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Practice final: (no answers)

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anyone else super annoyed he hasn't provided practice questions?
ya he said it was "unfortunate" that he didn't have practice stuff to handout but
then doesn't provide it :/

Anyone have intermediate micro notes to pass on??

1 - Information Systems

Q1 - What Is an Information System

- An Information system (IS) is a group of components that interact to produce information.
- All Information Systems use a five-component framework of computer hardware, software, data, procedures and people.
- The term Hardware refers to the electronic components and associated gadgetry that constitute a computer system.
- Software nowadays is referred to as programs (or applications) that run, or operate, on computer systems.

Q2 - What Is MIS?

- Management Information Systems or MIS, is a discipline that comprises the development and use of information system to help an organization achieve their goals and objectives.
- The definition of MIS has three key elements: development and use, information systems, and goals and objectives.

Development and Use of Information Systems

- Information systems are designed and created at the request of senior managers or entrepreneurs in order to solve a particular problem or meet a perceived need.
- In order to have an information system that meets your needs you need to take an active role in its development.

Achieving Business Goals and Objectives

- Every day organizations acquire and develop information systems for the wrong reasons.
- But one must look at the value added and ask themselves if the IS is worth the investment.

Q3 - How Does an IS Differ from IT?

- **Information technology (IT) refers to methods, inventions, standards and products. IT refers to the raw technology and concerns only the hardware, software, and data components of an information system and how they are networked together.**
- IS refers to a system of hardware, software, data, procedures, and people who produce information.
- **The real difference between the two is people (and procedures), which happens to be all the difference.**

Q4 - How Important Are Information Systems to Our Economy?

- The sector most closely related to the use of information systems in Canada is the **Information and Communications Technology (ICT) sector. It provides products and services that other industries rely on to get their work done.**
- The ICT sector is a "hidden" industry that is growing rapidly, near twice as high as the Canadian economy.
- This is an industry that supplies services that improve business processes, rather than producing a product.

Q5 - How Do Successful Business Professionals Use Information Systems?

- There is a need for individuals with core set of skills including the following: technical skills, specific technology and industry experience, and satisfactory communication and other business skills.
- **Organizations gain a competitive advantage by adding technical knowledge to their business skills.**

Q6 - What Is the Shape of Things to Come?

- **Moore's Law** noted that the density of circuits on an integrated chip was doubling approximately every two years or so. Exponential growth!

- **A major characteristic of IT is what economists call network effects and lock-in of certain technologies. Value increases significantly as the number of users increases (ex. Facebook).**
- **Once established network effects and lock-in make it harder to switch (ex. QWERTY keyboard) the sheer number of existing devices and large investment required (sunk costs) tend to prohibit adoption.**
- Today the final factors affecting information systems are Moore's law, the tendency of ubiquity, and location-based services.
- **David Ticoll suggests that within the next decade, unlimited storage will be almost free, that analytical software will reveal hidden information and that the real world and the virtual world will collide as wide-area networks (WANs) become cheap, reliable, and widely available.**

Q7 - What Is This Course About?

- The focus of this course will be on learning how to use information systems to accomplish organizational goals.

2 - Business Processes and Decision Making

Q2 - What Is a Business Process?

- **A business process is a series of activities, tasks, or steps designed to produce a product or service. It is often referred to as a business system.**

Q3 - What Are the Components of a Business Process?

- A business process consists of:
 - o **Activities** - **manual and/or automated procedures.**
 - o **Resources** - **items of value.** Both suppliers and customers are resources because they have value in the process. However they differ from activities because they are external.
 - o **Facilities** - **structures used within the business process** (ex. Factories, filing cabinets, etc.). Resources can be stored within facilities.
 - o **Information** - **activities that use info to transform inputs received into outputs produced.**
- A standard set of terms and graphical notations for documenting business processes was created. The standard was called **Business Process Modeling Notation (BPMN).**

Q4 - What Is Information?

- The most common definition is **knowledge derived from data** (recorded and figures). However it can also mean:
 - o Data presented in a meaningful context.
 - o **OR processed data obtained through various operations.**

Characteristics of Good Information

- Good information is **accurate information**.
 - o **Accurate information is based on correct and complete data that has been processed correctly and as expected.**
 - o An information system can develop a bad rep if it is known to produce inaccurate information.
 - o Over time information loses its level of accuracy.
- Good information is **timely information**.
 - o **It must be provided in time for its intended use.**
- Good information is **relevant information**.
 - o **Relevant to both context and subject.**
- Good information needs to be **sufficient** for the purpose it is generated, but **just barely so**.
 - o Knowing what information to ignore is difficult but important.
 - o The higher you rise in management the more information you are going to need to know to ignore.
- Good information is **worth its cost**.

Q5 - What Is the Role of Information in Business Processes?

- **Any time there is a physical flow, there is an opportunity to capture information.**
 - o Ex. A product may move to another location and be modified (sets of data), which can be derived into knowledge (information).
- Information becomes useful when we use it to manage business processes.

Business Process Management

- **Business Process Management (BPM)** is a field of management promoting the development of effective and efficient processes through continuous improvement and innovation.
- Many methods have been developed by organizations to support their improvements in business processes, including **total quality management (TQM)**, **six sigma**, and **lean production**.

- Information about the process provides the ability to better manage the process itself.
- As a manager you need to know how to use information that is generated by the business process within your organization.

Q6 - How Do Information Systems Support Business Processes?

- Information systems are used by the activities in a business process.
- Some activities use multiple information systems, while sometimes several activities use one information system.

What Does It Mean to Automate a Process Activity?

- Software is instructions for hardware, and procedures are instructions for people. Data forms a bridge between the computer side on the left and human side on the right.
- An activity in a business process that is handled by an automated system means that work carried out by people and procedures is now done by computers that follow instructions in software.
- Automation moves work from the human side to the computer side.

An Information System to Support Counter Sales

- Designers of IS decide to fully automate the counter sales process because the cashiers job is a relatively low-skill-level position with a high turnover (the rate at which new employees arrive and existing ones depart).

An Information System to Support Payment

- The IS supporting payment activity is a mostly manual system where most of the work is done by an Accounts Payable clerk.
- This is because processing exceptions is complicated: there are so many different exceptions, and each requires a different response.
- The IS would be very expensive and probably not be very effective (not worth its cost).

An Information System to Support Purchasing

- An even balance between an automated and manual system.
- Searching inventory for items that are low in stock is perfect for a computer, while finding which suppliers to use requires human judgment.

Q7 - How Do Information Systems Support Decision Making?

- Information systems support decision making by providing the information for many decisions.

Decisions Vary by Level

- Decisions occur at three levels in organizations:
 1. **Operational decisions** - **concern day-to-day activities**. (How many items should we order?) **Information Systems that support operations decision making are called transaction processing systems (TPS)**.
 2. **Managerial decisions** - **concern the allocation and utilization of resources**. (How many engineers should we assign to project A?) **Information systems that support managerial decision making are called management information systems (MIS)**. This term can be used in two ways.
 3. **Strategic decisions** - **concern broader organizational issues**. There is a longer time frame and outcomes of decisions may not be realized for a few years time, (Should we open a new product line?)

Decisions Vary by Structure

- A **structured decision** is one for which there is an understood and accepted method for making a decision. (ex. A formula for computing the reorder quantity of an item in inventory is an example of a structure decision process.)
- An **unstructured decision** process is one where there is no agreed upon decision-making method. The prediction method is neither standardized nor broadly accepted. (ex. Predicting the future direction of the economy or the stock market.)
- Weather on the other hand is a structured decision process, because even though weather itself is a unstructured phenomenon, the process to make the decision is standardized between forecasters.

Supporting Decision Making

- **Decisions at the operational level tend to be structured and decisions at the strategic level tend to be unstructured. Managerial decisions tend to be both structured and unstructured.**
- The typical steps in the decision-making process include:
 - o **Intelligence gathering** - what is to be decided, what the criteria for the decision will be, and what data are available.

- o **Alternatives formulation** - decision makers lay out various alternatives. Analyze the alternatives, then select one during the **choice** step and then implement the decision in the **implementation** step.
- o Finally the organization reviews the results in the **review** step, which may lead to another decision.
- **Each decision making step require a different information system.**

Q8 - What Is Your Role?

- You are apart of the information system you use. In fact your mind and thinking are the important components.
- **Even if you have a flawless information system, if you do not know how to use the information produced, then the information system doesn't matter (ex. Walt Disney case).**

3 - Productivity, Innovation, and Strategy

Q1 - Why Should I Care About Productivity and Innovation?

- **Labour productivity is the ratio of the gross domestic product (GDP) of a country divided by the total paid hours worked by people in the country. This is the primary indicator of our per capita income.**
- Increasing productivity in our current global economy is about our ability to innovate and adapt to changing economic conditions.
- To enhance productivity in Canada we must foster a culture of innovation, open our industries to more competition, and increase the amount of machinery and equipment in the economy (particularly in the **Information and Communications Technology [ICT] sector**).
- **Nobel Prize-winning economist Robert Solow created the productivity paradox with his now-famous statement, "We see computers everywhere except in productivity statistics."**
- There are three ways in which the value of IT can be realized:
 1. **Productivity - more and/or better outputs given the same inputs (ex. Accounting software).**
 2. **Competition - information technology alters the way that companies compete.** For example the battle between Netflix and Blockbuster.
 3. **Benefits for the end customer - competition drives down prices. Therefore the final customer often ends up with a product of the same quality for less money.**

Q2 - What is Business Technology Management (BTM), and How Is it Related to Productivity and Innovation?

- **The ICT sector is considered an important industry for productivity and innovation** because it includes technologies that can enhance individual and organizational productivity across many industries.
- Success in the ICT industry used to be directly related to one's technological skill. Now both technology and traditional business skills are coveted.
- **Canadian Coalition for Tomorrow's ICT Skills (CCICT)** was founded as an educational program that combines business and technology training.
- In 2009 a working group of the CCICT designed a set of learning outcomes for a new program named **Business Technology Management (BTM)**. These learning outcomes drew on skills frameworks, such as the **Skills Framework for the Information Age (SFIA)**.
- BTM includes topics such as business and technical training, financial accounting, system analysis and design, project management, writing and business communication, organizational behaviour, and teamwork skills.

Q3 - How do Information Systems Improve Productivity?

- Increasing **efficiency** means that business processes can be accomplished either more quickly or with fewer resources (or both). **When organizations focus on efficiency, they are working towards "doing things right", which means using the right amount of resources, facilities, and information to complete the job satisfactorily.**
- When companies focus on increasing **effectiveness** they are interested in **"doing the right things" (changing business processes to deliver something new and improved).**
- Companies with long-term success understand the balance between effectiveness and efficiency.

Business Processes and Value Chains

- A **value chain** is a network of activities that improve the **effectiveness (or value) of a good or service made up of one or more business processes.**
- For example rubber is manufactured then sent off to a factory where it is turned into high-quality tires then is purchased by a mechanic who installs them onto your car. Each of these steps adds value to the product.
- **Value chains have directions-upstream and downstream.**
- **Moving closer to raw materials is moving upstream or backwards integration.** (ex. Coffee shop grinding their own coffee in-store.)

- **Moving closer to end customer is moving downstream or forward integration.** (ex. A mining company that cuts their own diamonds.)
- There are two types of activities that support value chains
 1. **Primary activities** - **add value directly to the product** (painting raw furniture).
 2. **Support activities** - **indirectly add value to the product** (a company having a great payroll system).
- Understanding value chains helps to understand how information systems increase productivity.

Q4 - How Are Organizational Strategy and Industry Structure Related?

- **One model used to assess the fundamental characteristics and structure of an industry is Porter's five forces model, used to assess industry structure. Five forces determine profitability:**
 1. **Bargaining power of customers**
 2. **Threat of substitutions**
 3. **Bargaining power of suppliers**
 4. **Threat of new entrants**
 5. **Rivalry among existing firms**
- All industries have different structures.
- **An organization responds to the structure of its industry by choosing a competitive strategy.**
- According to Porter, to be effective, the organization's goals, objectives, culture, and activities must be consistent with the organization's strategy.
- All information systems must be facilitate and be aligned with the organization's competitive strategy.

Q5 - What Is the Relationship Between Innovation and Information Technology?

- There are two types of technological innovations:
 1. **Sustaining technologies** - **maintain the rate of improvement in customer value** (ex. The vulcanization of rubber improves tires and gives the driver a smoother ride).
 2. **Disruptive technologies** - **a new package of attributes to accepted mainstream products** (ex. The new mp3 file format revolutionized the portable music industry).
- **Companies gain a competitive advantage by employing IT, sometimes the competitive advantage is so large that it leads to a new industry.** For example the microcomputer gave birth to Intel, Dell, Apple, etc.

- The **diffusion of innovation** was defined by Everett Rogers as **"the process by which an innovation is communicated through certain channels over time among members of a social system."** The five steps in which it occur are:
 1. **Knowledge** - this stage occurs when you hear about an innovation but lack specific information about it.
 2. **Persuasion** - where you find out more about it.
 3. **Decision** - the pros and cons of adapting it.
 4. **Implementation** - you use the innovation and come to the point where you have to make a decision if you are going to continue using it.
 5. **Confirmation** - when you are using the innovation to its full potential.

Q6 - How do Information Systems Provide Competitive Advantage?

- Some of these competitive strategies are created via products and services, and others are enabled via the development of business processes.

Competitive Advantage via Products and Services

- Ex. Hertz has created an integrated GPS into all of their rental cars, which adds value and a competitive advantage to their product/service.

Competitive Advantage via Business Processes

- **Companies make it very expensive or difficult to switch to another product or service. This business strategy is referred to as **switch costs**.**
- Companies such as Telus apply this to their mobile phone service so that you are locked into a plan for a set amount of years. Apple does the same sort of thing with all of their products you commit to their company.
- Another way to create a competitive advantage is through establishing alliances with other companies. These products are more coveted and draw attention (Roots x Blue Jays collection).

Q7 - Can Competitive Advantage Through Information Systems be Sustained?

- **The more ubiquitous information technology becomes, the less advantage it provides.**
- Long-term competitive advantage lies not with technology but rather in how a company and its people adopt the technology.
- **Sustained competitive advantage comes from developing people and procedures that are well supported by underlying technology.**

Q1 - Why Do You Need to Know About Information Technology?

- We need to know about IT because of the negative and positive effects on society and how IT will change in the future.
- Understanding and applying IT is a fundamental building block for success.

Q2 - Where Did All This Information Technology Stuff Come From?

Early Computers: 1939 - 1952

- Financed by the US, the ENIAC (Electronic Numerical Integrator and Computer) was designed in 1946 to calculate missile-firing tables and was the first programmable general-purpose computer.
- A "bug" was used to describe unexpected computer problems resulting from a moth caught between mechanical relays of the Mark II Aiken Relay Computer.
- "Debugging" is now commonly used to describe fixing problems in computer programs.

Mainframes: 1952 - Present

- The first digital computers, which were large, room-sized devices based on now-obsolete vacuum tube technology, were called mainframes, and were mainly used by businesses and government.
- Costing between \$200 000 and \$400 000, they could add or subtract about 16 000 numbers per second.
- Second-generation mainframes developed in the late 1950's used transistors making them smaller, easier to maintain, and more reliable.
- They were often sold without software because companies would develop their own.
- Manulife Financial was the first insurance company in Canada to start using mainframes in 1956.
- Multiprocessing capability was introduced in the mid-1960's.
- Mainframes are designed for fast processing and massive storage.

Microcomputers: 1975 - Present

- Developed by Texas Instruments and Intel, microcomputers incorporated CPU and short-term memory in a single silicon chip.
- Microprocessors were small and often used in handheld devices.
- Microprocessors were invented in the early 1970's and were critical to the invention of microcomputers.

- Early microcomputers had no screen or monitor and required their users to develop their own programs.
- **Hardware technology** improved **in 1981**, and this led to IBM, Apple, Compaq, and Texas Instruments to **launch the personal computer (PC)**.
- The microcomputer was much easier to use than the mainframe computer. The PC revolution was born.

Networking Personal Computers: 1985 - Present

- **They were made for one person to use at a time, therefore sharing data was a cumbersome process. This was later solved by local area network (LAN) technology.**
- Ethernet allowed for devices to communicate and share information.
- LAN technology revolutionized business computing, provides shared access to data, printers, and other peripheral devices.
- **LAN was then commercialized with wide access network (WAN), which is exemplified by the internet.** Trent Tucker destroyed my bum last night.

Mobile and Tablet Computing: Late 1990's - Present

- Years were originally displayed using the last two digits to save resources. Therefore in 2000 someone born in 1960 would have to be -40.
- This is the Y2K problem, which didn't actually create many problems as they were fixed or had been exaggerated.
- **K is a computer term for 1024 commonly referred to as 1000 (incorrect).**
- Apples mp3 iPod music player fueled a resurgence bringing forth the 2007 iPhone and 2010 iPad.

Cloud Computing: 2010 - Present

- **Cloud computing promises flexible, secure, and scalable, low fixed-cost computing available anywhere, anytime, and on any device.**

Summary

- Here we have learned three important lessons:
 1. **Price and performance advances**
 - o The processing power price of computers has decreased. Data storage and network capacity have improved dramatically (Netflix).
 2. **Small is powerful**
 - o There is an ongoing effort to make IT smaller and more powerful.

- o **There are 3 main components: processor, memory, and storage.** They have all been getting smaller and less expensive over the years.
- 3. **The network is the thing**
 - o Computing has moved towards networks for communication, and collaboration, as well as bandwidth.

Q3 - What Does a Manager Need to Know About Computer Hardware?

- **As discussed in the five-component framework, hardware consists of the physical electronic components** and related gadgetry that input, process, output, and store data according to instructions encoded in computer programs or software.
- **Computers consist of four components: input, processing, output, and storage.**

Input, Processing, Output, and Storage Hardware

- **Input devices** may be one of the two most visible or familiar parts of the computer (output being the other).
- Inputs can vary greatly. They are evaluated and compared on a basis of physical dimensions or how they will be used.
- **Processing devices** include the **central processing unit (CPU)**, sometimes called the brain of the computer.
- **The CPU selects instructions, processes them, performs arithmetic and logical comparisons, and stores results of operations in memory.**
- **CPU performance is measured in Hertz (Hz) or cycles and counted in gigahertz (a billion cycles).**
- The CPU works in conjunction with the computer's **main memory**, often referred to as **random access memory (RAM)**. **The CPU reads data and instructions from the RAM and then stores the results of its computations in the main memory.**
- **Output hardware** is also a more visible part of a computer, likely because it has some of the most physical interaction with the user by displaying the desired results of a computational task or request.
- **Storage hardware saves data and programs.**
- **Flash or solid state device (SSD) technology** is increasing in popularity because it has **no moving parts, requires less power, generates less heat, and is less susceptible to mechanical failure, however it fails with no prior indication.**

- Large corporate centers use magnetic tapes because they remain low-cost and are an easily stored backup medium.
- Personal computers can have **special function devices** such as video cards, which can be added to augment each of its components.

Computer Data

- **Represents data using binary digits called bits (either a 1 or 0).**
- For example magnetism can be represented with a zero for one direction and a 1 for the other, giving us the orientation of a magnetic field.
- All computer data is represented in bits.
- **Bits are grouped into eight-bit chunks called bytes.**

In Less Than 300 Words, How Does a Computer Work?

- **CPU transfers program data from storage to the main memory. It then moves instructions from the main memory to the CPU via a data channel or bus, which is small, very fast data in cache.**
- Having a large cache makes the computer faster, but more expensive.
- **Memory contain instructions, as well as the instructions for the operating system (OS), which is a program that controls the computer's resources as well as a block of data.**
- The CPU loads programs into memory in sections. If a move is required (ex. Sort spreadsheet) then the OS will have the CPU move data into unused memory. **If there is not enough memory then the CPU will remove something that is unused to make room. This process is called memory swapping.**

Why Should a Manager Care How a Computer Works?

- If you have too little memory in your computer then there is a lot of memory swapping, slowing your computer down. **The cache and the main memory are known as volatile, that is their contents are lost when power goes off.**
- SSD and disks are **non-volatile**, meaning that their contents survive even when power goes off.
- Data may still remain even though you believe that you deleted it.

Q4 - What Is the Difference Between a Client and a Server, What Is Cloud Computing?

- **Servers provide a service that is accessed by client computers.** Servers are much faster and more powerful.
- Large sites use a collection of computers that coordinate all activities (**server farm**).

- **Cloud computing** is similar to the concept that servers supply applications and data. **Cloud is a metaphor for the internet.**
- For example Google Docs uses cloud apps through your browser.
- Regardless of private or public servers. What happens to all of the data when the service provider goes bankrupt. **PROBLEM!**
- You pay for what you use. Therefore cloud computing is very attractive for start-up businesses.

Q5 - What Does a Manager Need to Know About Software?

- There are two important software constraints:
 1. **OS versions are designed for specific instruction sets (commands that a CPU can process).** Linux on the other hand can run any instruction sets.
 2. **Some applications only work on certain OS's.**

What Are the Four Major Operating Systems?

1. **Windows** - Standard and most common.
 2. **Mac OS** - Originally Apple was very strict controlling all aspects of their computer systems (Power PC). However Intel use resurged the company.
 3. **Unix** - The workhorse of scientific and engineering communities.
 4. **Linux** - An open-source community that's free. Most prevalent for servers, particularly web-servers.
- You have to buy a **licence** to use an OS, which cannot be resold.

What Types of Applications Exist, and How Do Organizations Obtain Them?

- **Application software consists of programs that perform a business function** (ex. Word).
- **Horizontal market application software provides capabilities across many organizations and industries.**
- **Vertical market application software serves the needs of a specific industry.**
- **One-of-a-kind application software is designed for a specific, unique need.**
- You can purchase software like clothing: **off the shelf, off the shelf with alterations, or tailor made.**
- Tailor-made software is called **custom-developed software.**

Browsers

- Debate whether a browser is operating software or application software.

What Are Firmware and Utility Software?

- **Firmware is a computer software that is installed into devices**, in the ROM or read-only memory becoming a part of the devices memory as if designed into the circuitry.
- Utility software needs to be installed such as drivers.
- The **Basic Input/output System (BIOS) is firmware used when a computer is booted up. The first thing the computer does is load the BIOS and runs through commands making sure that the memory and input devices are functional. The OS is then loaded.**
- Firmware can be changed or upgraded.

What Is the Difference Between a Thin Client and a Thick Client?

- An application that **requires nothing more than a browser** is called a **thin client**.
- An application that **requires programs other than a browser on the user's computer** is called a **thick client**.
- The terms thick and thin refer to the amount of code that must run on the client computer.

Q6 - What Buying Decisions Does a Manager Need to Make?

- Large organizations have an information systems department who set standards for client hardware and software.
- Medium to small organizations standardize on one client OS.
- They have an important role in specifying requirements for vertical market application or tailor-made applications.

Q7 - What Are Viruses, Worms, and Zombies?

- A **virus is a computer program that replicates itself, and may take unwanted or harmful actions.**
- **The program that causes unwanted activity is called the payload, which can delete programs or data. It can also edit them in undetectable ways.**
- **Macro-viruses attach themselves to documents. When the documents are opened the macro-viruses place themselves in start-up files affecting every files that application creates or processes.**
- A **worm is a virus that propagates using the internet or other computer networks.**

- **Infected computers are called zombie computers, or zombies. They often are only one of many coordinated through a network and used to perform malicious tasks. This is called a botnet.**
 - **Most viruses take advantage of security holes, which are fixed with program modifications called patches.**
 - **System vulnerabilities are weaknesses in system design that can be exploited by knowledgeable people.**
- Every computer should have an **antivirus program** to protect it from malware.

Chapter: 5 Using Information Technology

What is content?

Content:

something of value that can be considered an asset just like other items of property.

Intellectual Property:

a form of creative endeavour that can be protected through a trademark, patent, copyright, industrial design, or integrated circuit topography.

- Content varies by industry. In advertising can refer to pictures, commercials, and text used to promote ideas about products and services.

Organization of Content

Content traditionally managed through organizational database management systems (DBMS)

Content Management Systems (CMS)

An information system that tracks organizational documents, webpages, graphics and related materials

Database

a self describing collection of integrated records.

- Bytes are grouped into columns (also called fields)
- Columns and fields are in turn grouped into rows (also called records)
- A group of similar rows or records are called files or a table

Key

A column or group of columns that identifies a unique row in a table

Relational Databases

Databases that carry their data in the form of tables and that represent relationship using other foreign keys

Metadata

Data that describe data

Database Management System

A program used to create, process, and administer data

Process: User – Database application- DBMS- Database

Popular DBMS: DB2, IBM, Access, SQL Server

Database Application:

A collection of forms, reports, queries, and application programs that process a Database

Enterprise DBMS

Process large organizational and workgroup databases

Support many different users and many different database applications

Also support 24/7 operations and can manage databases that span dozens of different magnetic disks with thousands of gigabytes or more of data

Personal DBMS

Products are designed for smaller, simpler database applications

Such products are used for personal or small workgroup applications that involve fewer than 100 users

Chapter 6: Networks and Collaboration (Page 218)**Networks and Collaboration**

Collaboration: occurs when two or more people work together to achieve a common goal, result or product.

Effective when, result is greater than what would've been achieved alone

Involves coordination and communication

Four Factors

- Communication skills and culture
- Communication systems: organizations network technologies
- Content management: data base filing etc.
- Workflow control: process or procedure by which content is created, edited, used, and discarded.
 - o Focuses on the internal delivery of a good or service to other employees in an organization

Network Externality: the larger the number of people using, the network, the more valuable that network becomes (network effect)

critical mass: the point where the value of being apart of the network is greater than the cost.

Natural Monopoly: where one can support all users and switching is hard

Q2: What is a Computer Network

Network: a collection of computers that transmit and or receive electronic signals through transmission media.

Transmission Media: might be, physical media such as copper cable and optical fibre (glass fibre) cable, or wireless media transmitting light or radio frequencies (including cellular and satellite systems)

Three Major Types of Networks

Local Area Network (LAN): connects devices within a relatively small. Single geographical location.

Wide Area Networks (WAN): connect devices at different geographical locations

Internet: a network of networks (private networks called intranets)

Q3 What are the Components of a LAN?

Switch: what connects all computers on the LAN

Network Interface Card: works with programs to implement protocols necessary: Ethernet

Media Access Control: the unique identifier in a NIC

Unshielded Twisted Pair UTP: cable with four pairs of wires that connects

IEEE 802.3 Protocol (Ethernet): specifies how messages are supposed to be packaged and processed for transmission over LAN

Wireless LANS

A computer network that allows users to connect to a network without using a network cable (Wireless NAC)

Wireless Access Point: coverage can range from 40 m to 100

Dependent on weather, indoors or outdoors, steel pillars, other devices on frequency

And power output of the device

Repeater and Reflectors are used to amplify and reflect signals to extend the range

Q5 What Do I Need To Know about Connecting to The Internet?

Router: special purpose devices that implement the protocol for WANS

Hypertext transfer protocol (HTTP): *the web* a subset of the internet consisting of sites and users that use this protocol. Programs that implement this protocol are called **browsers**

URL: an acronym for Uniform Resource Locator and is a reference (an address) to a resource on the Internet. A URL has two main components: Protocol identifier: For the URL `http://example.com`, the protocol identifier is `http`. Resource name: For the URL `http://example.com`, the resource name is `example.com`

IP Address: Public/Private

Domain Name System: to convert human friendly urls into computer friendly ip addresses

Analog: waves that are converted to a digital signal -> modem

DSI Digital subscriber line: operates on telephone line services

ADSL asymmetric digital subscriber lines (home/small business)

SDSL symmetric digital subscriber line: same fast speeds in both directions (business

Cable Modem: digital cable lines for transmission

Emails

Step1: Getting Internet Access and Pressing "send/Receive)

Step 2: Break Apart Message and Get ready for transport

Step 3: Send and Receive Packets

Step 4: Reassemble Packets and Display Messages

Firewall: a computing device that prevents unauthorized network access and gets its name from the way forest fires are often contained by open spaces

Can be special purpose computer, or program on computer or mode

Port: a number that is used to uniquely identify a transaction over a network

Port number specifies the service provided: can be used to create firewalls

ACL Access Control List: keeps track of which IP addresses are to be allowed access and which are to be prohibited

Packet Filtering Firewalls: examines each part of a message and determines whether it should let that part pass

Decision is based on assessment of source address, destination address and other data

Encryption: the process of transforming clear text into coded, unintelligible text to secure storage or communication

Virtual Private Network: uses the internet or a private internet to create what appears to be private point to point connections

Web Search Engines

Requires two things: 1. A way to collect URLs 2. A method for storing/accessing the URLs so they can be searched

Finding URLs is the job of a **webcrawler**

Chapter 7: Competitive Advantage and Business Processes

Two basic ways to develop competitive advantage

1. To enhance the product or service through information systems. These changes enable organizations to differentiate themselves.
2. Through business processes. Organizations look to technology to help retain customers, reduce costs, and create barriers for competitors to market.

Primary and Support Activities

Depends on what company is producing

Business functions: primary and secondary activities that are consistent throughout all industries and organizations. Including: accounting, finance, human resources, marketing & sales, operations and procurement.

Functional Systems: facilitate the work of a single department or business function.

In each functional area, companies often add features and capabilities to information systems to support more functional area activity.

The problem with functional applications is their isolation, sometimes called **functional Silos** because they are designed to work independently of one another.

Business processes are cross functional, cut across functional areas

Cross Departmental or Cross Functional Systems: integrate data and business processes across different department systems

Interorganizational systems: supply chain management systems and ecommerce applications

Major problems of isolated functional systems: Data duplication, disjointed process, limited info and lack of integration, inefficient overall activities and increased expenses

Business Process can be improved without technology: 1) adding resources 2) adding increased specialization 3) changing/ eliminating unproductive activities

-Doing more with more (1&2) Doing more with less (IT)

Enterprise Application Integration (EAI): Uses layers of software as a bridge to connect different functional systems together. Main principle is that it leaves the functional system basically intact.

-There is a customized interface for each functional system

-Central EAI server is accessed by management

Enterprise Resource Planning (ERP) Systems: support many or all primary business processes as well as the human resources and accounting support processes.

Primary users are manufacturing companies

Cross departmental process system

Three problems

Change to department rather than organization as whole

Convincing organization that cost of change is worth it

Implementing change in workers

Process Blueprint: Include a comprehensive set of inherent processes for all organizational activities. A documented tested business model.

Costly due to: hardware, software, development of new procedures, training, converting data, and other developmental expenses

Customer Relationship Management: support the business processes of attracting, selling, managing, delivering, and supporting customers.

CRM systems support all the direct value chain activities that involve the customer.

Four Phases of the customer life cycle

1. Marketing
2. Customer acquisition
3. Relationship management
4. Loss/churn

Sales Management applications: support sales to existing customers

Integrated CRM Applications: store data in a single database

Supply Chain: a network of organizations and facilities that transform raw materials into products delivered to customers

Four major factors or drivers affect supply chain performance: facilities, inventory, transportation, and information.

Information

Influences supply chain performance by affecting the ways in which organizations in the supply chain request from, respond to, and inform one another.

Three factors of information

1. **Purpose**
 - a. Can be transactional, such as orders and order return, or it can be informational, such as sharing of inventory or customer order data
2. **Availability**
 - a. Refers to the way in which organizations share their information, which organizations have access to which information and when
3. **Means**
 - a. Method by which the information is transmitted

Supplier Relationship Management (SRM): business process for managing all contacts between an organization and its suppliers.

Supplier in SRM refers to any organization that sells something to the organization that uses and SRM application

SRM supports both the inbound logistics primary activity and support activity.
Support 3 Basic processes

1. **Source**
2. **Purchase**
3. **Settle**

Q8: *What Are SCM Systems?*

- **Supply Chain Management (SCM) systems** are interorganizational systems that enable companies to efficiently handle the flow of goods from suppliers to customers.
- **Supply chain:** network of organizations and facilities that transfer raw materials into products delivered to customers
- **Four major factors affect supply chain performance:** facilities, inventory, transportation, and information
- Information influences supply chain performance by affecting the ways in which organizations in the supply chain request from, respond to, and inform one another.
 - o 3 factors of information: purpose, availability and means
- **3 fundamental information systems in SCM: (1)** Supplier Relationships Management (SRM), **(2)** Inventory, and **(3)** Customer Relationship Management (CRM)
- **SRM** is a business process for managing all contacts between an organization and its suppliers

Chapter 8: Decision Making and Business Intelligence

Q1: *What Challenges Do Managers Face When Making Decisions?*

-Decision making: rational act in which individuals consider possible choices and choose what they think is the best alternative

- **Decision making process difficult for 3 reasons: (1)** concept of rationality hard to define, **(2)** good outcomes may result from irrational processes and bad outcomes can result from good processes, and **(3)** “bounded rationality” -> we intend to be rational but there are limits to our cognitive capabilities
- Much of the decision making software (such as SAGE in 50s) was developed for military use
- **Ackoff's Assumptions: (1)** managers will have no problem making decision if they get the data they need, Ackoff countered that for most managers too many possibilities exist **(2)** poor decisions are made because managers lack relevant information, Ackoff

argued managers suffer more from Information Overload and **(3)** managers know what data they need, in reality managers are often unsure

Data Quality: another assumption is that data stored in systems are clean and accurate

-Dirty data, missing values, inconsistent data, data not integrated, wrong granularity and too much data

- Digital universe is doubling in size every two years
- Information Systems can both help and hinder information overload. Right data must be used at right time to improve process
- **Raw operational data** are seldom suitable for sophisticated reporting or data mining.
- **Data Granularity:** refers to the degree of summarization or detail. **Coarse data** are highly summarized; **fine data** express details that are too precise.
- **Clickstream data:** data on all a consumer's clicking behavior (i.e. on a website)

Q2: What is OLTP, and How Does it Support Decision Making?

- **Online Transaction Processing (OLTP):** System used to collect data electronically and process the transaction online.
- **2 basic ways a transaction can be processed: (1)** if transactions are entered and process immediately on entry, then the system is operating in real time because there is little or no delay in updating the system with new data, **(2)** Other option is to wait for many transactions to pile up before you process them
- **OLTP systems** support decision-making by providing the raw information about transactions and status for an organization.

Q3: What Are OLAP and the Data Resource Challenge?

- **Data Resource Challenge:** Like to think of data as an asset, yet we do not treat it as an important resource. So data may be collected in the OLTP, but it isn't used to improve decision-making.
- **Decision Support Systems (DSSs):** Systems that focus on making OLTP-collected data useful for decision making
 - o More Generally known as **Online Analytic Processing (OLAP)**
 - o **Distinguishing feature** of OLAP report is that people can alter the format
 - o **Downfalls of OLAP flexibility** are that if the database is large, doing the necessary actions will take a lot of computing power
- **Drill Down:** further divide the data into more detail

Q4: What Are BI Systems, and How Do They Provide Competitive Advantage?

- **Business Intelligence (BI) system** is a system the provides information for improving decision making

- **Market-basket analysis** is one of the data-mining systems; computes correlations of items on past orders to determine items that are frequently purchased together
- **RFM Analysis** is a way of analyzing and ranking customers based on their purchase patterns

BI System	Characteristics	Competitive Advantage
Group Decision Support System (GDSS)	Allows multiple decision makers to collaborate, often anonymously and at different times and locations	Reduce many of the biases inherent in group discussions and option evaluation
Reporting Systems	Integrate and process data by sorting, grouping, summing, and formatting. Produce, administer and deliver reports	Provide relevant, accurate, and timely information to the right person
Data-Mining Systems	Use sophisticated statistical techniques to find patterns and relationships	Discover patterns and relationships in data to predict future outcomes
Knowledge Management System	Share knowledge of products, product uses, best practices etc. among employees, managers, customers and others	Publish employee and others' knowledge. Create value from existing intellectual capital. Foster innovation, improve customer service, and reduce costs.
Expert Systems	Encode human knowledge in the form of if/Then rules and process those rules to make a diagnosis or recommendation.	Improve decision making by non-experts by encoding, saving, and processing expert knowledge

Q5: What are the Purpose and Components of a Data Warehouse?

- **Purpose of Data Warehouse** is to extract and clean data from operational systems and other sources and to store and catalogue that data for processing by BI tools
- **Components of Data Warehouse:** Operational databases, other internal data, external data, data extraction/cleaning/preparation programs, data-warehouse DBMS, BI tools, data warehouse metadata, data warehouse database
- **Metadata** are data about data

Q6: What is a Data Mart, and How Does it Differ from a Data Warehouse?

- A **Data mart** is a data collection that is created to address the needs of a particular business function, problem or opportunity
- **Data warehouse** can be thought of as a distributor in a supply chain, **data mart** can be thought of as retail store

Q7: What Are Typical Data-Mining Applications?

- **Data mining** is the application of statistical techniques to find patterns and relationships among data and to make classifications and predictions
- **Unsupervised data mining:** Analysts apply the data-mining technique to the data and observe the results - > Create hypotheses after the analysis to explain pattern
 - o **Cluster Analysis:** Common unsupervised technique in which statistical techniques identify groups of entities that have similar characteristics. (Finding similar groups of customers)
- **Supervised data mining:** Analysts develop model prior to analysis
 - o **Regression Analysis:** Testing the impact of a set of variables on another variable
 - o **Neural Networks:** Another popular technique

Chapter 9: Ecommerce, Social Networking, and Web 2.0

Ecommerce: the buying and selling of goods and services over public and private computer networks.

The emergence of ecommerce has provided much more information for consumers.

Thanks to ecommerce customers are now more knowledgeable than ever before about products and services they purchase.

Merchant Companies: are defined as those that take title in the good they sell – they buy goods and resell them.

Non Merchant Companies: are those that arrange for the purchase and sale of goods without ever owning or taking title to those goods.

Merchant companies sell services they provide; non merchant companies sell services provided by others.

Ecommerce Merchant Companies

There are three main types of merchant companies: (1) those that sell directly to consumers, (2) those that sell to companies, and (3) those that sell to government.

Business-to-consumer (B2C) Ecommerce concerns sales between a supplier and a retail customer (the consumer). A typical information system for B2C provides a web-based application or **web storefront** by which customers enter and manage their orders.

Business-to-Business (B2B) Ecommerce: refers to sales between companies

Business-to-government (B2G) Ecommerce: refers to sales between companies and governmental organizations.

The number of companies engaged in B2B and B2G commerce far exceeds engaging in B2C commerce.

Nonmerchant Ecommerce

The most common nonmerchant ecommerce companies are auctions (such as eBay) and clearinghouses.

Ecommerce Auctions match buyers and sellers using an ecommerce version of a standard auction. **Ebay is the best known Ecommerce auction.**

Clearinghouses provide goods and services at a stated price and arrange for the delivery of goods, but they never take title. **Amazon is an example of a Clearinghouse.**

Other examples are **Electronic Exchanges (such as Priceline.com)** that match buyers and sellers; similar to that of a stock exchange.

Benefits of Ecommerce

Often discussed that ecommerce is something new or just a technology extension of existing business practices.

Disintermediation is the removal of intermediaries between parties. General results for disintermediation are higher revenues for manufacturers and lower consumer prices.

Improves flow of price information, extremely easy to compare products and prices of those products.

Consumers have generally benefited from ecommerce and the net effect has not been quite as negative as initially imagined.

Price Elasticity effects: companies can easily experiment with customers on price changes to see if there is a change in demand of the good.

The Challenges of Ecommerce

Channel Conflict

If a company starts conducting B2G and starts selling a product originally for a retail outlet to strictly the government, that outlet will resent them then they will lose that retail outlet as a customer

Price Conflict

The manufacturer can offer a lower price online compared to the retailer in store and still make a profit.

Logistic Expense

If the cost to process 1 unit through ecommerce is the same as 12 unit order through retail than the average logistic expense through ecommerce will be much higher in comparison. In conclusion, not worth the single orders from consumers. compared to multiple from retail outlet.

Customer Service Expenses

The manufacturer will be required to provide service to less-sophisticated users and on a one-by-one basis. Instead of explaining it to one professional on how to fix something,

they will have to hire customer service representatives to answer phones and explain to everyday people on how to fix it.

Show rooming

When a consumer tests out a product in a large retail store and then goes home and purchases it online if they like it.

Social Networking

Social Networking is the process by which individuals use relationships to communicate with others in a social network.

Social Capital is investment in social relations with the expectation of returns in the marketplace. Such as joining a business for the purpose of meeting new people or joining LinkedIn. This was defined by Nan Lin a Cambridge University professor.

Social Capital adds value in four ways:

- 1. Information**
- 2. Influence**
- 3. Social Credentials**
- 4. Personal Reinforcement**

Value of Social networks is determined by the number of relationships in a social network, by the strength of those relationships, and by the resources controlled by those related.

Weak relationships in Social Networking contribute the most to the growth of a network. You are more likely to expand your social network with people you barely know than the people who you want to get to know more.

Social Networking Enabled by Technology

- 1) Improved search capabilities-** allow us to quickly sort large amounts of data
- 2) Reduction in the trade-off of richness and reach-**ability to keep track of many more people and enhance personalization.
- 3) Network Effects-** improved speed at which a network grows and how useful they become.

Web 2.0

There is no universal definition for the term Web 2.0.

It was first popularized in 2005 by Tim O'Reilly to refer to the integration and interaction of products and services, such as smartphones, user-created content, social networking, location and context-based services, and dynamic marketplaces, not as a specific technology.

Google, Amazon.com, and eBay exemplify Web 2.0. They do not sell software licences because software is not their product. They provides services with the bulk of their processing occurring in the cloud and generate revenues from advertising.

Web 2.0 are thin clients because they do not require installation on users computers.

Traditional Software vendors depend on software license fees. If a large number of Office users switched to free word-processing and spreadsheet applications the effect on Microsoft's revenue would be catastrophic.

User Generated Content (UGC) refers to website content that is contributed by users.

Crowdsourcing combines social networking, viral marketing, and open-source design, saving considerable cost while cultivating customers. One form is the crowd performs classic in-house market research and development and does so in such a way that customers are being set up to buy.

Another form is a start-up raising money who prepay for a new good or service called Crowdfunding.

Traditional vs. Web 2.0

Traditional software models utilizes a toolbar interface such as PowerPoint and Word, Web 2.0 uses an organic interface that allowed users to find their way around the websites.

Traditional Websites are about publishing where as Web 2.0 is about participation such as reviews, discussion responses and map content.

Traditional websites lock down all the legal rights they can but Web 2.0 locks down some rights and encourages people to share them.

How Can A Business Benefit from Web 2.0

Advertising- can be specific to user interests; Google pioneered Web 2.0 advertising through its Ad Words software. Companies can pay money to Google for a certain amount of particular search words.

Mashups – non-internet companies can mash up contents of their websites so it is easier for a consumer to find what they are looking for such as the clothing worn in a movie and the store that is selling it.

It should be noted that Web 2.0 does not benefit all business information systems. Any company that deals with assets, such as financial material, needs some level of control.

Chapter 10: Acquiring Information Systems Through Projects

Q1: How Can IS be acquired?

1. Buy it and use it as it is
2. Buy it and customize it (most common method)
3. Rent or lease it
4. Build it yourself (software development)
5. Outsource it

- software does not equal an information system, when you acquire a new software, you must integrate data, as well as procedures and the people that use it, which can be costly

Q2: What are IT projects, and what does PMBOK mean?

PMBOK: Project Management body of Knowledge

Project: consists of temporary endeavour undertaken to create unique project or service result

- begin with a set of objective or goals (scope of project found from these)
- often represents change in an organization
- if there is a large IT component, project referred to as an IT project
- a crucial skill to complete projects is communication

Information Technology Project Management : collection of methods that project managers use to plan, coordinate and complete IT projects

Five process groups in any project (often overlap)

1. Initiating
2. Planning
3. Executing
4. Controlling and monitoring
5. Closing

Project Knowledge areas:

(1) integration management, (2) scope management, (3) time management, (4) cost management, (5) quality management, (6) human resources management, (7) communications management, (8) risk management, and (9) procurement management. Inside each of these knowledge areas are techniques that project managers use to manage their projects.

Q3: What should you know about IT Operations and IT projects?

Two basic activities to provide IT services

1. Maintaining current IT infrastructure
2. Renewing and adapting it to keep it working effectively in the future

1. OPERATIONS

IT services/operations : the delivery, maintenance, and protection/management

- referred to as Keeping The Lights On
- is a major part of the operational budget

Production Systems : set of system that supports operations,

- predictability
- stability
- security
- **Information technology infrastructure library :** collection of books that provide framework of best practice approaches to IT operations

2. PROJECTS

- Projects change the production systems rather than maintaining them
- natural balance between projects and operations
- renewal and adaption is accomplished through IT projects

What about the Web?

- Company has Intranet website to support tasks
- Company also has a website for customers and their questions

- IT professionals supports company's website

Q4: Why are IT projects so risky?

- IT Project Risk
 - lack of a good model
 - precise estimates are difficult to establish
 - can't monitor progress
 - risk does not emerge from technology but from management and employees lack of skills or knowledge

Q5 and Q6: What is an SDLC

System Development Life Cycle: classic process used to acquire information systems

1. System Definition
 - Define system goals and scope
 - Assess feasibility (cost, schedule, technical, and organizational feasibility)
2. Requirement Analysis
 - Project team is formed and requirements are developed
 - it is essentially the management of scope
 - mainly business and systems analysts
 - users are active players and approve requirements
 - commercial off the shelf software will never fit requirements fully so you
 - modify software
 - modify organizational procedures or data
 - or live with the problem
3. Component Design
 - developing alternatives and comparing those against requirements
 - design the procedure for both users and operational personnel for normal processing, backing up, and failure recovery
 - create new job descriptions
4. Implementation
 - building, testing, and converting users to the new system
 - system testing: test plan, beta testing, product quality assurance
 - system conversion can occur in 4 ways
 - plunge (dive right into new system)
 - parallel (use with old system)
 - pilot (keep new system to limited section of company)
 - phased (implement in phases)

5. System Maintenance
 - record requests for change
 - prioritize requests
 - fix failures(patches, service packs)

Problems with SDLC

- Waterfall method : seldom works so smoothly as many believe it to be
- analysis paralysis : too many requirements documented, can't work on feature properly

Q7: What is outsourcing, and what are application service providers

Outsourcing: hiring another organization to perform a service

- overseas vendor is offshoring
- provides cost reductions, reduced risk
- puts vendor in driver seat however, loss of some control
- loss of intellectual capital
- vendor doesn't have same priorities
- high unit cost forever, may not get what you pay for, cost increases after time
- no easy exit to leave vendor, they know company's information

Chapter 11: Structure, Governance, and Ethics

Q1: How is the IT Department Organized?

- **Chief Information Officer (CIO):** Principal manager of IT department
 - **Chief Technology Officer (CTO):** Often heads the technology group of the IT department. They investigate new information systems technologies and determine how the organization can benefit from them.
 - **Operations:** manages the computing infrastructure, including individual computers, computer centers, networks, and communications media. Important function is to monitor user experience and respond to user concerns or problems
 - **Development:** Third group in IT department. This group manages projects that acquire new information systems and maintains existing information systems. If programs are not developed in-house business analysts and/or systems analysts will staff the department.
 - **Business Analysts** are normally involved in developing the business case for a newly proposed system as well as the requirements for that system

Q2: What Jobs Exist in IT Services? Who cares - Trueeeeeeee...

Q3: What is IT Architecture?

- **Competitive Strategy:** Supported by activities in the value chain, which consists of a collection of business process supported by information systems
- **IT Architecture:** The basic framework for all the computers, systems, and information management that support organizational services.

- **Enterprise Architect:** Job is to create the blueprint of an organization's information systems and the management of these systems.
- **Zachman Framework:** Tool used to organize the development of IT architecture. It divides systems into two dimensions: **(1)** One is based on six reasons for communication (*what* – data, *how* – function, *where* – network, *who* – people, *when* – time, *why* – motivation), and **(2)** the other is based on stakeholder groups (planner, owner, designer, builder, implementer, and worker)

Q4: What is Alignment, Why is it Important, and Why is it Difficult?

- **Alignment:** Process of matching organizational objectives with IT architecture
 - This process takes advantage of IT capabilities as they develop, at the same time maintaining a balance between business objectives and IT architecture
 - Communication between business and IT executives is the most important indicator of alignment.

Q5: What is Information Systems Governance?

- **Governance:** For business organizations, it is the development of consistent, cohesive management policies and verifiable internal processes for information technology and related services.
- **Sarbanes-Oxley Act (SOX)** in the US and **Budget Measures Act (Bill 198)** in Ontario are laws that force companies to comply with governance standards for collecting, reporting, and disclosing information

Q6: What is an Information Systems Audit, and Why Should You Care About It?

- **Information Systems Audit:** An audit on information resources that are used to collect, store, process and retrieve information
- **Information Systems Audit and Control Association (ISACA):** Organization that has become a leader in developing knowledge and standards relating to IT audit and IT governance
- **Control Objectives for Information and Related Technology (COBIT):** framework of best practices designed for IT management
 - Provides a process through which alignment between IT and business objectives is developed
 - Processes such as COBIT are not likely to guarantee alignment on their own, the ability to communicate and share knowledge across organizational boundaries is just as important

Q7: What is Information Systems Ethics?

- **Information Systems Ethics:** about the people involved in the system, and how they use private information

Q8: What is Green IT, and Why Should You Care About It?

- **Green IT:** IT resources to better support the triple bottom line for organizations
 - Primary goals are to improve energy efficiency, promote recyclability, and reduce the use of material that are hazardous to the environment

- **Triple Bottom Line:** Includes measures of traditional profit along with ecological and social performance
- **ENERGY STAR** program is an international government-industry partnership that is intended to produce equipment that meets high-energy efficiency specifications or promotes the use of such equipment
- **E-Cycling:** the recycling of electronic computing devices
- **E-Waste** industry is starting to develop and expand quickly. An example of a company in the industry is **Electronic Product Recycling Association (EPRA)**

Chapter 12: Managing Information Security and Privacy

Q1: What is Identity Theft?

- **Identity Theft:** Involves stealing, misrepresenting, or hijacking the identity of another person or business and provides an effective way to commit other crimes
 - One of the fastest-growing crimes in Canada

Q2: What is PIPEDA?

- **Personal Information Protection and Electronic Documents Act (PIPEDA):** Intended to balance an individual's right to the privacy of his or her personal information with an organization's need to collect, use, and share that personal information for business purposes.
- Governs how data are collected and used
- It states that individuals have a right to know what type of information an organization collects about them and how it is going to be used

Q3: What Types of Security Threats Do Organizations Face?

- **Three sources of Security Threats:** (1) Human error and mistakes, (2) malicious human activity, and (3) natural events and disasters
- **Five types of security problems:** (1) unauthorized data disclosure, (2) incorrect data modification, (3) faulty service, (4) denial of service, and (5) loss of infrastructure
- **Unauthorized Data Disclosure:** Can occur by human error, this type of disclosure is covered under PIPEDA
 - **Pretexting** occurs when someone deceives by pretending to be someone else
 - **Phishing** uses pretexting via email. Pretends to be legitimate company asking for confidential email
 - **Spoofing** is a term for someone pretending to be someone else.
 - **Sniffing** is a technique for intercepting computer communications.
 - **Drive-by sniffers** take computers with wireless connections through an area and search for unprotected wireless networks.
- **Incorrect Data Modification:** can be caused by human error
 - **Hacking** occurs when a person gains unauthorized access to a computer system
- **Faulty Service:** Includes problems that result because of incorrect system operations
- **Denial of Service (DOS)**

- **DOS attacks** are often launched maliciously by flooding a web server with millions of bogus service requests to occupy the server so that it cannot service legitimate requests.

Q4: How Can Technical Safeguards Protect Against Security Threats?

- **Technical Safeguards** involve the hardware and software components of an information system.
 - User name identifies the user, password authenticates
- **Smart card:** A plastic card similar to a credit card except they have microchips rather than magnetic strips. The microchip (which hold far more data than the magnetic strip) is loaded with identifying data or algorithms
 - Users of smart cards are required to enter a Personal Identification Number (PIN) to be authenticated
 - Smart cards can enable **challenge-response** authentication in which a new password is generated at each login by an algorithm accessed by or store on the chip
- **Biometric Authentication:** Uses personal physical characteristics, such as fingerprints.
- **Encryption and Firewalls** are two important technical safeguards
- **Malware:** Includes viruses, worms, Trojan horses, spyware, and adware
 - **Spyware:** Programs installed on the user's computer without the user's knowledge or permission
 - **Adware:** Installed without the user's permission and resides in the background to observe user behavior

Q5: How Can Data Safeguards Protect Against Security Threats?

- **Data Safeguards** protect databases and other organizational data. Two organizational units are responsible for data safeguards:
 - **Data administration:** organization-wide function in charge of developing data policies and enforcing data standards. Typically a staff function reporting to CIO
 - **Database administration:** function that pertains to a particular database. Ensures procedures exist to facilitate orderly multiuser processing of the database, to control changes to the database structure, and to protect the database.
- An organization should protect sensitive data by storing them in encrypted form
- **Key escrow** is a safety procedure in which a trusted party has a copy of the encryption key

Q6: How Can Human Safeguards Protect Against Security Threats?

- **Human Safeguards** result when authorized users follow appropriate procedures for system use and recovery.
 - Effective Human Safeguards begin with creating definitions of job tasks and responsibilities. Should provide a separation of duties and authorities.
- **Hardening:** To take extraordinary measures to reduce a system's vulnerability. These sites use special versions of the operating system and lock down or eliminate operating system features and functions that are not required for the application.

- The best safeguard from threats from public users

Q7: What is Disaster Preparedness?

- Best safeguard against a disaster is appropriate location
- **Hot Sites** are remote processing centers and may be run by commercial disaster-recovery services
- **Cold Sites** provide space and limited technology and customers provide and install the equipment needed to continue operations following a disaster. Recovery time is considerably longer.
- **Warm Sites** are somewhere in the middle of the two extremes

Q8: How Should Organizations Respond to Security Incidents?

- **Major Factors in Incident Response:** (1) Have a plan in place, (2) centralized reporting, (3) specific responses, and (4) practice