

CHAPTER 1

THE INFORMATION SYSTEM: AN ACCOUNTANT'S PERSPECTIVE

REVIEW QUESTIONS

1. Operational, operations management, middle management, and top management. Horizontal flows support operation-level tasks. The information is highly detailed about the day-to-day operations. Vertical flows distribute summarized information to managers at all levels, and this information flows upward. Instructions, quotas, and budgets also flow downward.
2. Natural systems stem from the atom, while artificial systems are put together by humans.
3. Multiple components, relatedness, subsystems, purpose, and interdependency.
4. System decomposition is the process of dividing the system into smaller subsystem parts, while interdependency is the interaction between the subsystems. They are related by the degree and nature of the interaction between the subsystems. If a vital subsystem fails, the entire system will most likely fail.
5. Data are facts that are collected in a "raw" form and made meaningful through processes such as sorting, aggregating, classifying, mathematically manipulating, and summarizing. The meaningful data is considered to be information.
6. AISs process financial transactions and certain nonfinancial transactions that directly affect the processing financial transactions. The external financial reporting documents of AIS are subject to legal and professional standards. Consequently, management and accountants have greater legal responsibility for AIS applications than for MIS applications. The MIS processes nonfinancial transactions that are outside the scope of the AIS. MIS applications expand the information set provided to such areas as production, sales, marketing, and inventory management. MIS often draws from and builds on data from the AIS.
7. Revenue cycle, expenditure cycle, and conversion cycle.
8. Reports used by management, which the company is not obligated by law, regulation, or contract to provide. These are often used for internal problem-solving issues rather than by external constituents.
9. Relevance, accuracy, completeness, summarization, and timeliness.
10. Relevance and efficiency.
11. Data attribute (field), record, file, and database.
12. Storage, retrieval, and deletion.

13. Feedback is output that is sent back to the system as a source of data. Feedback is useful because it can be used to initiate or adjust the system processes.
14.
 - a. to support the stewardship function of management,
 - b. to support the decision-making processes of managers, and
 - c. to support the day-to-day operations of the firm.
15. Stewardship is the responsibility of management to properly utilize the resources of the firm entrusted to them. Information systems provide management with reports to better manage the resources and also provide responsibility reports by which management may be evaluated.
16. Budgets and standards are set by upper-management levels. The responsibility for meeting these goals is passed to the managers at the closest operational level. In order for these managers to have the power to make a difference as to whether these goals and/or standards are met, they must be entrusted with the appropriate level of authority to make decisions. Responsibility of goals and standards, along with corresponding authoritative powers, flow downward. The results of the operations must flow upward to upper-level management. These upward flows represent reports, which hold managers accountable for their decisions and management actions.
17. Turnkey systems are ready to implement systems that may be purchased. Backbone systems are partially developed systems with an underlying basic structure that is built on to suit the client's unique needs. Vendor-supported systems are custom systems provided, maintained, and supported by a commercial vendor.
18.
 - a. Materials Management
 1. purchasing
 2. receiving
 3. stores
 - b. Production
 1. production planning
 2. quality control
 3. maintenance
 - c. Marketing
 1. advertising
 2. market research
 3. sales order processing

- d. Distribution
 - 1. warehousing
 - 2. shipping
 - e. Personnel
 - 1. recruiting
 - 2. training
 - 3. benefits
 - 4. counseling
 - f. Finance
 - 1. portfolio management
 - 2. treasury
 - 3. credit
 - 4. cash disbursement
 - 5. cash receipt
 - g. Accounting
 - 1. inventory control
 - 2. cost accounting
 - 3. payroll
 - 4. accounts payable
 - 5. accounts receivable
 - 6. billing
 - 7. fixed-asset accounting
 - 8. general ledger
 - h. Computer Service
 - 1. data processing
 - 2. systems development and maintenance
 - 3. database administration
19. Internal auditors are responsible for in-house appraisal of the financial reporting system. Internal auditors are concerned with deterring and detecting fraud and for conducting EDP audits. External auditors are independent CPAs engaged by the firm to attest to the completeness and accuracy of the financial statements. External auditors work together with the internal auditors.
20. The database administrator is responsible for the security and integrity of data stored in a central database.

21. Geographic location, product lines, and function.
22. The role of the accounting function is to manage the financial information resources of the firm. First, the accountants must capture and record business events of a firm and their financial impact. Secondly, the accounting function distributes transaction information to decision makers and operations personnel to help them coordinate their many tasks. The accountants must also assign accountability for each of these tasks.
23. In a centralized data processing approach, the computer services function is centrally located. The databases are housed in one place where all of the data processing occurs by one or more main computers. All systems development and maintenance work for the entire organization is performed by systems professionals. End users wishing to have new systems or features must submit a formal request to this group and are usually prioritized and placed in a queue.

In a distributed data-processing approach, the CPUs are spread out and control over data and processing is at the information processing unit (IPU) level. Thus, end users have more influence over the systems development projects, which are typically handled by systems professionals at the IPU level.

24. The data control group is a liaison between the end user and data-processing personnel. It receives the user input and distributes the output to the users. Data control members scan the input for accuracy and completeness before passing the input to the data-entry personnel.
25. Data processing is organized around several information processing units, which are distributed throughout the organization and placed under the control of end users. The central computer services are eliminated or minimized.
26. The advantages of DDP are:
 - a. cost reductions
 - b. improved cost control responsibility
 - c. improved user satisfaction
 - d. ability to back up computer facilitiesThe disadvantages of DDP are:
 - a. potential mismanagement of organization-wide resources
 - b. hardware and software incompatibility
 - c. redundant tasks
 - d. consolidating incompatible activities
 - e. acquiring qualified professionals
 - f. lack of standards

27. Identical applications or applications that are very similar may be created by multiple user areas, which are unaware of what other areas are doing. Further, data redundancy may occur if the same data are being collected and stored by different user areas. The duplicated data may result in data consistency problems if not properly managed.
28. A flat-file system is one in which individual data files are not related to other files. End users in this environment *own* their data files rather than *share* them with other users. Data processing is thus performed by standalone applications rather than integrated systems.
29.
 - a. increased data storage since the same data is stored in multiple files
 - b. increased data updating since changes must be made to multiple files
 - c. possibility of noncurrent data caused by failure to update.
30. The key elements of the REA model are summarized below.

Resources. Economic **resources** are the assets of the organization. They are defined as objects that are both scarce and under the control of the enterprise. This definition departs from the traditional model since it does not include accounts receivable. An account receivable is an artifact record used simply to store and transmit data. Since it is not an essential element of the system, it need not be included the database. Instead accounts receivable are derived as the difference between sales to customers and the cash received in payment of sales.

Events. Economic **events** are phenomena that affect changes in resources. They can result from activities such as production, exchange, consumption, and distribution. Economic events are the critical information elements of the accounting system and should be captured in a highly detailed form to provide a rich database.

Agents. Economic **agents** are individuals and departments that participate in an economic event. They are parties both inside and outside the organization with discretionary power to use or dispose of economic resources. Examples of agents include sales clerks, production workers, shipping clerks, customers, and vendors.

31. Enterprise Resource Planning (ERP) is an information system model that enables an organization to automate and integrate its key business processes. ERP breaks down traditional functional barriers by facilitating data sharing, information flows, and the introduction of common business practices among all organizational users.
32. Users, system designers, and system auditors.
33. The attest function is performed by an independent certified public accountant who expresses an opinion about the fairness of a client-firm's financial statements.

34. Assurance pertains to professional services, including the attest function, that are designed to improve the quality of information, both financial and non-financial, used by decision makers. The domain of assurance services is intentionally unbounded so that it does not inhibit the growth of future services that are currently unforeseen. For example, assurance services may be contracted to provide information about the quality or marketability of a product. Assurance services are intended to help people make better decisions by improving information. This information may come as a by-product of the attest function, or it may ensue from an independently motivated review.
35. IT auditing is part of a broader financial audit in which the auditor attests to the integrity of elements of the organization's information system that have become complicated by computer technology.
36. The conceptual system must first be determined. It specifies the nature of the information required, how and when it is to be collected, and who is the user. For each conceptual system, many different physical configurations may be possible. The physical system is the medium and method used to collect the data, process it, and disseminate the resulting information.

DISCUSSION QUESTIONS

1. The reporting requirements of external users such as lending institutions, the IRS, the SEC, and stockholders are subject to stringent reporting standards. Thus, firms have historically placed a very high emphasis on the accuracy of the AISs and the reports they produce for external agencies since failure to provide accurate and timely information carries heavy penalties. Internal users, such as managers, also need vital information to make good decisions. Firms are beginning to realize that the needs of these internal users are also very important to efficiently and effectively operate and plan for the future.
2. The level of detail necessary for the stockholders is highly aggregated and typically follows the format prescribed by the SEC and GAAP. Much more detailed information is necessary for middle management to plan and control operations. Highly detailed information is needed at the operations management level in order to run the day-to-day business processes and operations.
3. Financial transactions affect the accounts in the balance sheet in some manner. Three examples are 1) use of equipment-depreciation, 2) payment of a bond payable, and 3) receipt of cash from a customer for a sale previously made on account. Nonfinancial transactions include business events that do not impact the financial statements. Three examples are 1) a book checked out by a student in a school library, 2) the recording of a customer complaint via a toll-free hotline, and 3) status reports of research and development projects.

4. Managers of all areas typically need data from both the AIS and the MIS. If the data needed by managers for decision-making processes are located in two or more datasets, the preparation of reports is both inefficient and expensive. Further, a lack of coordination between the two datasets can result in data that is not consistent and is unreliable.
5. The transaction processing systems only differ in the types of data elements collected. Both service and manufacturing industries need to collect data regarding business processes. While a manufacturing firm may collect data regarding the amount of scrap generated at a particular workstation, a service firm, such as a public accounting firm, needs to collect data regarding the number of hours spent by staff to verify cash balances. Transaction processing systems are equally important to both types of industries.
6. The General Ledger System (GLS) summarizes all of the transaction cycle activity and general journal entries. The GLS provides most of the input in the Financial Reporting System (FRS). The FRS communicates information from the GLS to the external users. The FRS often collects additional pieces of information other than that which is found in the GLS. An example of this is when a pending lawsuit is likely to be settled in the next year. The GLS would not have this information.
7. If the collected data are not accurate and/or not correctly entered, then the resulting information will not be accurate. Also, if the data processing system is not correctly processing the information, then the resulting information will also be incorrect. If the database is not accurately maintained over time, again the resulting information will be incorrect.
8. Efficiency is crucial to an AIS. The cost of collecting and producing information should not outweigh its benefits. Further, the applications should be run in a manner that places the least strain on the overall system. For example, the printing of checks to vendors should not be done during the day if it slows down the online sales order processing system in a multitasking environment.

In order for a system to be effective, the appropriate data should be processed, and the resulting information disseminated to the appropriate users. For example, an accounts receivable delinquent report should be sent to the collection department in a timely fashion, so that measures can be taken to collect the funds. The ability to react to a change is very important, especially in an FRS where reporting requirements and standards change frequently.

9. This statement means that the accounting system is a representation of the operations of a firm. As machines operate, workers perform their duties, raw materials are transferred into finished goods and cash flows are exchanged between suppliers and customers, the accounting system must be continuously updated to accurately reflect these actions. This conceptual flow is crucial because it allows management to view in summary and in detail the financial effects of these operations on the firm.

10. Accounting independence is important because the separation between the record-keeping functions and the physical resources is crucial. This concept is extremely important for cash receipts operations. The person in charge of deposits of currency and check receipts should not be allowed to reconcile the sales records to the cash deposits and/or the bank account. If these duties are not separated, then the cash receipts clerk can steal money and cover it up during the reconciliation process.
11. The internal auditors are responsible for detecting and pursuing fraud within the firm. If management-level employees are involved, the internal auditors may fear losing their jobs if they blow the whistle on such activities. Thus, the internal auditors should report to the board of directors so that they do not fear any repercussions of their actions from top management.
12. In a centralized data-processing environment, the computer services personnel are all housed in one department where all of the systems development and maintenance takes place. End users must formally request any additions or enhancements to the current system. In a distributed data processing (DDP) system, the systems professionals may still be housed together or they may be located throughout the various segments of the organization. End users gain more control over their data and applications. DDP is becoming more and more popular as networking computers is becoming easier and more commonplace.
13. The conceptual system represents the logic and decision rules to be applied, while the physical system represents the means of accomplishing the tasks. Many different possibilities (physical systems) may be available to accomplish the conceptual system. The accountant is important in the design of the conceptual system; however, system designers may dominate in the tasks of physical design because of the technical nature of the solution. The accountant should still be involved in the process, although he/she may only participate in an advisory role.
14. Accountants, although providers of financial information to both internal and external users, are still the primary “users” of the AIS. The accountants oversee the data collection, processing, and output of the AIS. Thus, as new AISs are developed by system professionals, accountants’ needs as seen from the viewpoint of a user are very important. Thus, the accountants guide the systems developers by conveying their needs and constraints.
15. Yes and No. Virtually all publicly traded firms have computerized AISs as well as most small- and medium-sized firms. Audits of non-computerized systems are becoming rare. Thus, one may say that virtually all auditors must deal with electronic processing of data. However, certain auditing personnel, known as IT auditors, have special skills, which allow them to focus on the computer “processing.” Thus, distinguishing these auditors from auditors who do not have such skills may still be appropriate.

16. Organizations are segmented in order to promote internal efficiencies. These internal efficiencies occur as a result of localized control over resources and also by specialization of labor. Localized control over resources allows the managers of those resources to have increased responsibility and authority. Hopefully, these management teams understand the segment's operating environment better than anyone else in the organization. If this is true, they should be able to make the best allocation of resources. Geographic location is also important, especially in a global economy where firms operate in many different cultures. The local management team should be in the best position to make cost-effective resource allocations.

17. The accounting function provides record-keeping services for all of the operations and day-to-day activities of other departments, which affect the financial position of the organization. Record-keeping tasks must be kept separate from any area that has custody over assets. Thus, the accounting function must remain independent so that the protection of the firm's assets is carried out in an environment with minimum possibilities for theft.

18. **Turnkey.** These are completely finished and tested systems that are ready for implementation. Typically, they are general-purpose systems or systems customized to a specific industry. Typically the end user will have standard business practices that permit the use of "canned" or "off-the-shelf" systems that can be employed with little or no modification.

In-house. Larger organizations with unique and frequently changing needs engage in in-house development. The formal process by which this is accomplished is called the system development life cycle.

Backbone. Backbone systems consist of a basic system structure on which to build. The primary processing logic is preprogrammed, and the vendor then designs the user interfaces to suit the client's unique needs. A backbone system is a compromise between a custom system and a turnkey system.

19. The REA model requires that accounting phenomena be characterized in a manner consistent with the development of multiple user views not simply those of the accounting function. As such, REA procedures and databases are structured around events rather than accounting artifacts such as journals, ledgers, charts-of-accounts, and double-entry accounting. Under the REA model, business organizations prepare financial statements directly from the event database.

20. Advantages of ERP

- Enterprise Resource Planning (ERP) systems enable organizations to automate and integrate key business processes.
- ERPs break down traditional functional barriers by facilitating data sharing.
- ERP software embodies and supports the best business practices of a given industry, thus encouraging positive changes in the way firms do business.
- Organizations experience internal efficiencies by employing standard business practices among all organizational units.

Disadvantages of ERP

- The implementation of an ERP system can be a massive undertaking that can span several years.
- Because of their complexity and size, few organizations are willing or able to commit the necessary financial resources and incur the risk of developing an ERP system in-house. Hence, virtually all ERPs are commercial products designed to solve standardized business problems. Many organizations have unique needs that require customized systems.
- Organizations that implement an ERP often need to modify their business processes to suit the ERP. Often, additional software applications need to be connected to the ERP to handle unique business functions, particularly industry-specific tasks. These applications, often called bolt-ons, are not always designed to communicate with ERP packages.
- ERP packages are enormously expensive. Organization management should exercise great care in deciding which, if any, ERP is best for them.

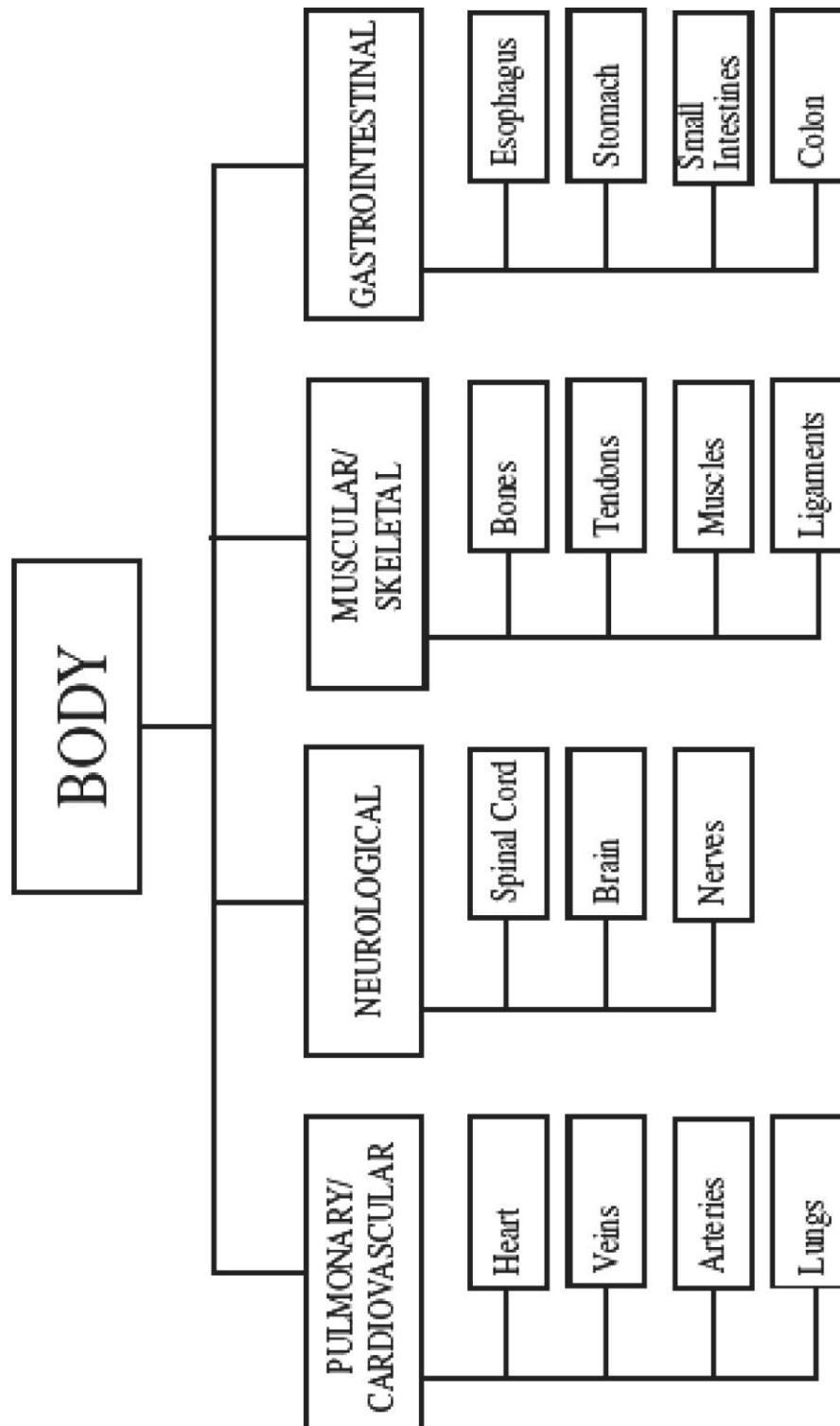
MULTIPLE CHOICE

1. C
2. B
3. A
4. D
5. D
6. C
7. C
8. D
9. D
10. D
11. E
12. A
13. B
14. C

PROBLEMS

1. a. S
b. I
c. S
d. T
e. S
f. S
g. S
h. I
i. T
j. S

2. See the following diagram. Each subsystem is interdependent upon each other. The human body must have all subsystems working properly in order to survive.



Problem 1-2

3. The missing element is feedback. Feedback is crucial to determine when it is necessary to adjust data collection procedures or data-processing elements to satisfy the needs of internal and external end users.
4. AIS data would include historical sales data by customer and product line, gross margin and profit by product line, and sales return data by customer and product line. MIS data would include customer complaints, average delivery time from order placement to receipt of goods, and reasons for return of merchandise. Benefits of integrating the information would include more efficient reporting and enhanced understanding of causal effects of the non-financial (MIS) performance metrics on the firm's financial results (AIS).
5.
 - a. MRS
 - b. TPS
 - c. FRS
 - d. MRS
 - e. TPS
 - f. FRS
 - g. MRS
 - h. TPS
 - i. FRS
 - j. TPS
 - k. MRS
6. The problem associated with the flat file model are:

Data Storage

An efficient information system captures and stores data only once and makes this single source available to all users who need it. In the flat-file environment, this is not possible. To meet the private data needs of users, organizations must incur the costs of both multiple collection and multiple storage procedures. Some commonly used data may be duplicated dozens, hundreds, or even thousands of times.

Data Updating

Organizations have a great deal of data stored in files that require periodic updating to reflect changes. When users keep separate flat files, all changes must be made separately for each user. This adds significantly to the task and the cost of data management.

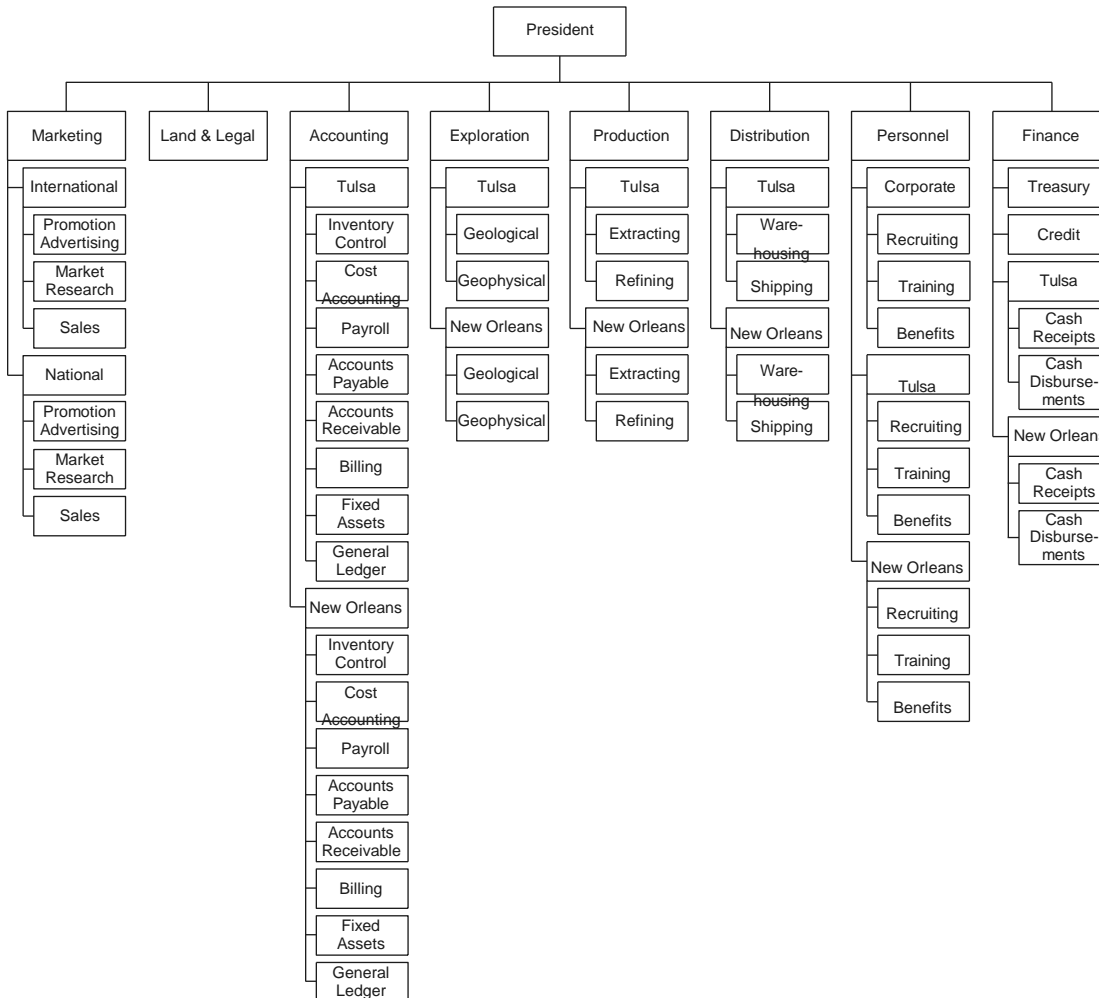
Currency of Information

In contrast to the problem of performing multiple updates is the problem of failing to update all the user files affected by a change in status. If update information is not properly disseminated, the change will not be reflected in some users' data, resulting in decisions based on outdated information.

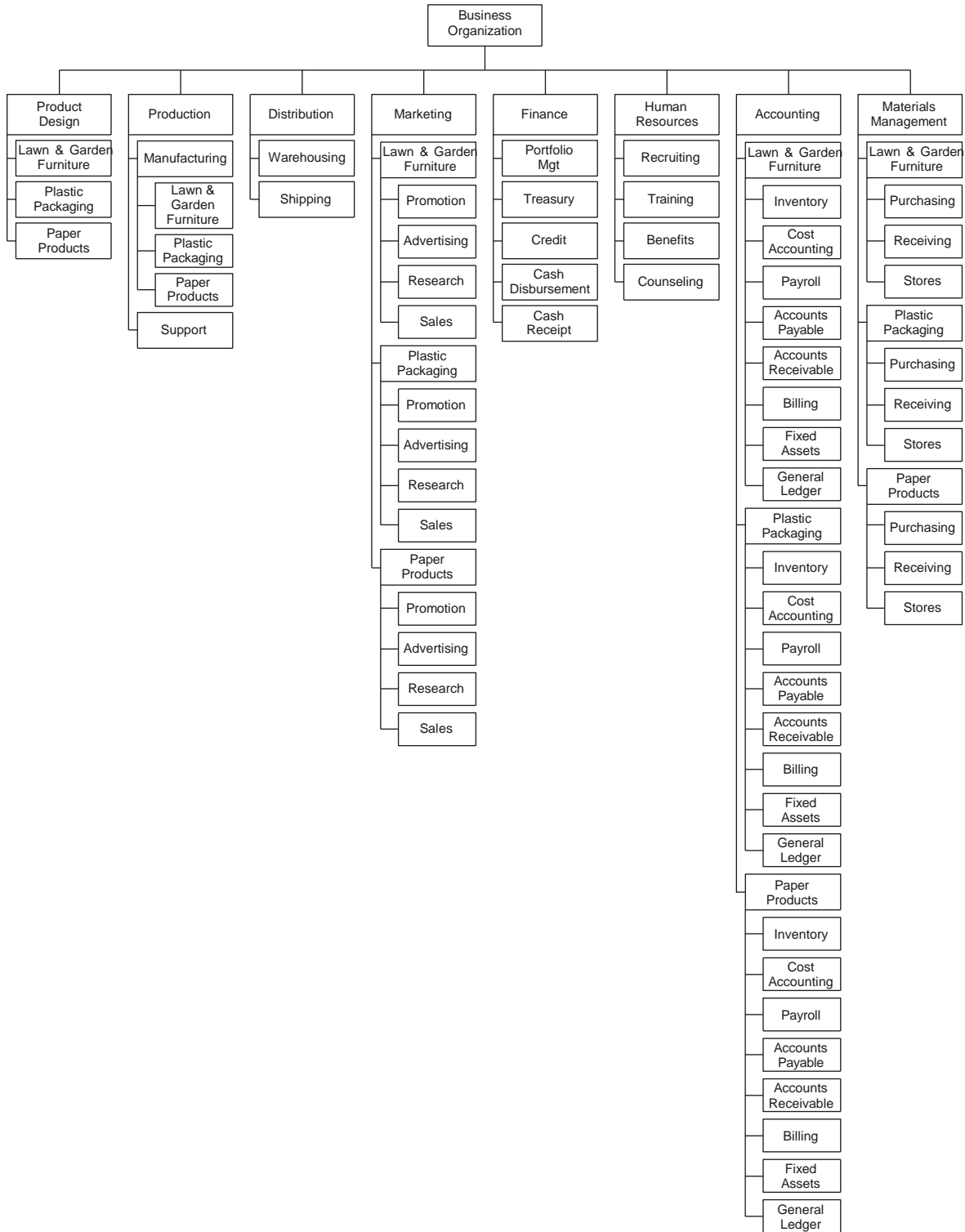
Task-Data Dependency

The flat-file user's ability to function is constrained by the data that he or she possesses and controls. New tasks require the procurement of new information which takes time, inhibits performance, adds to data redundancy, and drives data management costs even higher.

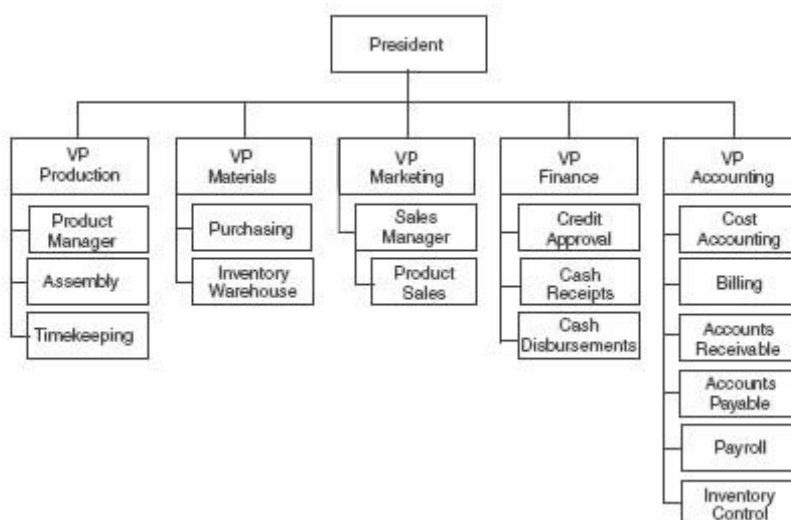
7.



8.



9. a. The production department's vice president or manager should not supervise the inventory management tasks. The production department uses the raw materials and therefore should not have any custodial tasks over the storage of the inventory items. A separate materials management department should handle the purchasing of inventory items and the warehousing of raw materials. The production department may not take the time (and should not be wasting its time trying) to investigate the best possible prices for a given quality and quantity of goods. Further, the production department may be able to pilfer goods from the production line if a separate department is not controlling the release of raw materials for specific job lots. The production department should not be in charge of cost accounting. The cost accounting department should be separate since this department tracks the costs of the production process. If the cost accountants report to the production manager, they may be influenced to overlook some cost items or alter the amounts to make the cost center look better. Also, the production manager should not be in charge of payroll, he or she may have paychecks written for fictitious employees. The sales department should not be in charge of credit approvals. Salespeople's compensation is typically tied to their sales figures, and thus salespeople have an incentive to write as many sales as possible without regard to the financial stability of the customer. Poor credit decisions may be made if the credit department reports to the sales manager. Further, the billing department should not report to the sales manager either because the salespeople may be tempted to issue unwarranted and unauthorized discounts to their most valuable customers. The finance department collects and distributes cash; therefore, it should not have custody over the accounts receivable and accounts payable. A separate accounting function should provide a check and balance on the cash collections and disbursements.
- b. A reorganization is presented in the following diagram. Two new positions have been created: VP-Materials Management and VP-Accounting (or Controller). The VP-Finance is a "promotion" given to the financial manager.



10. Because businesspeople were not able to adequately express their needs and much of what they did express was not fully understood by the systems analysts, many new systems projects produced ineffective systems. Most business students now study the development process of information systems so they will be better able to communicate their information needs to system personnel and have an appreciation that clear expression of the problem by the user and better understanding of the business situation/problem environment by the system developer will enhance a projects deployment. Either avoiding jargon or fully explaining the terms will also help to close the communication gap.

11. Record Type	Primary Key
Accounts Receivable	Customer Number
Accounts Payable	Vendor Number
Inventory	Part Number
Customer Sales Order	Sales Order Number
Purchase Orders to vendors	Purchase Order Number
Cash Receipts from customers	Receipt Number
Cash Disbursements to vendors	Check Number
Employee Payroll Earnings records	Employee Number

12. This response is NOT in normalized form.

Accounts Payable Record:

- Primary key-vendor number
- invoice number
- amount
- date due
- date paid
- discounts

Inventory:

- Primary key-part number
- Description
- amount on hand
- unit price
- economic order quantity
- reorder level

Customer Sales Orders Record:

- Primary key-sales order number
- customer number
- item number
- unit price
- quantity
- discount
- date billed
- date due
- ship date
- total (not really necessary since it is a calculated amount)

Purchase Orders to Vendors:

Primary key-purchase order number
 vendor number
 vendor's part number
 part number (our's)
 quantity
 date ordered
 date required
 expected dollar amount

Cash Receipts from Customers:

Primary Key-cash receipt number (sequentially assigned)
 customer number
 invoice number
 customer's check number
 amount received
 date

Employee Payroll Earnings records

Primary Key-employee identification number
 Hours worked-regular time
 Hours worked-overtime
 Current Gross Pay
 Current federal income tax withheld
 Current state income tax withheld
 Current FICA tax withheld
 Year to date hours-regular
 Year to date hours-overtime
 Year to date gross pay
 Year to date federal income tax withheld
 Year to date state income tax withheld
 Year to date FICA tax withheld

13. Advantages of DDP. The most commonly cited advantages of DDP are related to cost savings, increased user satisfaction, and improved operational efficiency. Specific issues are:

Cost reductions. In the past, achieving economies of scale was the principal justification for the centralized approach. The economics of data processing favored large, expensive, powerful computers. The wide variety of needs that such centralized systems had to satisfy called for computers that were highly generalized and employed complex operating systems. Powerful yet inexpensive small scale, which can cost effectively perform specialized functions, have changed the economics of data processing dramatically. DDP can reduce costs in two other areas: (1) data can be entered and edited at the IPU, thus eliminating the centralized tasks of data conversion and data control; and (2) application complexity can be reduced, which in turn reduces development and maintenance costs.

Improved cost control responsibility. Managers assume the responsibility for the financial success of their operations. This requires that they be properly empowered with the authority to make decisions about resources that influence their overall success.

Improved user satisfaction. Perhaps the most often cited benefit of DDP is improved user satisfaction in three areas: (1) users desire to control the resources that influence their profitability; (2) users want systems professionals (analysts, programmers, and computer operators) who are responsive to their specific situation; and (3) users want to become more actively involved in developing and implementing their own systems.

Backup. The final argument in favor of DDP is the ability to back up computing facilities to protect against potential disasters such as fires, floods, sabotage, and earthquakes. One solution is to build excess capacity into each IPU. If a disaster destroys a single site, its transactions can be processed by the other IPUs. This requires close coordination between decision makers to ensure that they do not implement incompatible hardware and software at their sites.