

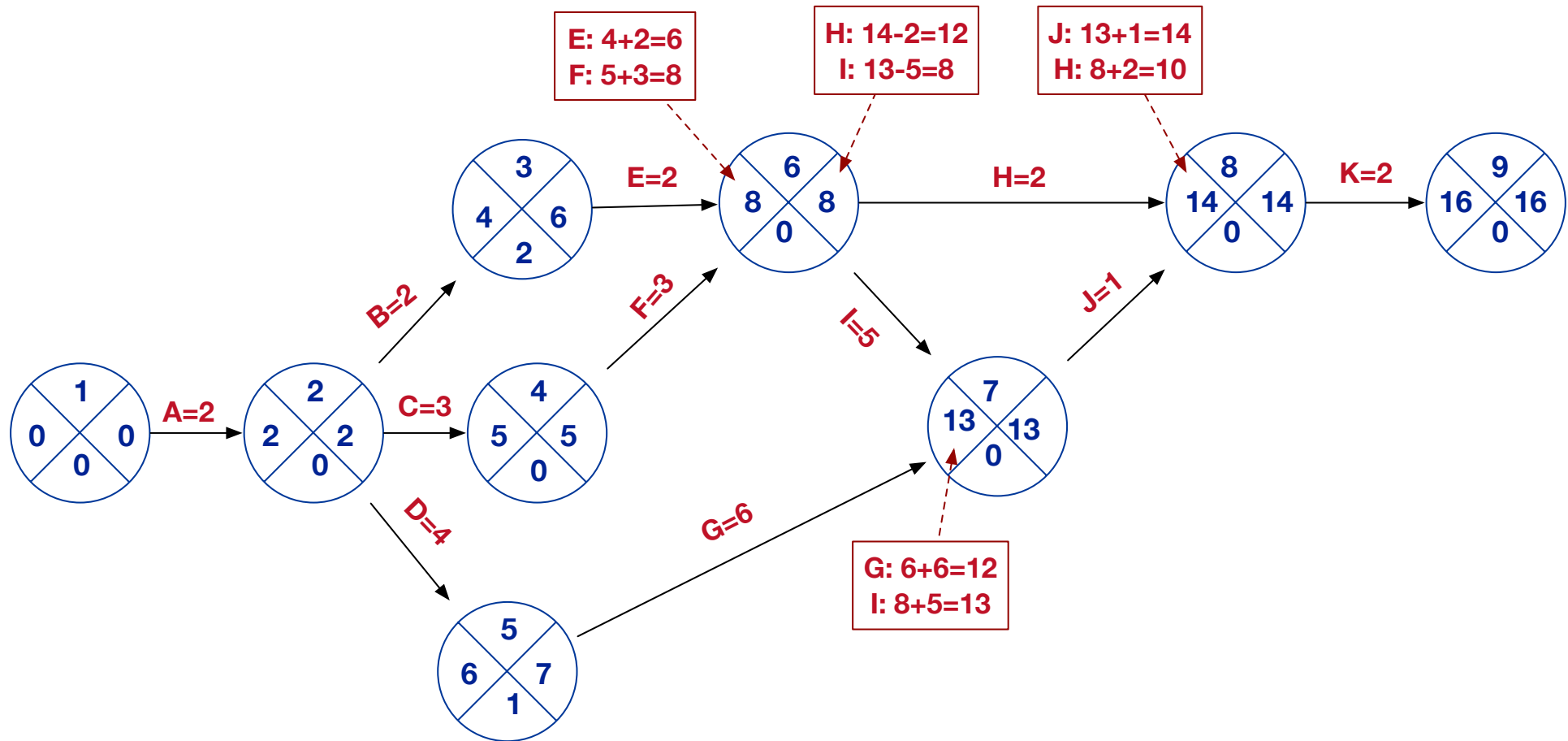
# Lecture 6: Software Project Management (3)

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# Critical Path Method

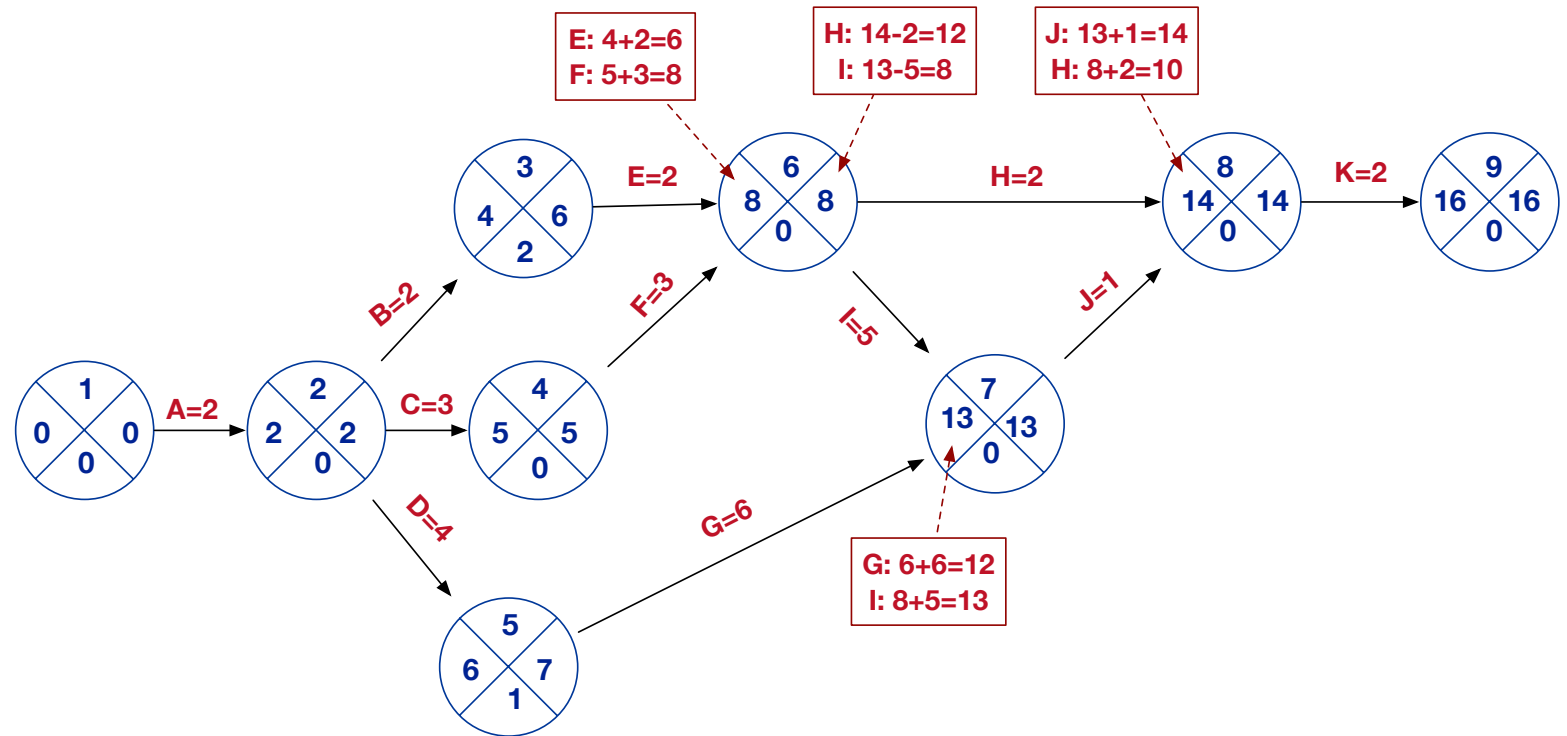
Activity	Initial Node	Final Node	Estimated Duration
A	1	2	2
B	2	3	2
C	2	4	3
D	2	5	4
E	3	6	2
F	4	6	3
G	5	7	6
H	6	8	2
I	6	7	5
J	7	8	1
K	8	9	2

# Critical Path Method (1)



# Critical Path Method (2)

- Critical Nodes:
  - 1,2,4,6,7,8,9;
- Critical Path:
  - 1,2,4,6,7,8,9  
(A,C,F,I,J,K)



- Is path 1,2,4,6,8,9 (A,C,F,H,K) a critical path?

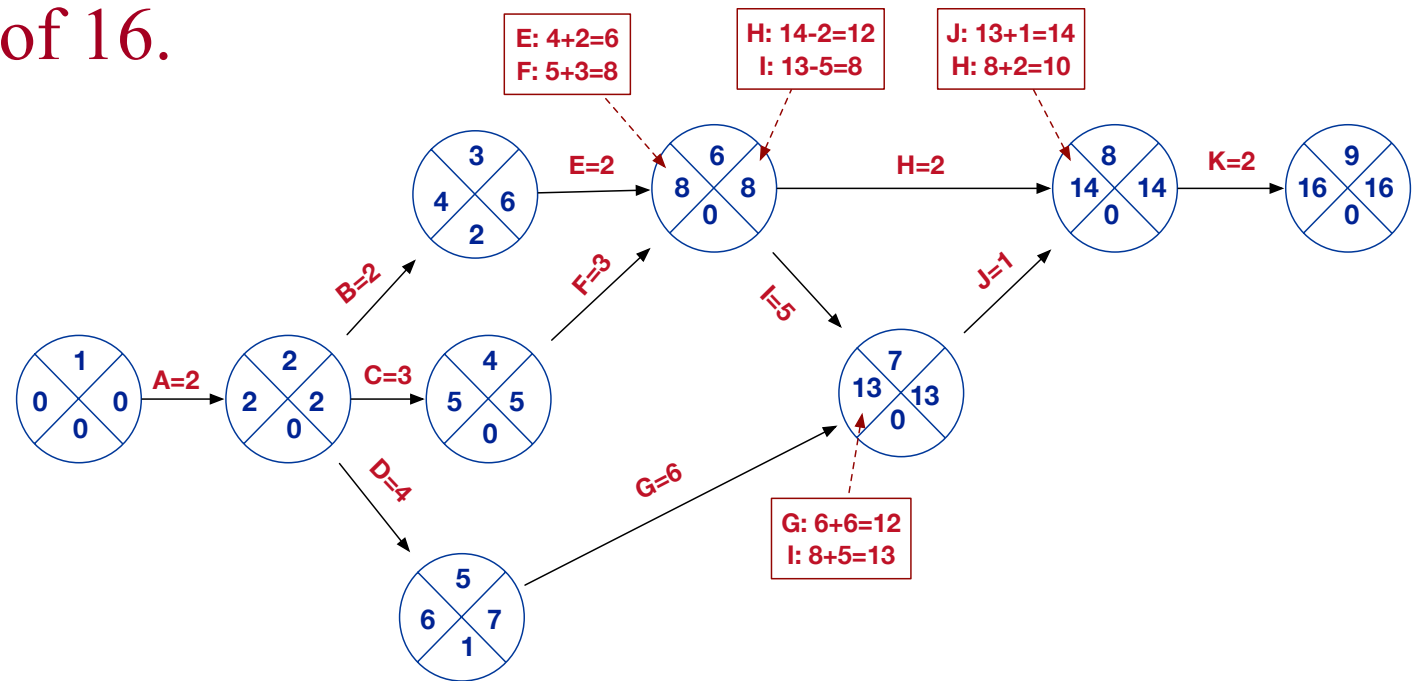
# Critical Path Method (CPM)

- **Critical Path Method (CPM):** is also critical path analysis—is a network diagramming technique used to predict total project duration.
- **Critical Path:** A critical path for a project is the series of activities that determine the earliest time by which the project can be completed.
- **Slack or float** is the amount of time an activity may be delayed without delaying a succeeding activity or the project finish date.

# Critical Path Method (2)

Is path 1,2,4,6,8,9 (A,C,F,H,K) a critical path? **NO!**

It takes 12 days instead of 16.



# Notes

- There can be **more than one critical paths** in a project.
- For a project, however, **each activity on** must be done in order to complete the project.
- Activities that lie on the critical path **cannot be delayed without delaying the entire project duration**.
- Project managers should **closely monitor performance** of activities on the **critical path** to avoid late project completion. If there is more than one critical path, project managers must keep their eyes on all of them.

# Project Quality Management



# Project Quality Management

- The International Organization for Standardization (ISO) defines quality as “the totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs” (ISO8042:1994) or “the degree to which a set of inherent characteristics fulfils requirements” (ISO9000:2000).
- The purpose of project quality management is to ensure that the project will satisfy the needs for which it was undertaken.

# Project Quality Management (2)

- Important scope aspects of IT projects that affect quality include functionality and features, system outputs, performance, and reliability and maintainability

# Project Quality Management (3)

- **Functionality** is the degree to which a system performs its intended function. Features are the system's special characteristics that appeal to users. It is important to clarify what functions and features the system must perform, and what functions and features are optional.
- **System outputs** are the screens and reports the system generates. It is important to define clearly what the screens and reports look like for a system.
  - Can the users easily interpret these outputs?
  - Can users get all of the reports they need in a suitable format?

# Project Quality Management (4)

- **Performance** addresses how well a product or service performs the customer's intended use.
  - What volumes of data and transactions should the system be capable of handling?
  - How many simultaneous users should the system be designed to handle?
  - What is the projected growth rate in the number of users?
  - What type of equipment must the system run on?
  - ....

# Project Quality Management (5)

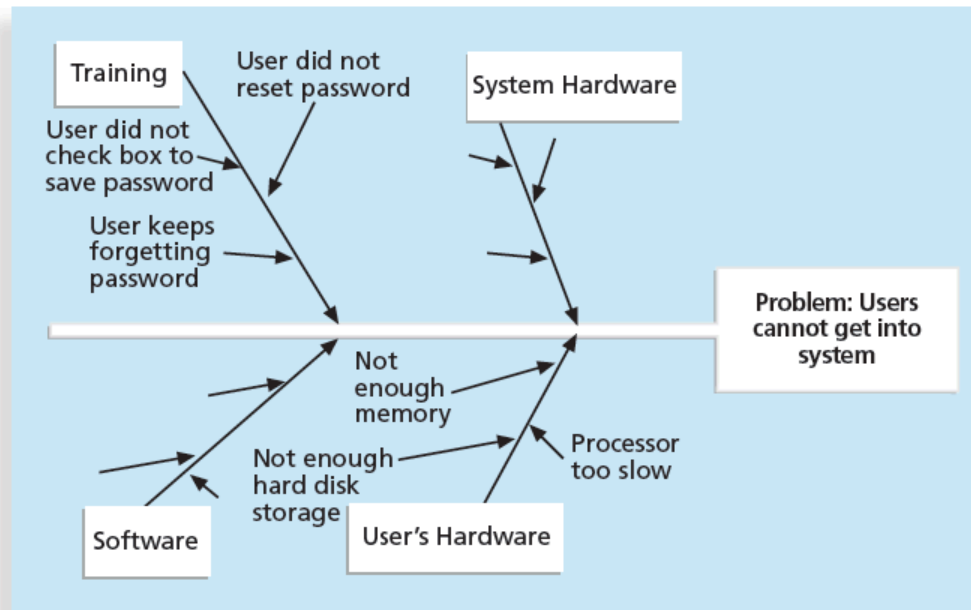
- **Reliability** is the ability of a product or service to perform as expected under normal conditions. In discussing reliability for IT projects, many people use the term IT service management.
- **Maintainability** addresses the ease of performing maintenance on a product. Most IT products cannot reach 100 percent reliability, but stakeholders must define their expectations.
  - Providing help desk support could also be a maintenance function.
  - How fast a response do users expect for help desk support?
  - How often can users tolerate system failure? Are the stakeholders willing to pay more for higher reliability and fewer failures?

# Tools for Quality Controls

- Cause-and-effect diagram
- Control Chart
- Checksheet
- Scatter Diagram
- Histogram
- Pareto Chart （帕累托图）
- Flowchart

# Cause-and-effect Diagram

- **Cause-and-effect** diagrams trace complaints about quality problems back to the responsible production operations.
- It is also known as **fishbone** or **Ishikawa diagram**, named after their creator, Kaoru Ishikawa.



# Cause-and-effect Diagram Procedure

- (1) Agree on a problem statement (effect). Write it at the center right of the flipchart or whiteboard. Draw a box around it and draw a horizontal arrow running to it.
- (2) Brainstorm the major categories of causes of the problem. If this is difficult use generic headings:
  - Methods
  - Machines (equipment)
  - People (manpower)
  - Materials
  - Environment
  - ...

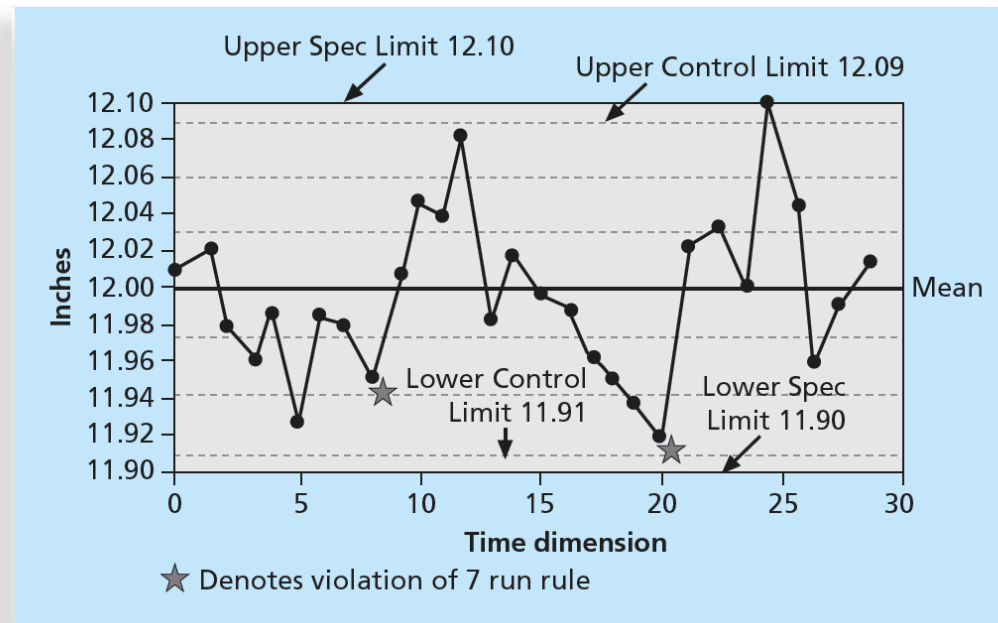


# Cause-and-effect Diagram Procedure (2)

- (3) Write the categories of causes as branches from the main arrow.
- (4) Brainstorm all the possible causes of the problem.
  - Ask "Why does this happen?"
  - As each idea is given, the facilitator writes it as a branch from the appropriate category.
  - Causes can be written in several places if they relate to several categories.
- (5) Again ask "Why does this happen?" about each cause. Write sub-causes branching off the causes.
  - Continue to ask "Why?" and generate deeper levels of causes.
  - Layers of branches indicate causal relationships.

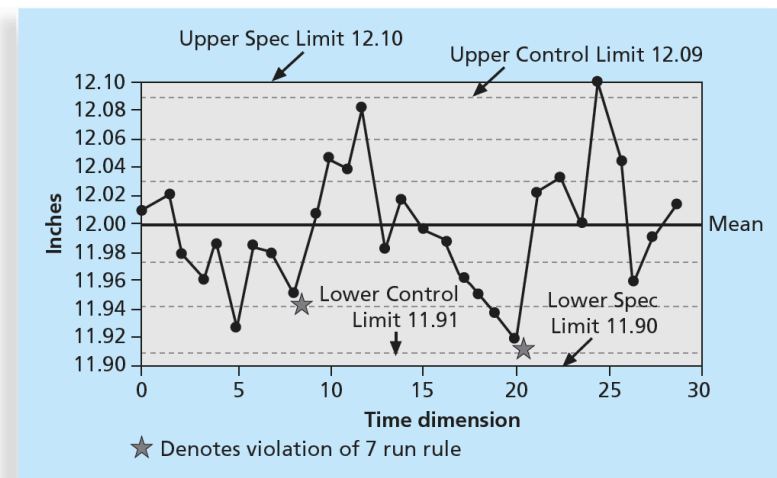
# Control Chart

- A control chart is a graphic display of data that illustrates the results of a process over time.
- Control charts allow you to determine whether a process is in control or out of control.



# Control Chart (2)

- You can use quality control charts and the seven run rule to look for patterns in data.
- The seven run rule: The seven run rule states that if seven data points in a row are all below the mean or above the mean, or are all increasing or decreasing, then the process needs to be examined for nonrandom problems.



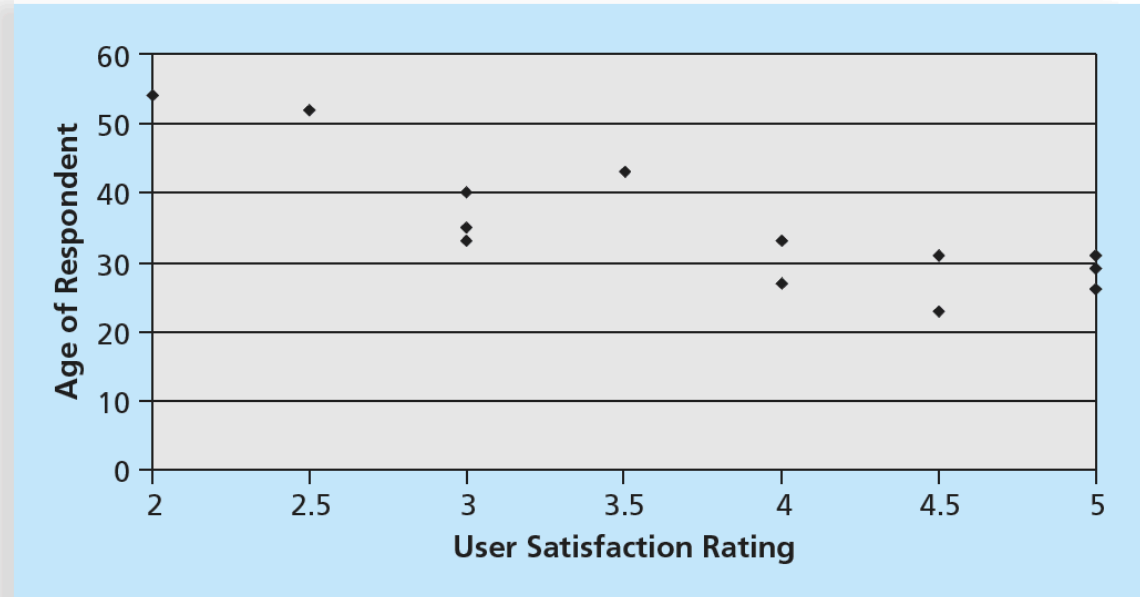
# Checksheet

- A checksheet is used to collect and analyze data. It is sometimes called a **tally sheet** or **checklist**, depending on its format.

System Complaints								
Source	Day							Total
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
E-mail								12
Text	<del>    </del>		<del>    </del>					29
Phone call								8
Total	11	10	8	6	7	3	4	49

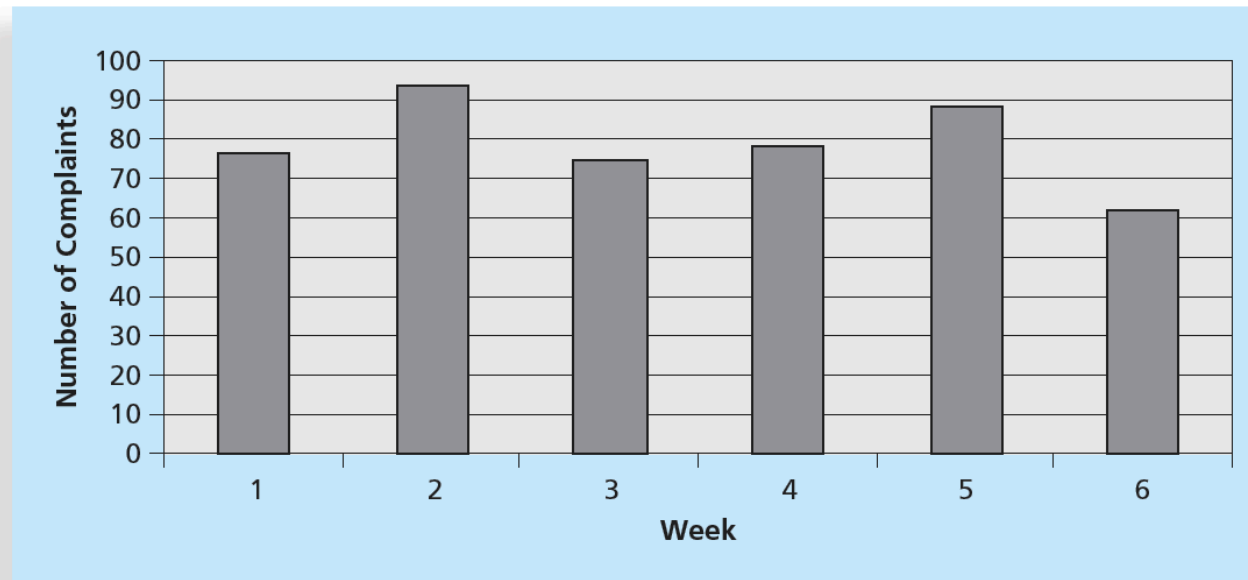
# Scatter Diagram

- A scatter diagram helps to show if there is a relationship between two variables.
- The closer data points are to a diagonal line, the more closely the two variables are related.



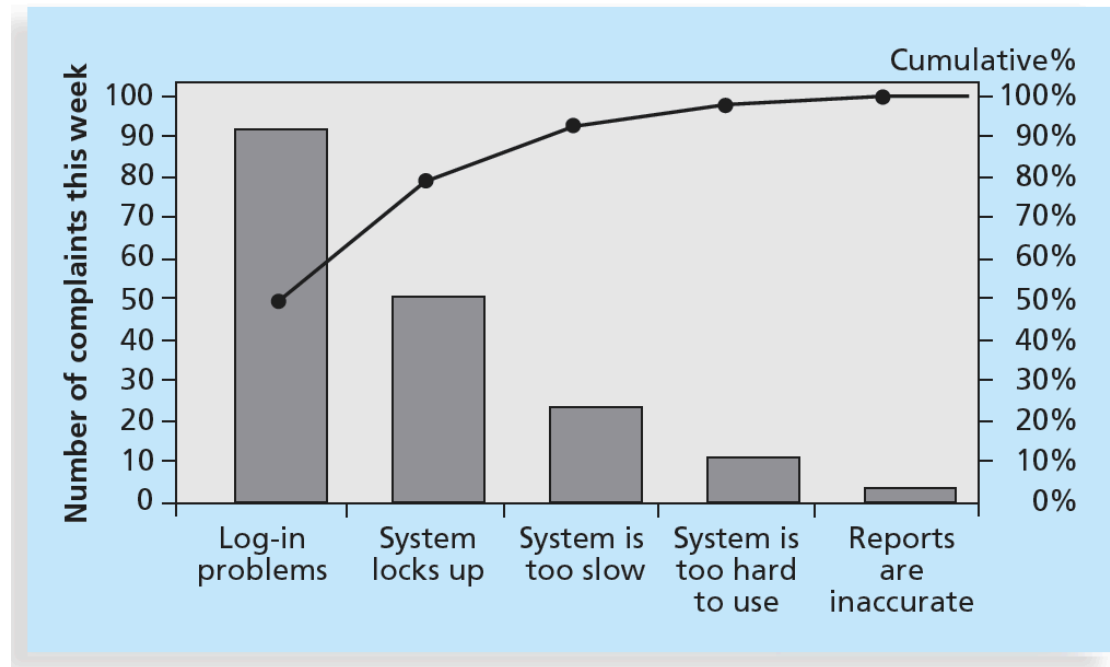
# Histogram Diagram

- A **histogram diagram** is a bar graph of a distribution of variables. Each bar represents an attribute or characteristic of a problem or situation, and the height of the bar represents its frequency.



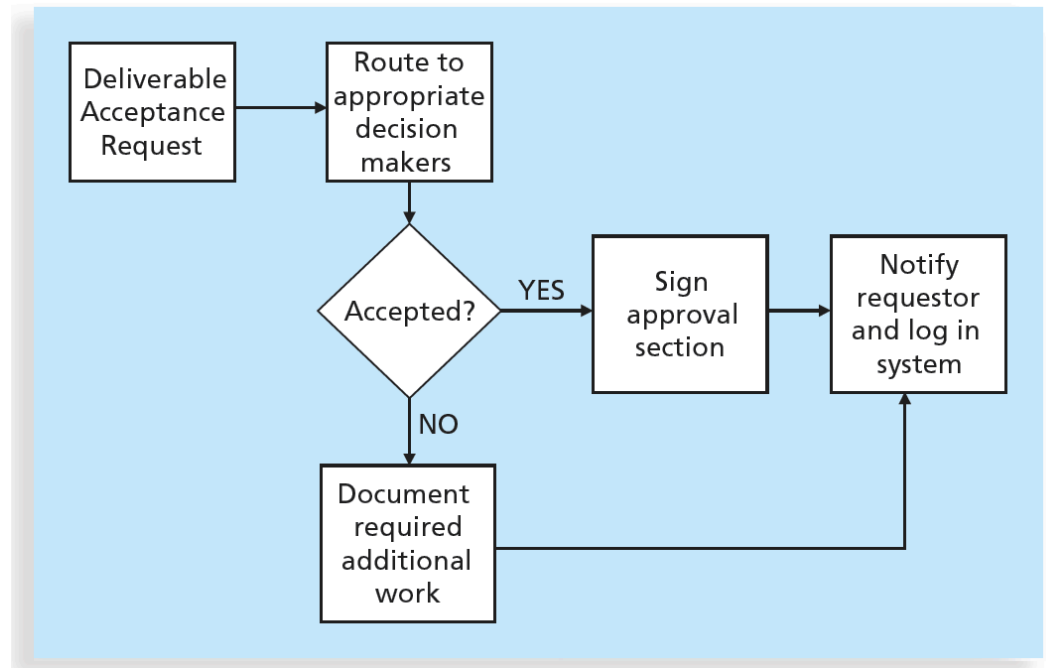
# Pareto chart

- A **Pareto chart** is a histogram that can help you identify and prioritize problem areas. The variables described by the histogram are ordered by frequency of occurrence.



# Flowchart

- **Flowcharts** are graphic displays of the logic and flow of processes that help you analyze how problems occur and how processes can be improved. They show activities, decision points, and the order of how information is processed.





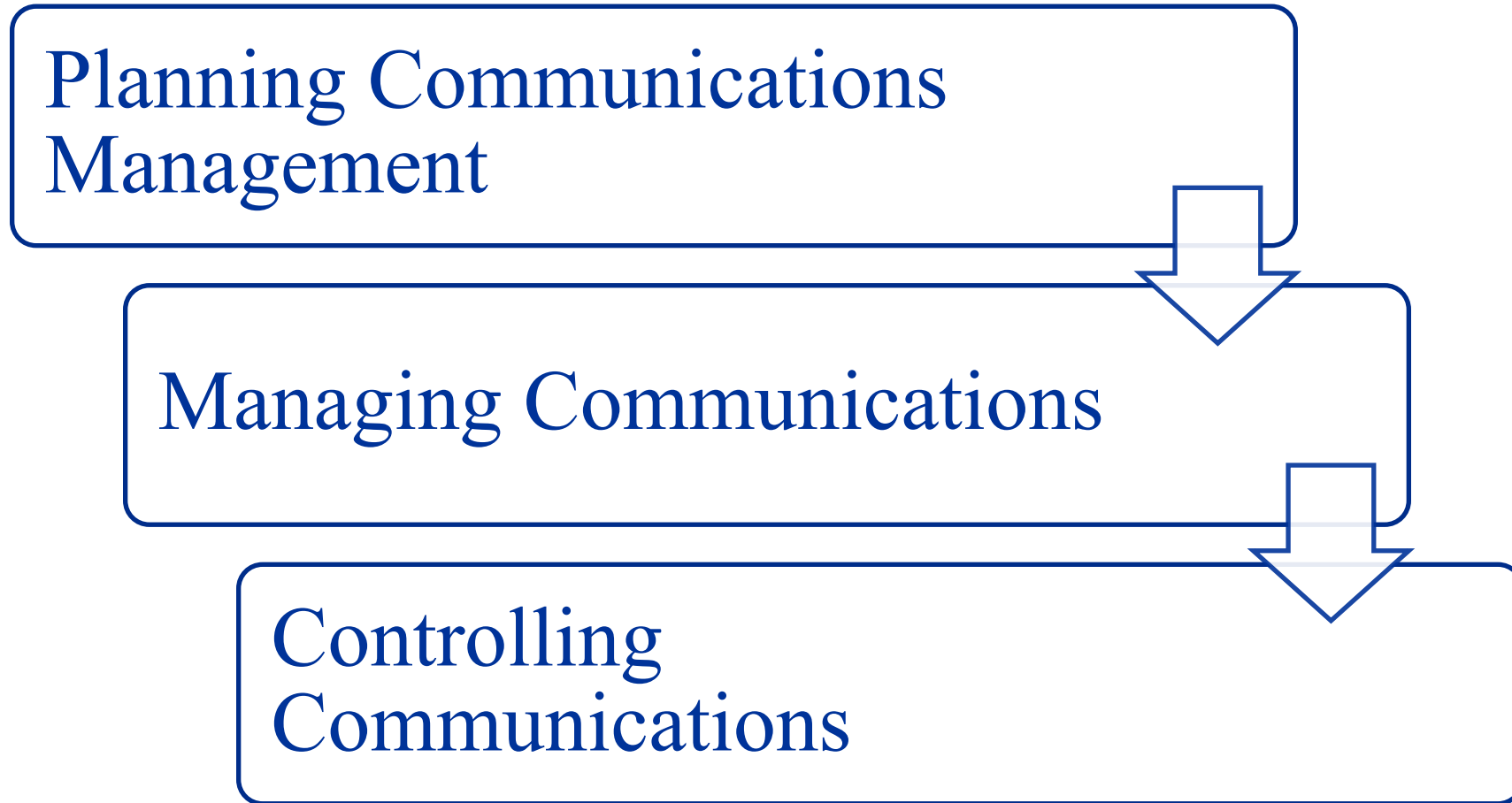
# Project Communication Management

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# Project Communication Management

- Many experts agree that the greatest threat to the success of any project, especially IT projects, is **a failure to communicate**.
- **The gap in knowledge and experience** causes some of the communication problems between technical professionals and their business colleagues;
- The goal of project communications management is to ensure **timely and appropriate generation, collection, dissemination, storage, and disposition** of project information.

# Project Communication Management (2)



# Keys to Good Communication

- (1) Focusing on Group and Individual Communication Needs;
- (2) Formal and Informal Methods for Communicating;
- (3) Distributing Important Information in an Effective and Timely Manner;
- (4) Setting the Stage for Communicating Bad News;
- (5) Determining the Number of Communication Channels;

# Group and Individual Communication Needs

- People have different **personality traits** that often affect their communication preferences.
- It is important for project managers and their team members to **be aware of their own communication styles**.
- Many IT professionals have different personality traits than the general population, such as being more **introverted, intuitive, and oriented to thinking (as opposed to feeling)**. These personality differences can lead to miscommunication with people who are extroverted, sensation-oriented, and feeling-oriented.

# Formal and Informal Methods for Communicating

- It is **not enough** for project team members to **submit reports** to their project managers and other stakeholders and then assume that everyone who needs to know the information will read the reports.
- They use informal discussions about the project to develop these relationships.
- Many experts believe that the difference between good project managers and excellent project managers is **their ability to nurture relationships and use empathic listening skills**.

# Distributing Important Information in an Effective and Timely Manner

- People have a tendency to avoid reporting bad news
- However, people tend to become overwhelmed by too much information, and they might not understand what it means to them on their particular project.
- Oral communication via meetings and informal talks helps bring important information—positive or negative—into the open. Because IT projects often require a lot of coordination, **it is a good idea to have short, frequent meetings.**

# Setting the Stage for Communicating Bad News

- Bad news might seem like a major setback, but you can **recommend steps to take** to mitigate a problem.
- Project sponsors and other senior managers want to know that
  - you have **evaluated the impact** of the situation, considered alternatives, and
  - you have **made a recommendation** based on your expertise.

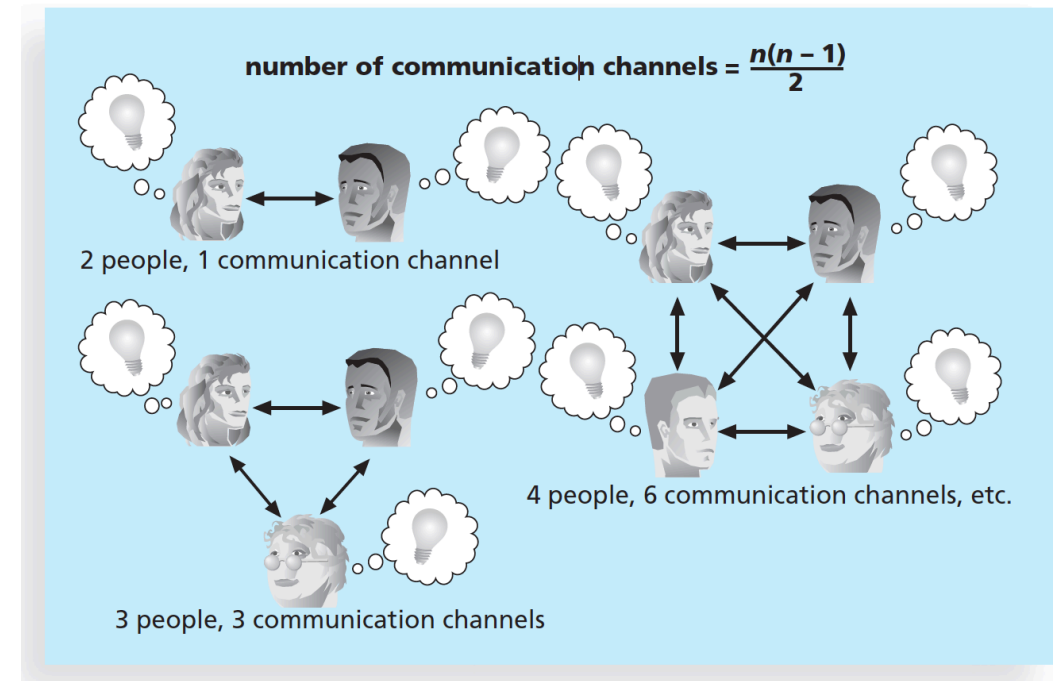
**BAD NEWS**



# Number of Communication Channels

- As the number increases, the **complexity of communication increases** because there are more channels or pathways through which people can communicate.

- $$\text{number of communication channels} = \frac{n(n-1)}{2}$$



# Communication Management Plan

- Because communication is so important on projects, every project should include a **communications management plan**—a document that guides project communications.
- The communications management plan varies with the needs of the project, but some type of written plan should always be prepared.



# Communication Management Plan (2)

- The communications management plan should address:
  - 1. Stakeholder communications requirements
  - 2. Information to be communicated, including format, content, and level of detail
  - 3. Who will receive the information and who will produce it
  - 4. Suggested methods or technologies for conveying the information
  - 5. Frequency of communication
  - 6. Escalation procedures for resolving issues
  - 7. Revision procedures for updating the communications management plan
  - 8. A glossary of common terminology

# Communication Management Plan (3)

Stakeholders	Document Name	Document Format	Contact Person	Due
Customer management	Monthly status report	Hard copy and meeting	Tina Erndt, Tom Silva	First of month
Customer business staff	Monthly status report	Hard copy	Julie Grant, Sergey Cristobal	First of month
Customer technical staff	Monthly status report	E-mail	Li Chau, Nancy Michaels	First of month
Internal management	Monthly status report	Hard copy and meeting	Bob Thomson	First of month
Internal business and technical staff	Monthly status report	Intranet	Angie Liu	First of month
Training subcontractor	Training plan	Hard copy	Jonathan Kraus	November 1
Software subcontractor	Software implementation plan	E-mail	Najwa Gates	June 1

# Communication Management Plan (4)

- Information about the content of essential project communications comes from the work breakdown structure (WBS).
- Creating some sort of communications management plan and reviewing it with project stakeholders early in a project helps prevent or reduce later communication problems.
- Consistent communication helps organizations improve project communications, especially for programs composed of multiple projects.

# Managing Communication

- Managing communications is a large part of a project manager's job. Getting project information to **the right people at the right time and in a useful format** is just as important as developing the information in the first place.
- (1) Using Technology to Enhance Information Creation and Distribution;
- (2) Selecting the Appropriate Communication Methods and Media;
- (3) Reporting Performance

# Managing Communication (2)

- Using Technology to Enhance Information Creation and Distribution.
- Most people and businesses rely on
  - e-mail,
  - instant messaging,
  - websites,
  - telephones, cell phones,
  - texting, and other technologies to communicate.

# Managing Communication (3)

- Selecting the Appropriate Communication Methods and Media
- There are three broad classifications for communication methods:
  - Interactive communication: exchange information via meetings, phone calls, or video conferencing. This method is usually the most effective way to ensure common understanding.
  - Push communication: Information is sent or pushed to recipients without their request via reports, e-mails, faxes, voice mails, and other means.
  - Pull communication: Information is sent to recipients at their request via websites, bulletin boards, e-learning, knowledge repositories like blogs and wikis, and other means.



# Managing Communication (4)

Key: 1 = Excellent, 2 = Adequate, 3 = Inappropriate						
How Well Medium Is Suited to:	Hard Copy	Phone Call	Voice Mail	E-mail	Meeting	Website
Assessing commitment	3	2	3	3	1	3
Building consensus	3	2	3	3	1	3
Mediating a conflict	3	2	3	3	1	3
Resolving a misunderstanding	3	1	3	3	2	3
Addressing negative behavior	3	2	3	2	1	3
Expressing support or appreciation	1	2	2	1	2	3
Encouraging creative thinking	2	3	3	1	3	3
Making an ironic statement	3	2	2	3	1	3
Conveying a reference document	1	3	3	3	3	2
Reinforcing one's authority	1	2	3	3	1	1
Providing a permanent record	1	3	3	1	3	3
Maintaining confidentiality	2	1	2	3	1	3
Conveying simple information	3	1	1	1	2	3
Asking an informational question	3	1	1	1	3	3
Making a simple request	3	1	1	1	3	3
Giving complex instructions	3	3	2	2	1	2
Addressing many people	2	3 or 1*	2	2	3	1

# Managing Communication (5)

- Reporting Performance
- Performance reporting keeps stakeholders informed about how resources are being used to achieve project objectives.



# Controlling Communication

- The project manager and project team should use their various reporting systems, expert judgment, and meetings to assess how well communications are working. If communication problems exist, the project manager and team need to take action.
- It is often beneficial to have a facilitator from outside the project team assess how well communications are working. A facilitator can also help the team solve any communication problems.

# Resources

- Information Technology Project Management
  - [https://files.transtutors.com/cdn/uploadassignments/2411827\\_1\\_information-technology-project-management--8-edition-.pdf](https://files.transtutors.com/cdn/uploadassignments/2411827_1_information-technology-project-management--8-edition-.pdf)



# Resources (2)

- Writing and using a software management plan
  - <https://www.software.ac.uk/resources/guides/software-management-plans>
- Software Project Management Plan Samples
  - SPMP for Nirvana National Bank ATM Software Project
  - [http://buckley-golder.com/papers/mbg\\_SPMP\\_ProjectManagement.pdf](http://buckley-golder.com/papers/mbg_SPMP_ProjectManagement.pdf)