Chapter one

Computer Hardware: The physical elements of a computing system.
Computer Software: The programs that provide he instructions that a computer executes.
Abstraction: A Mental model that removes complex details.
3 innermost layers of a computing system-->

1. Information: The innermost layer, information, reflects the ways we represent information on a computer. 1 and 0s
2. Hardware: consists of the physical hardware of a computer system. Gates, circuits, CPU, memory.
3. Programming: deals with software, the instructions used to accomplish computations and manage data.

1) vacuum tubes: stored information, generated a great deal of heat and was not very reliable.
2) transistor: replaced the vacuum tube as the main component in the hardware, smaller, more reliable, faster more durable and much cheaper.
3) integrated circuits: solid pieces of silicon that contained the transistors, other components and their connections,

Chapter Two

Integer: A natural number, a negative of a natural number, or zero.
Floating point number: Fractional numbers. May be positive, negative or zero, 1.0, 5.25, 83.1, -23.0, 0.0 (A representation of a real number that keeps track of the sign, mantissa, and exponent)
Bit: Binary digit
Byte: eight binary digits.
Base/Radix:
Binary: base 2 (0 & 1)
Octal: base 8 (0 - 7)
Decimal: base 10 (0 - 9)
Hexadecimal: base 16 (0 - f)
Positional Notation: the value of each digit in a given number can be found by multiplying that digit by its positional place- value.

Chapter Three

Data: Basic values or facts.
Information: Data that has been organized or processed in a useful way.
Analog Data: A continuous representation of data.
Digital Data: A discrete representation of data.
Sampling: To digitize the signal, we periodically measure the voltage of the signal and recored the appropriate numerical value.
Sample Rate: how many times a second a sample(ing) is taken (40,000 times per second is reasonable)
Sample Size:
Vector Graphics: Representation of an image in terms of lines and shapes.
Raster Graphics: Storing image information pixel by pixel.
Compression Ratio: The size of the compressed data divided by the size of the uncompressed data.
Lossy Compression: A data compression technique in which there is loss of information.
Lossless Compression: A data compression technique in which there is no loss of information.
Radix Point: The dot that separates the whole part from the fractional part in a real number in any base.
Sign: positive or negative
ASCII: American Standard Code for Information Interchange. (8 bite)
UNICODE: Extended version of ASCII. (16 bite)
Temporal (Inter-Frame) Compression: Stores only the differences between frames, using "key frames" as a basis.
Spatial (Intra-Frame) Compression: Encodes areas of identical color with a reduced description format, e.g. "100x100 red pixels".
How Each Are Represented
Text: broken down to characters ACSII or UNICODE.
Color: RGB (red, green, blue)
Black (0,0,0) / White (255,255,255) / Yellow (255,255,0) / Red (255,0,0) / Green (0,255,0) / Blue (0,0,255) / Magenta (255,0,255)

Cyan (0,255,255)
Images: pixels with RGB or by vectors
Sounds: by sound waves, impulses through the speaker.
8 bit signed magnitude 8BSM were the leading value is the sign (0 = +) and (1 = -)
8 bit twos complement 8B2C were the leading value is (-128)
8B2C => 10 (minus one then flip the bites) : 10 => 8B2C (flip the bites then add one) : base 2 decimal points (8,4,2,1, . ,1/2,1/4,1/8) place values. : X bites has 2^X unique Values; 64 unique Values has X bites 2^X=64

Chapter Four

Gate: A device that performs a basic operation on electrical signals, accepting one or more input signals and producing a single output signal.
Circuit: A combination of interacting gates designed to accomplish a specific logical function.
Circuit Equivalence: The same output for each corresponding input-values combination for two circuits.
Half-Adder: A circuit that computes the sum of two bits and produces the appropriate carry bit.
Full-Adder: A circuit that computes the sum of two bits, taking an input carry bit into account.
Boolean Expression: Is the equation used to represent a circuits output.
Truth Table: A table showing all possible input values and the associated output values.
Logic Diagram: A graphical representation of a circuit; each type of gate has its own symbol.
Moore's Law: Transistor Density Will Double Every 18 - 24 Months.
False: The output of a sequential circuit is determined only from the circuit inputs.

Chapter Five Computing Components

Arithmetic / logic (ALU): The part of the CPU that performs arithmetic and logical operations.
BUS: The data connection between computing components.
Operand: The portion of a machine language instruction which identifies the data.
Registers: Fast memory cells inside the CPU.
CPU: The control unit and the arithmetic logic unit.
Opcode: The part of each machine language instruction which identifies the operation to be performed.
Input Unit: Provides a means to read values from the outside world.
Memory Unit: Stores data in addressable cells.
Output Unit: Provides a means to write values to the outside world.
Memory Hierarchy Pyramid: Faster, smaller, more expensive storage at the top; slower, larger, cheaper storage at the bottom.
Fetch-Execute Cycle
Decode: The Control Unit examines the current instruction in the IR.
Get Data: The Control Unit gets data from physical memory if needed.
Execute:The Control Unit performs the actions specified by the current instruction in the IR.
Fetch: The Control Unit uses the PC to copy the next Instruction from the Memory Unit to the IR.
Magnetic Disk Performance
Latency: The time it takes for the desired sector to rotate under the read/write head.
Seek Time: The time it takes for read/write head to move to the desired track.
Access Time: Seek Time + Latency.
Addressability: The number of bits stored in each addressable location in memory.
Instruction register (IR): The register that contains the instruction currently being executed.
Program counter (PC): The register that contains the address of the next instruction to be executed.
Track: A concentric circle on the surface of a disk.
Sector: A section of a track.
Block: The information stored in a sector.

Chapter Eight High-Level Programming Language Constructs

Selection / Condition: Chooses between two sets of actions to perform based on a Boolean expression.
Sub-Program: A means of sharing program statements. Can be called from multiple places within a program.
Polymorphism: An object oriented construct witch allows a method (sub-program) to be called based on the run-time object type rather than by the compile time class type.
Repetition: Executes a block of code in a loop over and over, until a given Boolean expression evaluates to false.
Assignment: Used to set a variable to a given value.
Declaration: Used to name and reserve memory space for a new variable.
Inheritance: An object oriented construct which provides the ability to define anew class based on an existing class, "Dog extends Animal".
Encapsulation: An OO construct which associates sub-programs & data together into an entity called a "class", preventing direct access to the class's private data from outside that class.

High Level Language Data Types

Real: A data type that can represent floating point numeric values.
Character: A data type that can represent one ASCII or UNICODE encoded value.
Integer: A data type that can represent whole numbers.
String: A data type that can represent a sequence of ASCII or UNICODE encoded values.
Boolean: A data type that can represent the value true or false.
Boolean expression: A sequence of identifiers, separated by compatible operators, that evaluates to true of false.
Strong type: Each variable is assigned a type, and only values of that type can be stored in the variable.
Date Type: A description of the set of values and the basic set of operations that ban be applied to values of the type.
Reserved word: A word in a language that has special meaning; it cannot be used as an identifier.
Case sensitive: Uppercase and lowercase letters are not considered the same; two identifiers with the same spelling but different capitalization are considered to be two distinct identifiers.
Control structure: An instruction that determines the order in which other instructions in a program are executed.
Parameter list: A mechanism for communication between two parts of a program.
Parameters: The identifiers listed in parentheses beside the subprogram name; sometimes called formal parameters.
Arguments: The identifiers listed in parentheses on the subprogram call; sometimes called actual parameters.
Value parameter: A parameter that expects a copy of its argument to be passed by the calling unit (put on the message board).
Reference parameter: A parameter that expects the address of its argument to be passed by the calling unit (put on the message board.
Recursion: The ability of a subproblem to call itself.
Asynchronous: Not occurring at the same moment in time as some specific operation of the computer; in other words, not synchronized with the program's actions.
Object class (class): A description of a group of objects with similar properties and behaviors.
Object (problem solving phrase): An entity or thing that is relevant in the context of a problem.
Object (implementation phase): An instance of a class.
Class (implementation phase): A pattern for an object.
Instantiate: To create an object from a class.

Programming Language Attributes

Name	Level	Paradigm	Data Type	Translate to machine
Machine Lang.	Low	Procedural / Imperative	N/A	Not needed
Assemble Lang.	Low	Procedural / Imperative	N/A	Assembled
C	High	Procedural / Imperative	Strong	Compiled
C++	High	Procedural / Imperative & Object Oriented	Strong	Compiled
Java	High	Object Oriented & Procedural / Imperative	Strong	Complied to byte code then Interpreted
Java Script	High	PI	weak	Translated @ runtime Interpreted

C++: A high level, procedural & object oriented programming language that is compiled into machine language.
Java Script: A high level procedural programming language that is interpreted at execution time, normally with in a web browser.
Java: A high level, object oriented & procedural programming language that is compiled into byte code and executed via a virtual machine.
C: A high level, procedural programming language that is compiled into machine language.
Machine Language: A low level programming language that is directly executed by the CPU.
Assembly Language: A low level programming language that uses human readable mnemonics to specify the opcode, operand, and addressing mode for each instruction.

Chapter Fifteen Networks

Ethernet: The OSI layer 2 networking protocol used to transport network traffic over a LAN.
Node / Host: Any addressable device attached to a computer network.
Switch / HUB: The device that directs network traffic within a star topology LAN.
Internet Protocol (IP): The OSI layer 3 networking protocol used to transport network traffic over a WAN.
IP Address: The 4 byte identifier used to identify devices on a WAN.
Packet: The name for the individual units of data sent over a network.
Router: The device that directs network traffic over a WAN.
User Datagram Protocol (UDP): The OSI ayer 4, non reliable, connectionless networking protocol used to send streaming media over a network as fast as possible.
Transmission Control Protocol (TCP): The OSI layer 4, reliable, connection oriented protocol which uses DAT, ACK, NAK packets to transfer data over a network.
Domain Name System (DNS): The service used by web browsers to look up the IP address from a given domain name.
MAC Address: The 6 byte identifier used to identify devices on a LAN.
Computer network: A collection of computing devices connected so that they can communicate and share resources.
Wireless: A network connection make with out physical wires.
Data transfer rate(Bandwidth): The speed with which data is moved from one place to another on a net work.
Protocol: A set of rules that defines how data is moved from one place to another on a network.
Client/Server model: A distributed approach in witch a client makes requests of a server and the server responds.
File server: A computer dedicated to string and managing files for network users.

The Layers of OSI Reference Model ====>

Number	Layer
7	Application layer
6	Presentation layer
5	Session layer
4	Transport layer
3	Network layer
2	Data Link layer
1	Physical layer

Web server: A computer dedicated to responding to request for Web pages.
Local area network(LAN): A network connecting a small number of nodes in a close geographical area.
Ring topology: A LAN configuration in which all nodes are connected in a closed loop.
Star topology: A LAN configuration in which a central node controls all message traffic.
Bus topology: A LAN configuration in which all nodes share a common line.
Wide area network(WAN): A network connection two or more local area networks.
Gateway: A node that handles communication between its LAN and other networks
Internet: A wide area network that spans the planet.
Metropolitan area network(MAN): A network infrastructure developed for a large city.
Internet backbone: A set of high speed networks carrying Internet traffic.
Internet service provider(ISP): A company providing access to the Internet.
Phone modem: A device that converts computer data into an analog audio signal and back again.
Digital subscriber line(DSL): An Internet connection made using a digital signal on regular phone lines.
Cable modem: A device that allows computer network communication using the cable TV hookup in a home.
Broadband: Network technologies that generally provide data transfer speeds great than 128k bps.
Download: Receiving data on you home computer from the Internet.
Upload: Sending data from your home computer to a destination on the Internet.
Packet switching: The approach to network communication in which packets are individually routed to their destination, then reassembled.
Repeater: A network device that strengthens and propagates a signal along a long communication line.
Proprietary system: A system that uses technologies kept private by a particular commercial vendor.

Interoperability: The ability of software and hardware on multiple machines and from multiple commercial vendors to communicate.
Open system: A system that is based on a common model of network architecture and an accompanying suite of protocols.
Open system interconnection reference model(OSI): A seven layer logical breakdown of network interaction to facilitate communication standards.
Protocol stack: Layers of protocols that build and rely on each other.
Ping: A program used to test whether a particular network computer is active and reachable.
Trace route: A program that shows the route a packet takes across the Internet.
Port: A numerical designation corresponding to a particular high level protocol.
MIME type: A standard for defining the format of files that are included as email attachments or on websites.
Firewall: A gateway machine and its software that protects a network by filtering the traffic it allows.
Access control policy: A set of rules established by an organization that specify what types of network communication are permitted and denied.
Host name: A name made up of words separate by dots that uniquely identifies a computer on the Internet; each host name corresponds to a particular IP address.
Network address: The part of an IP address that specifies a specific network.
Host number: The part of an IP address that specifies a particular host on the network.
Domain name: The part of a host name that specifies a specific organization or group.
Top level domain(TLD): The last section of a domain name, specifyi8ng the type of organization or its country of origin.
Domain name server: A computer that attempts to translate a host name into an IP address.

Chapter Sixteen:
World Wide Web (Web): An infrastructure of information and the network software used to access it.
Internet:
Hypertext Markup Language (HTML): The language used to create or build a Web page.
HTML Tag:The syntactic element in a markup language that indicates how information should be displayed.
HTML Attribute: Part of a tag that provides additional information about the element.
Extensible Markup Language (XML): A language that allows the user to describe the content of a document.
Web Page: A document that contains or references various kinds of data.
Web Site: A collection of related Web pages, usually designed and controlled by the same personal or company.
Web Browser: A software tool that retrieves and displays Web pages.
Uniform Resource Locater (URL): A standard way of specifying the location of a Web page.
Cookie: are another Web based technology that has advanced the abilities and usefulness of Web to its users.

Unix / Java
Unix is a Operating System that is Multi-tasking and Multi-user which has a built in Hierarchical File System and was designed to be a OS that has Portability.
Portable Operating Systems Interface (POSIX):
UNIX Commands:
ls - Short for list : Lists the contents of the current directory.
pwd - Print working directory : Outputs the current working directory, in other words, shows you where you are in the file hierarchy).
cd - Change directory
mkdir - make directory
man - Short for manual : outputs information about any available UNIX command by displaying its man page).
apropos - Outputs a list man pages related to a given topic.