CGS2060 Concept Exams #1
Study Guide

Chapter 1 Topics:

- What can you use computers for-
  - **combines hardware and software to accept the *input* of data, *process* and *store* the data, and produce some useful *output***
- When you talk about something digital it references things that can be represented by numbers
  - Bit- represents data using 1's and 0's
  - ***Digitization*** is the process of transforming information into 1's and 0's
- A group of 8 bits is called a **byte**
- Things that can be stored on a digital device include numbers, characters, sounds, images, movies, etc.
- Know what a special purpose computer is
  - A **kiosk** is a computer station that provides the public with specific and useful information and services.
- Know the general definition of a computer network
  - A telecommunications network that connects two or more computers for data communications.
  - *Telecommunications* are communications that take place electronically over a distance
- Know that Wi-Fi (short of wireless fidelity) is a popular wireless networking standard
  - *Wireless networks* use radio signals rather than cables to connect users.
- VOIP (Voice-over-Internet-Protocol) is **a popular technology that allows phones to use internet connections.**
- The speed of a human brain has been estimated at 100 trillion operations per second

Chapter 1 Outline/Summary

- Computer- A digital electronics device that combines hardware and software to accept the input of data, process and store the data, and produce some

useful output.

- **Technology refers to tools, materials, and processes that help solve human problems.**
- **Digital electronics devices store and process *bits* electronically.**
- ***General-purpose computers* can run any number of software applications**
- ***Special-purpose computers* are designed primarily for one particular function**
- ***Data*: items stored on a digital electronics device: numbers, characters, & sounds**
- ***Information*: data organized and presented in a manner that provides value to the user: documents, graphs, music, photos**
- ***Microprocessor*- Sometimes called a *chip* or just a *processor*, combines microscopic electronic components on a single integrated circuit that processes bits according to software instructions.**
- ***computing platform* A computer's type, processor, and operating system define its.**
- ***Mobile Media*- Movies, television shows, and other video clips can be downloaded from the Web or transferred from DVD to the devices and displayed on the 3.8-inch screen.**
- ***Internet* is the world's largest public computer network, a network of networks, that provides a vast array of services.**
- **The *Web* is an Internet service that provides convenient access to information through hyperlinks**
- ***Wireless networks* use radio signals rather than cables to connect users.**
- *Wi-fi* is a popular wireless standard

- Computers were invented to compute – calculate solutions to mathematical problems.

Automation involves utilizing computers to control otherwise human actions and activities

- A ***Computer-based***

Information System (CBIS) uses these components to manage and distribute information.

- *Information Technology- IT* can be defined as issues related to the components of a computer-based information system.
- ***Information security*** refers to the protection of information systems and the information they manage against unauthorized access, use, manipulation, or destruction, and against the denial of service to authorized users.

Chapter 2 Topics:

- Know that data is stored as bits (binary)
  - Bits are the 1's and 0's that allow us to represent, store, and manipulate data
  - They are the smallest unit of data in a digital electronics device
- Know basic counting with binary numbers

- Information can be assigned to the two states of the bit: On OR Off

- Know what an Arithmetic Logic Unit (ALU) is
  - contains the circuitry to carry out the instructions in the processors *instruction set*
- Know that the Front Side Bus consists of electronic pathways between the CUP and RAM
  - The system bus connects the CPU to the chip set, and through it to RAM and other components on the motherboard.
- Know that clock speeds are measured today in Gigahertz and Megahertz
- Know the different storage (RAM, ROM, CMOS) and know which one is the largest
  - *Secondary storage* is used to store data more permanently without the need for electricity
  - ***Random Access Memory*** (RAM) is temporary, or volatile, memory that stores bytes of data and program instructions for the processor to access.
  - ROM- **Read-only memory**. A class of storage media used in computers and other electronic devices. Data stored in ROM cannot be modified. **LARGEST**
  - CMOS- **Complementary metal-oxide-semiconductor** (a technology for constructing integrated circuits.)
- Know that RAM consists of chips grouped on a board called SIMM
- Look up the capabilities and properties of Magnetic Tape
  - High-capacity Disks & Floppy Disks (outdated)/Microdrives
- Know that Flash Memory
  - is a form of Solid State storage
- Know that notebook computers
  - integrate the mouse as touch-sensitive pad called the touch pad

Chapter 2 Outline/Summary

- **Bits are the 1's and 0's that allow us to represent, store, and manipulate data**
- **They are the smallest unit of data in a digital electronics device**
  - **A bit can be a capacitor that is *electronically charged* or not charged.**
  - **A bit can be an area of metal particles on the surface of a disk that are either *magnetically charged* or not.**

A bit can be a microscopic spot on a highly reflective disk surface that either has a pit burned into it or not.

- Anything that can be expressed through words, numbers, sounds, pictures, and even scents can be digitized.
- Digital information is easy to manipulate.
- Digital information is easy to copy and transfer.
- Digital information is long lasting.
- ***Digital convergence*** is the trend to merge multiple digital services into one device.

transistor is an electronics component, composed typically of silicon, that opens or closes a circuit to alter the flow of electricity to store and manipulate bits.

Integrated Circuit (chip) combines transistors and capacitors in a tiny module to store and process bits and bytes in today's digital electronic devices

- ***Central Processing Unit*** (***CPU***) is a group of integrated circuits that work together to perform the processing in a computer system.

motherboard is the primary circuit board of a computing device that houses the digital device's circuitry including the microprocessor and memory.

- The microprocessor accesses instructions stored in memory over the system bus.
- ***Arithmetic Logic Unit*** (ALU): contains the circuitry to carry out the instructions in the processors *instruction set*.
- ***Control Unit***: sequentially accesses program instructions, decodes them, and coordinates the flow of data throughout the system.
- ***Registers***: hold the data and instructions currently being processed (~300 bytes).
- *Dual-core processors* and *quad-core processors* use two and four CPUs on one chip that work together to provide twice and four times the speed of traditional single-core chips.
- The system bus connects the CPU to the chipset, and through it to RAM and other components on the motherboard.
- The four stages of the machine cycle are **(1) fetch** the instruction from memory, **(2) decode** and **(3) execute** the instruction, then **(4) store** the results.
- The first consideration in selecting a computer is typically its speed: how quickly it can carry out such tasks as loading a program, opening a file, and writing to a CD.
- *Moore's Law*- Gordon Moore, cofounder of Intel, observed in 1965 that the continued advances in technological innovation made it possible to reduce the size of transistors, doubling their density on the chip every two years.
- *Secondary storage* is used to store data more permanently without the need for electricity.
- ***Magnetic storage*** devices use the magnetic properties of iron oxide particles to store bits and bytes more permanently than RAM.
- Microdrives can store gigabytes of data on a disk one or two inches in size.
- ***Optical storage*** media store bits using an optical laser to burn pits into the surface of a highly reflective surface.
- ***Solid State storage*** devices use flash memory to store bits.

- An ***input device*** assists in capturing and entering raw data into the computer system.

An **output device** allows you to observe the results of computer processing with one or more of your senses

Chapter 3 Topics:

- Know that System Software is the set of programs that coordinates the activities of the hardware and various computer programs.
    - controls the hardware and runs the computer system.
- Know the definition of Application Software
    - *Application Software* provides services for people.
- Know the definition of Source Code
    - text files created by programmers that is translated into an object code.
- Know that a compiler
    - takes in source code and produces output of object code and executable code.
- Know what Open-Source code is.
    - Uncompiled code available for programmers to modify at will (Linux)
- Know the definition of Creative Commons Licenses.
    - Allows the creator of the intellectual property to specify the terms of the license.
- Know that operating systems
    - support single user, multi user, and multi computer platforms
- Operating systems have
    - both a graphic user interface (GUI) and a command prompt access.

Chapter 3 Outline/Summary

- ***System Software*** **controls the hardware and runs the computer system.**
- ***Application Software*** **provides services for people.**
- **Software consists of a number of files at least one of which is "executable".**
- **Executable File: stores computer instructions in binary machine language.**
- ***programming language*** **is the primary tool of computer programmers, providing English-like commands for writing software that is translated into the detailed step-by-step instructions executed by the processor.**
- Commercial software
    - You only get the "Executable Code".
    - It impossible to translate executable code back to the original "Source Code".
- Defines permissions, right, and restrictions provided to the person who purchases a copy of the software.
    - Public Domain
    - Open Source
        - Uncompiled code available for programmers to modify at will (Linux)
    - Creative Commons License
        - Allows the creator of the intellectual property to specify the terms of the license.
- ***Off-the-shelf software*** is mass-produced software designed for use by the general public.
- **Shareware-** Marketed under a "try before you buy" philosophy
- ***Custom Designed software***, either in-house developed, or contracted, is software designed to solve a unique and specific problem.
- Operating System Functions: Manages Processor Resources
- Manages Memory (RAM)
- Manages Storage and I/O
- Manages Peripheral Devices
    - Uses device drivers
- Provides a Common User Interface
    - Graphical User Interface
- Provides Applications with Hardware Independence
- Utility Programs- **Programs designed to assist the machine in running smoothly, securely, and efficiently.**
- A ***software suite*** is a collection of application software packages sold together.
- **AI** refers to the science and engineering of creating computer systems that simulate human thought and behavior.
- Virtual Reality- Computer-simulated environment that can be manipulated by the user.

Chapter 4 Topics:

- Know the definition of the Internet Backbone
    - ***Internet backbone*** consists of the main pathways and connections of the Internet owned primarily by telecom companies.