

IT Project Management

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Chapter 1: Introduction to Project Management

- A *project* is a temporary endeavor undertaken to create a unique product, service, or result
- *Project management* is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements
- A *program* is a group of related projects managed in a coordinated way
- *Project portfolio management* involves organizing and managing projects and programs as a portfolio of investments
- Project portfolio management addresses *strategic* goals of an organization. while project management addresses *tactical* goals.

Chapter 1: Introduction to Project Management

- *Project management knowledge areas*: describe the key competencies that project managers must develop.

10 knowledge areas of project management:

- Scope management
- Time management
- Cost management
- Quality management
- Human resource management
- Communication management
- Risk management
- Procurement management
- Stakeholders management
- Integration management

Chapter 2: The PM and IT Context

- *Project managers* need to take a systems approach when working on projects
- Organizations have four different frames: *structural, human resources, political, and symbolic*
- The *structure and culture* of an organization have strong implications for project managers
- Projects should successfully pass through each phase of *the project life cycle*
- Project managers need to consider several factors due to the *unique context of information technology projects*
- Recent trends affecting IT project management include *globalization, outsourcing, virtual teams, and Agile*

Chapter 2: The PM and IT Context

- *Systems thinking* describes the holistic view of carrying out projects within the context of the organization.
- *Systems approach* describes a holistic and analytical approach to solving complex problems that includes using systems philosophy, systems analysis, and systems management.
- *Systems philosophy*: an overall model for thinking about things as systems
- *Systems analysis*: problem-solving approach
- *Systems management*: address business, technological, and organizational issues before making changes to systems

Chapter 2: The PM and IT Context

- *A deliverable* is a product or service, such as technical report, a training session, a piece of hardware, or a segment of software code.
- *Product life cycles* include the designing, producing and utilizing of a product.
- *Project stakeholders* are the people involved in project activities or affected by them.
- *Scrum* is the leading agile development method for completing projects with a complex, innovative scope of work.

Chapter 2: The PM and IT Context

Organizational structure:

Organizational structure	Scope of application
Functional	Suitable for companies that produce and sell standard products.
Project	Suitable for businesses that are projects and do not produce standard products.
Matrix	Suitable for companies with multiple projects of varying sizes and complexity.

Chapter 3: The Project Management Process Groups

- The five project management process groups are *initiating, planning, executing, monitoring and controlling, and closing*.
- You can map the main activities of each process group to the *ten knowledge areas*.
- Some organizations develop their own information technology project management *methodologies*.
- The JWD Consulting *case* study provides an example of using the process groups and shows several important project documents.
- The second version of the same case study illustrates differences using *agile (Scrum)*. The biggest difference is providing three releases of useable software versus just one.

Chapter 3: The Project Management Process Groups

- **Pre-initiation**

- 1、 Determine the scope, time, and cost constraints for the project
- 2、 Identify the project sponsor
- 3、 Select the project manager
- 4、 Develop a business case for a project (see Table 3-2 for an example)
- 5、 Meet with the project manager to review the process and expectations for managing the project
- 6、 Determine if the project should be divided into two or more smaller projects

Chapter 3: The Project Management Process Groups

• Project Initiation

Initiating a project includes *recognizing and starting* a new project or project phase

The main goal is to *formally select and start off* projects

- 1、 Identifying Project Stakeholders
- 2、 Drafting the Project Charter
- 3、 Holding a Project kick-off Meeting

Chapter 3: The Project Management Process Groups

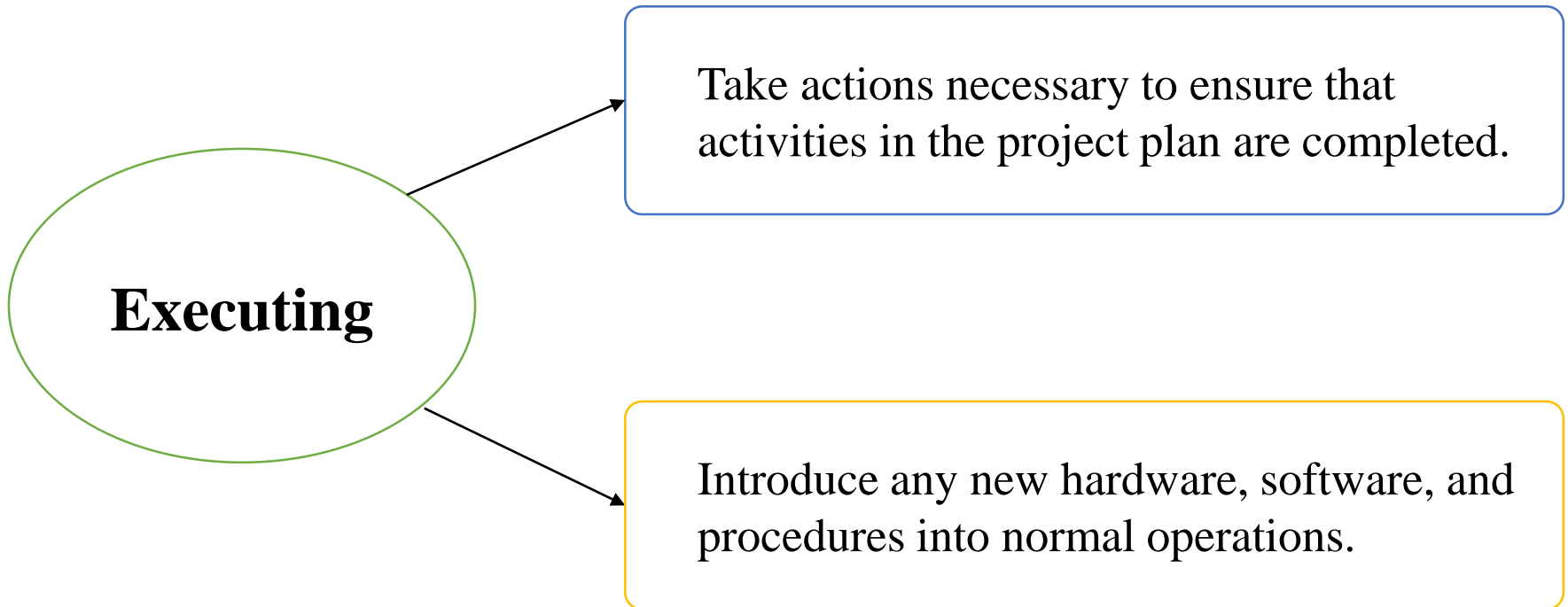
- **Project planning**

The main purpose of project planning is to guide execution Every knowledge area includes planning information

- 1、 A team contract
- 2、 A project scope statement
- 3、 A work breakdown structure (WBS)
- 4、 A project schedule, in the form of a Gantt chart with all dependencies and resources entered
- 5、 A list of prioritized risks (part of a risk register)

Chapter 3: The Project Management Process Groups

- **Project Executing**



The products of the project are produced during project execution, and it usually takes the most resources to accomplish this process.

Chapter 3: The Project Management Process Groups

- **Project monitoring and controlling**

Involves measuring progress toward project objectives, monitoring deviation from the plan, and taking correction actions

Affects all other process groups and occurs during all phases of the project life cycle

Outputs include performance reports, change requests, and updates to various plans

- 1、 Submit weekly report every week
- 2、 Using project management software

Chapter 3: The Project Management Process Groups

- **Project closing**

- Involves gaining stakeholder and customer acceptance of the final products and services
- Even if projects are not completed, they should be closed out to learn from the past
- Outputs include project files and *lessons-learned reports*, part of organizational process assets
- Most projects also include a final report and presentation to the sponsor/senior management

- *Project integration management* involves coordinating all of the other knowledge areas throughout a project's life cycle
- Main processes include
 - Develop the project charter
 - Develop the project management plan
 - Direct and manage project execution
 - Monitor and control project work
 - Perform integrated change control
 - Close the project or phase

- *SWOT analysis* – analyzing strengths, weaknesses, opportunities and threats.
- *Net Present Value Analysis (NVP)* : Calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and out follows to the present point in time.
- *Payback period* is the amount of time it will take to recoup the total dollars invested in a project, in terms of net cash inflows.
- *A change control system* is a formal, documented process that describes when and how official project documents may be changed.
- *A change control board (CCB)* is a formal group of people responsible for approving or rejecting changes on a project.

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- *Project management plan* is a document used to coordinate all project planning documents and help guide a project's execution and control.
- *Project management plan functions:*
 - Guide the execution of the project
 - Help managers to manage and control team
 - Provide a benchmark for performance evaluation and measurement
 - Act as a platform for communications among stakeholders

- *Possible criteria for selecting it projects* using the weighted scoring model.
 - Supports key business objectives
 - Has strong internal sponsor;
 - Has strong customer support
 - Uses realistic level of technology
 - Can be implemented in one year or less
 - Provides positive NPV
 - Has low risk in meeting scope, time, and cost goals

- *Integrated change control* involves identifying, evaluating, and managing changes throughout the project life cycle.
- *Three main objectives* of integrated change control are:
 - Influencing the factors that create changes to ensure that changes are beneficial
 - Determining that a change has occurred
 - Managing actual changes as they occur

Chapter 5: Project Scope Management

- *Project scope management* includes the processes required to ensure that the project addresses all the work required, and only the work required, to complete the project successfully。
- Main processes include
 - Planning scope management
 - Collect requirements
 - Define scope
 - Create WBS
 - Validate scope
 - Control scope

Chapter 5: Project Scope Management

- *Scope* refers to all the work involved in creating the products of the project and the processes used to create them.
- *Requirements Traceability Matrix (RTM)* is a table that lists requirements, their various attributes, and the status of the requirements to ensure that all are addressed.
- *A scope statement* is a document that describes the consensus on the scope of the project among all project stakeholders.
- *A work breakdown structure (WBS)* is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project
- *A WBS dictionary* is a document that describes detailed information about each WBS item

Chapter 5: Project Scope Management

There are several ways to collect requirements:

- *Interviewing stakeholders*
- *Holding focus groups and facilitating workshops*
- *Using group creativity and decision-making techniques*
- *Questionnaires and surveys*
- *Observation*
- *Prototyping and document analysis*
- *Benchmarking or generating ideas by comparing*

Chapter 5: Project Scope Management

Approaches to developing WBS

- *Using guidelines*: Some organizations, like the DOD, provide guidelines for preparing WBSs
- *The Analogy approach*: Review WBSs of similar projects and tailor to your project
- *The Top-down approach*: Start with the largest items of the project and break them down
- *The Bottom-up approach*: Start with the specific tasks and roll them up
- *Mind-mapping approach*: a technique that uses branches radiating out from a core idea to structure thoughts and ideas.

Chapter 5: Project Scope Management

- **How to judge the decomposition of WBS is up to standard?**
 - The work decomposed is *necessary and sufficient* to complete the corresponding deliverables of the upper layer.
 - *Work independence*. That is, once the work starts, it can be completed without interruption.
 - *Judgment of work completion*. That is, you can clearly judge whether the work has started, how much work has been completed, and whether the work has been completed.
 - *Work deliverables*. That is to clarify what results will be obtained after the work is completed.

Chapter 6: Project Time Management

- *Project time management* is often cited as the main source of conflict on projects, and most IT projects exceed time estimates
- Main processes include
 - Plan schedule management
 - Define activities
 - Sequence activities
 - Estimate activity resources
 - Estimate activity durations
 - Develop schedule
 - Control schedule

Chapter 6: Project Time Management

- *A milestone* on a project is a significant event that normally has no duration.
- Network diagrams: *AOA* (Activity-On-Arrow) & *ADM* (Arrow Diagramming Method) & *PDM* (Precedence diagramming method)
- *Critical path analysis* (*CPM*) is a network diagramming technique used to predict total project duration.
- *PERT analysis* - a network analysis technique used to estimate project duration when there is a high degree of uncertainty about the individual activity duration estimates.

Chapter 6: Project Time Management

Table 6-3. All duration estimates or estimated times are in weeks, and the network proceeds from Node 1 to Node 8.

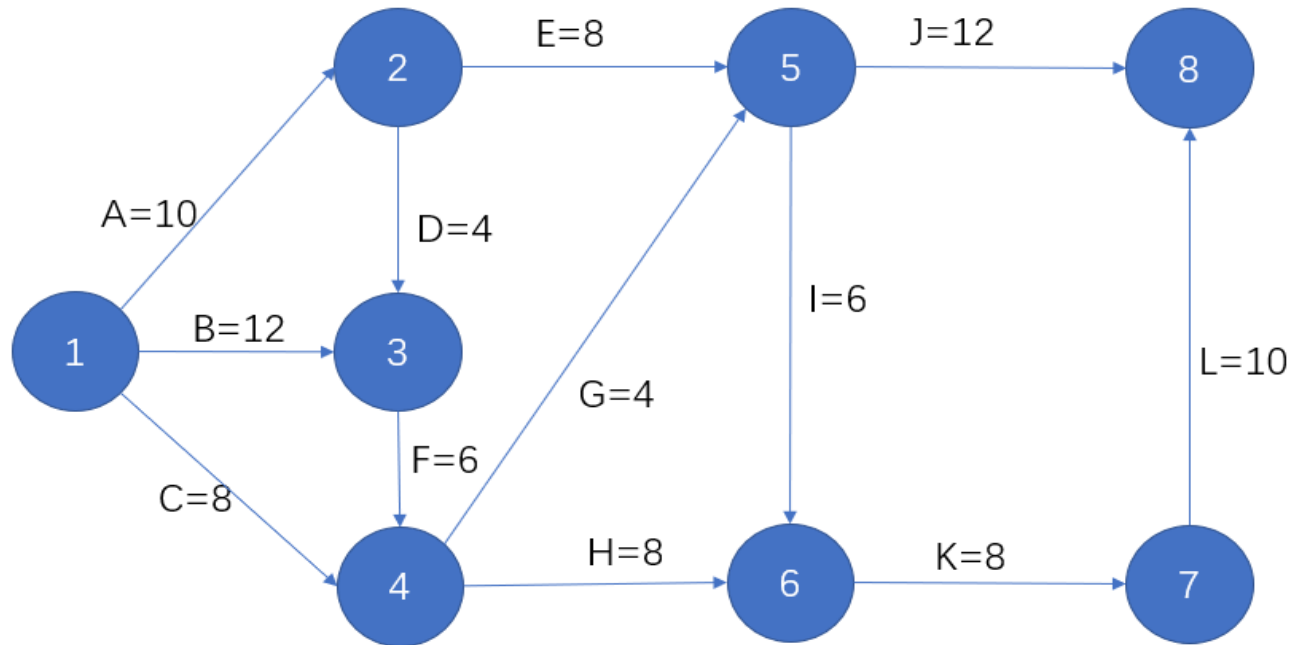
TABLE 6-3 Network diagram data for a large project

Activity	Initial Node	Final Node	Estimated Duration
A	1	2	10
B	1	3	12
C	1	4	8
D	2	3	4
E	2	5	8
F	3	4	6
G	4	5	4
H	4	6	8
I	5	6	6
J	5	8	12
K	6	7	8
L	7	8	10

- a. Draw an AOA network diagram.
- b. Identify all of the paths.
- c. What is CPM and how long is it?
- d. What is the shortest possible time needed to complete this project?

Chapter 6: Project Time Management

Table 6-3. All duration estimates or estimated times are in weeks, and the network proceeds from Node 1 to Node 8.





Chapter 7: Project Cost Management

- What is cost ?
- Earned value management / Earned value analysis
- A cost baseline
- Project cost management processes
 - Plan cost management
 - Estimate costs
 - Determine budget
 - Control costs

Chapter 7: Project Cost Management

- *Cost baseline* is an approved time-based cost expenditure plan.
 - *Cash flow analysis* determines the estimated annual costs and benefits for a project and the resulting annual cash flow
 - *Earned value management (EVM)* is a project performance measurement technique that integrates scope, time, and cost data.
-
- | | |
|-----------------------------------|---|
| • Planned value (PV) | • Schedule variance (SV) |
| • Actual cost (AC) | • Cost performance index (CPI) |
| • Earned value (EV) | • Schedule performance index (SPI) |
| • Rate of performance (RP) | • Budget at completion (BAC) |
| • Cost variance (CV) | • Estimate at completion (EAV) |

Chapter 7: Project Cost Management

Given the following information for a one-year project, answer the following questions.

$$PV = 23000 \quad EV = 20000$$

$$AC = 25000 \quad BAC = 120000$$

- What is the CV, SV, CPI, and SPI for the project.
- How is the project doing? Is it ahead of schedule or behind schedule? Is it under budget or over budget.
- Use the CPI to calculate the estimate at completion for this project. Is the project performing better or worse than planned?
- Use the SPI to estimate how long it will take to finish this project.
- Sketch the earned value chart for this project, using Figure 7-5 as a guide.

Chapter 8: Project Quality Management

- *Project quality management* ensures that the project will satisfy the needs for which it was undertaken
- *Main processes include:* Plan quality、Perform quality assurance、Perform quality control
- *Tools and techniques for quality control:* Cause-and-effect diagrams、control chart、Checksheet、scatter diagram、histogram、Pareto chart、Flowcharts、Statistical sampling、Six sigma
- *Noteworthy quality experts include:* Deming、Juran、Crosby、Ishikawa、Taguchi、Feigenbaum
- *Maturity models:* SQFD、CMMI、OPM3

Chapter 8: Project Quality Management

Cause-and-effect diagrams

Training

User did not
check box to
save password

User keeps
forgetting
password

User did
not reset
password

System Hardware

Users
cannot
get into
system

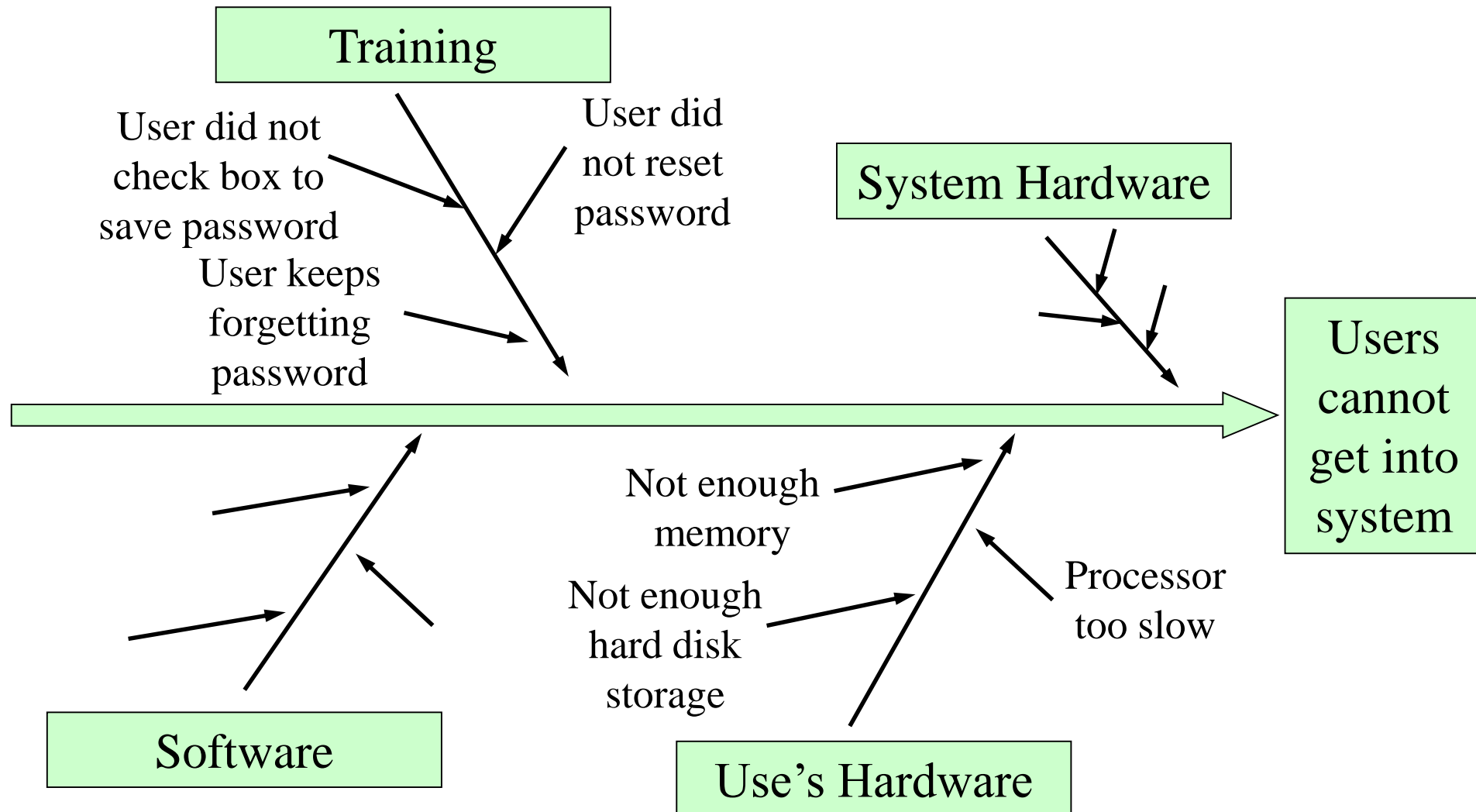
Software

Not enough
memory

Not enough
hard disk
storage

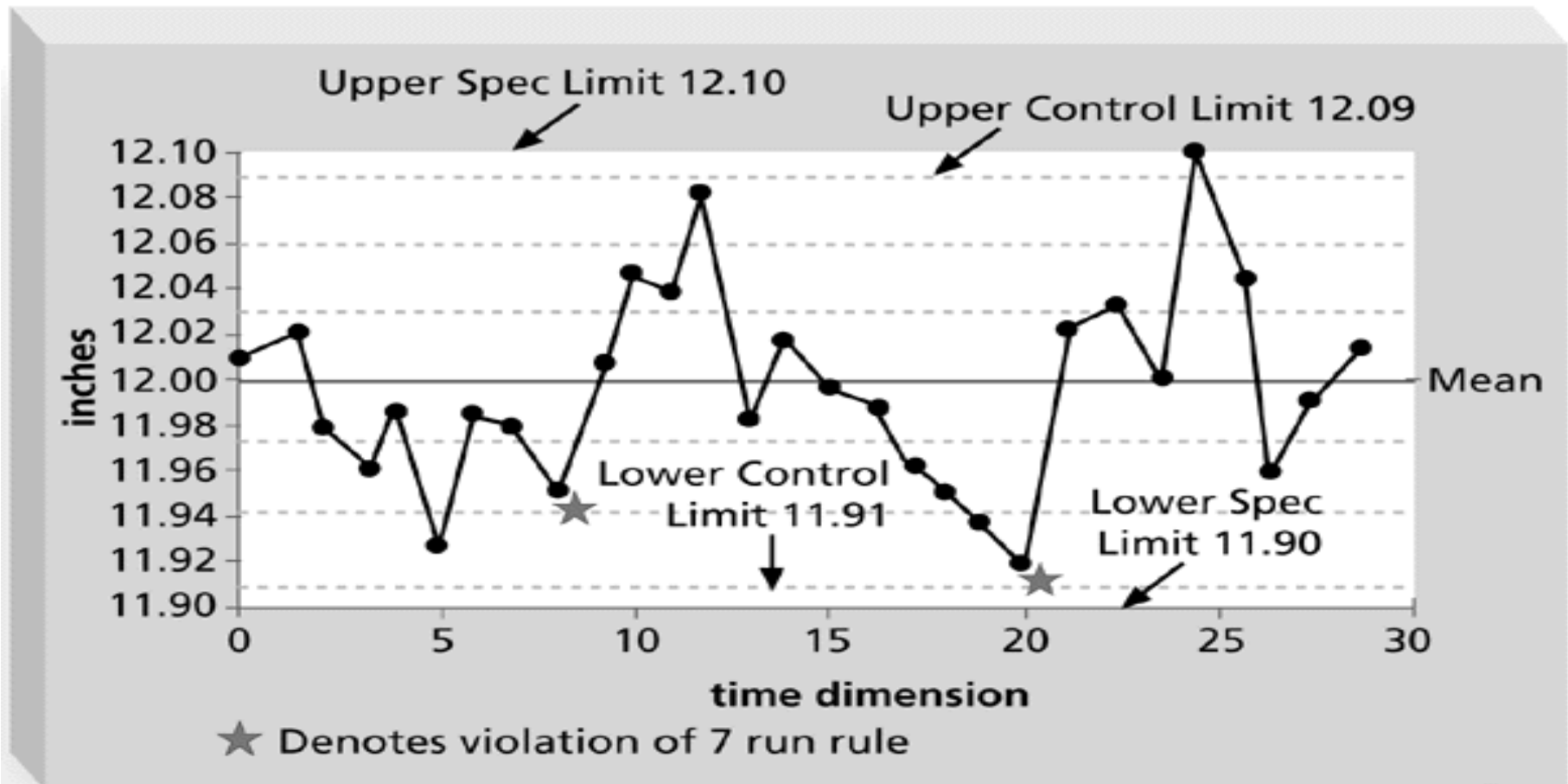
Processor
too slow

Use's Hardware



Chapter 8: Project Quality Management

- A **control chart** is a graphic display of data that illustrates the results of a process over time



Chapter 8: Project Quality Management

- A **checksheet** is used to collect and analyze data

It is sometimes called a tally sheet or checklist, depending on its format

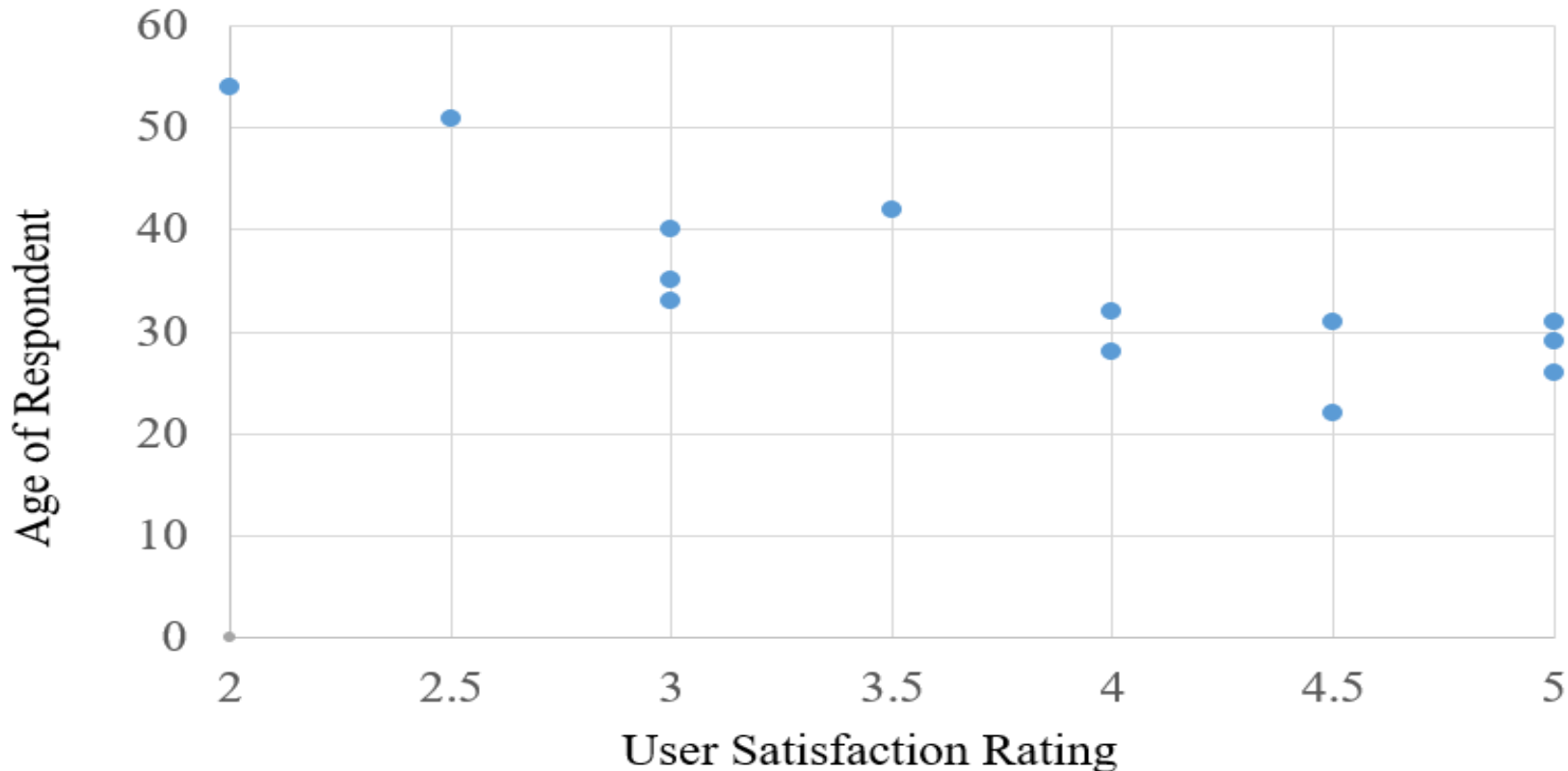
System Complaints								
Source	Day							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Email	III	III	I	II	I		I	12
Text	VII	III	VI	III	III	II	III	29
Phone call	I	II	I	I	II	I		8
Total	11	10	8	6	7	3	4	49

This information might be useful in improving the process for handling complaints

Chapter 8: Project Quality Management

A **scatter diagram** helps to show if there is a relationship between two variables.

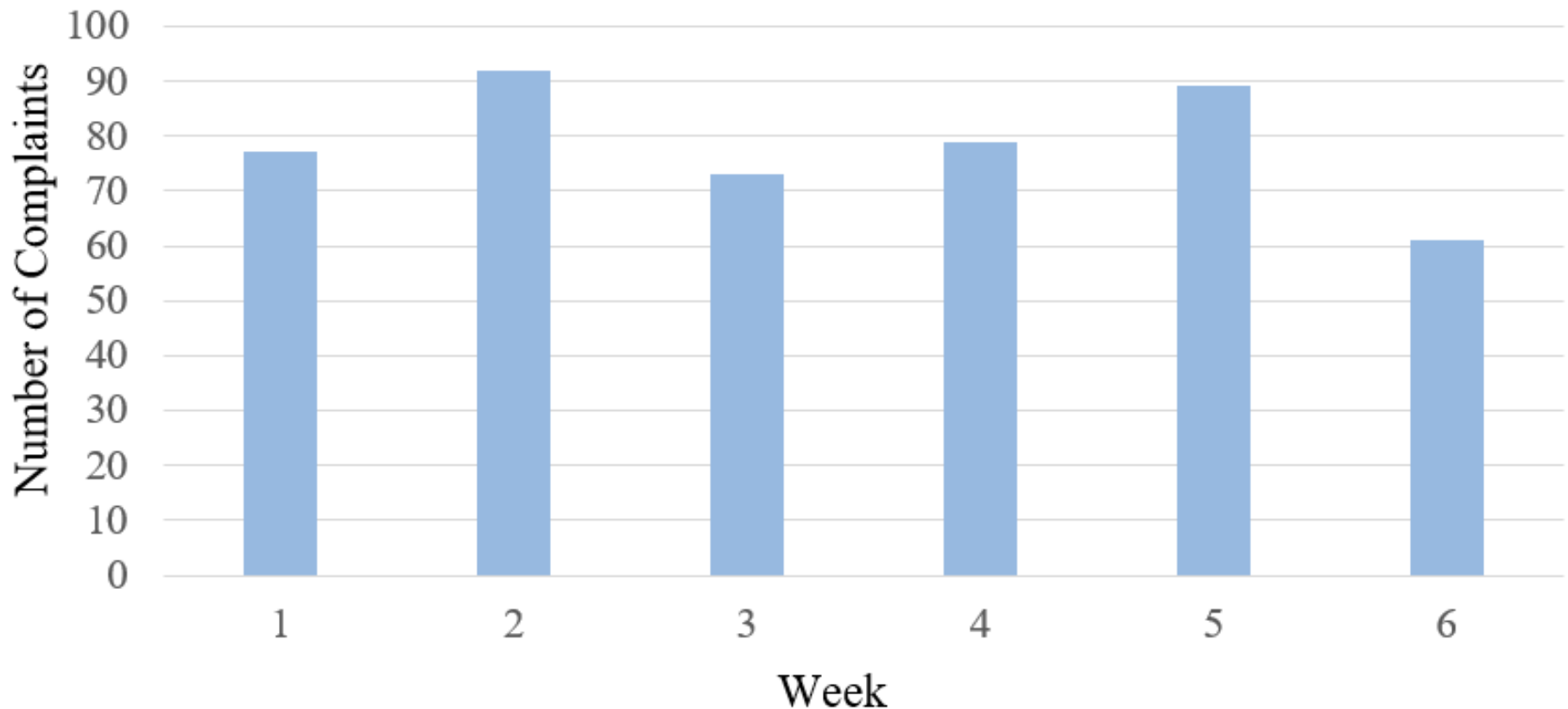
The closer data points are to a diagonal line, the more closely the two variables are related.



Chapter 8: Project Quality Management

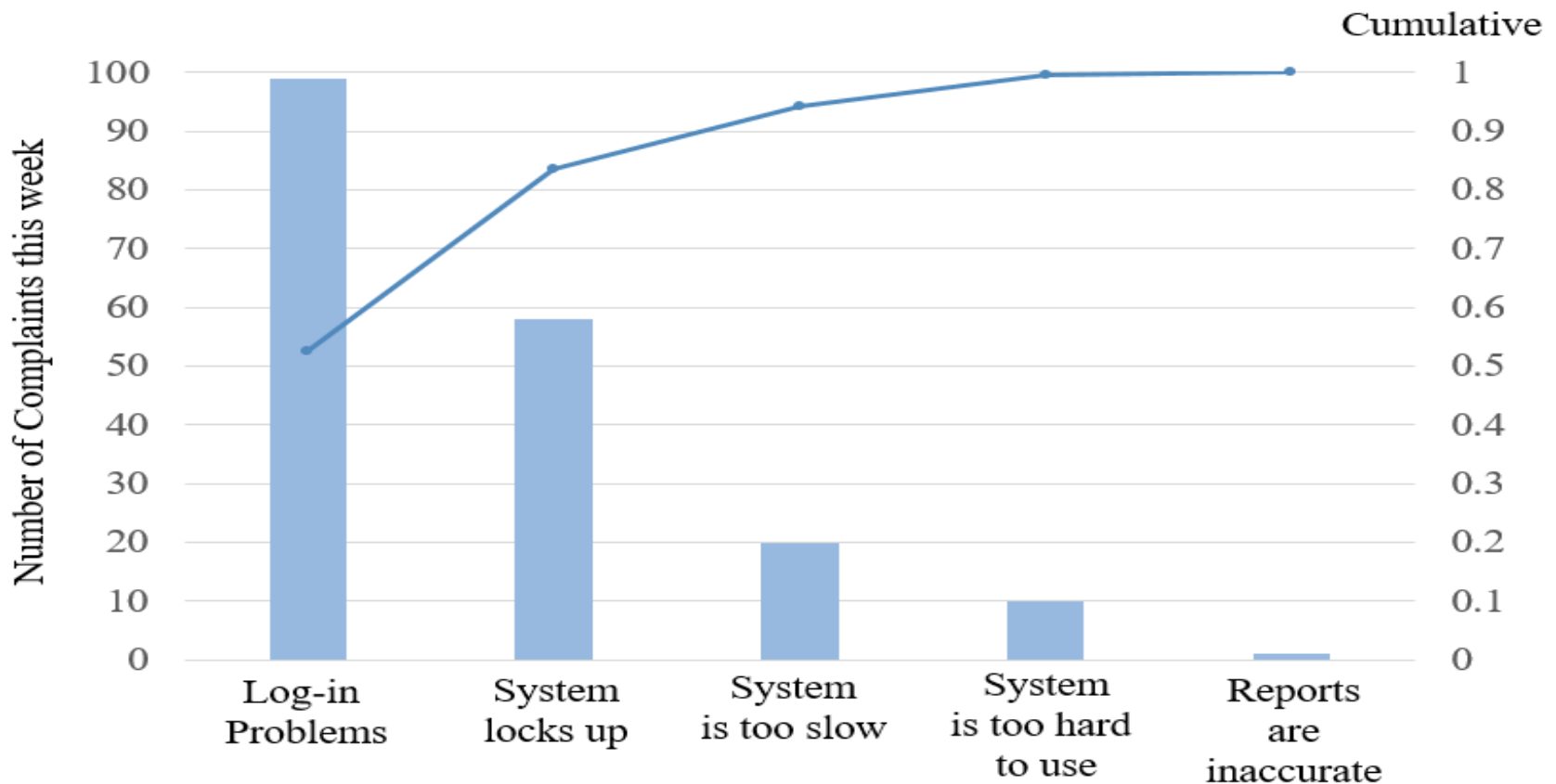
A **histrogram** is a bar graph of a distribution of variables

Each bar represents an attribute or characteristic of a problem or situation, and the height of the bar represents its frequency



Chapter 8: Project Quality Management

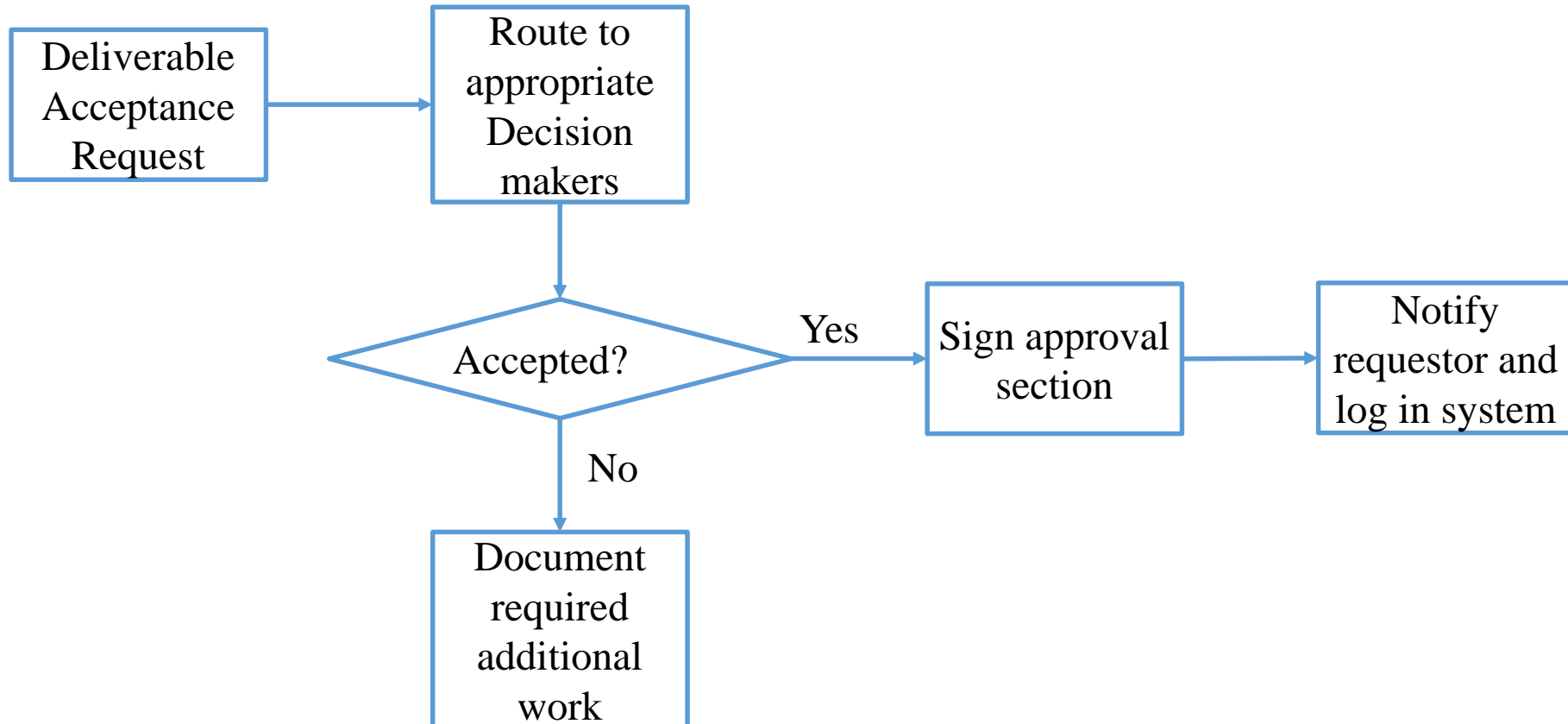
A **Pareto chart** is a histogram that can help you identify and prioritize problem areas
Pareto analysis is also called the 80-20 rule, meaning that 80 percent of problems are often due to 20 percent of the causes



Chapter 8: Project Quality Management

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



Chapter 8: Project Quality Management

Several suggestions for improving quality for IT projects include:

- Establish *leadership* that promotes quality
- Understand the *cost* of quality
- Focus on organizational influences and workplace factors that affect quality
- Follow *maturity models*
 - i. Software Quality Function Deployment (SQFD) model
 - ii. Capability Maturity Model Integration (CMMI) model
 - iii. Project Management Maturity Models



Chapter 8: Project Quality Management

- *Deming* was famous for his work in rebuilding Japan and his 14 Points for Management.
- *Juran* wrote the Quality Control Handbook and ten steps to quality improvement.
- *Crosby* wrote Quality is Free and suggested that organizations strive for zero defects.
- *Ishikawa* developed the concepts of quality circles and fishbone diagrams.
- *Taguchi* developed methods for optimizing the process of engineering experimentation.
- *Feigenbaum* developed the concept of total quality control.

Chapter 9: Project Human Resource Management

- *Project human resource management* includes the processes required to make the most effective use of the people involved with a project
- Keys to managing people:
 - Motivation (*Herzberg's motivation-hygiene theory, McMlelland's acquired-needs theory, McGregor's theory X and theory Y*)
 - Influence and power (*Thamhain and Wilemon's influence and power*)
 - Effectiveness (*Covey and improving effectiveness*)
- Main processes include
 - Plan human resource management
 - Acquire project team
 - Develop project team
 - Manage project team

Chapter 9: Project Human Resource Management

- *Resource loading* refers to the amount of individual resources that an existing schedule requires during specific time periods.
- *Over allocation* means that not enough resources are available to perform the assigned work during a given time period.
- *Resource leveling* is a technique for resolving resource conflicts by delaying tasks.
- *RAM*: Responsibility assignment matrices
- *OBS*: Organizational Breakdown Structure
- *MBTI*: Myers-Briggs Type Indicator

Chapter 9: Project Human Resource Management

Resource leveling Benefits:

- When resources are used on a more constant basis, they require less management.
- Resource leveling may enable project managers to use a just-in-time inventory type of policy for subcontractors or other expensive resources.
- Resource leveling results in fewer problems for project personnel and accounting department.
- Resource leveling often improves morale.

Chapter 9: Project Human Resource Management

Conflict handling modes:

- *Confrontation*: Directly face a conflict using a problem-solving approach
- *Compromise*: Use a give-and-take approach
- *Smoothing*: De-emphasize areas of difference and emphasize areas of agreement
- *Forcing*: The win-lose approach
- *Withdrawal*: Retreat or withdraw from an actual or potential disagreement
- *Collaborating*: Decision makers incorporate different viewpoints and insights to develop consensus and commitment

Chapter 9: Project Human Resource Management

Suggestions for ensuring that teams are productive

- Be patient and kind with your team
- Fix the problem instead of blaming people
- Establish regular, effective meetings
- Allow time for teams to go through the basic team-building stages
- Limit the size of work teams to three to seven members
- Plan some activities to help team members to know each other better
- Stress team identity
- Nurture team members and encourage them to help each other
- Recognize individual and team performance
- Take additional actions to work with virtual team members



Chapter 10: Project Communications Management

- The goal of *project communications management* is to ensure timely and appropriate generation, collection, dissemination, storage, and disposition of project information
- *Method of information exchange*: Written Form、Oral Form、Formal 、Informal 、Gesture Action、Medium、Wording and Phrasing
- Main process include:
 - Plan communications management
 - Manage communications
 - Control communications

Chapter 10: Project Communications Management

Some useful methods for managing communications:

- Using technology to enhance information creation and distribution
- Selecting the appropriate **communication methods** and media
 - i. Interactive communication
 - ii. Push communication
 - iii. Pull communication
- Reporting performance
 - i. Status reports
 - ii. Progress reports
 - iii. Forecasts

Chapter 10: Project Communications Management

Suggestions for improving project communications

- Developing better communication skills
- Running effective meetings
- Using e-mail, instant messaging, texting and collaborative tools effectively
- Using templates for project communications

5C principle of written communication

- | | |
|----------------------|--------------------|
| • Clear Purpose | Correct Expression |
| • Concise Expression | Coherent Logic |
| • Controlling Ideas | |



Chapter 10: Project Communications Management

Lessons Learned Report

Prepared by:

Date:

Project Name:

Project Sponsor:

Project Manager:

Project Dates:

Final Budget:

1. Did the project meet scope, time, and cost goals?
2. What was the success criteria listed in the project scope statement?
3. Reflect on whether or not you met the project success criteria.
4. In terms of managing the project, what were the main lessons your team learned?
5. Describe one example of what went right on this project.
6. Describe one example of what went wrong on this project.
7. What will you do differently on the next project based on your experience working on this project?

Chapter 11: Project Risk Management

- *Project risk management* is the art and science of identifying, analyzing, and responding to risk throughout the life of a project and in the best interests of meeting project objectives
- Main processes include:
 - Plan risk management
 - Identify risks
 - Perform qualitative risk analysis
 - Perform quantitative risk analysis
 - Plan risk responses
 - Control risks

Chapter 11: Project Risk Management

- *Risk* is an uncertainty that can have a negative or positive effect on meeting project objectives.
- *Crisis* indicates an obvious danger to the success of a project.
- *Risk utility*: is the amount of satisfaction or pleasure received from a potential payoff.
- *Estimated monetary value (EMV)* is the product of a risk event probability and the risk event's monetary value
- *Simulation* uses a representation or model of a system to analyze the expected behavior or performance of the system

Chapter 11: Project Risk Management

Topics Addressed in a Risk Management Plan

- Methodology
- Roles and responsibilities
- Budget and schedule
- Risk categories
- Risk probability and impact
- Revised stakeholders' tolerances
- Tracking
- Risk documentation

Chapter 11: Project Risk Management

Suggestions for identifying risks

- Brainstorming
- Delphi technique
- Interviewing
- Root cause analysis
- SWOT
- Checklists
- Analysis of assumptions
- Diagrams

Chapter 11: Project Risk Management

Suggestions for responding the risks

Negative risks:

- Risk avoidance
- Risk acceptance
- Risk transference
- Risk mitigation
- Reporting risk

Positive risks:

- Risk exploitation
- Risk sharing
- Risk enhancement
- Risk acceptance
- Reporting risk



Chapter 12: Project Procurement Management

- *Project procurement management* involves acquiring goods and services for a project from outside the performing organization
- *Types of contracts*
 - Fixed price or lump sum contracts
 - Cost reimbursable contracts
 - Time and material contracts
- *Processes include:*
 - Plan procurement management
 - Conduct procurements
 - Control procurements
 - Close procurements



Chapter 12: Project Procurement Management

- *FFP contract* : Firm-fixed-price contract
- *FP-EPA contract*: Fixed-price with economic price adjustment contract
- *FPIF contract*: Fixed-price incentive fee
- *CPIF contract* : Cost plus incentive fee contract
- *CPFF contract* : Cost plus fixed fee contract
- *CPAF contract* : Cost plus award fee contract
- *CPPC contract* : Cost plus percentage of costs contract
- *T&M contracts* : Time and material contracts.

Chapter 12: Project Procurement Management

- *SOW* : Contract Statement of Work is a description of the work required for the procurement
- *RFP : Request for Proposal* is a document used to solicit proposals from prospective suppliers.
- *RFQ : Request for Quote* is a document used to solicit quotes or bids from prospective suppliers.
- *BID* : is a document prepared by sellers providing pricing for standard items that have been clearly defined by the buyer
- *PTA*: Point of Total Assumption.



Chapter 12: Project Procurement Management

Suggestions for Change Control in Contracts

- Changes need to be reviewed, approved. documented by the same people in the same way
- Evaluation of any change should include an impact analysis.
- Changes must be documented in writing.
- Meet business needs and work in an operational environment
- Have backup plans
- Use tools and techniques

Chapter 13: Project Stakeholder Management

- *The purpose of project stakeholder management* is to identify all people or organizations affected by a project, to analyze stakeholder expectations, and to effectively engage stakeholders in project decisions throughout the life of a project.
- Processes include:
 - Identify stakeholders
 - Plan stakeholder management
 - Manage stakeholder engagement
 - Control stakeholder engagement

Chapter 13: Project Stakeholder Management

A stakeholder register includes basic information on stakeholders:
Identification 、 Assessment information、 Stakeholder classification

Name	Position	Internal/ External	Project Role	Contact Information
Stephen	VP of Operations	Internal	Project sponsor	stephen@globaloil.com
Betsy	CFO	Internal	Senior manager, approves funds	betsy@globaloil.com
Chien	CIO	Internal	Senior manager, PM's boss	chien@globaloil.com
Ryan	IT analyst	Internal	Team member	ryan@globaloil.com
Lori	Director, Accounting	Internal	Senior manager	lori@globaloil.com
Sanjay	Director, Refineries	Internal	Senior manager of largest refinery	sanjay@globaloil.com
Debra	Consultant	External	Project manager	debra@gmail.com
Suppliers	Suppliers	External	Supply software	suppliers@gmail.com



Chapter 13: Project Stakeholder Management

The engagement level of stakeholders:

- **Unaware:** Unaware of the project and its potential impacts on them
- **Resistant:** Aware of the project yet resistant to change
- **Neutral:** Aware of the project yet neither supportive nor resistant
- **Supportive:** Aware of the project and supportive of change
- **Leading:** Aware of the project and its potential impacts and actively engaged in helping it succeed



Chapter 13: Project Stakeholder Management

Suggestions for Managing stakeholder :

- Be clear from the start
- Explain the consequences
- Have a contingency plan
- Avoid surprises
- Take a stand



Chapter 13: Project Stakeholder Management

Final Exam

1. Choices (20 pts)
2. Explain following terminology(20 pts)
- 3 . Answer the following questions (30 pts)
4. Application (30 pts)