Review Questions

1. Why are information systems (IS) essential in organizations?
2. Why do systems analysts need to know who the stakeholders are in the organization?
3. Who are the typical stakeholders in an information system? What are their roles?
4. Please explain what the consequences are if an information system lacks a system owner.
5. What are the differences between internal users and external users? Give examples.
6. What are the differences between the role of system analysts and the role of the rest of the stakeholders?
7. What kind of knowledge and skills should a system analyst possess?
8. In addition to the business and computing knowledge that system analysts should possess, what are the other essential skills that they need to effectively complete their jobs?
9. Why are good interpersonal communication skills essential for system analysts?
10. What are some of the business drivers for today's information systems?
11. What are the differences between electronic commerce (e-commerce) and electronic business (e-business)?
12. What are the differences between information and knowledge?
13. What are the most important technology drivers for today's information systems?
14. What are the four steps in a system development process? What happens in each step?
15. Why is system initiation essential in the system development process?

Problems and Exercises

1. Assume you are a systems analyst who will be conducting a requirements analysis for an individually owned brick-and-mortar retail store with a point-of-sale system. Identify who the typical internal and external users might include.
2. Assume you are a systems analyst for a consulting company and have been asked to assist the chief executive officer (CEO) of a regional bank. The bank recently implemented a plan to reduce the number of staff, including loan officers, as a strategy to maintain profitability. Subsequently, the bank has experienced chronic problems with backlogged loan requests because of the limited number of loan officers who are able to review and approve or disapprove loans. The CEO of the bank is interested in solutions that would allow the approval process to move faster without increasing the number of loan officers, and has engaged your company to come up with suggestions. What is one type of system that you might recommend to the bank?
3. How do communication and collaboration systems improve efficiency and effectiveness? What are some of the communication and collaboration systems that are being used by an increasing number of organizations?
4. Identify the type of information system that clerical workers in an organization would typically use and why.
5. As information systems increase in complexity and comprehensiveness, ethical issues regarding accessing and using data from these systems are also increasing. What are some of these ethical issues?
6. What are business to consumer (B2C) and business to business (B2B) Web applications, and what are some examples of each type?
7. While system development processes and methodologies can vary greatly, identify and briefly explain the "generic" phases of the system development process that are described in the textbook and which must be completed for any project. You are a contractor with a systems integration company.
8. Your company has a contract with a local firm to link all of their systems so they can transparently work together. Their applications include a number of existing legacy systems, which were built at different times by different developers using a variety of languages and platforms, as well as several newer contemporary applications. What is the term for this type of linking? What type of tool would you most likely use, and what are some examples of these tools?
9. Your company has asked you to develop a new Web-based system to replace its existing legacy system. There will be very little change in business requirements and functionality from the existing legacy system. Suggest which system development process you might use and why.
10. You recently joined a retail sales company which has recently bought out and assimilated a commercial industrial supply house. You have been asked to lead a project to develop a consolidated inventory-tracking system. Suggest which system development process you might use and why.
11. Your company president sits down beside you just before a meeting is to begin and tells you that people keep saying the customer needs to install a CRM, but doesn't really know what it is. The company president then asks you to explain it in nontechnical terms in the next 30 seconds.
12. Industry studies indicate that mobile and wireless technology has become one of the major technology drivers for designing new information systems. Why is this the case and what is the impact?
13. Briefly explain the impact of Web services on Web development. Give some examples of Web services.
14. Identify in which phase of the development process the following activities belong:
    a. Development of the technical blueprint or design document.
    b. Project scheduling.
    c. Integration testing.
    d. Interviewing system users to define business requirements.
15. What are the two most important advantages of object-oriented software technologies over structured software technologies?

Chap-03

Review Questions

1. Explain why having a standardized system development process is important to an organization.
2. How are system life cycle and system development methodology related?
3. What are the 10 underlying principles for systems development?
4. Why is documentation important throughout the development process?
5. Why are process management and project management necessary?
6. What is risk management? Why is it necessary?
7. Which stakeholders initiate most projects? What is the impetus for most projects?
8. Who are the main participants in the scope definition? What are their goals in the scope definition?
9. What are the three most important deliverables in scope definition?
10. Who are the main participants in the requirements analysis phase? Why are they the main participants?
11. What feasibility analyses are made in the decision analysis?
12. What is model-driven development?
13. Why is model-driven development popular?
14. What is rapid application development (RAD)?
15. What benefits can RAD bring to the system development process?
16. What is computer-assisted software engineering (CASE)? List some examples of CASE.

Problems and Exercises

1. The Capability Maturity Model (CMM) was developed by the Software Engineering Institute at Carnegie Mellon, and is widely used by both the private and public sectors. What is the purpose of the CMM framework and how does it achieve this?
2. List the five maturity levels, and briefly describe each of them.
3. Table 3-1 in the textbook illustrates the difference in a typical project's duration, person-months, quality, and cost, depending upon whether an organization's system development process is at CMM level 1, 2, or 3. Between which two CMM levels does an organization gain the greatest benefit in terms of percentage of improvement? What do you think is the reason for this?
4. *Systems development methodology* and *system life cycle* are two terms that are frequently used and just as frequently misused. What is the difference between the two terms?
5. Describe how using a systems development methodology is in line with CMM goals and can help an organization increase its maturity level.
6. A number of underlying principles are common to all systems development methodologies. Identify these underlying principles and explain them.
7. The PIECES framework was developed by James Wetherbe as a means to classify problems. Identify the categories, then categorize the following problems using the PIECES framework:

   a. Duplicate data is stored throughout the system.
   b. There is a need to port an existing application to PDA devices.
   c. Quarterly sales reports need to be generated automatically.
   d. Employees can gain access to confidential portions of the personnel system.
   e. User interfaces for the inventory system are difficult and confusing, resulting in a high frequency of incorrect orders.

8. Each phase of a project includes specific deliverables that must be produced and delivered to the next phase. Using the textbook's hypothetical *FAST* methodology, what are the deliverables for the requirements analysis, logical design, and physical design/integration phases?
9. Scope definition is the first phase of the *FAST* methodology, and it is either the first phase or part of the first phase of most methodologies. What triggers the scope phase, which stakeholders are involved in this phase, what two essential questions need to be answered, and what three important deliverables come out of this phase?
10. The requirements analysis phase is an essential part of a system development methodology. According to the *FAST* methodology, which stakeholders typically participate in this phase? What is the primary focus of requirements analysis? What is *not* the focus? How should each proposed requirement be evaluated? What critical error must be avoided?
11. In the *FAST* methodology, as well as most system methodologies, system owners and system designers do not participate in the requirements analysis phase. What do you think the reason is for this?
12. What is the essential purpose of the logical design phase? How does it accomplish this? How are technological solutions incorporated in this phase? What are some common synonyms for this phase used by other methodologies? Who are the typical participants in this phase? What is agile modeling and what is its purpose? What are the deliverables coming out of this phase? In terms of the development team, what critical transition takes place by the end of this phase?
13. What is the essential purpose of the physical design phase? Who must be involved in this phase, and who may be involved? What are the two philosophies of physical design on the different ends of the continuum, and how are they different? Is this a likely phase in which a project might be canceled? With what other phase is there likely to be overlap, and what do you think is the reason for this?
14. A customer has engaged your software development company to develop a new order-processing system. However, the time frames are very tight and inflexible for delivery of at least the basic part of the new system. Further, user requirements are sketchy and unclear. What are two system development strategies that might be advantageous to use in this engagement?
15. What is the potential downside to using the strategies described in the preceding question?

Review Questions

1. What is a project?
2. Of the many different reasons that projects fail, what is the major cause of project failure?
3. What is the difference between scope creep and feature creep?
4. What are the five main categories of competencies that a project manager should have?
5. Why are business achievement competencies important?
6. What are the basic project management functions?
7. What are PERT and Gantt charts? How do we decide which one to use?
8. What are the eight major activities in the project management life cycle?
   - Negotiate scope
   - Identify tasks
   - Estimate task durations
   - Specify intertask dependencies
   - Assign resources
   - Direct the team effort
   - Monitor and control progress
   - Assess project results and experiences
9. Why is negotiating scope important? What is the deliverable in the process of negotiating the scope?
10. What is a popular tool used to identify tasks in the project management life cycle?
11. What are the factors to consider in estimating task durations?
12. What are the differences between forward scheduling and reverse scheduling?
13. What are the categories of resources to be allocated to the project?
14. What should project managers do to manage changes that occur and/or are requested during a project?
15. Why is critical path analysis important?

Problems and Exercises

1. Assume you are a systems analyst and a proud member of a project team that has just completed a major project that spanned several years and that touched almost every business unit in your organization. The project was completed ahead of schedule and well within budget. Development and implementation went very smoothly with virtually no disruption of business operations. A postimplementation survey indicates that system users have been able to use the system with minimal training, although there have been some comments from the more vocal users that it wasn't quite what they expected and doesn't do some of the things they thought it would. Should the project be considered a success?
2. Executive management is concerned that some users are less than satisfied with the new system described in the preceding question and have assigned you to lead a postimplementation work group to determine the cause. Of the dozen project mismanagement problems described in the textbook, which ones do you think were most likely to have contributed to user dissatisfaction?
3. As a newly appointed project manager, you are eager to get started on your first project. What should your first activity be? How important is it? Who is typically involved? What questions do you need to make sure are answered? What's the ultimate outcome from this activity, and what is included in this deliverable?
4. You are the project manager of a medium-size project that is scheduled to take 10 months from project initiation on September 1st through delivery on June 30th. It is now April 1st, seven months since the project began, and the project is slightly behind schedule, by perhaps a week. Draw a Gantt chart (you may use the style shown in Figure 4.2 or another Gantt chart style if you prefer). Assume you are using the *FAST* methodology, and that project phases can overlap.
5. You are the project manager for a company that is building a behavioral health system for some of the counties in your state. The project is slightly ahead of schedule and there haven't been any significant problems to date. In reviewing some of the screens under construction, you are surprised to

find a number of features that were not part of the design. The system builder was one of your most talented and creative programmers. When you ask about these features, the builder proudly tells you that they add to the functionality of the system without taking any additional programming time, and that they were intended to be a surprise. You can see that the features definitely do add to the functionality of the system. The code has already been written for them—should you allow them to be included in the system, even though they were not part of the approved technical design?

6. The methodology used in your organization calls for change requests to be considered by a change control board (CCB). After some reflection and a discussion with the programmer, you have decided to submit a change request to the CCB to add the new features. In your presentation to the CCB, what reason might you give for the change request and what things should you take into consideration?
7. The CEO of your organization was so impressed with your last project that you have been given responsibility with a larger, even more important project. The CEO calls you in for a discussion regarding the importance of the project, and tells you that the very survival of the organization may hinge upon completing this project and rolling out the new system to customers before a certain date when a competitor is expected to complete a similar project. The company can afford to budget only up to a certain maximum, although if other, less critical projects-in-progress are delayed, there may be some additional funding available if absolutely necessary. Finally, in order to be a competitive product in the market, the new system must contain at least a certain minimum feature set, although more would be desirable, and the quality must be of the highest level. At the conclusion of this discussion, the CEO shakes your hand and wishes you good luck. Use the priorities set by the CEO to create an initial management expectations matrix.
8. Now suppose that during the course of this project, it becomes apparent that costs were significantly underestimated and the budget is rapidly becoming depleted. In addition, the head of marketing has picked up a trade magazine and read that your organization's main competitor is adding some really exciting features to their product without changing their release date. The budget overage is not the major problem; you know additional money can be allocated, although it may delay other projects. But you also know that your marketing stakeholders will be demanding that similar features be added to the system you are developing while keeping to the original schedule. This presents an expectations conflict since scope is the constrained measure of success. What should you do at this point?
9. Suppose the CEO decides that no matter what, the new features absolutely must be added in order for the new system to be competitive. What issues does this raise, and how would this be reflected in the expectations matrix?
10. You are working on the schedule for the system design phase and are trying to estimate the duration of a complex design task. From breaking this task down into smaller tasks similar to ones that you've had experience with on other projects, you estimate the task should normally take an expected duration (ED) of three workdays, given a typical 75 percent worker efficiency rate and 15 percent interruption factor. But you also know of some instances where absolutely nothing went right, and it took up to two full workweeks, or a pessimistic duration (PD) of 80 hours, to complete the design task. Using the classic technique described in the textbook, calculate the most likely duration of the task.
11. In the preceding question, what technique did you use to estimate the expected duration of the design task? Describe some of the other techniques you could use to estimate task duration.
12. During one phase of the project, you review the project schedule and realize that a member of your project team has been assigned multiple tasks that add up to more hours than the person has available to work during that period. What technique could you use to resolve this?
13. You have been asked to complete a project in shortest time possible. The project tasks, most likely duration (in days), and predecessors are shown below. What are the different paths (sequence of tasks) and the number of days for each? What is the critical path, that is, the shortest time in which the project can be completed? Is it actually important in the business world for project managers to understand critical path analysis, or is this just theoretical knowledge?

Tasks	Duration	Predecessors
A	2	None
B	2	None
C	1	None
D	4	A
E	5	B
F	1	C, D
G	6	A, E
H	4	F
I	7	G,H

14. As a new project manager in a rapidly growing organization, you have been asked to lead a project team for an important project. The scope of the project is not too broad, project time frames are somewhat on the tight side but definitely doable, and the budget is more than generous. In fact, you have been given the authority to hire as many people as you want for your project team. You estimate that 5 people would be about right for this type of project, 8 would provide a healthy amount of backup, and 10 could give you the resources to deliver an outstanding system in record time. What is something you might want to keep in mind before making your decision on how many people to hire?

Review Questions

1. What does a creeping commitment approach to feasibility analysis mean?
2. What are the feasibility analysis checkpoints in the development cycle? What should be done at each checkpoint?
3. What are the objectives of the operational feasibility test?
4. Why is it important to find out how the end users and managers feel about the problem solution that the system analyst has identified?
5. When is usability analysis performed? What is the objective of the usability analysis?
6. What is the objective of the technical feasibility test?
7. What are the characteristics of development costs and operating costs? List three examples of each kind of cost.
8. List five examples of tangible benefits.
9. Why is the time-value-of-money concept an essential consideration when accessing economic feasibility?
10. What are the most commonly used techniques to determine the cost-effectiveness of a project?
11. For what are the candidate systems matrix and feasibility analysis matrix used?
12. For written reports, what is the difference between the factual format and the administrative format?
13. What are the steps in writing a report?
14. What are the advantages and disadvantages of presentations?
15. What should be done to follow up the formal presentation?

Problems and Exercises

1. The textbook describes a creeping commitment approach to feasibility.
   a. Explain this approach and why the textbook recommends it.
   b. What are the some of the changes or events that might occur which make this approach advisable?
   c. Should an organization cancel a project if it becomes infeasible?
2. The textbook describes three checkpoints for measuring feasibility.
   a. What are these checkpoints?
   b. Typically, how accurately can feasibility be determined at each checkpoint?
   c. Which checkpoint, if any, is the most critical one?
3. What are the four categories of feasibility tests, and what is the criteria each of them uses to measure feasibility?
4. You are a systems designer on a project which is getting close to finishing the systems design phase. A working prototype has been developed, and you've been tasked with doing a usability analysis. Draft a one- or two-page plan detailing your approach to conducting the usability analysis.
5. You are a systems analyst working in the IT shop of a medium-size organization with about 300 employees. The organization is in the system design phase of a project to develop an

electronic activity reporting system for all employees, replacing the current hard copy method. All of the work is being done in-house except for several consultants, who are providing ancillary services, such as IV&V. The application will use employees' existing desktops, although several dedicated servers will need to be acquired. The user interface is very intuitive, but the project calls for about a half day of training for all employees on policies and procedures for using the new application. The system is not using any new technology, and the IT technical staff have a great deal of expertise. Create a worksheet, detailing the estimated one-time development costs and ongoing operating costs. By the way, in your organization, salary and benefits for systems analysts average $40 per hour; you can use this as a basis for estimating salary and benefits for other classifications involved in the project.

6. In the project described above, it was noted that the electronic activity reporting system will be replacing the current manual system. Describe the tangible benefits that might be expected. Take a "best guess" approach, and calculate the annual savings to the organization. Show your assumptions in the calculations.
7. You are designing a Web-based system where your regional offices can submit their sales reports online instead of filling them out by hand and mailing them in. Three candidate solutions have been identified. Their estimated lifetime benefits and estimated lifetime costs are shown below. All have been time-adjusted over the projected five-year lifetime of each alternative.

	Estimated Lifetime Benefits	Estimated Lifetime Costs
Candidate Solution 1:	$640,000	$172,000
Candidate Solution 2:	$640,000	$160,000
Candidate Solution 3:	$640,000	$185,000

According to return-on-investment analysis, which candidate solution offers the highest ROI? If the organization sets a minimum lifetime ROI of 80 percent, which of these solutions is economically feasible?

8. What are the different techniques or methods for identifying candidate solutions? If you had to choose just one of these methods, which would it be and why?
9. You are working as a system designer for a company that manufactures heavy-duty power tools used by contractors. Every month, your regional sales and service centers batch together the hard copy repair orders for work performed under warranty. They are sent to headquarters, where they are run through a legacy mainframe batch process. A report is then generated, which the engineers analyze for signs of any problem trends in the new models. The company's CEO has decided that this process is far too slow in today's highly competitive business environment and wants to replace the legacy system as soon as possible with something more contemporary. Identify at least three candidate solutions, and describe them in a candidate systems matrix, using Figure 11-7 as an example.
10. Prepare a feasibility analysis matrix, using the candidate solutions you identified and described in the preceding question. Use Figure 11-9 as your template, but choose the weighting factors that you feel would be most appropriate in this situation. For purposes of this exercise, you may provide an estimate of the economic feasibility.
11. Once the feasibility analysis matrix has been completed, it is time to write the feasibility report. For this exercise, prepare a feasibility report to executive-level managers, using the appropriate format shown in Figure 11-10.
12. You have been asked to present the feasibility analysis and recommendation to the executive managers of every department in your organization at their weekly meeting. Prepare a set of PowerPoint slides to be used as a visual aid during your presentation.
13. Name at least 10 things you should *not* do if you want your presentation to be informative, persuasive, and well-received.

Chapter 01(Review question)

Why are information systems (IS) essential in organizations?

1. **Better Decision-Making**: IS provides timely, accurate, and relevant data that helps managers and employees make smarter decisions.
2. **Increased Efficiency**: Automates routine and repetitive tasks, reducing time and labor costs while improving accuracy and consistency.
3. **Improved Communication**: Facilitates seamless communication within and outside the organization, enhancing collaboration and coordination.
4. **Enhanced Customer Service**: Tracks customer interactions and preferences, helping deliver personalized and faster services.
5. **Gaining Competitive Advantage**: Enables innovation, supports strategic planning, and helps businesses adapt to market changes quickly, staying ahead of competitors

D.E.C.C.A = Decision, Efficiency, Communication, Customer, Advantage

Why do systems analysts need to know who the stakeholders are in the organization?

Systems analysts need to understand stakeholders to identify their needs, expectations, and constraints. Stakeholders include system owners, users, designers, and builders, each with unique perspectives that influence the system's requirements and success.

Who are the typical stakeholders in an information system? What are their roles?

- **System Owners**: Fund the system and set priorities.
- **System Users**: Define business requirements and use the system regularly (e.g., employees, customers).
- **System Designers**: Translate requirements into technical solutions (e.g., database administrators, network architects).
- **System Builders**: Construct and maintain the system (e.g., programmers, webmasters).

What are the consequences if an information system lacks a system owner?

- **Lack of Accountability**: No one is responsible for the system's performance, security, or maintenance, leading to negligence.

- **Poor Decision-Making**: Without ownership, it's unclear who makes decisions about upgrades, changes, or improvements.

- **Security Risks**: No clear responsibility for data protection and access control increases the risk of breaches.

- **System Inefficiency**: The system may become outdated or misaligned with business needs, reducing effectiveness.

4. **What are the differences between internal users and external users? Give examples.**

Differences Between Internal and External Users

Aspect	Internal Users	External Users
Definition	Employees or departments within the organization.	Individuals or entities outside the organization.
Access Level	Typically have higher system permissions (e.g., admin rights).	Limited access (e.g., customer portals, public APIs).
Primary Use Case	Day-to-day operations, data entry, reporting.	Transactions, inquiries, or service requests.
Examples	- Cashiers (POS access) - HR (employee database) - Managers (analytics dashboards).	- Customers (e-commerce checkout) - Suppliers (inventory portal) - Vendors (payment systems).
System Interaction	Directly input, modify, or analyze business data.	Submit requests or view limited data (e.g., order status).
Security Requirements	Role-based access control (RBAC) for sensitive data.	Authentication (e.g., passwords, 2FA) for secure transactions

5. **What are the differences between the role of system analysts and the rest of the stakeholders?**

Differences Between System Analysts and Other Stakeholders

Role	System Analysts	Other Stakeholders (Owners, Users, Designers, Builders)
Primary Focus	Bridge business needs with technical solutions.	Focus on their specific domain (funding, using, designing, or building the system).
Responsibilities	- Gather & analyze requirements - Design system workflows - Mediate between stakeholders.	- **Owners**: Fund/approve - **Users**: Define needs - **Designers**: Create tech specs - **Builders**: Implement code.
Skills	Hybrid of business + technical skills (e.g., UML, SQL, process modeling).	Specialized: - **Owners**: Budgeting - **Users**: Domain expertise - **Designers**: Architecture - **Builders**: Programming.
Perspective	Holistic view of the system's alignment with business goals.	Narrow view tied to their role (e.g., users want usability; builders want clean code).
Deliverables	Requirements documents, use cases, wireframes.	- **Owners**: ROI reports - **Designers**: Blueprints - **Builders**: Tested software.
Interaction Level	Work with **all** stakeholders to translate needs.	Typically interact only with adjacent roles (e.g., users ↔ analysts ↔ designers).

6. **What kind of knowledge and skills should a system analyst possess?**
    a. Working knowledge of IT and programming.
    b. General business knowledge.
    c. Problem-solving, communication, interpersonal skills.
    d. Flexibility, adaptability, and ethical judgment.

Besides business and computing knowledge, what other skills do system analysts need?

- **Communication Skills** – To clearly explain technical concepts to non-technical users and gather accurate requirements.
- **Problem-Solving Skills** – To analyze issues and design effective, practical solutions.
- **Analytical Thinking** – To evaluate systems, data, and processes critically.
- **Teamwork and Interpersonal Skills** – To collaborate effectively with clients, developers, and stakeholders.

9.Why are good interpersonal communication skills essential for system analysts?

1. **Requirement Elicitation** – Clearly gather needs from non-technical users.
2. **Stakeholder Alignment** – Resolve conflicts between business and IT teams.
3. **Facilitation** – Lead productive meetings (e.g., JAD sessions).
4. **Documentation Clarity** – Write unambiguous specs for developers.
5. **User Training** – Explain complex systems simply to end-users.
6. **Team Collaboration** – Work smoothly with designers, programmers, and testers.
7. **Change Management** – Gain buy-in for system changes from resistant users.
8. **Presentation Skills** – Convince executives to approve projects.

7. What are some business drivers for today's information systems?

a. Globalization.
b. E-commerce and e-business.
c. Security and privacy.
d. Knowledge asset management.
e. Business process redesign.

11.What are the differences between e-commerce and e-business?

Aspect	E-Commerce	E-Business
Definition	Buying/selling goods/services online.	Using the internet to manage **all** business operations.

Aspect	E-Commerce	E-Business
Scope	Subset of e-business (focused on transactions).	Broader (includes e-commerce + internal processes).
Examples	Amazon, eBay, online stores.	CRM, supply chain management, employee portals.
Primary Goal	Generate sales revenue.	Improve efficiency across the organization.
Transactions	Required (customer purchases).	Not always (e.g., HR workflows, inventory tracking).
Audience	External customers.	Internal employees + external partners/customers.
Tech Used	Shopping carts, payment gateways.	ERP, intranets, collaboration tools.

12.What are the differences between information and knowledge?

Aspect	Information	Knowledge
Definition	Processed data with context (e.g., sales reports).	Insights gained from experience + information (e.g., sales strategies).
Form	Structured (reports, charts, databases).	Tacit (expertise) or documented (best practices).
Source	Data analysis (e.g., "Q1 Revenue: $1M").	Experience + reflection (e.g., "How to boost Q2 revenue").
Dependency	Can exist without knowledge.	Requires information + human judgment.
Example	"Customer A bought Product X."	"Customer A prefers upsells during holidays."

13.What are the most important technology drivers for today's information systems? **Answer:**

Q13. What are the most important technology drivers for today's information systems? (For 4 marks)

1. **Networks and the Internet**: The internet and network technologies have revolutionized communication, allowing for the global exchange of information and creating interconnected systems across organizations. This enables easy access to resources and services anywhere, anytime.
2. **Mobile/Wireless Technologies**: With the advancement of mobile devices and wireless networks, users can access information systems from virtually any location, increasing flexibility and productivity. This also promotes the development of mobile applications for businesses and services.
3. **Object Technologies**: Object-oriented programming (OOP) and other object-based technologies allow for the creation of modular, reusable, and maintainable code. This increases development efficiency and makes systems more scalable and flexible.
4. **Collaborative Technologies (e.g., email, groupware)**: Technologies that support collaboration, such as email, instant messaging, and groupware, enable better teamwork and communication among employees, partners, and customers, improving efficiency and fostering innovation.
5. **Enterprise Applications (e.g., ERP, CRM)**: Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems help organizations streamline business processes, integrate data, and improve decision-making by providing a unified platform for managing various business functions.

বাংলা অনুবাদ (৪ নম্বরের জন্য):

১৩। আজকের ইনফরমেশন সিস্টেমের জন্য সবচেয়ে গুরুত্বপূর্ণ প্রযুক্তিগত চালিকা শক্তিগুলো কী কী?

১। **নেটওয়ার্ক ও ইন্টারনেট:** ইন্টারনেট ও নেটওয়ার্ক প্রযুক্তি যোগাযোগের ক্ষেত্রে বিপ্লব ঘটিয়েছে, যা বিশ্বব্যাপী তথ্য বিনিময় এবং প্রতিষ্ঠানের মধ্যে সংযোগ তৈরি করেছে। এর মাধ্যমে যেকোনো স্থানে সহজে সংস্থান ও সেবা অ্যাক্সেস করা সম্ভব।

২। **মোবাইল/ওয়্যারলেস প্রযুক্তি:** মোবাইল ডিভাইস এবং ওয়্যারলেস নেটওয়ার্কের উন্নতির ফলে ব্যবহারকারীরা যেকোনো জায়গা থেকে ইনফরমেশন সিস্টেম অ্যাক্সেস করতে পারেন, যা নমনীয়তা এবং উৎপাদনশীলতা বাড়ায়। এতে ব্যবসা ও সেবার জন্য মোবাইল অ্যাপ্লিকেশনগুলোর উন্নয়নও উৎসাহিত হয়।

৩। **অবজেক্ট প্রযুক্তি:** অবজেক্ট ওরিয়েন্টেড প্রোগ্রামিং (OOP) এবং অন্যান্য অবজেক্ট ভিত্তিক প্রযুক্তি মডুলার, পুনঃব্যবহারযোগ্য এবং রক্ষণাবেক্ষণযোগ্য কোড তৈরির সুবিধা দেয়। এর ফলে উন্নয়ন প্রক্রিয়া সহজ হয় এবং সিস্টেমগুলো আরও স্কেলেবল ও নমনীয় হয়।

৪। **কোল্যাবরেটিভ প্রযুক্তি (যেমন ইমেইল, গ্রুপওয়্যার):** যেসব প্রযুক্তি সহযোগিতা সমর্থন করে, যেমন ইমেইল, ইনস্ট্যান্ট মেসেজিং, এবং গ্রুপওয়্যার, সেগুলি কর্মীদের, অংশীদারদের এবং গ্রাহকদের মধ্যে উন্নত দলগত কাজ এবং যোগাযোগের সুযোগ সৃষ্টি করে, যা কার্যকারিতা বাড়ায় এবং উদ্ভাবনকে উৎসাহিত করে।

৫। **এন্টারপ্রাইজ অ্যাপ্লিকেশন (যেমন ERP, CRM):** এন্টারপ্রাইজ রিসোর্স প্ল্যানিং (ERP) এবং কাস্টমার রিলেশনশিপ ম্যানেজমেন্ট (CRM) সিস্টেমগুলি ব্যবসায়িক প্রক্রিয়াগুলোকে সহজ করে, ডেটা একীভূত করে এবং সিদ্ধান্ত গ্রহণে সহায়তা করে একটি একক প্ল্যাটফর্মের মাধ্যমে বিভিন্ন ব্যবসায়িক কার্যক্রম পরিচালনা করতে।

8. What are the four steps in a system development process? What happens in each step? ADI²

1. **System Initiation**: Define scope, goals, and budget.
2. **System Analysis**: Study business requirements.
3. **System Design**: Create technical specifications.
4. **System Implementation**: Build, test, and deploy the solution.

15.Why is system initiation essential in the system development process?
Why System Initiation is Essential in the System Development Process

1. **Defines Project Scope** – Clearly outlines what the system will (and won't) do, preventing scope creep.
2. **Sets Objectives & Goals** – Aligns the project with business needs (e.g., "Reduce checkout time by 30%").
3. **Identifies Stakeholders** – Determines who will fund, use, or build the system.
4. **Estimates Budget & Timeline** – Provides a realistic roadmap for resource allocation.
5. **Risk Assessment** – Flags potential challenges (e.g., legacy system compatibility).
6. **Feasibility Check** – Validates if the project is technically/financially viable before investing further.
7. **Approval Gateway** – Secures management buy-in to proceed to the next phase.

Exercise and Problem Solving:

1: Assume you are a systems analyst who will be conducting a requirements analysis for an individually owned brick-and-mortar retail store with a point of sale system. Identify who the typical internal and exteral users might include.

As a systems analyst conducting a **requirements analysis** for a retail store's **Point of Sale (POS) system**, you would interact with the following **stakeholders**:

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1. Internal Users (Employees & Management)

These users interact with the POS system daily to process sales, manage inventory, and oversee operations.

- **Store Owner**
  - *Role*: Approves system features, sets business rules, and reviews sales/reports.
  - *Needs*: Financial summaries, inventory alerts, and sales performance dashboards.
- **Cashiers / Sales Associates**
  - *Role*: Process transactions, handle returns, and apply discounts.
  - *Needs*: Fast checkout, easy-to-use interface, and receipt printing.
- **Inventory Manager**
  - *Role*: Tracks stock levels, places orders, and manages suppliers.
  - *Needs*: Real-time inventory updates, low-stock alerts, and purchase order integration.
- **Store Manager**
  - *Role*: Oversees staff, monitors sales trends, and handles promotions.
  - *Needs*: Employee performance tracking, shift scheduling, and sales analytics.
- **Accountant / Bookkeeper**
  - *Role*: Manages finances, tax reporting, and payroll.
  - *Needs*: Exportable sales data, tax calculation features, and integration with accounting software (e.g., QuickBooks).

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2. External Users (Customers & Third Parties)

These users interact with the POS system indirectly or through integrations.

- **Customers**

    - *Role*: Make purchases, request refunds, and use loyalty programs.
    - *Needs*: Smooth checkout, digital receipts, and support for payment methods (credit cards, mobile wallets).
- **Payment Processors (e.g., Stripe, Square, PayPal)**
    - *Role*: Facilitate credit/debit card transactions.
    - *Needs*: Secure API integration for real-time payment processing.
- **Suppliers / Vendors**
    - *Role*: Provide inventory and restock products.
    - *Needs*: Automated reorder alerts and purchase order generation.
- **Tax Authorities (e.g., IRS, VAT systems)**
    - *Role*: Require accurate sales tax reporting.
    - *Needs*: Compliance with tax laws and automated tax calculations.
- **Loyalty Program Partners**
    - *Role*: Offer rewards and discounts.
    - *Needs*: Integration with membership databases and coupon validation.

A **POS system** must balance **internal operational efficiency** (cashiers, inventory, reporting) with **external stakeholder needs** (customers, payment processors, suppliers). As a **systems analyst**, you'd gather requirements from both groups to ensure the system is **user-friendly, secure, and scalable**.

6**: What are business to consumer (B2C) and business to business (B2B) Web applications, and what are some examples of each type?**

Business-to-Consumer (B2C) vs. Business-to-Business (B2B) Web Applications

1. Business-to-Consumer (B2C) Web Applications

Definition: Online platforms where businesses sell products or services directly to individual consumers.

Key Features:

- Designed for ease of use, quick transactions, and mass-market appeal.

- Often include marketing tools (discounts, ads, loyalty programs).
- Payment methods optimized for end-users (credit cards, PayPal, mobile wallets).

Examples:

- **Amazon** – Sells products directly to shoppers.
- **Netflix** – Provides streaming services to consumers.
- **Uber** – Connects riders with drivers for transportation.
- **Spotify** – Offers music subscriptions to individual users.

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2. Business-to-Business (B2B) Web Applications

Definition: Online platforms where businesses sell products, services, or software to other businesses.

Key Features:

- Focus on bulk orders, contracts, and long-term relationships.
- Often include invoicing, procurement workflows, and enterprise integrations.
- Pricing may be negotiated (not always publicly listed).

Examples:

- **Alibaba** – Connects wholesalers with retailers/manufacturers.
- **Salesforce** – Provides CRM software for businesses.
- **Slack** – Sells team collaboration tools to companies.
- **SAP Ariba** – A procurement platform for supply chain management.

Key Differences Between B2C and B2B Web Applications

Feature	B2C (Amazon, Netflix)	B2B (Salesforce, Alibaba)
Target Users	Individual consumers	Businesses, organizations
Purchase Size	Single items, small orders	Bulk orders, subscriptions
Sales Cycle	Short (impulse buys)	Long (contracts, negotiations)
Pricing	Fixed, transparent	Often customized/negotiated
User Experience	Simple, visually engaging	Complex, feature-rich
Payment Methods	Credit cards, PayPal	Invoices, bank transfers

Here are concise, textbook-based answers to your questions:

3. **How do communication and collaboration systems improve efficiency and effectiveness? What are some of the communication and collaboration systems that are being used by an increasing number of organizations?**

Communication/Collaboration Systems Benefits & Examples

Efficiency/Effectiveness Improvements:

- Reduce email overload through organized messaging (Slack/Microsoft Teams)
- Enable real-time document co-editing (Google Workspace)
- Automate approval workflows (ServiceNow)
- Provide unified customer communication channels (Zendesk)

Growing Adoption Systems:

- Team collaboration: Microsoft Teams (used by 1M+ organizations)
- Project management: Asana, Trello

- Video conferencing: Zoom (300M+ daily participants)
- Internal knowledge bases: Confluence

4. 4. **Identify the type of information system that clerical workers in an organization would typically use and why.**

Information System for Clerical Workers

Type: Office Automation System (OAS)

Why?

1. **Handles Routine Tasks** – Supports daily clerical work like:
    - Document creation (Word, Google Docs)
    - Spreadsheet management (Excel, Sheets)
    - Email communication (Outlook, Gmail)
    - Scheduling (Calendar apps)
2. **Improves Efficiency** –
    - Reduces paper-based processes (e.g., digital forms).
    - Automates repetitive tasks (e.g., mail merges, data entry).
3. **User-Friendly** – Designed for non-technical staff with simple interfaces.
4. **Integration** – Connects with other systems (e.g., databases, ERP) for seamless workflows.

5. 5. **As information systems increase in complexity and comprehensiveness, ethical issues regarding accessing and using data from these systems are also increasing. What are some of these ethical issues? .. ……..**

Key Ethical Issues in Data Usage

1. **Privacy Violations** (GDPR fines totaled €1.3B in 2022)
2. **Algorithmic Bias** (Amazon's recruiting tool showed gender bias)
3. **Data Security** (83% of orgs had >1 data breach in 2022 - IBM)
4. **Digital Divide** (Workforce automation displacing low-skill jobs)
5. **Informed Consent** (Only 32% of users read T&Cs - Pew Research)

7. **While system development processes and methodologies can vary greatly, identify and briefly explain the *generic" phases of the system development process that are described in the textbook and which must be completed for any project. You are a contractor with a systems integration company.**

Generic SDLC Phases (Textbook)

1. **Planning** (Feasibility study, ROI analysis)
2. **Analysis** (Requirements gathering, process modeling)
3. **Design** (System architecture, database schema)
4. **Implementation** (Coding, testing, deployment)
5. **Maintenance** (Updates, patches, enhancements)

Contractor Perspective:

- Emphasize traceability between phases
- Document all deliverables (BRD, FRD, Test Cases)
- Follow change control procedures
- Validate against original requirements

9. Your company has asked you to develop a new Web-based system to replace its existing legacy system. There will be very little change in business requirements and functionality from the existing legacy system. Suggest which system development process you might use and why.

Web-Based System to Replace Legacy System (Minimal Requirement Changes)

Recommended Process: Waterfall Model

Why?

- Requirements are stable and well-understood (little change needed).
- Sequential phases (Planning → Analysis → Design → Implementation) ensure structured migration.

- Works well for straightforward replacements where the legacy system's functionality is already optimized. যখন পুরোনো সিস্টেমের সব ফিচার ইতিমধ্যে কার্যকর থাকে, তখন নতুন সিস্টেমে সেগুলো সহজেই স্থানান্তর করা যায়।
- Easier to estimate costs/timelines for management.

Example: Replacing a 1990s inventory system with a modern web version using the same business rules.

10.You recently joined a retail sales company which has recently bought out and assimilated a commercial industrial supply house. You have been asked to lead a project to develop a consolidated inventory-tracking system. Suggest which system development process you might use and why.

Best Method to Use: Agile (Scrum or Kanban)

Why?

1. **Requirements Keep Changing**
    - When two companies merge, their ways of working need to blend.
    - Agile lets you adjust plans easily as new needs come up.
2. **Quick Feedback from Teams**
    - The retail team and industrial supply team have different needs.
    - Agile lets you check with both teams often and make changes fast.
3. **Test Small Parts First**
    - Instead of building the whole system at once, test small pieces step by step.
    - Fix problems early before they get big.
4. **Launch a Basic Version Fast (MVP)**

- Get a simple working system up quickly to solve urgent issues (like stock shortages).
- Add more features later in small updates.

Example: Combining a retail POS inventory system with an industrial supply chain tracker.

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11. Your company president sits down beside you just before a meeting is to begin and tells you that people keep saying the customer needs to install a CRM, but doesn't really know what it is. The company president then asks you to explain it in nontechnical terms in the next 30 seconds.

30-Second CRM Explanation (Nontechnical)

Script:
"A CRM (Customer Relationship Management) system is like a digital Rolodex that tracks every interaction with customers—calls, emails, purchases, and complaints. It helps sales teams follow up smarter, marketing target ads better, and support resolve issues faster. Think of it as the company's shared memory for customer relationships."

Analogy:

- **For Sales:** Like a cheat sheet showing which customers need attention.
- **For Execs:** A dashboard showing sales trends and customer satisfaction.

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12. Industry studies indicate that mobile and wireless technology has become one of the major technology drivers for designing new information sys-tems. Why is this the case and what is the impact?

Mobile/Wireless Tech as a Major Driver

Why?

1. **User Demand:** 60% of web traffic is mobile (StatCounter, 2023).
2. **Workforce Flexibility:** 75% of employees expect mobile access to work systems (Gartner).
3. **IoT Integration:** Sensors in warehouses/retail use wireless (e.g., RFID, Bluetooth).

Impact:

- **Design:** Must prioritize responsive UIs, offline functionality, and touch inputs.
- **Security:** Increased need for encryption (e.g., TLS for mobile apps).
- **Infrastructure:** Cloud backend required for real-time sync across devices.

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13. Briefly explain the impact of Web services on Web development. Give some examples of Web services.

Impact of Web Services on Development

Impact:

- **Faster Development:** Reusable APIs reduce coding from scratch (e.g., PayPal for payments).
- **Interoperability:** Legacy systems can "talk" to modern apps via SOAP/REST.
- **Scalability:** Microservices architecture (e.g., AWS Lambda) handles traffic spikes.

Examples:

- **Payment Processing:** Stripe API
- **Maps:** Google Maps API
- **Authentication:** OAuth 2.0 (e.g., "Login with Facebook")

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14. 14. Identify in which phase of the development process the following activities belong:

a. Development of the technical blueprint or design document.

b. Project scheduling.

C. Integration testing.

d. Interviewing system users to define business requirements.

SDLC Phase Identification

Activity	Phase
a. Technical blueprint design	**Design**
b. Project scheduling	**Planning**
c. Integration testing	**Implementation**
d. Interviewing users for requirements	**Analysis**

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15. What are the two most important advantages of object-oriented software technologies over structured software technologies?

Object-Oriented vs. Structured Tech: Top 2 Advantages

1. **Reusability**
    - OOP: Objects (e.g., `ShoppingCart` class) can be reused across projects.
    - Structured: Code is often rewritten for similar functions.
2. **Flexibility**
    - OOP: Easily extended (e.g., add `Discount` subclass without breaking existing code).

- Structured: Changes risk "spaghetti code" errors.

Example:

- **OOP:** Java/C# apps scale well with new features.
- **Structured:** Older COBOL systems are harder to modify.

Here are the words with **Bangla translations** in a simple format:

General Terms
1. **Stakeholders** – স্টেকহোল্ডার (যারা প্রজেক্টে আগ্রহী)
2. **Scope Creep** – প্রজেক্টের লক্ষ্য বেড়ে যাওয়া
3. **Feasibility** – সম্ভাব্যতা
4. **Legacy System** – পুরানো সিস্টেম
5. **Prototype** – নমুনা
6. **ROI** – বিনিয়োগের লাভ
7. **Workflow** – কাজের ধারা
8. **Backlog** – জমে থাকা কাজ

Technical Terms
9. **API** – সফটওয়্যার সংযোগ ব্যবস্থা
10. **Middleware** – মধ্যস্থ সফটওয়্যার
11. **UML** – সিস্টেম ডিজাইনের ডায়াগ্রাম
12. **SQL** – ডাটাবেস ভাষা
13. **Encryption** – ডাটা সুরক্ষা
14. **Cloud Backend** – ক্লাউডে ডাটা সংরক্ষণ

Business Terms
15. **B2B** – ব্যবসা থেকে ব্যবসা
16. **B2C** – ব্যবসা থেকে গ্রাহক
17. **ERP** – ব্যবসায়িক ব্যবস্থাপনা সফটওয়্যার

18. **CRM** – গ্রাহক সম্পর্ক ব্যবস্থাপনা
19. **KPI** – সাফল্যের মাপকাঠি

Project Management
20. **Gantt Chart** – প্রজেক্ট সময়রেখা
21. **Critical Path** – দীর্ঘতম কাজের ধারা
22. **Change Control Board** – পরিবর্তন অনুমোদনকারী দল
23. **Sprint** – অ্যাজাইলের কাজের চক্র

Example:
- **API** = সফটওয়্যার সংযোগ ব্যবস্থা (যেমন, PayPal API দিয়ে পেমেন্ট নেওয়া যায়)।