Chapter 1

- Computers are data processing devices which perform four major functions
  1) Gathers data
  2) Processes data into information
  3) Outputs the data/information
  4) Stores data/ information

Data versus information

- Data: is a representation of a fact, figure or an idea. It can be a number/picture/word/recording of a sound. Ex: 121212 – data Derek – data
- Information: data that has been organized or presented in a meaningful fashion. Ex: name of a person: Derek associated with their phone number: 121212
- We input data into our computers → the computer processes the datda → which outputs information

Bits versus bytes

- Bit: computers were in a language that they understand to process data or information
- Their language is binary language which is broken down into two digits: 0 & 1
- Everything a computer does is processed into 0 & 1
- Byte: 8 bites create one byte. Each letter/character has their unique combination of 0 & 1's.
- There are other types of bytes (kilobytes, megabytes, gigabytes)

Hardware

- Hardware is explained as any part of a computer that can be touched
- They can also be connected to the computer. Ex: a printer
- Devices that can be connected to the computer can also facilitate the connection between two computers (routers).
- The system's unit creates the four main functions of the computer

Software

- A set of computer programs that enable the hardware to perform difficult tasks
- Application software: is a set of programs a computer uses to help carry out tasks (typing a document/ creating spreadsheets in excel)
- System software: is a set of programs that enable your computer's hardware device and application software to work together.
- The operating system is a system that manages the computers hardware.

Types of computers

- Portable

- Netbook
- Notebook
- Tablet
- Desktop
- Main frame: supports hundreds of users simultaneously
- Super computer: a computer that performs complex calculations rapidly. (used by engineers)
- Embedded computer: self-contained computer that performs dedicated functions.

Input Devices

- Input devices enable us to enter data and instructions onto the computer
- Key boards and mouse are types of input devices.
- Input devices are things that can be plugged into the computer (scanner, digital camera, microphone, game controller)

Keyboards

- Most of the key boards have a standard QWERTY layout (first six letters)
- Key boards include numbers, function/navigation keys
- Notebook computers are smaller there for their key boards are more compact
- There are virtual laser key boards which laser a key board on a surface that allows you to type
- There are keyboards you can configure to set keys to programs/functions you use most.

Mice

- Optical: no mouse pad needed, they work with a laser
- Track ball: this mouse stays stationary on the desk and is controlled from the side
- Wireless: sends data to the computer through radio or light waves
- Touch pads: offered on most laptops which replace the need for a input device mouse
  Mouse Features
- Magnifier: enhance the viewing on hard to read images
- Customize buttons: extra buttons on the mouse that can be programmed to perform tasks that you use most often.
- Web search: your mouse allows you to high light a word and search is quickly

- USB is used for file storage

Input devices

- Image input devices: digital cameras/ camcorders and cellphones
- Sound input: microphones which allow for podcasts, video conferences, internet phone calls
- People who are physically challenged can still input data using voice recognition
- Input devices can be controlled in a certain way

Output Devices

- Enables you to send processed data out of your computer in the form of text/pictures/sounds and video
- Two types of output devices are a monitor (displays texts and graphics) and printer (creates hard copies of text)
- Output devices make both hard copies (prints) and soft copies (videos and sounds)

Monitor

- LCD: liquid crystal display is a flat, light and energy efficient monitor
- LED: light emitting diode is more energy efficient than LCD monitors, which has better color accuracy and thinner panels
- CRT: legacy technology
- LCD: monitors are the most popular. They are made up of millions of dots called pixels. Each pixel is composed of red blue and green and sometimes yellow. Liquid crystal is sandwiched between two transparent layers of the screen to form images.
- Quality factors: width to height, resolution, the light intensity (brightest white to darkest black), how far you can tilt your monitor before the image quality degrades, brightness, response time: how long it takes for a pixel to change colours.
- 21 inch monitor: 1680x1050 pixels
- 19 inch monitor: 1440x900 pixels

Printer

- Inkjet printer: sprays tiny drops of ink on the page
- Inkjet printers are less expensive and print high quality color image cost effectively
- Laser: uses laser beams and static electricity to deliver toner on the page
- Laser printers are more expensive and quick/quiet production. They are more economical because they print per page cheaper than inkjet printers (competitor)
- Qualities to look for: speed, resolution (quality), color output (how many pages can be printed per cartridge)

The mother board

- This is the key essential to holding all the processing parts together
- Attached directly to the mother board is the CPU, memory modules, expansion card and slots

RAM versus ROM

- Random access memory (ram)
- Stores instructions and data
- It is temporary storage
- Consists of several memory cards

- Read only (rom)
- Stores start up instructions
- Permanent storage

CPU

- Central processing unit
- Brains of the computer: controls all functions performed
- Processes commands and instructions
- Can perform billion tasks an hour without error
- The speed of the cpu is measured in megahertz or gigahertz

Drive bays (monitor)

- Internal drive bays cannot be seen or accessed outside of the systems unit. They are reserved for internal hard drives
- External drive bays can be accessed from outside the systems unit. House of CD's or DVD's that are covered by a face plate.

Hard Drives

- Computers primary device for permanent storage of software and documents
- It is non-volatile storage: holds the data and instructions your computer needs permanently
- Inside or outside the unit

Extra storage can be found in: DVD's, Blue ray's , flash drives (usb) and memory cards

Power controls

- Power on: you use it to turn on your computer but not to turn it off
- Cool boot: powering your computer from a fully turned off state.
- Sleep mode/ hibernation

Setting your computer up

- Ergonomics: how you set up your computer and other equipment to minimize your risk of injury or discomfort
- Taking breaks from using the computer

Chapter 2

- The internet was originally designed to facilitate communication between the US government in the 1960's.
- Evolved from ARPANET
- The web is a part of the internet that was invented in 1989 by Tim Berners

- The internet was only made global in 1997
- There are different ways you can communicate using the internet (email, IM, chats, blogs, webcasts, wiki, social networking)

Email

- Email is electronic mail
- There are client/business based email accounts
- It can be run through the internet (Hotmail/web) or in outlook programs
- Email can be interpreted in the wrong way because the communication is not face to face
- Using spell checks and smiles always reinforces happiness and politeness

Instant messaging

- Instant messaging is a real conversation that take place in chat rooms
- Users set up contact lists
- Instant messaging allows you to appear online and offline
- Types of instant messengers include MSN/AOL
- Group communications can be done through IM

Chat Rooms

- Chat rooms are created to talk to more than one person at a time
- Chat rooms are like instant messaging
- Chat rooms can allow for anonymous interactions (you will not always know the people you are talking to)

Newsgroups

- News groups are online discussions
- Members post and reply to messages in forms of threads

Netiquette

- Behavior that is used in a chat room
- Introducing yourself
- In chat rooms it is important not to spam the chat

Web 2.0

- The newest version of the web
- Users are participants
- Interaction between people/software/data

Social network

- Connecting with people around the world to meet and connect with others
- Members can connect with people world wide
- Examples of social net works: facebok, twitter, myspace, instagram

Blogs

- Personal journals that are posted on the web
- Personal messages about different things that interest the writer
- Video blogs: digital video blog that play on media software
- Blogs→written video blogs→clips

Wiki

- Websites that allows anyone to edit/change their content
- Collaborative writings
- Not credible sources for academic use

Podcasts

- Podcasts are audio and video clips that are compressed for they can be distributed on the internet
- Podcasts can be viewed all over the web
- Proper software is needed when you want to play videos and files

Webcasts

- Audio/video broadcasts that are distributed on the internet
- They difference between podcasts and webcasts is that a webcast is live

Twitter

- Social network allows you to share your status with friends
- Messages that are posted on twitter are called tweets
- Twitter is used for the marketing of companies-it is a good marketing strategy because many people use twitter

Web entertainment

- Web entertainment is multimedia
- Involves anything in the form of media
- Graphics, audio, video, games

E-Commerce

- B2C: business to consumers (amazon) and internet based company that provides products to consumers
- B2B: business to business and internet based company that provides products for other companies to buy
- C2C: consumer to consumer (Ebay) is an internet based company that is run by consumers adding their personal products for other consumers to buy

Online shopping

- It is important to shop on secure websites
- Secure websites can sometimes be safer than retail shopping
- http:// ← normal websites https:// ← secure
- VeriSign: company that verifies online transactions security
- When purchasing online you must make sure that the store actually has a website
- You need to make sure that you make transactions online on personal computers and not public computers
- Paying with credit cards are always more secure because debit cards do not have the same amount of protection
- Always keep records of transactions and return policies

Web browsers

- Pre downloaded software that allows you to locate/view/ navigate the web
- Internet explorer
- Safari
- Chrome

Browser Features

- Quick tabs: images of all open web pages
- Tabbing: opening many tabs within one browser to access many different sites
- Built in search engine (google)

URL'S: a websites address (unique web address)

FTP/HTTP: set of rules to retrieve specific documents

www (world wide web) is part of the domain name up until .com

.com is referred to as top level domain

Path or subdirectory

Hyperlinks

- Jumping from one web page to the next within a website by clicking coded text
- Appears in a different color
- Breadcrumb list: list of pages within a website that you visited (top of page)

Favorites: allows you to return to web pages

In safari or internet explorer they are called favorites

In Firefox and chrome they are called bookmarks

Search engines

- Typing words or phrases into search box
- The search engine scans other web pages
- Results are sent to the client
- Different search engines produce different produce different websites
- To improve searches use quotations use limited words

What can you borrow from the web?

- Avoid plagiarism: representation someone else's ideas or words as your own
- Copy right violations: using another person's material for your own gain
- Information must always be properly credited and quoted

Evaluating websites

- Identifying the author of the website
- Looking if the site is biased
- Looking if the information is current
- Looking if there is links available on the website
- Making sure the information should exist on at least three different websites

Internet clients and servers

- The internet is a client /server network
- Client computer: users connected through internet, used for data and web pages
- Server computer: stores webpages and data, returns requested data to client
- Internet backbone
- IP addresses are the means by which all computers connected to the internet identify each other

Connecting to the internet

- To take advantages of the internet you need to connect your computer to the internet

- Originally people used dial up connection which provided internet while using your phone line
- Broad band connection offers a faster way to connect to the internet
- Other broadband ways: DSL, cable, fiber-optic service, Satellite

Broadband Connections

- Cable: uses cables to connect to a modem, provides fast connection speed, speed depends on a number of users (fastest internet)
- DSL: uses the telephone line, it is faster than dial up, it does not take up the phone line, it is not available in all areas
- Satellite: uses dish and cables, slower than cable and DSL, it is expensive

Wireless

- Increases the mobility and productivity
- Requires the wi-fi
- Devices can have wireless adapters if they are not already wireless

Dial up connections

- Dial up connections use the telephone line
- You need to tie up your phone line
- It requires a modem that converts signals
- It is the lowest cost but slowest connections

Comparing internet connections

- DSL's average download speed is 1.5 mbps, max download speed is 7 Mbps
- DSL allows you to access the internet and talk on the phone at the same time
- DSL's The speed of the internet slows down depending how close you are to the company
- Cable average download speed is 5 mbps and has a max download speed of 30 mbps
- Cable isn't dependent on cable location of the central office
- Fibre optic download speed is 20 mbps
- Fibre optic maximum download speed is 50 mbps
- It is high cost but it is not available in all areas

Future of the internet

- Internet is entrenched in daily life
- Web services are used for personal and professional interaction

Chapter 3

Software

- set of instructions that tells a computer what to do
- the set of instructions also called programs
- there are two types of software (system software/application software)

System software

- coordinates instructions between software and hardware
- coordinates how the computer works
- including the operating system and utility programs

Application software

- programs used to complete tasks
- productivity software, specialty software, entertainment software, educational software and personal software
- word, image editing, drawing, home business

Productivity software

- programs that allow you to perform tasks needed in work/ school ad business life
- example: Microsoft word/ excel

Word Processing Software

- used to create and edit documents
- includes features like easy editing/formatting/ graphics and templates

Spreadsheet software

- used to perform calculations and numerical analysis
- spreadsheet software has values and formulas, functions, and provides automatic recalculation
- the basic “blank page” of an excel document is referred to as a work sheet which is made up of rows and columns called cells
- labels – text that describes a certain component of a worksheet
- values – data that is entered in the form of numbers (entered manually or as a result of a calculation)
- formulas- equations that you build yourself
- functions- formulas that are preprogramed into spreadsheet software that allow for calculations
- the primary benefit of a spreadsheet software is the ability to recalculate all functions and formulas al automatically
- examples are excel and open office

Presentation software

- it is used to create slide shows
- presentation software offers templates/animations and layouts
- animation effects allow a presentation to move automatically
- types of presentation software: Microsoft powerpoint

Data base software

- it is used as an electronic filing system
- it sorts and groups data to generate reports
- it is a way of organizing data
- examples: Microsoft access and oracle

Note taking software

- used to organize the way in which someone takes notes
- can be used on any type of computer
- example: Microsoft one note

Personal information manager (PIM) software

- used to replace traditional management tools that are found on a desk (calendar, contact book)
- PIM software provides all these services in one software
- Example: Microsoft outlook

Productivity software tools

- Productivity software tools are described as the tools that help you complete your task on a given software
- Wizards: step by step guide to walk you through steps to complete the tasks
- Templates: pre designed forms included in the software
- Macros: small programs that group a series of commands to perform a single command.

Integrated software applications versus software suites

Integrated software

- Single program that incorporates many software programs
- It is less expensive
- Example: Microsoft works which includes word, excel, PowerPoint

Software Suite

- Collection of stand-alone programs
- Integrate well with each other

- Example: Microsoft, corel, lotus

Personal Finance Software

- Used for tax preparation and financial planning
- Tax preparation software: enables you to prepare your own taxes instead of hiring a professional. ex (turbo tax)
- Financial planning software: software that helps you plan your daily finances, they allow for automatic bill payment and electronic check book (Microsoft money, mint.com)

Graphics and Multimedia Software

Digital audio software

- Used to edit files in formats of mp3, WAV, WMA,AIFF
- Mp3 compresses audio files
- Allows you to record, edit, add special features and convert your file
- Allows you to rip, organize and play mp3 files

Digital image editing software

- Edits digital images to remove red eye, modify contrasts and fix photos
- Examples: picasa, photoshop

Digital video editing software

- Used to create and edit videos
- Adobe premiere pro and windows movie maker
- You need to buy a program that is appropriate for your file

Multi media management software

- Used to organize your multi media files
- Used to organize songs by artists, name, album
- Itunes
- Manages play lists and allows to burn cds

Online photo management software

- Web based sites that allow you to share and organize your photos
- You can create photo albums online
- Examples: Kodak and flickr

Home Software

- Computer games require certain functions and types of applications to run properly

- Processing power
- RAM
- Hard disk capacity
- Sound and video cards
- Speakers
- Dvd and cd drive
- Monitor

Game software

- Games are rated by the entertainment software rating board (esrb)
- They rate games according to their content M,A,T,E

Educational software

- Provides software to train and teach young brains from pre k until grade 12
- They are purchased at discount because schools purchase in bulk

Drawing software

- Drawing software is used to create dimensional figures
- It also creates animations
- Can be used on adobe illustrator or Microsoft visio

Business software for home and office

Accounting software

- Helps small businesses manage their finance
- Tracks the accounts receivable and payable
- Includes statements and financial reports
- Example: Peachtree

Desktop publishing software

- It is used to arrange texts and graphics for publications
- Brochure
- Microsoft publisher

Web page authoring software

- Used to create a web page
- It offers different templates and wizards on how to perform tasks
- You can also save your webpage as a document
- Microsoft web expansion

Large business software

- This software is used across different industries
- Helps in the business/management and marking plans of a business

Mapping software

- Provides directions to a certain place
- Used on the internet or as an application such as google maps
- Allows you to better plan your travel

Specialized business software

- Business software that is specifically created for the use of a certain business
- It is custom developed for a company

Computer aid design software (CAD)

- Used to create 3-d designs
- Used in architecture and engineering

Getting help with softwares

- Usually software comes with a FAQ section that will probably have the answer to your question
- You can get help from an online website
- Some software comes with on screen help which provides tips as you go
- Some software comes with integrated help

Software licenses

- You buy the license for the software not the actual software
- Licenses come with a number of downloads per license

Where to buy software

- Software can be purchased almost anywhere. Through online websites, stores
- Productivity may already come pre-installed on your computer
- Some software is web based which means that you do not even need to download it you can just use it off the internet

Shareware and Freeware

- Freeware is any software you can use for free
- Sometimes before the launch of software beta versions are available that offer the software for free so they are tested out by people who offer comments and suggestions about which bugs to fix

- Shareware is software that is free for a limited amount of time, after that period ends you have broken the licensing agreement and will have to pay
- Open source software is a software that can be worked on by anyone for free

Software upgrades

- Numbers are used to indicate minor and major upgrades of software
- 1.0 →2.0 is a big software change
- 2.0→ 2.1 is a small software change

System requirements

- Minimum standards for the operating system, processor, ram and hard drive capacity
- Computers need sufficient amount of storage and processing capabilities

Uninstalling software

- Use the uninstall option of the software because deleting the software will not fully get rid of the software it will just get rid of some of the parts while other parts of the pre downloaded software continue to take up space on your computer

Chapter 4

- The operating system is the main program that controls how your computer functions and manages the hardware(things that are outside of the computer), memory, processor and peripheral devices
- The operating system allows for the software and the CPU to work together
- The operating system manages the interaction of tasks
- The operating system provides the desktop, icons

Utilities

- Utility programs serve as the “back up” programs on a computer
- They provide “housekeeping” which means they provide backup, security and recovery

There are four categories of operating systems

1) Real time operating systems
    - Machines that perform repetitive tasks in the exact amount of time that task requires
    - This type of operating system is programed with a specific purpose
    - Cars, printers
2) Multi user operating system
    - Multi user operating systems can allow for many people to work all at the same time
    - It efficiently juggles multiple requests

- The networks operating system is installed to manage all the requests and make sure they do not interfere with each other
- Linux, Unix, windows 2008

3) Single user – multi task (apple)
4) Single user- single task

Unix

- Unix is a multi-user operating system
- It is used with main frame computers as a network operating system
- It is also found on computers

Main frames and Super computers

- These types of computers use the multi user operating system
- Main frames: are computers that can handle millions of requests simultaneously
- Super computers: computers that are used to make specific calculations. They are used by scientists and engineers

Smart Phone

- Smart phones allow the user to do more than just call and answer calls
- Smart phones give access to the internet and allow for multi-tasking
- Smart phones are equipped with cameras, microphones etc.
- IPhone, android, blackberry

Desk top and Net books

- Together the processor and operating system is referred to as the plat form
- Windows and Intel processor
- An application software is platform specific

Microsoft windows

- Microsoft windows is an operating system
- Windows 8 is the newest version
- Windows is a multi-user operating system
- Window is a user friendly operating system

Mac Operating system

- It was the first technology with point and touch
- Macs operating systems are very advanced in graphics, processing, reliability and file backup
- The applications that mac has is less than windows
- Macs are more expensive than windows

Linux

- Open source multi user operating system
- It is based on UNIX
- It can be downloaded from the internet
- It runs on most all electronics

The operating system

- It provides a user desktop
- It manages the CPU
- Manages the memory and storage
- Manages the hardware and peripheral devices
- It coordinates the application software with the CPU

The user interface

- Allows you to interact with your computer
- Command driven interface: the user must give very specific tasks for the computer to load the program
- Menu driven: allows you to select which command you would like on the screen. You were not forced to know every command
- Graphical interface: icons that appear on the desktop that allow you to click on the application needed

Processor Management

- Controls the timing of events that the processor works on
- It controls multi-tasking and interruptions

Operating System Architecture

- OS systems all require memory to run
- Systems with more than 4GB of RAM use a 64 bit version of windows
- Previous systems used at 32 bit system

RAM

- Ram capability is limited
- To run more than one program at time requires ram
- For the operating system, most of them like windows require more than 1 GB

Virtual Memory

- Instructions and data are stored on the hard drive when the RAM is full

- The instructions go through the hard drive swap file

Hardware and peripheral device management

- Device drivers: each program that we plug into our computer comes with a device driver which facilitates the communication between our device and our operating system
- The device driver translates special commands from the device to the operating system
- The device will not function properly without the device driver because the operating system would not understand the comman

Plug and play

- Devices who's device drivers are included in windows are called plug and play
- They are not drivers but software and hardware designed to facilitate the installation of new hardware in computers
- Plug and play allows for immediate use of the device that was plugged in
- The OS automatically recognizes the device

Software application coordination

- Software will only work with the CPU when they have a code that the CPU recognizes
- Application programming interfaces: is a block of codes that the software applications need to run
- The operating system uses the code blocks to run the application software

Starting the computer

- The boot process is referred to as starting up the computer from a dead stop
- The boot process : the basic input and output system is activated by powering on the CPU, the basic input and output system checks that devices are in place, the operating system is loaded into RAM and customization is checked
- The computer is only ready to take commands and data once the boot process is complete

Errors in the Boot process

- If the computer enters safe mode it means that it did not boot properly
- Safe mode only allows the main devices to work (keyboard, mouse)
- You will have to close your computer and re open it or uninstall a newly installed program

The desktop

- The first look at the operating system you have is with your desktop
- The desktop provides you with icons of all the applications that can be run
- The recycle bin can only delete files from the C drive

Mac and windows essentially have the same functionality, they look alike and have their work areas available on the desktop

Windows

- Almost all windows that appear in windows have the same functions
- Any based windows software has the same window
- Tool bar, menu bar etc.
- Windows can be views side by side, stacked

File Management

- The operating system provides organizational structure
- The operating system allows you to organize your computer in folders, drives, files
- Libraries: the concept of having all relevant files in one single folder
- Icons of folders can be displayed in small to extra lard icons

File name Extensions

- After the dot of a file comes with a file type
- The file type identifies where the file is coming from
- Word 2003 documents are saved as .doc where as word 2007 and 2010 are saved as .docx
- All word, excel and PowerPoint files created in word from 2007 to 2010 have and x at the end
- Texts from pdf, rtf, and txt can be read on any computer

Naming files

- File name: is the name you assigned to your document plus the extension name
- Files can be named up to 255 characters
- Mac file names are very sensitive and do not need file extensions

File path

- You can tell the location of the file from its file path
- Subfolders will be the places where the file is saved
- Drive→primary folder→subfolder→ file name →extension

Utility Programs

- Small programs that perform special functions
- Some manage system resources
- Some improve efficiency

Display Utilities

- Through the display properties you can change your background, screen savers, and colours

Add and Remove programs

- To add programs you should always consult the wizard with the step by step process of how it works
- Programs should not simply be deleted they must be uninstalled or else they will delete specific parts on your computer

File Compression

- File compression compresses the file to reduce the size
- It compacts long names
- Compression programs look for repeated patters and letters and replace it with shorter titles
- Windows has this built in

Maintenance

- Windows has a built in system to perform maintenance
- Disk cleanup to remove unnecessary files from the hard drive
- Disk defragmenter allows for related files to be grouped together to more efficiently utilize the operating system
- Should be done several times a year
- Error checking: rediscover lost files and delete unnecessary ones
- When a program stops working you can use task manager to exit the program

Systems restore

- Allows you to reset your system to a date that everything was running smoothly

Back up

- Creates a copy of a hard drive to another storage device (external hard drive)
- Task scheduler: schedules tasks to perform at certain times

Ease of access center: a specific location to have tools and settings in one place

Chapter 5

Buying or upgrading your computer

- When considering change in your system you must consider moore's law
- Moore's law: describes the pace that the CPU (small chips) improve
- Before upgrading or buying you must consider moores law, the cost, time and wants vs needs
- You must assess your computers subsystems
- CPU, RAM, Storage device, audio, video
- Consider the raining you will need when you have a new hardware

Desktop

- It is a stationary computer that is less expensive
- Easier to upgrade
- Hard to transport and move around
- Large monitors

Notebook

- Portable computers that are more expensive
- Easily stolen
- Difficult to upgrade
- Easy external expansion
- Smaller displays

How the CPU works

- The CPU is the brains of the computer
- It processes information, instructions, performs tasks, manages the flow of information and is responsible for processing data into information
- The CPU is located on the mother board
- The CPU is made up of two parts
- Control unit: coordinates activities of all other computer components
- Arithmetic logic unit: responsible for calculation and math related decisions

Machine cycle

- Every time the CPU performs a program instruction it goes through the machine cycle
- 1) fetches required data or instruction from RAM
- 2) decodes the instruction into computer language
- 3)executes instruction
- 4)stores result to RAM

Different CPU's

Processing power

- Core: a complete processing section from the CPU embedded in a physical chip
- Clock speed: how quickly the processor works
- Cache: the amount of immediate access to the memory the CPU has
- Front side bus: connects the processor to the systems memory

Evaluating CPU

- Identify your current one

- Consider how quickly the data moves to or from CPU
- CPU usage can be found in task manager

RAM

Evaluating RAM

- Ram: random access memory is your computers temporary storage space
- Memory cards: the small circuit board that holds the ram chips in slots on the mother board
- Dual inline memory modules: memory modules
- DDR2,DDR3,SRAM,DRAM,SDRAM

How much Ram do you need?

- Physical memory: the amount of temporary memory (RAM) actually sitting on your computer
- Kernel memory: the memory your operating system uses
- Every program requires RAM
- RAM is needed for system, productivity and entertainment software
- 1000MB→1GB

Adding RAM

- Adding ram on a computer can have a positive effect on performance
- Amount of ram, and number of slots

Storage

- RAM is temporary storage nothing is permanently saved
- It is important to have devices that allow you to permanently save data
- Hard drive, flash drive, optical drive, external hard drive
- The devices that store your items permanently are nonvolatile

Hard drive

- The capacity is up to 2 terabytes
- Time is measured in milliseconds
- Data transfer is measured in megabytes per second

How the hard disk works

- It is composed of coated platters stacked on a spindle
- Data is saved on the hard disk through a pattern of spots
- Each spot represents a 1 and each space a 0 (binary language)
- Read and write heads: move from the outer edge to the center to read and write data from the hard disk

Evaluating storage

- You need to identify your total storage on your hard drive
- Determine the capacity needs

Optical storage: stores data s tiny pits burned onto a disk by a laser

Video

- The display of video depends on the video card and the monitor
- You may need to upgrade your video subsystem if you display complex and enriched graphics on your system

Video card

- Expansion card that is installed in your system, to translate binary data to be viewed on your monitor
- Video cards include ports that allow you to connect different video equipment (video memory)
- Video cards come with processors
- Video card controls the number of colors your monitor can display
- Bits = pixels
- 4 bit video card displays 16 colors →standard
- 24 bit video card displays 16 million colors → true color mode

Graphics processing unit

- Performs the same work as the cpu
- Specializes in video images and graphics
- CPU works better when its with the GPU

Evaluating video card

- Identify the amount of video memory on your card

Audio

- Sound cards: attached to the mother board enables you to produce sounds
- Processes digital data into sounds

Evaluating system reliability

- Make sure before buying new system that the problem you are dealing with is not able to be fixed
- Upkeep and maintence are key to a system
- Clean up your start up folders: some programs automatically install on your computer and run each time you boot your computer

- Clear out unnecessary files: temporary internet files accumulate quickly, running the disk clean up helps take away the unnecessary space these files take up
- Run spy ware: detect virus
- Use the disk defragmenter

Systems should always be updated when there is an available update because they allow your system to work more reliably.

Sometimes the updates create fixes to the problems you are experiencing

If your latest upgrade of your operating system does not increase reliability then you may need to buy a new device or reinstall your operating system