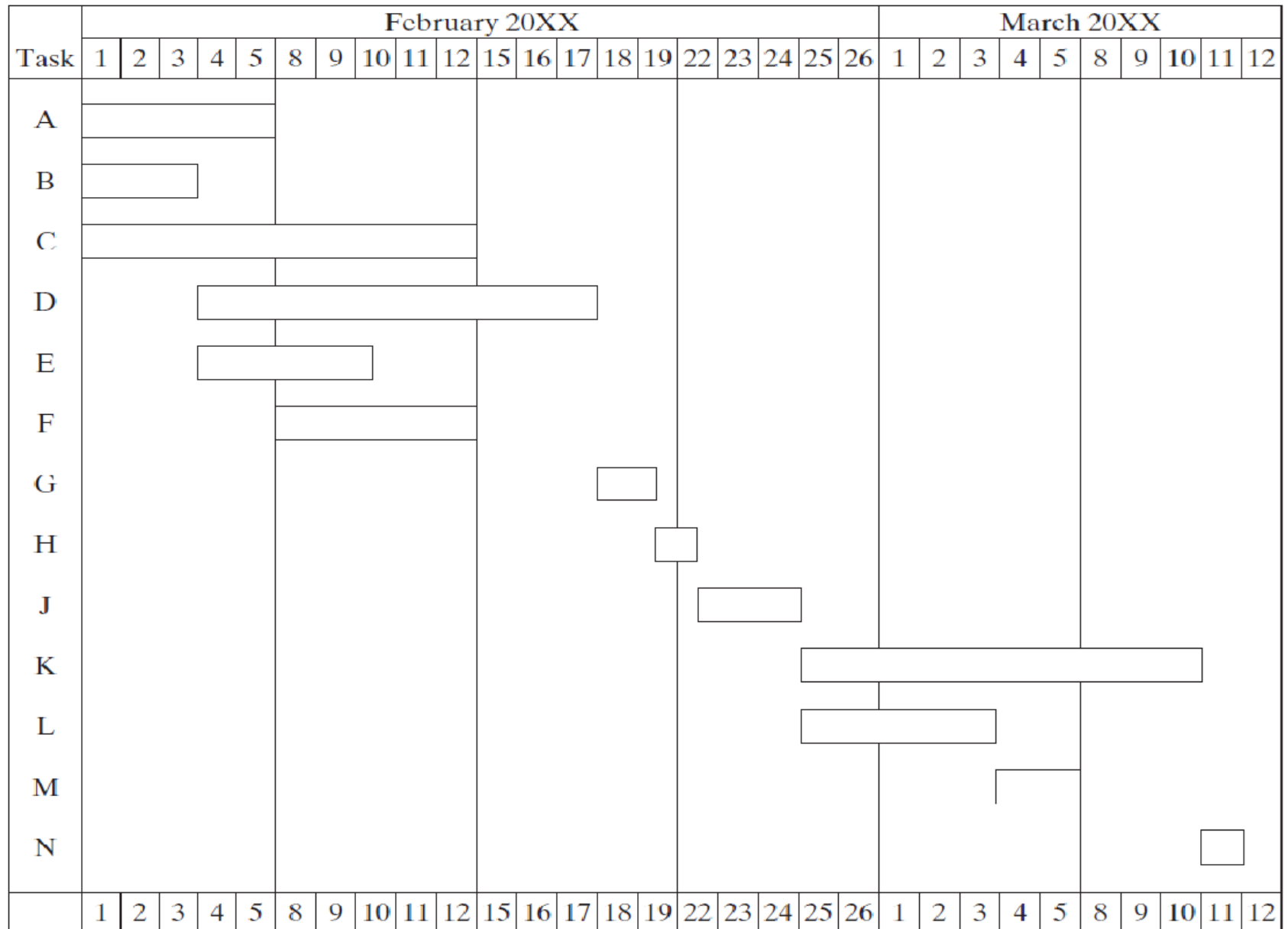


Figure 14.7 Bar chart of house project

Advantages:

- A useful tool for displaying time-based information within a project.
- Very simple to create
- They provide a useful overview of project activities, a good starting point for project planning.
- The charts are widely used and understood.
- There exists several PC software packages that allow you to build Gantt Charts.

The Limitations:

- The Gantt Chart does not explain the reasoning behind the chosen duration of each activity. (Maylor, 2001)
- The Gantt Chart is very difficult to update when changes to the project plan take place. This makes it time consuming and results in long-term planning being very difficult. (Goldratt, 1997)

Gantt Charts encourage a one-step approach to planning – this prevents flexibility in project planning.

Modern day Gantt Charts, using PC software, can look very professional without actually having meaning, preventing project teams from challenging their content. This can lead to difficulties later in the project. (Maylor, 2001)

As Gantt Charts are difficult to update manually, they can often become obsolete.

The charts do not consider project costs or resources.

Alternatives

- PERT/GERT
- Work Breakdown Structure
- Critical Path Method
- Resource Levelling
- Many Others!

NETWORK ANALYSIS

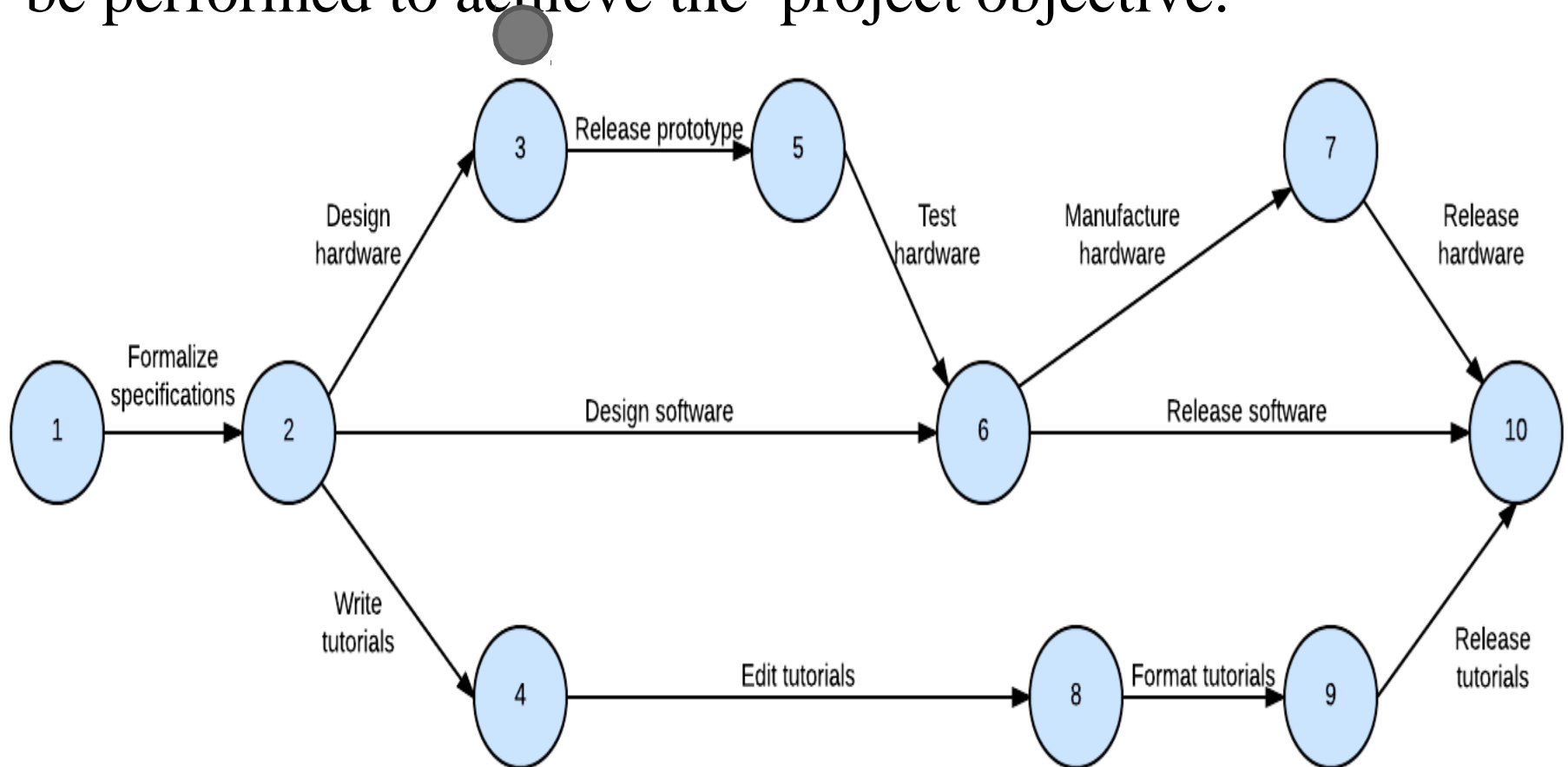
Network Analysis refers to a number of techniques for the planning and control of complex projects.

The two most frequently used forms of network planning are:

1. Programme Evaluation and Review Technique(PERT)
2. Critical Path Method (CPM)

WHAT IS A NETWORK?

A network is a graphical diagram consisting of certain configuration of “Arrows” (\rightarrow) and “Nodes” (O) for showing the logical sequence of various tasks to be performed to achieve the project objective.



PERT / CPM Techniques

The initial step in PERT/CPM project scheduling process is the determination of all specific activities that comprise the project and their relationships.

EXAMPLE

Activity	Description	Duration (in weeks)	Immediate predecessor
A	Obtain the budget approval	2	-
B	Obtain the machine	5	A
C	Hire the operator	1	A
D	Install the machine	1	B
E	Train the operator	6	C
F	Produce the goods	1	D,E

TERMS USED IN A NETWORK

1.Activity: An effort that is required to complete a part of the project. It is represented by “→”.

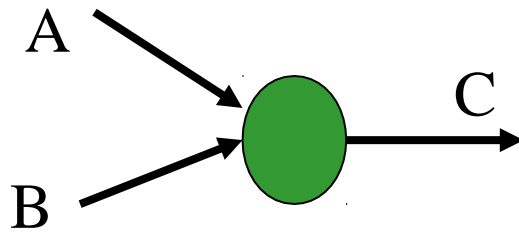
2.Node: It represents the beginning or completion of an activity. It is represented by “O”.

RULES OF NETWORK CONSTRUCTION

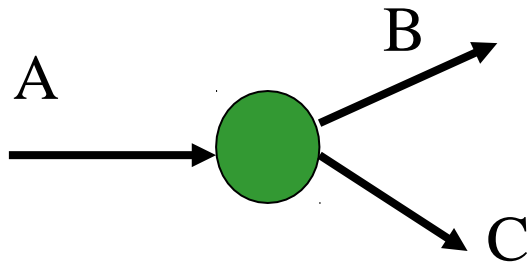
1. Each defined activity is represented by one and **only one arrow** in the network.
2. **Before** an **activity** can be undertaken, all activities **preceding** it must be **completed**.
3. The **arrows** depicting various **activities** are indicative of **logical procedure** only. The length and bearing of the arrows are of no significance.

4. The **arrow direction** indicates the general **progression** in time. Head events and Tail events.
5. When a number of activities terminate at one event, it indicates that no activity emanating from that event may start unless all activities terminating there have been completed.
6. Events are identified by **numbers**.
7. The activities are identified by the numbers of their starting and ending events or by alphabets.

8. A network should have only one initial and terminal node.



Merge Event



Burst Event

9. **Parallel activities** between two events, without intervening events, are **prohibited**. When two or more parallel activities in a project have the same head and tail events, dummy activities are needed in constructing the network.

10. Dummy activities do not consume time or resources. An efficient network contains a minimum number of dummy activities required to portray the correct precedence relationships.

11. Looping is not permitted in a network.

NETWORK SYMBOLS

SYMBOL MEANING



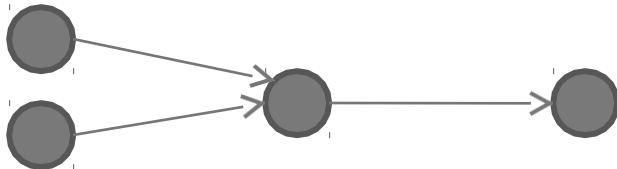
Activity



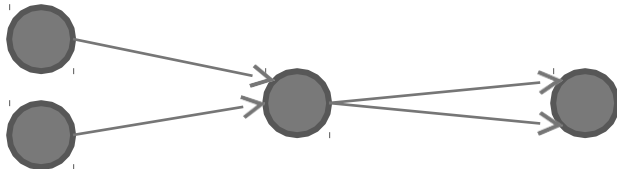
Event



Activity A must be completed before Activity B completed

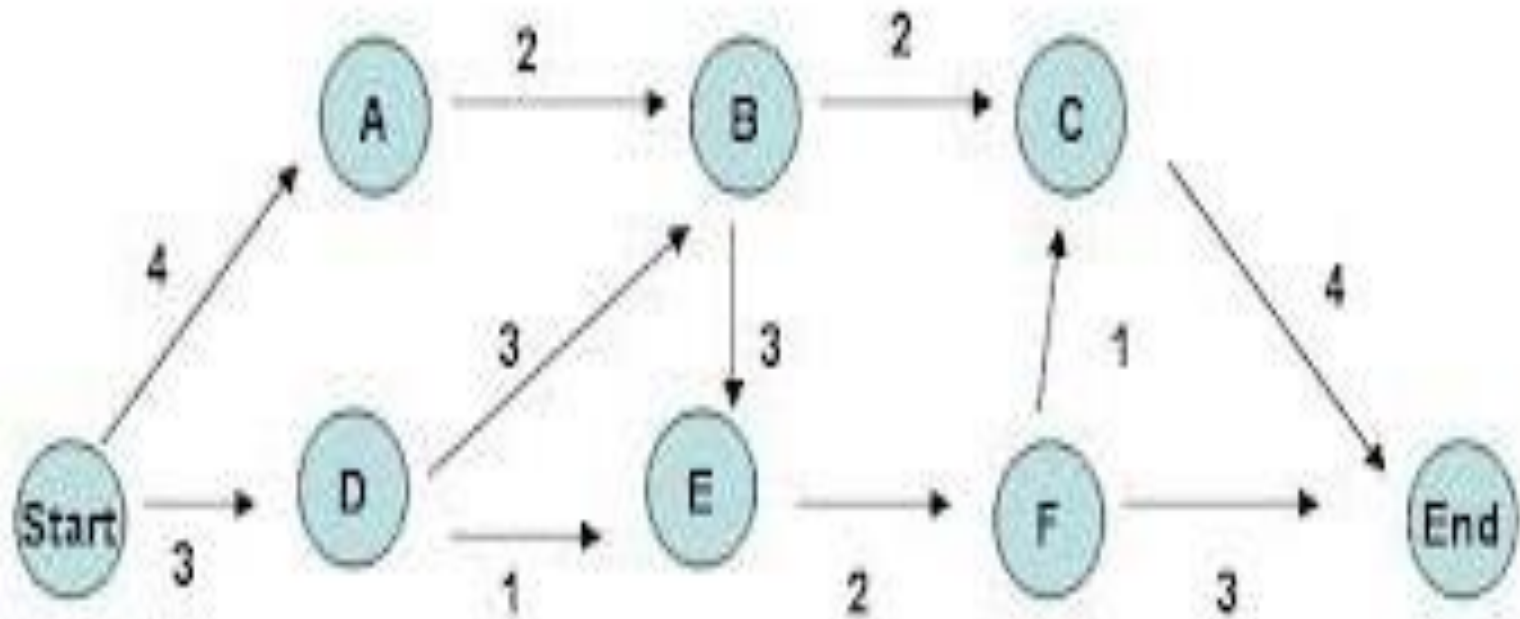


Activities A & B can occur concurrently, but both must be completed before activity C can begin

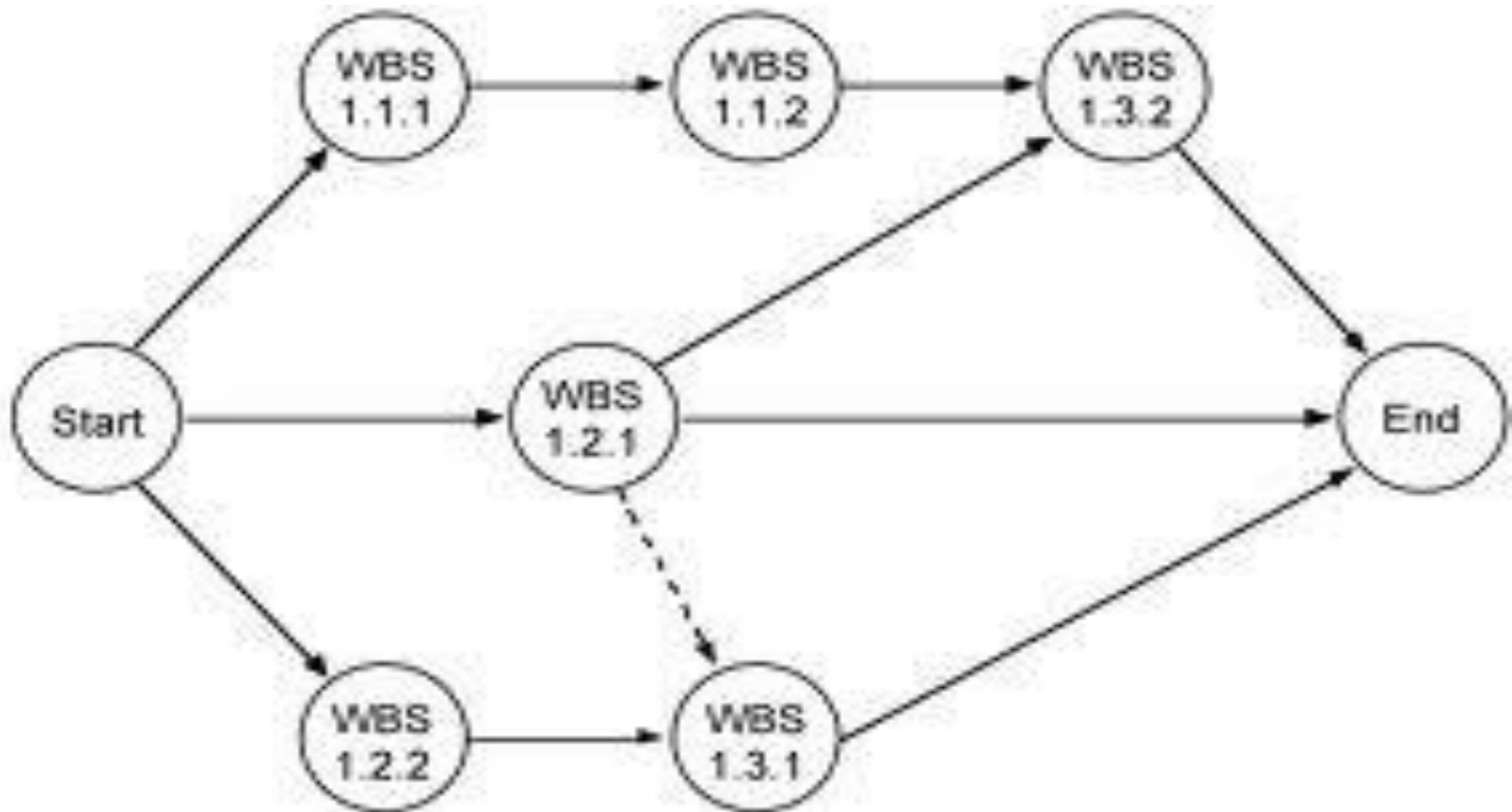


Activities A & B must be completed before activities C & D can begin, but C can begin independently of D & vice versa

SAMPLE NETWORK



DUMMY ACTIVITY



CRITICAL PATH METHOD

CPM aims at the determination of the time to complete a project and the important activities on which a manager shall focus attention.

PROCEDURE

- Consider all the paths in a project, beginning with the start event and stopping at the end event.
- For each path, calculate the time of execution.
- The path with the largest time is called the critical path and the activities along this path are called critical activities or bottleneck activities.

Network Analysis

- A network diagram represents the various activities of a project.
- An event/node marks the begin/end of an activity.
- An activity is represented by a straight line arrow.
- There can be only one activity between 2 nodes.
- A dummy activity is a hypothetical activity which does not require any type of resource. And duration is 0.

Critical Path Method

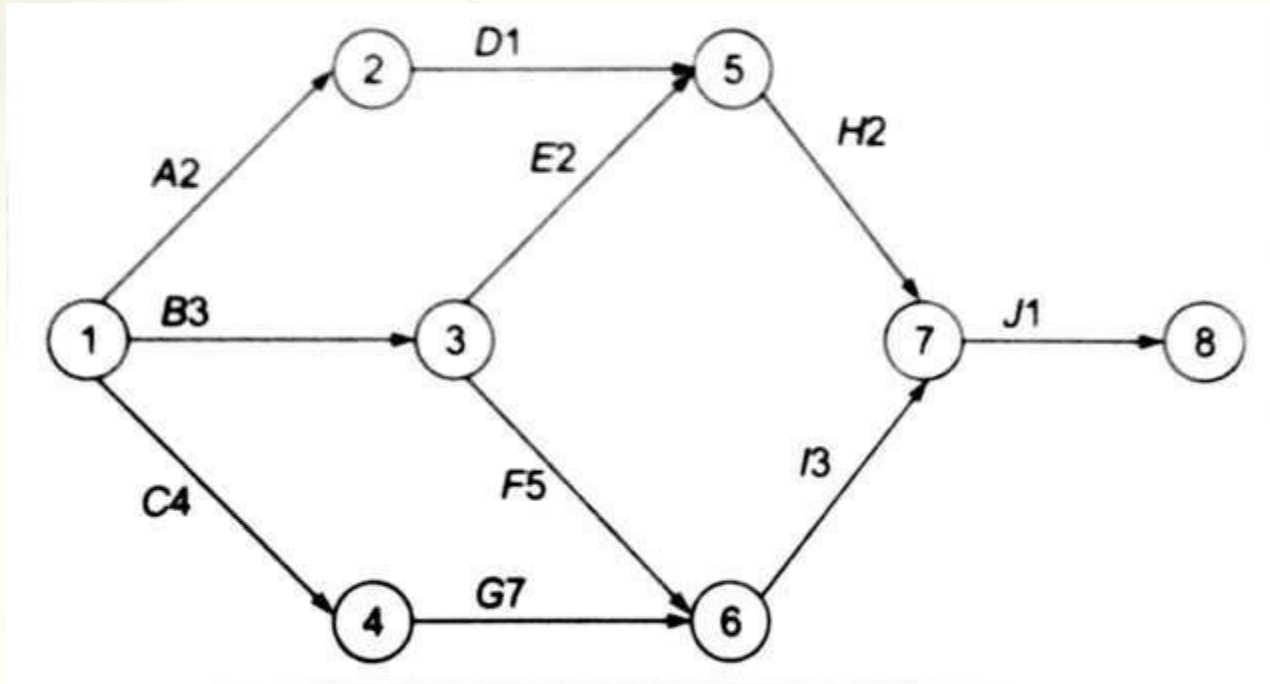
- In project management, the critical path is **the longest sequence of tasks that must be completed to complete a project.**
- The tasks on the critical path are called critical activities because if they're delayed, the whole project completion will be delayed.
- Finding the critical path is very important for project managers because it allows them to:
 - ✓ Accurately estimate the total project duration
 - ✓ Identify task dependencies, resource constraints and project risks
 - ✓ Prioritize tasks and create realistic [project schedules](#)

Critical Path Method

Table 8.2

Task	Time (days)	Required Predecessor(s)
A	2	-
B	3	-
C	4	-
D	1	A
E	2	B
F	5	B
G	7	C
H	2	D,E
I	3	F,G
J	1	H,I

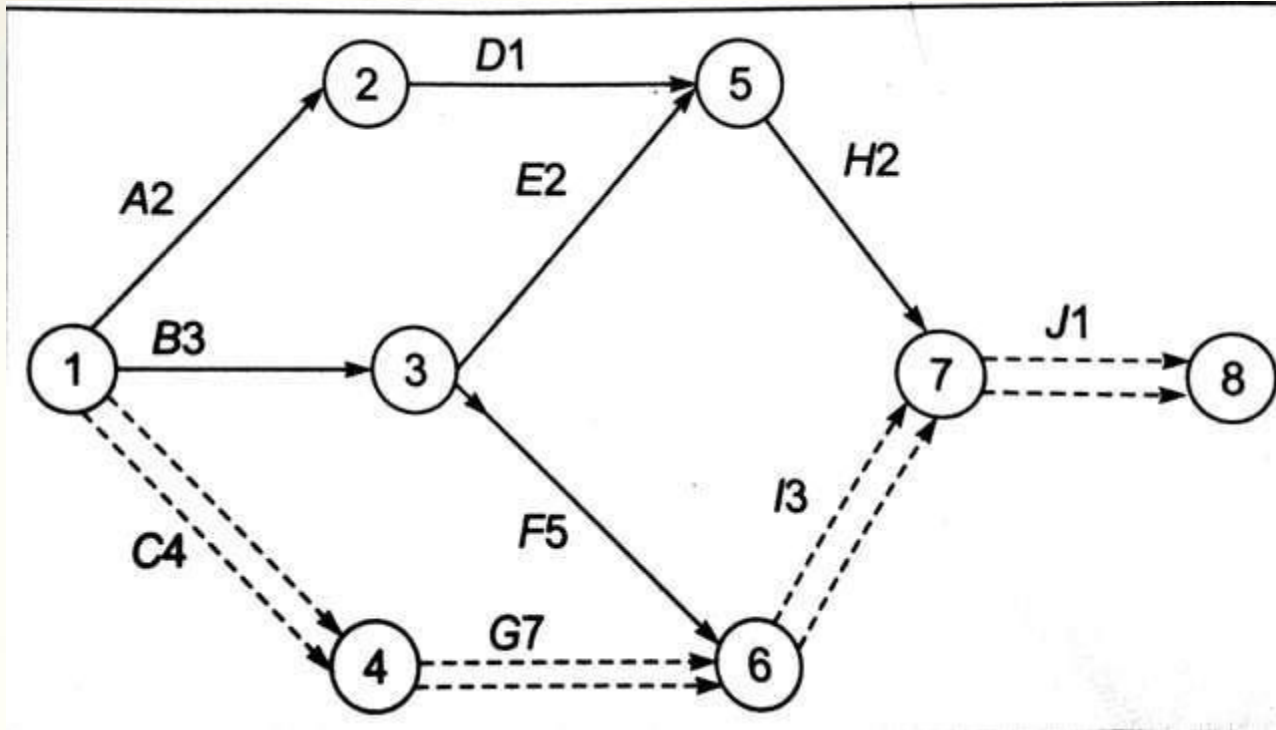
Critical Path Method



Critical Path Method

Path	Duration (in days)
1-2-5-7-8 (ADHJ)	$2 + 1 + 2 + 1 = 6$
1-3-5-7-8 (BEHJ)	$3 + 2 + 2 + 1 = 8$
1-3-6-7-8 (BFIJ)	$3 + 5 + 3 + 1 = 12$
1-4-6-7-8 (CGIJ)	$4 + 7 + 3 + 1 = 15$

Critical Path Method



PERT: Programme Evaluation & Review Technique

- PERT is applied in projects where the duration of various activities cannot be predicted with certainty.
- Similar to CPM.
- Suitable for R&D projects.

PROJECT EVALUATION REVIEW TECHNIQUE

In the critical path method, the time estimates are assumed to be known with certainty. In certain projects like research and development, new product introductions, it is difficult to estimate the time of various activities.

Hence PERT is used in such projects with a probabilistic method using three time estimates for an activity, rather than a single estimate, as shown in Figure

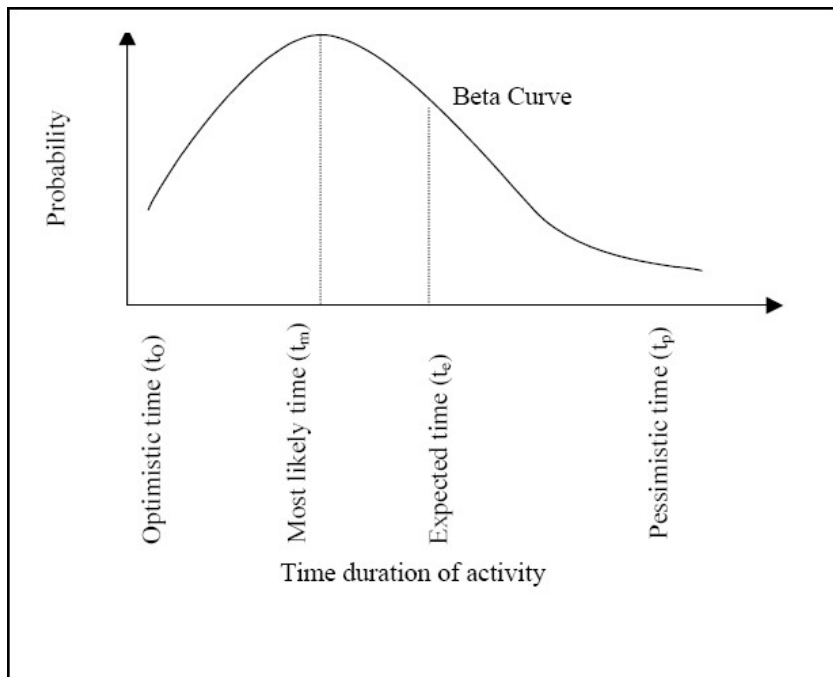


Figure 8.22: PERT Using Probabilistic Method with 3 Time Estimates

Optimistic time t_o :

It is the shortest time taken to complete the activity. It means that if everything goes well then there is more chance of completing the activity within this time.

Most likely time t_m :

It is the normal time taken to complete an activity, if the activity were frequently repeated under the same conditions.

Pessimistic time t_p :

It is the longest time that an activity would take to complete. It is the worst time estimate that an activity would take if unexpected problems are faced.

1. You are required to prepare a network diagram for constructing a 5 floor apartment. The major activities of the project are given as follows:

Activity	Description	Immediate Predecessor
A	Selection of site	-
B	Preparation of drawings	-
C	Arranging the for finance	A
D	Selection of contractor	A
E	Getting approval from Govt	A
F	Laying the foundation	E
G	Start construction	D, F
H	Advertise in newspaper	B, C
I	Allocation of tenants	G, H

Example Problem of PERT

An R & D project has a list of tasks to be performed whose time estimates are given in the Table 8.11, as follows.

Table 8.11: Time Estimates for R & D Project

Activity i j	Activity Name	T_0	t_m (in days)	t_p
1-2	A	4	6	8
1-3	B	2	3	10
1-4	C	6	8	16
2-4	D	1	2	3
3-4	E	6	7	8
3-5	F	6	7	14
4-6	G	3	5	7
4-7	H	4	11	12
5-7	I	2	4	6
6-7	J	2	9	10

- Draw the project network.
- Find the critical path.
- Find the probability that the project is completed in 19 days. If the probability is less than 20%, find the probability of completing it in 24 days.

Assignment

1. You are required to prepare a network diagram for constructing a 5 floor apartment. The major activities of the project are given as follows:

Activity	Description	Immediate Predecessor
A	Selection of site	-
B	Preparation of drawings	-
C	Arranging the for finance	A
D	Selection of contractor	A
E	Getting approval from Govt	A
F	Laying the foundation	E
G	Start construction	D, F
H	Advertise in newspaper	B, C
I	Allocation of tenants	G, H

2. For the problem No.1 the time estimates in days are given. Determine the Time earliest and Time latest, and the critical activities

Activity	A	B	C	D	E	F	G	H	I
Time (days)	3	5	7	2	5	20	60	2	10

- Draw a network diagram for the project:

Activity	A	B	C	D	E	F	G	H	I	J
Predecessor	-	A	B	B	B	C	C	F, G	D, E, F	I

- A national conference is planned in a college. The activities are listed down along with their predecessors and time taken. Prepare a network diagram and determine the critical activities.

Activity	Description	Immediate Predecessor	Duration (days)
A	Confirm lead speaker and topic	-	5
B	Prepare brochure	-	1
C	Send letters to other speakers	B	2
D	Get confirmation from speakers	C	5
E	Send letters to participants	C,D	2
F	Obtain travel plans from speakers	D	2
G	Arrange for accommodation for speakers	F	1
H	Get handouts from speakers	F	4
I	Finalize registrations	G,H	10
J	Arrange hall and AV	I	1
K	Conduct of programme	J	1

- For the PERT problem find the critical path and project duration. What is the probability that the project will be completed in 25 days?

Activity	Predecessor	Time		
		Optimistic	Most likely	Pessimistic
A	-	2	5	14
B	-	1	10	12
C	A	0	0	6
D	A	1	4	7
E	C	3	10	15
F	D	3	5	7
G	B	1	2	3
H	E,F	5	10	15
I	G	3	6	9