C182 STUDY RESOURCE

This study resource is intended as a supplement to the course but not as a replacement. It will still be necessary to study the course.

STUDY RESOURCE FOR C182 INTRODUCTION TO IT

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C182 Introduction to IT Study Rescouce

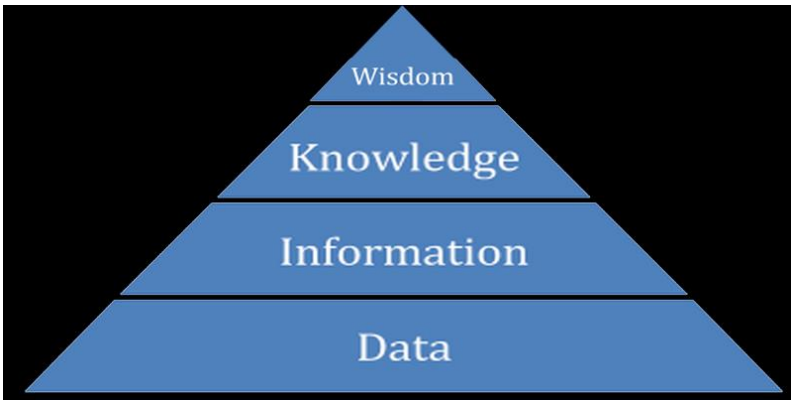
Identify Major IT Roles & Functions

- **Administration** - An administrator is in charge of some portion of the IT infrastructure.
- **Network administrator** - oversees all aspects of the computer network. The network administrator's duties include physically laying down cable, making connections, and working with the network hardware (for instance, routers and switches).
- **Database administrator** - focus on the design, development, and support of database management systems (DBMSs). Tasks will include installation, maintenance, performance analysis, and troubleshooting as with the other administrative areas
- **Security administrator** - install, configure, and administer appropriate firewall security to protect the organization's systems and to work proactively against such intrusions.
- **Web administrator** - also known as a webmaster, but more precisely referred to as a web server administrator. This role is responsible for maintaining webstorages, which differs from the development of webstorages. Specifically, the web administrator must install, configure, maintain, secure, and troubleshoot the web server.

Define Information Technology:

- IT is a term used to describe several aspects: the task of gathering data and processing it into information, the ability to disseminate information using technology, the technology itself that permits these tasks, and the collection of people who are in charge of maintaining the IT infrastructure (the computers, the networks, and the operating systems). Generically, we will consider IT to be the technology used in creating, maintaining, and making information accessible. In other words, IT combines people with computing resources, software, data, and computer networks.

The DIKW hierarchy describes the transition of data to wisdom.

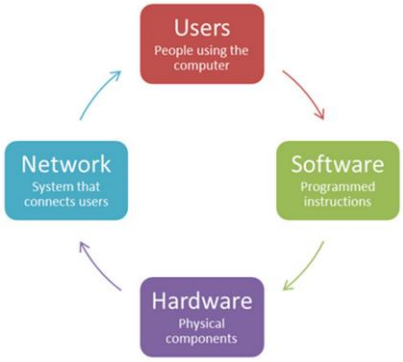


- **Information Technology** - describes the technology infrastructure that may support information systems, although Information Technology could also support many other

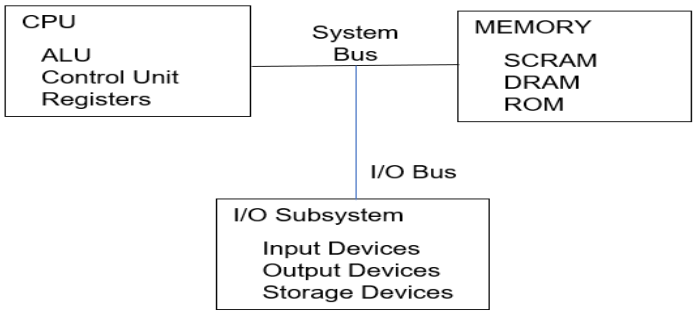
types of systems (e.g., telecommunications systems). Information Technology includes hardware, software, networks, and databases that work together to allow an organization to manage data and information.

- **Quality Data** – relevant, timely, thorough, accurate and reliability
- **A computer performs four operations**: (Input-Processing-Output-Storage cycle, typically referred to as IPOS)
  - Input
  - Processing
  - Output
  - Storage

Hardware	Software	Network	Users
The physical components of the computer	The programs and other operating information used by the computer	A collection of computers and resources connected by various media so they can communicate with each other	The people who use the computer system



Computer Structure



The **CPU** is the device that not only executes your programs' instructions, but also commands the various components in the computer. **Memory** stores the program(s) being executed and the data that each program is using. The **I/O** subsystem includes all peripheral devices (input, output, storage, network) where storage consists of the long-term storage devices (disk drives, tape). The **bus** is the device that permits information to move between each component.

- **The system unit** is a core feature of notebooks, tablets, smartphones, and other types of computers; therefore, it comes in a variety of shapes and sizes. The system unit contains various components that enable the PC system to run programs and complete other important functions. Various different types of computers are likely to have many of the same components. These include:
  - the case, which is a protective covering,
  - internal bays and slots that grip the internal components,
  - buses, which are the circuitry and electrical channels that enable communication among the electronic components,
  - bays (external openings) and ports that connect peripherals, and
  - lights and indicators that show the computer is turned on.

Memory - short-term and long-term storage.

- Dynamic RAM (DRAM) which is typically called main memory
- Static RAM (SRAM), which is cache memory and registers
- Read only memory (ROM), which retains its contents indefinitely
- **BIOS** - Basic Input Output System
- **Hard drive** - store data even when the computer is turned off
- **Peripheral devices** - components that are located outside the system unit yet are connected physically or wirelessly to it.

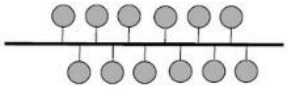
Early Computers

Name	Year	Nationality	Characteristics
Zuse Z3	1941	German	Binary floating point, electromechanical, programmable
Atanasoft-Berry	1942	US	Binary, electronic, nonprogrammable
Colossus Mark 1	1944	UK	Binary, electronic, programmable
Harvard (Mark 1)	1944	US	Decimal, electromechanical, programmable
Colossus Mark 2	1944	UK	Binary, electronic, programmable
Zuse	1945	German	Binary floating point, electromechanical, programmable

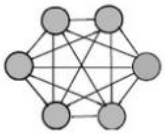
- **Machine language** - The lowest-level programming languages understood by computers, representing instructions in binary (0s and 1s)
- **Assembly Language** - specified instructions using words
- **High Level Language** - FORTRAN (FORmula TRANslation) and COBOL (Common Business-Oriented Language)
- **Compiler** - requires that the components of the software all be defined before compilation can begin.
- **Interpreted language** - runs inside of a special environment called the interpreter, the interpreter converts that command to machine language and executes it.
- **Scripting languages** - perl, php, ruby, python, and asp

- **Computer network** - collection of computers and computer resources (e.g., printers, file servers) connected in such a way that the computers can communicate with each other and their resources
- **Bandwidth** - transfer rate permissible over the media, described as some number of bits per second (bps).
- **Network hub** - device that connects multiple computers together
- **Network switch** - more functional connection than a hub, its purpose is to only send transmissions to a specific, intended computer.
- **Router** - device that connects multiple networks together
- **Wireless access point** - connected to a hub, a switch, or a router. This device then sends out a wireless signal so computers on the network can connect without a cable
- **Radio waves** - provide access to networks over long distances
- **IP Address** - A series of numbers that indicates a specific internet location
- **Server** - computer that takes requests and responds with the requested information

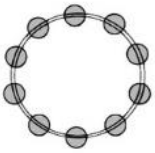
Network Types



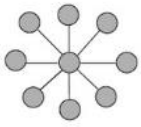
In a bus network, devices are connected along a single cable.



In a mesh network, every device is connected directly to every other device in the network.



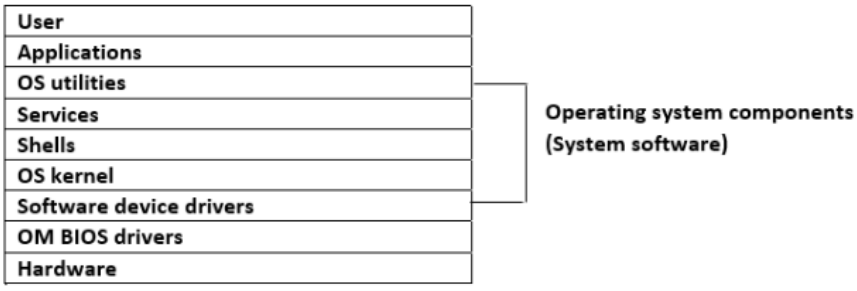
In a ring network, each device is connected directly to its neighbors, and messages are forwarded from device to device until the proper destination is reached.



- **Confidentiality** - requires that data be kept secure so that they are not accidentally provided to unauthorized individuals and cannot be obtained by unauthorized users.
- **Integrity** - requires that data are correct
- **Availability** - requires that information is available when needed

- **Strategic risk analysis**, - security policies are translated into mechanisms which support information security. We will focus on the risk management process\
- **Social engineering** - threat that targets users.
- **Phishing** - is the process of targeting a specific individual, usually via email, under the guise of a reputable or trustworthy entity to reveal private or personal details such as usernames or password
- **Hacking** - is when an individual obtains unauthorized access to a host
- **Packet sniffing** - means of obtaining a password; in reality, in addition to passwords, packet sniffing allows you to obtain anything being sent over the network if the data being transmitted is sent without encryption
- **Malware** - "malicious" software
- **Spyware** - is often downloaded unknown to the user when accessing webstorages.
- **Denial of service (DOS) attack** - In the DOS attack, one or more attackers attempts to flood a server with so many incoming messages that the server is unable to handle legitimate business
- **Firewalls** - prevent certain types of messages from coming into or out of the network and anti-viral software seeks out malware
- **Antivirus software** - attempts to identify if a file contains a virus or, more generally, some form of malware.
- **Information security** - attempts to ensure the confidentiality, integrity, and availability of information when it is stored, processed, and transmitted (across a network)
- **Encryption** - is the idea of obfuscating the information that resides on a computer or is sent over a network so that if it is intercepted the hacker will be unable to use the information. Encryption uses a mathematical algorithm for converting the plain-text information to the encrypted form
- **Symmetric key encryption** - uses the same key for performing the encryption and decryption. **Public-key encryption** - uses two keys, a public and private key.
- **Software** - is the term we use for the systems and programs that are developed, as a result of programming and scripting efforts by individuals, to perform a business function.
- **Application software** - consists of programs that end users run to accomplish tasks
- **System software** - consists of programs that make up the operating system
- **Server software** - works with hardware to provide a network service
- **Cloud computing** - combines several different technologies: distributed computing, computer networks, and storage area networks. The idea is to offer, as a service, the ability to offload computation and storage from your local computer to the cloud
- **Operating system (OS) -** is a program. Its primary task is to allow a computer user to easily access the hardware and software of a computer system. Beyond this, we might say that an OS is required to maintain the computer's environment. (Windows 7/8/10, Linux,

and Mac OS X., Android, Windows, and iOS)



Layers of a computer system.
Alternative Version

- **Kernel** - The core components of the operating system
- **Device drivers** - provide specific interfaces between the OS running a computer and hardware
- **Shell** - an interface for the user, often personalized for that given user
- **System utilities** - programs that allow the user to monitor and improve system performance.
- **GUI** - allows a user to control the computer by using the mouse and pointing and clicking at objects on the screen (icons, menus, buttons, etc.).
- **Web Server -** The role of a web server is to respond to HTTP requests
- **Proxy server** - used in an organization to act as a giant cache of web pages that anyone in the organization has recently retrieved.
- **Database server** - permits database access across a network
- **Proprietary software** - is purchased from a vendor
- **Shareware** - usually provides you a trial version of the software
- **Freeware** - is usually software that has become obsolete because a newer software has replaced it, or is software that the original producer (whether an individual or a company) no longer wishes to maintain and provide support for
- **Public Domain software** -on the other hand, is software that has been moved into the public domain.
- **Open source software** -This software was created in the Open Source Community and made freely available as source code

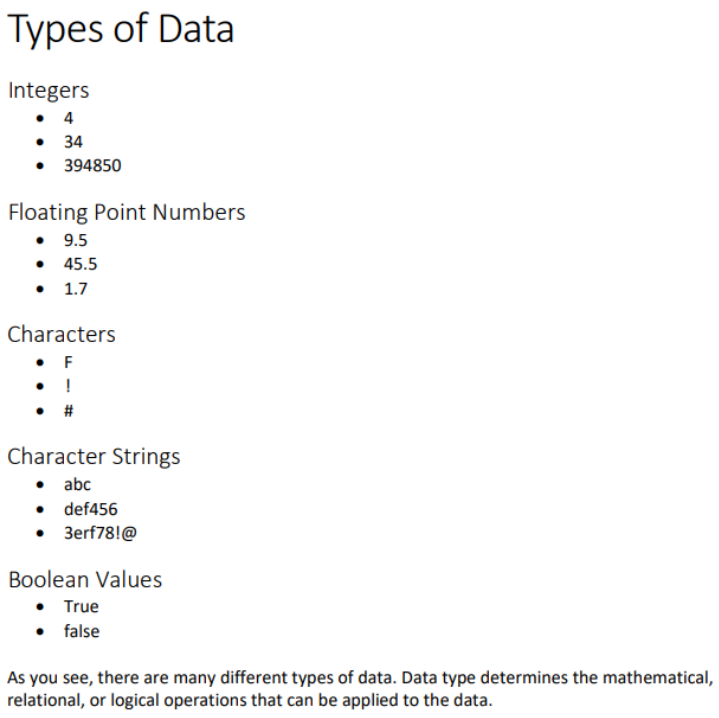
Language Type	Translator	Function of the Translator
Compiled Language	Compiler	Translates the entire program, creating an executable program, which can be run at a later time.
Interpreted Language	Interpreter	Takes the most recently entered instruction, translates it into machine language, and executes it.

- Scripting languages include:
  - JavaScript
  - ASP
  - JSP
  - PHP
  - Perl
  - Tcl
  - Python

Algorithm - is a formula or procedure for solving a problem

Data Types

- **Flat file database** - is used if the amount of data that is being recorded is fairly minimal. It is one large single table without the relations between tables that a relational format provides
- **Relational database** - is the most common structure for databases. A relational database has multiple tables (relations) with interrelated fields.
- **Hierarchical database** - format organizes data using a tree-like or organizational chart type structure.
- **Business Intelligence** - is knowledge
- **Business Intelligence system** - helps to capture the knowledge contained in various information systems within the company for making strategic decisions
- **Structured Query Language (SQL) -** is a standard query language that is used to communicate in many DBMSs. In general, SQL uses the following format for interacting with the data contained within a database:
  SELECT fields FROM tables WHERE fields from tables match criteria;



- **IT department** - supports the day-to-day technology needs of an organization. More broadly, an IT department is charged with helping an organization achieve its strategic goals.
- **Goals** – translate the organization's philosophy into specific, measurable outcomes the organization plans to achieve.

Project Phases

A project is normally carried out in phases. Although organizations may refer to these phases using differing terms, we will refer to these phases as initiation, planning, executing, monitoring and controlling, and closing.

The five project phases: initiation, planning, executing, monitoring & controlling, and closing.
Alternative Version

- **Business continuity** - relates to information technology systems, as well as all other business processes, including marketing, manufacturing, finance, accounting, human resources, management, and so on. Key components of the process are developing a plan and testing the plan.
- **A hot storage** - is a physical location where an organization can move its operations. A hot storage includes everything for normal business operations, including HVAC systems, hardware, software, and backed-up data. Hot storages allow for the quickest return to business (often without any delay), but they are expensive.
- **A cold storage** - is also a physical location, but unlike a hot storage, it is not equipped with hardware, servers, and the full range of items a hot storage has. A cold storage is more like a shell that can be used for operations should the need arise. It is less costly than a hot storage, but the organization must be able to purchase, receive, and install all the necessary hardware and software before operations can continue.
- **Bluetooth** - is a standard that enables devices to exchange data using wireless technology
- **The Internet of Things** - refers to the myriad types of devices that can and will be connected to the Internet in the next few years.
- **Big data** - means integrating these vast amounts of data, whether the data is generated internally or externally and finding ways to investigate the relationships that can be discerned from the data.
- **Software as a Service (SaaS) -** businesses can access and use software through the Internet. Companies in many industries now use Google Docs and other programs that use SaaS
- **Platform as a Service PaaS** - is to be able to quickly and reliably develop and deliver applications.
- **Infrastructure as a Service IaaS -** all the resources (e.g., servers, data storage) an IT department needs are located outside of the organization and are accessible by anyone, anywhere.
- **Ethics**- a code of moral conduct or a set of principles that govern behavior

The 10 Commandments of Computer Ethics

1. Thou shalt not use a computer to harm other people.
2. Thou shalt not interfere with other people's computer work.
3. Thou shalt not snoop around in other people's computer files.
4. Thou shalt not use a computer to steal.
5. Thou shalt not use a computer to bear false witness.
6. Thou shalt not copy or use proprietary software for which you have not paid.
7. Thou shalt not use other people's computer resources without authorization or proper compensation.
8. Thou shalt not appropriate other people's intellectual output.
9. Thou shalt think about the social consequences of the program you are writing or the system you are designing.
10. Thou shalt always use computers in ways that ensure consideration and respect for fellow humans.

Know these:

- The Family Educational Rights and Privacy Act of 1974 (FERPA)
- Electronic Communication Privacy Act of 1986
- Computer Matching and Privacy Protection Act of 1988
- Health Insurance Portability and Accountability Act of 1996 (HIPAA)
- Digital Signature and Electronic Authentication Law of 1998 (SEAL)
- The AITP code of ethics (http://www.aitp.org/?page=Ethics)
- Information Systems Audit and Control Association (ISACA)

Please contact your Course Instructor if you need any assistance.