INTRODUCTION TO INFORMATION AND COMMUNICATION TECHNOLOGY

LESSON 1
INTRODUCTION TO INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

EVOLUTION OF COMMUNICATION

Communication has improved and evolved to facilitate our daily activities. In the 21st century, everything related to communication utilizes technology to 'send out' or disseminate information to a wider audience. Information can be 'sent out' in many ways. The inventions of cellular phones, television and other electronic devices are important in enhancing communication.

WHAT IS ICT?

ICT is the technology required for information processing, in particular, the use of electronic computers, communication devices and software applications to convert, store, protect, process, transmit and retrieve information from anywhere, anytime.

INFORMATION

Information refers to the knowledge obtained from reading, investigation, study or research.

The tools to transmit information are the telephone, television and radio.



We need information to make decisions and to predict the future. For example, scientists can detect the formation of a tsunami using the latest technology and warn the public to avoid disasters in the affected areas.

Information is knowledge and helps us to fulfill our daily tasks. For example, forecasting the stock exchange market.


COMMUNICATION



Communication is an act of transmitting messages. It is a process whereby information is exchanged between individuals using symbols, signs or verbal interactions. Previously, people communicated through sign or symbols, performing drama and poetry. With the advent of technology, these 'older' forms of communication are less utilised as compared to the use of the Internet, e-mail or video conferencing.


Communication is important in order to gain knowledge. With knowledge, we are more confident in expressing our thoughts and ideas.

TECHNOLOGY

Technology is the use of scientific knowledge, experience and resources to create processes and products that fulfill human needs. Technology is vital in communication.

Aiding Communication

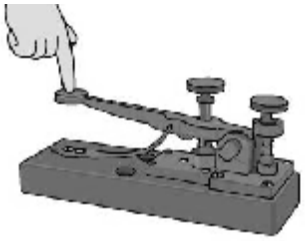
Telephone and fax machines are the devices used in extending communication.

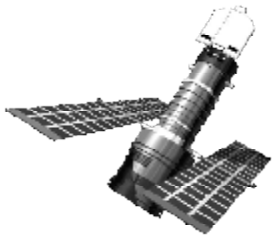
Spreading Information

To broadcast information such as news or weather reports effectively. Radio, television, satellites and the World Wide Web (www) are powerful tools that can be used.

TECHNOLOGY TIMELINE

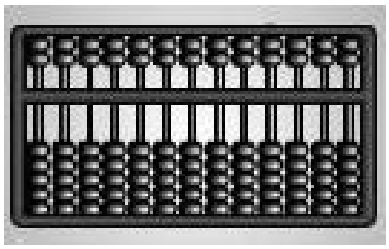
Technology	Year
	**In 3500 BC, the Sumerians developed cuneiform writing.**
	**In 1500 BC, the Phoenicians developed the alphabet**
	**In 105 BC, Tsai Lun of China invented paper.**
	**In 1454, the first printing began with the creation of a printing machine.**

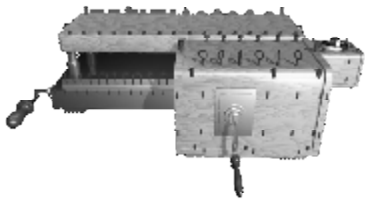
	**In 1793, the telegraph line was invented.**
	**In 1876, the first telephone was introduced.**
	**In 1925, television was made known to public.**
	**In 1941, the computer was created.**
	**In 1958, the photocopier machine was introduced.**

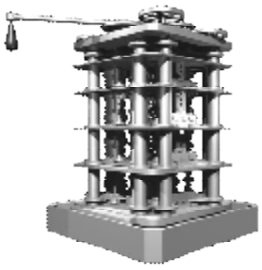
	**In 1963, the communication satellite was introduced.**
 	**In 1969, the first Internet known as ARPANET was introduced.**

LESSON 2
EVOLUTION OF COMPUTERS

In the early years, before the computer was invented, there are several inventions of counting machines.

Year		
200 BC	 **CHINESE ABACUS**	
500 BC	 **EGYPTIAN ABACUS**	

1620	 **JOHN NAPIER**	 **NAPIER'S BONES**
1653	 **BLAISE PASCAL**	 **PASCALINE**
1673	 **GOTTFRIED WILHELM VON LEIBNIZ**	 **LEIBNIZ'S RECHNER**
1801	 **JOSEPH MARIE JACQUARD**	 **WEAVING LOOM**

1823	 **CHARLES BABBAGE**	 **MECHANICAL CALCULATOR MACHINE**
1941	**HARVARD UNIVERSITY**	 **MARK 1**

COMPUTER GENERATIONS

FIRST GENERATION (1940-1956)

The first generation of computer were huge, slow, expensive and often unreliable. In 1946, two Americans, Presper Eckert and Willian Mauchly build the ENIAC (Electronic Numerical Integrator and Computer). It use vacuum tube instead of mechanical switches of the MARK 1.

Presper Eckert

Willian Mauchly

Vacuum tube

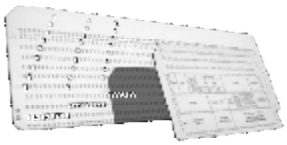
MARK 1

In 1951, Eckert and Mauchly build the UNIVAC, which could calculate at the rate of 10,000 addition per seconds.

UNIVAC – UNIVERSAL AUTOMATIC COMPUTER

Hardware Technology

New invention of hardware were needed with the new computer technology.

Technology	Details
VACUUM TUBE 	**The vacuum tube was an extremely important step of the advancement of computers.In a computer, a vacuum tube which is an electronic tube about the size of light bulbs, was used as the internal computer components. Thousands of them were used.**
PUNCHED CARD 	**Punched card was used to store data.**
MAGNETIC TAPE 	**Magnetic tape was introduced in 1957. It was a faster and a more compact method of storing data. Using magnetic tape became more reliable and cost-effective.**

Problems

- **the vacuum tubes generated a great deal of heat causing many problems in temperature regulation and climate control**
- **the tubes also burnt out frequently**
- **people operating the computer did not know that the problem was in the programming machine**
- **the second generation computer scientists invented something new due to lots of problem created by vacuum tubes**

SECOND GENERATION (1956-1963)

The famous computer scientists during the second generation era were:

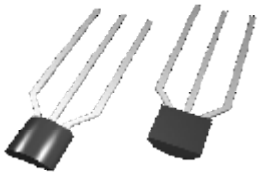
John Bardeen

Walter Houser Brattain

William Shockley

The creation of transistor spark the production of a wave of second generation computer. Transistor was small devices use to transfer electronic

signals across a resister. Transistors had many advantages compared to other hardware technology.



- **transistors were smaller than vacuum tubes**
- **they needed no warm up time**
- **consumed less energy**
- **generated much less heat**
- **faster and more reliable**

THIRD GENERATION (1964-1971)

In the third generation era, the IBM 370 series were introduced in 1964. It came in several models and sizes.It was used for business and scientific programs. Other computer models introduced were CDC 7600 and B2500.

The development of integrated circuit (IC), signal the beginning of the third generation computers. Silicone chips were manufactured in 1961 at the Silicone Valley. Then came the integrated circuit technology, which had reduced the size and cost of computers.

It is a complete electronic circuit on a small chip of silicone. Which is also known as semi conductor. Other than that, the Magnetic Core Memory was replaced by a device called the microchip. Also the first 256 bit RAM was introduced and it was the basis for development of 1K bit RAM.

Advantages
A new concept in this generation was that of a family of computer which allowed computer to be upgraded and expanded as necessary.

- **Silicone chips were reliable, compact and cheaper.**
- **Sold hardware and software separately which created the software industry.**
- **customer service industry flourished (reservation and credit checks)**

FOURTH GENERATION (1971-PRESENT)

It took only 55 years for the 4 generations to evolve. The growth of the computer industry developed technologies of computer inventions. There are many types of computer models such as:

- **Apple Macintosh**
- **IBM**
- **DELL**
- **ACER**

In 1971 Intel created the first microprocessor. In 1976, Steve Jobs built the first Apple computer. Then, in 1981, IBM introduced its first personal computer.

Steve Jobs

Bill Gates

Micheal Dell

During the fourth generation, hardware technology such as silicone chips, microprocessor and storage devices were invented. A microprocessor is a specialized chip which is developed for computer memory and logic.

Microprocessor

Silicone Chips

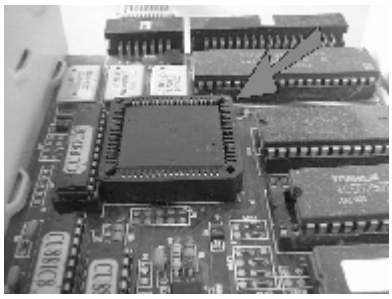
The microprocessor is a large-scale integrated circuit which contained thousands of transistors. The transistors on this one chip are capable of performing all of the functions of a computer's central processing unit.

Advantages

- **Computers became 100 times smaller than ENIAC (Electronic Numerical Integrator and Computer) the first computer**
- **Gain in speed, reliability and storage capacity**
- **Personal and software industry boomed**

FIFTH GENERATION (PRESENT & BEYOND)

The fifth generation computers are technologically advance and are still being development to become more efficient.



The inventions of new hardware technology in the fifth generation have grown rapidly including many other modern computer devices such as :

- **silicone chips**
- **processor**
- **robotics**
- **virtual reality**
- **intelligent systems**
- **programs which translate languages**

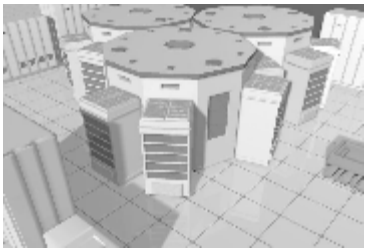
NEW ERA COMPUTER

After the fifth generation computer, the technology of computer has become more advanced, modern and sophisticated. The latest invention in the era of computers are :

- **Super Computers**
- **Mainframe Computers**
- **Mini Computers**
- **Personal Computers**
- **Mobile Computers**

Mini Computers

Mobile Computer



Super Computers

Mainframe Computers

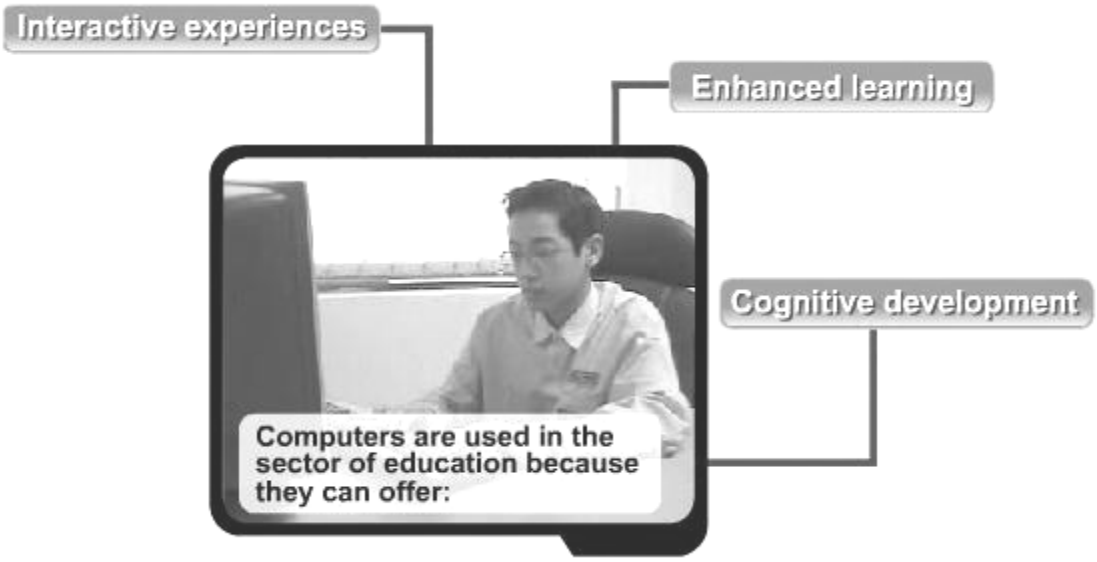
Personal Computers

In the new era of computers, expert system such as teleconferencing and speech-recognition system have been invented as part of modern world communication tools.

LESSON 3
USAGE OF ICT IN DAILY LIFE

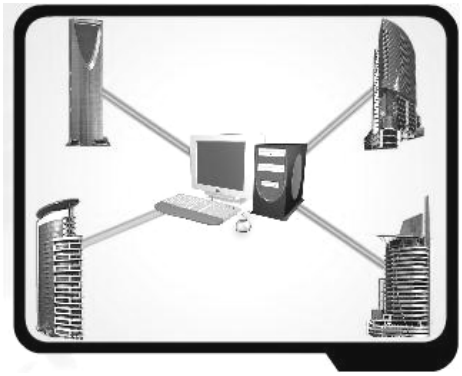
EDUCATION

Today, most schools and higher educational institutions have computers in the classroom for teacher and students. In education, teachers, students, researchers and school administrators benefits from the usage of ICT.



 **Teachers**	**Teachers use computers to research for teaching materials, participate in online forums and online conferences as well as to aid their teaching.**
 **Students**	**Students use the computers as a reference tool. They use computers to browse the Internet to look for information.**
 **Researchers**	**Researchers use computers to collect and process data.**
 **School administrators**	**School administrators use computers for administrative purposes to make sure that the entire operation runs smoothly.**

BANKING



The computer is the nerve centre of the banking system around the world. It functions to control the entire banking system that also includes 'Electronic Banking Services'.

Electronic banking provides 24 hour services. The services include :

- **Automated Teller Machine (ATM)**
- **Cheque Deposit**
- **Electronic Fund Tranfer**
- **Direct Deposit**
- **Pay by phone system**
- **Personal computer banking/ internet banking**

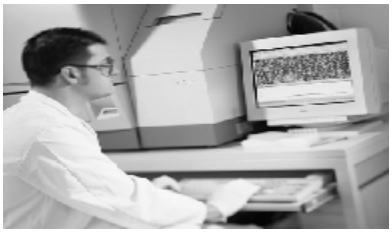
In the banking sector, customers, businessman and bank administrator benefits from the usage of ICT.

 **Customers**	**Customers can make any transactions at the 24 hour service centres or via online.These services allow them to do transaction at anytime they want.**
 **Businessmen**	**Businessmen can save their time by using the online services offered by banks. They can access company accounts for loan applications, business transactions and update on their cash flow at any time.**

 **Bank administrators**	**Bank administrators can oversee the entire banking activities such as reconciliations, inter-branch transactions (IBT), telegraphic transfer and others by referring to the banking system.**

INDUSTRY

Computers are used to facilitate production planning and control systems, to support chain management and to help in product design in the industrial sector.In the industrial sector ,workers, researchers and administrator benefits from the usage of ICT.

 **Workers**	**Workers use machines that are connected to computers to operate. In some productions, robots are used to take over jobs that are dangerous to the workers.**
 **Researchers**	**Researchers use computers to analyse and collect research data for future reference.**
 **Administrators**	**Administrators use computers to oversee the entire operations in the plant or factory to detect specific errors or defects that occurred in the process.**

E-COMMERCE

E-commerce helps in boosting the economy. It makes buying and selling activities easier, more efficient and faster. For this application, computers, Internet and shared software are needed.

In the e-commerce sector ,customers r, suppliers and employees benefits from the usage of ICT.

 **Customers**	**Customers use computers to be connected online with suppliers to purchase products. This method can save time and cost as they do not have to go to any outlets.**
 **Suppliers**	**Suppliers use computers to keep track of their transactions. All products are bar coded and can be read by the computer scanner to help in determining prices and managing inventory.**
 **Employees**	**Employees use computers and telephones to communicate with their customers for any enquiries.** **The system helps employees to get the latest updates on inventory to be informed to the customers.**

OTHER SECTOR

LESSON 4
COMPUTERISED AND NON-COMPUTERISED SYSTEMS

COMPUTER SYSTEM

A system is an arrangement of elements that when it is put together it becomes an organised and established procedure. A system typically consists of components connected together in order to facilitate the flow of information, matter or energy.

A computer system consists of a set of hardware and software which processes data in a meaningful way.

EDUCATION

EDUCATION BEFORE ICT

EDUCATION WITH ICT

- **education is the science of teaching and learning of specific skills**
- **it also imparts knowledge, good judgement and wisdom**

BANKING SYSTEM

BANKING BEFORE ICT

- **banking was done manually by taking deposits directly**
- **transactions can only be made during working hours**
- **takes time to approve any loan applications**

BANKING WITH ICT

- **all transactions are done by computers**
- **transaction can be done at anytime and place**
- **online services, phone banking system, credit cards are available**

INDUSTRY

INDUSTRY BEFORE ICT

Production was slow because everything was done manually and totally depended on human labour.

INDUSTRY WITH ICT

Computers and telecommunications industry became very opular and profitable since production can be increased through an all day operation.

COMMERCE

Commerce is an activity of exchanging, buying and selling of commodities on a large scale involving transportation from place to place.

COMMERCE BEFORE ICT

- **Trading was made using the barter system and it was then later developed into currency.**
- **Advertisement was in the form of word of mouth, billboards and printed flyers.**
- **Trading globally was extremely slow, late and expensive. Traders had to find ways to market local products in the global market.**

COMMERCE WITH ICT

E-commerce plays an important role in the economic scene. It includes distribution, buying, selling and servicing products that are done electronically.

LESSON 5
THE IMPACT OF ICT ON SOCIETY

FASTER COMMUNICATION SPEED

In the past, it took a long time for any news or messages to be send. Now with the Internet, news or messages are sent via e-mail to friends, business partners or to anyone efficiently. With the capability of bandwidth, broadband and connection speed on the Internet, any information can travel fast and at an instant. It saves time and is inexpensive.

LOWER COMMUNICATION COST

Using the Internet is cost-effective than the other modes of communication such as telephone, mailing or courier service. It allows people to have access to large amounts of data at a very low cost. With the Internet we do not have to pay for any basic services provided by the Internet. Furthermore, the cost of connection to the Internet is relatively cheap.

RELIABLE MODE OF COMMUNICATION

Computers are reliable. With the internet, information could be accessed and retrieved from anywhere and at anytime. This makes it a reliable mode of communication. However, the input to the computer is contributed by humans. If the data passed to the computer is faulty, the result will be faulty as well. This is related to the term GIGO.

GIGO is a short form for Garbage In Garbage Out. It refers to the quality of output produced according to the input. Normally bad input produces bad output.

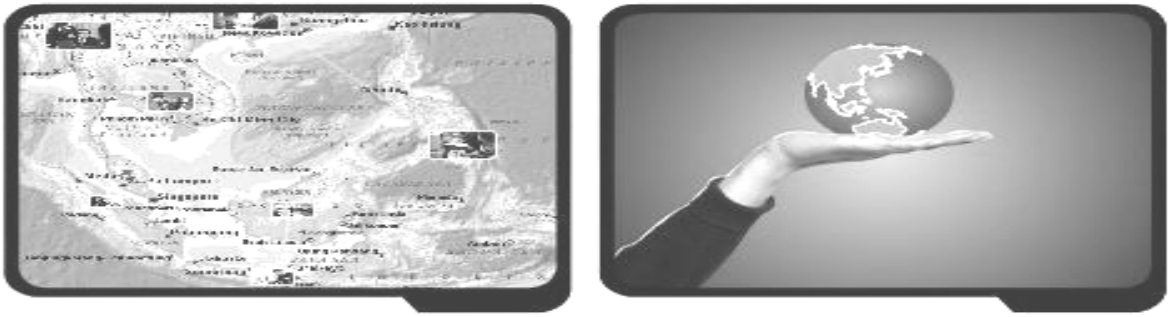
EFFECTIVE SHARING OF INFORMATION

With the advancement of ICT, information can be shared by people all around the world. People can share and exchange opinions, news and information through discussion groups, mailing list and forums on the Internet. This enable knowledge sharing which will contribute to the development of knowledge based society.

PAPERLESS ENVIRONMENT

ICT technology has created the term paperless environment. This term means information can be stored and retrieved through the digital medium instead of paper. Online communication via emails, online chat and instant messaging also helps in creating the paperless environment.

BORDERLESS COMMUNICATION



Internet offers fast information retrieval, interactivity, accessibility and versatility. It has become a borderless sources for services and information. Through the Internet, information and communication can be borderless.

SOCIAL PROBLEMS

There are some negative effects of ICT. It has created social problems in the society. Nowadays, people tend to choose online communication rather than having real time conversations. People tend to become more individualistic and introvert.

Another negative effect of ICT is :

- **fraud**
- **identity theft**
- **Pornography**
- **Hacking**

This will result a moral decedent and generate threads to the society.

HEALTH PROBLEMS

A computer may harm users if they use it for long hours frequently. Computer users are also exposed to bad posture, eyestrain, physical and mental stress. In order to solve the health problems, an ergonomic environment can be introduced. For example, an ergonomic chair can reduces back strain and a screen filter is used to minimize eye strain.

COMPUTER ETHICS AND LEGAL ISSUES

LESSON 6
COMPUTER ETHICS

ETHICS IN GENERAL

A guideline is needed to stop the current technology products from being exploited for example replicating original CDs and selling them as pirated software, this unethical behaviour can be controlled by the code of conducts.

Unethical refers to any code of conducts that are not conforming to approved standards of social or professional behaviour.

Computer ethics is a system of moral standards or values used as a guideline for computer users.

THE TEN COMMANDMENTS OF COMPUTER ETHICS

The United States Institute of Computer Ethics has come out with the Ten Commandments of Computer Ethics. These principles consider the effective code of conducts for the proper use of information technology. The Ten commandments of computer ethics are :

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

GUIDELINES ON THE E-MAIL AND INTERNET USAGE

Some guidelines from the Department of Public Services of Malaysia:

- **use only individual e-mail address to forward individual opinion**
- **keep the identity name and password a secret to avoid the misuse of your e-mail without your knowledge**
- **e-mail must be active to promptly reply the necessary actions needed for any matters**
- **ensure the total mail kept in the box is within the computer storage capacity**
- **scan files regularly to avoid the transmission of virus from one computer to another**
- **do not send e-mails that contain classified information which can be used to tarnish other people or country**
- **choose a suitable time to search the Internet to save access time and cost**
- **beware of prohibited sites which could affect one's moral, organisation or nation**
- **print only relevant documents that you think can be used in future to save cost**

UNETHICAL COMPUTER CODE OF CONDUCTS

With the advancement of ICT, it is easy for anyone to retrieve your information from the Internet. You may not realise that when you fill a form on the Internet, your information may be exposed and stolen.

Examples of unethical computer code of conducts include:

- **modifying certain information on the Internet, affecting the accuracy of the information**
- **selling information to other parties without the owner's permission**
- **using information without authorization**
- **involvement in stealing software**
- **invasion of privacy**

Intellectual property refers to any product of human intellect that is unique and has value in the market place. This covers ideas, inventions, unique name, computer program codes and many more.

ETHICAL COMPUTER CODE OF CONDUCTS

Examples of ethical computer code of conducts include:

- **sending warning about viruses to other computer users**
- **asking permission before sending any business advertisements to others**
- **using information with authorization**

LESSON 7
THE DIFFERENCES BETWEEN ETHICS AND LAW

DEFINITION OF ETHICS

In general, ethics is a moral philosophy where a person makes a specific moral choice and sticks to it. On the other hand, ethics in computing means moral guidelines to refer to when using the computer and computer networks. This includes the Internet.

DEFINITION OF LAW

Law is a legal system comprising of rules and principles that govern the affairs of a community and controlled by a political authority.

Law differs from one country to another. In the era of technology, computer law is needed to clarify goods or actions that fall under the computer law. Computer law refers to all areas in law that requires an understanding of computer technology such as hardware, software and Internet.

Examples of laws of computing in Malaysia include the Malaysian Communication and Multimedia Act, the Computer Crime Act 1997 and the Telemedicine Act 1997.

WHY DO WE NEED ETHICS AND LAW IN COMPUTING?

- **Respecting Ownership**
- **Respecting Privacy**
- **Respecting Property**

RESPECTING OWNERSHIP

We must respect ownership by not stealing other people's work either by duplicating or distributing it. Duplicating and distributing copies of audio tapes, video tapes and computer programs without permission and authorisation from the individual or company that created the program are immoral and illegal.

RESPECTING PRIVACY AND CONFIDENTIALITY

We should respect other people's privacy and confidentiality by refraining ourselves from reading their mails or files without their permission. If we do so, it is considered as violating an individual's rights to privacy and confidentiality.

RESPECTING PROPERTY

Property here means ownership. Since an individual data and information are considered as property, therefore, an act of tampering and changing electronic information is considered as vandalism and disrespect for other people's property.

SIMILARITIES BETWEEN ETHICS AND LAW

Both ethics and law are complimentary to each other and are made:

- **to guide user from misusing computers**
- **to create a healthy computer society, so that computers are used to contribute to a better life**
- **to prevent any crime**

DIFFERENCES BETWEEN ETHICS AND LAWS

ETHICS	
GUIDELINE	**As a guideline to computer users.**
MORAL STANDARDS	**Ethical behaviour is judged by moral standards.**
FREE TO FOLLOW	**Computer users are free to follow or ignore the code of ethics.**
NO PUNISHMENTS	**No punishment for anyone who violates ethics.**
UNIVERSALS	**Universal, can be applied anywhere, all over the world.**
PRODUCE ETHICAL COMPUTER USERS	**To produce ethical computer users.**
IMMORAL	**Not honouring computer ethics means ignoring the moral elements (immoral).**

LAW	
CONTROL	**As a rule to control computer users.**
JUDICIAL STANDARDS	**Law is judged by judicial standards.**
MUST FOLLOW	**Computer users must follow the regulations and law.**
PENALTIES, IMPRISONMENTS AND OTHER PUNISHMENTS	**Penalties, imprisonments and other punishments for those who break the law.**
DEPENDS ON COUNTRY	**Depends on country and state where the crime is committed.**
PREVENT MISUSING OF COMPUTERS	**To prevent misuse of computers.**
CRIME	**Not honouring the law means committing a crime.**

UNETHICAL VS. LAW BREAKING CONDUCTS

Unethical:

- **using the office computer to do personal things**
- **reading your friend's e-mail without his or her permission**
- **plagiarising and using materials from the Internet for your class assignment without giving credit to the original author.**

Law breaking:

- **sending a computer virus via e-mail**
- **hacking into your school's database to change your examination results.**
- **selling pirated software in a night market**

LESSON 8
INTELLECTUAL PROPERTY RIGHTS

DEFINITION OF INTELLECTUAL PROPERTY

Intellectual Property refers to works created by inventors, authors and artists. These works are unique and have value in the market place. In our daily lives, we are surrounded by things that are protected by IP. Your school bags, your shoes and even your socks are protected by Intellectual Property rights. Nike, Bata or Adidas, for example, are all protected by a group of legal rights.

INTELLECTUAL PROPERTY LAW

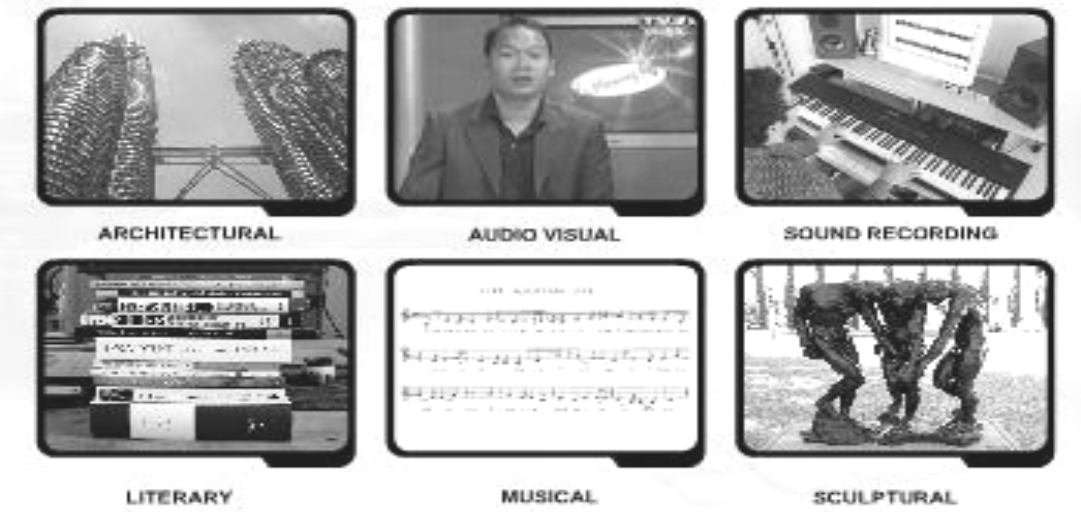
Intellectual Property laws cover ideas, inventions, literary creations, unique names, business models, industrial processes, computer program codes and more.

INVENTIONS PROTECTED BY INTELLECTUAL PROPERTY LAWS

As businesses continue to expand globally, business owners must realise the importance of getting professional advice on how to establish and safeguard their intellectual property rights. These include :

- **Trademarks**
- **Service marks**
- **Trade/company names**
- **Domain names**
- **Geographical indications**
- **Copyrights**
- **Patents**

Example : Protected by property law.



INTELLECTUAL PROPERTY PROTECTION

There are four types of Intellectual Property protection. They are patents for invention, trademarks for brand identity, designs for product appearance and copyright for material.

- **Patents for inventions**
- **Trademarks for brand identity**
- **Design for product appearance**
- **Copyright for material**

Patents for inventions

Utility, design or plant patents that protect inventions and improvements to existing inventions

Trademarks for brand identity

Words, names, symbols, devices and images that represent products, goods or services.

Design for product appearance

Literary and artistic material, music, films, sound recordings and roadcasts, including software and multimedia.

Copyright for material

The features of, in particular,the lines, contours, colours,shape, texture or material of the product itself or its ornamentation.

LESSON 9
PRIVACY IN COMPUTER USAGE

WHAT IS PRIVACY?

Privacy in IT refers to data and information privacy.

Data refers to a collection of raw unprocessed facts, figures and symbols. Then, computer is used to process data into information. In general, data include texts, numbers, sounds, images and video.

Information privacy is described as the rights of individuals and companies to deny or restrict the collection and use of information about them.

WAYS COMPUTER TECHNOLOGY THREATEN OUR PRIVACY

Every time you click on an advertisement or register a software product online, your information is entered into a database. Computer technology can also threaten privacy through spam. Do you know what spam is? Spam is unsolicited e-mail messages, advertisements or newsgroup postings sent to many recipients at once.

How does computer technology threaten the privacy of our data?

It is done through:

- **Cookies**
- **Electronic profile**
- **Spyware**

Computer technology threatens our privacy through electronic profiling. For example, when we fill out a form such as a magazine subscription, purchasing products or contest entry form on the Internet, this data is kept in the database. It will include age, address, marital status and other personal details.

Cookies

- **are used to identify users by web casting, e-commerce and other web applications**
- **contain user information and are saved in the computer hard disk**
- **are used by some websites to store passwords and track how regularly we visit a website, that's how we become potential targets for web advertisers**
- **enable web sites to collect information about your online activities and store them for future use, then the collected details will be sold to any company that requests for it.**

Electronic profile

- **electronic profile is the combining of data in a database that can be sold to the Internet by the company to the interested parties.**
- **this database is in a form such as magazine subscription or product warranty cards that had been filled by online subscribers.**
- **the information in electronic profile includes personal details such as your age, address and marital status.**

Spyware

- **refers to a program that collects user information without the user's knowledge.**
- **can enter computers, sneaking in like a virus.**
- **is a result of installing new programs.**
- **communicates information it collects to some outside source while we are online.**

WHY DO WE NEED PRIVACY?

We need privacy for anonymity. For example, the Internet creates an elaborate trail of data detailing a person surfing on the Web because all information is stored inside cookies. We do not want our trail to be detected.

We also need privacy for confidentiality. For example, online information generated in the course of a business transaction is routinely used for a variety of other purposes without the individual's knowledge or consent.

We do not want our private lives and habits exposed to third parties.

CAN PRIVACY BE PROTECTED?

Privacy can be protected by:

(a) Privacy law

The privacy laws in Malaysia emphasises on the following:

- **Security Services to review the security policy**
- **Security Management to protect the resources**
- **Security Mechanism to implement the required security services**
- **Security Objects, the important entities within the system environment**

(b) Utilities software

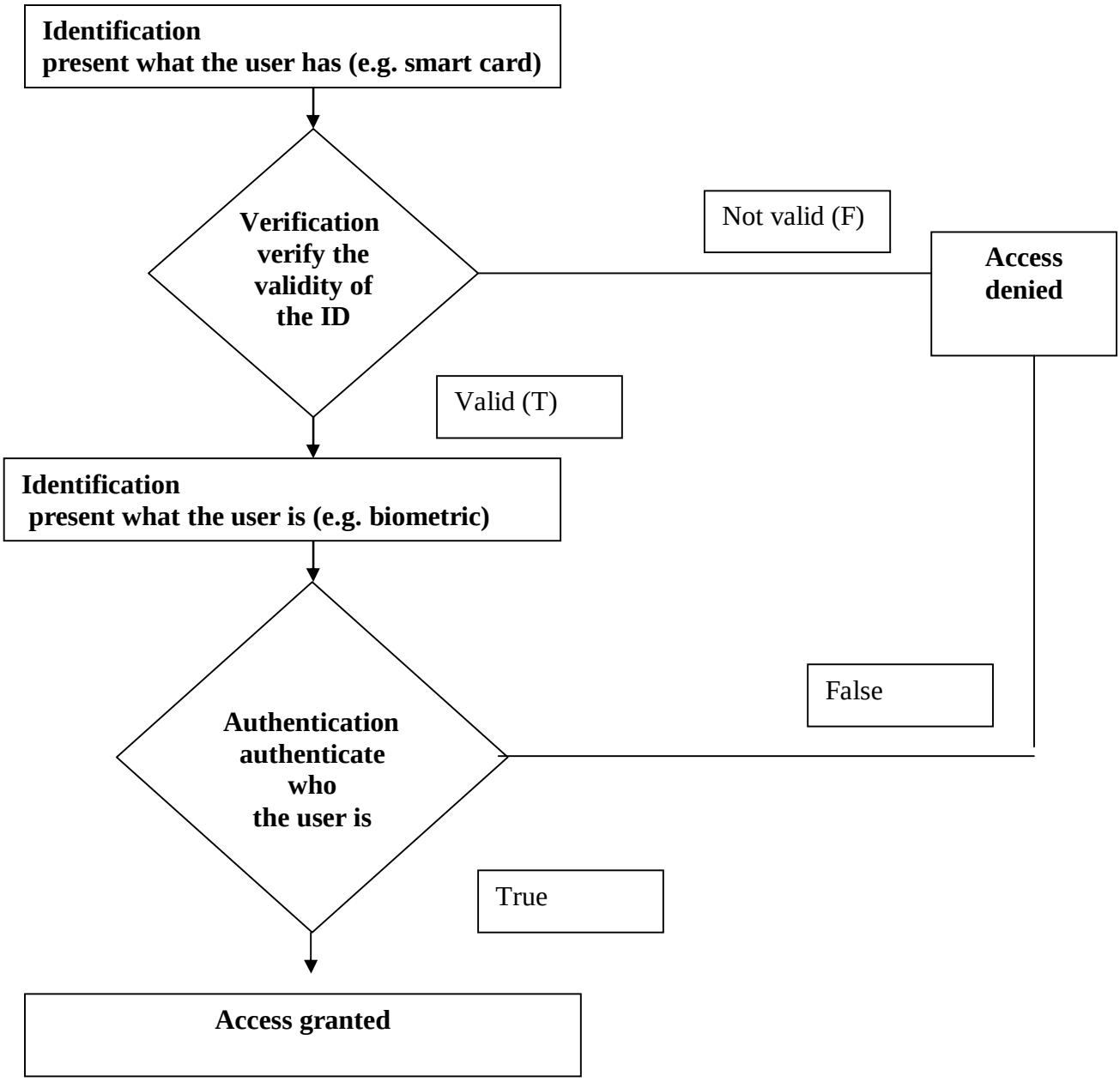
Example: anti-spam program, firewall, anti-spyware and antivirus.

LESSON 10
AUTHENTICATIONS

Authentication is a process where users verify that they are who they say they are. The user who attempts to perform functions in a system is in fact the user who is authorised to do so.

For Example : When you use an ATM card, the machine will verify the validation of the card then the machine will request for a pin number. This is where the authentication process takes place.

AUTHENTICATION



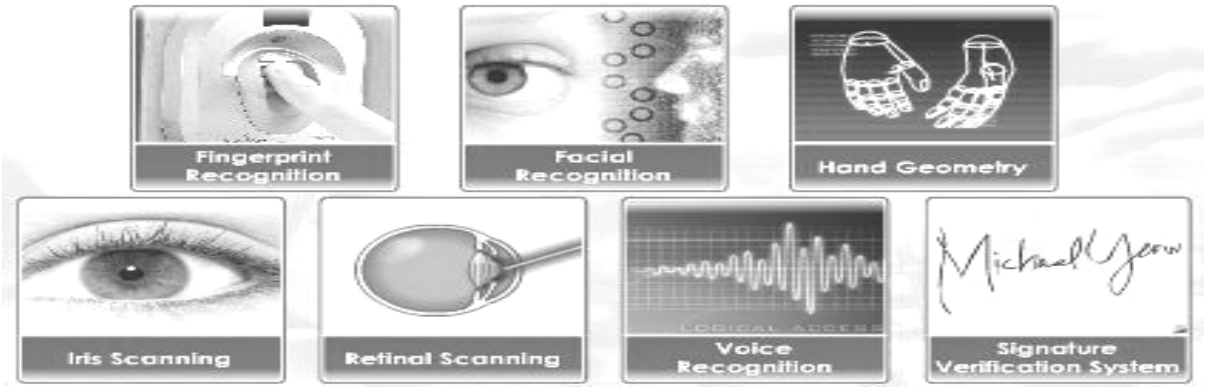
METHODS OF AUTHENTICATION

There are two commonly used authentication methods, which are biometric device and callback system.

Biometric device is a device that translates personal characteristics into a digital code that is compared with a digital code stored in the database.

Callback system refers to the checking system that authenticates the user.

BIOMETRIC DEVICES



Fingerprint Recognition

In order to prevent fake fingers from being used, many biometrics fingerprint systems also measure blood flow, or check for correctly arrayed ridges at the edges of the fingers.

Facial Recognition

Facial recognition analyses the characteristics of an individual's face images captured through a digital video camera. Facial recognition is widely used, touted as a fantastic system for recognising potential threats (whether terrorists, scam artists, or known criminals).

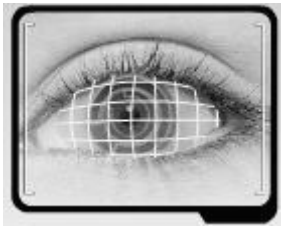
Hand Geometry Scanning

Hand scanning involves the measurement and analysis of the shape of one's hand.

Unlike fingerprints, the human hand isn't unique. Individual hand features are not descriptive enough for identification.

It is possible to devise a method by combining various individual features and measurements of fingers and hands for verification purposes.

Iris Scanning



Iris scanning analyses the features that exist in the coloured tissues surrounding the pupil which has more than 200 points that can be used for comparison, including rings, furrows and freckles.

The scans use a regular video camera and can be done from further away than a retinal scan.It will work perfectly fine through glasses and in fact has the ability to create an accurate enough measurement that it can be used for identification purposes.

The accuracy of this method is excellent while the cost involved is high.

Retinal Scanning

Retinal biometrics involves the scanning of retina and analysing the layer of blood vessels at the back of the eye.

Retinal scanning involves using a low-intensity light source and an optical coupler and can read the patterns at a great level of accuracy.

Retina scanning requires the user to remove glasses, place their eye close to the device, and focus on a certain point. Whether the accuracy can outweigh the public discomfort is yet to be seen.

The accuracy in retinal scanning is very good and the cost involved is fair.

Voice Recognition

Voice recognition system compares a person's live speech with their stored voice pattern.

Voice recognition biometrics requires user to speak into a microphone. What he speaks can be his password or an access phrase.

Verification time is approximately 5 seconds. To prevent recorded voice use, most voice recognition devices require the high and low frequencies of the sound to match, which is difficult for many recording instruments to recreate well. Also, some devices generate random number of sequences for verification.

The accuracy in voice recognition is fair and the cost involved is very reasonable.

Signature Verification System

Signature verification system uses special pen and tablet. After pre-processing the signature, several features are extracted.

The authenticity of a writer is determined by comparing an input signature to a stored reference set (template) consisting of three signatures.

The similarity between an input signature and the reference set is computed using string matching and the similarity value is compared to a threshold.

The accuracy in signature verification system is fair and the cost involved is excellent.

CALLBACK SYSTEM

The callback system is commonly used in the bank operation and business transaction.

For example, when you book for the taxi service, the operator will ask you to hang up and she will call you back to confirm for the service required.

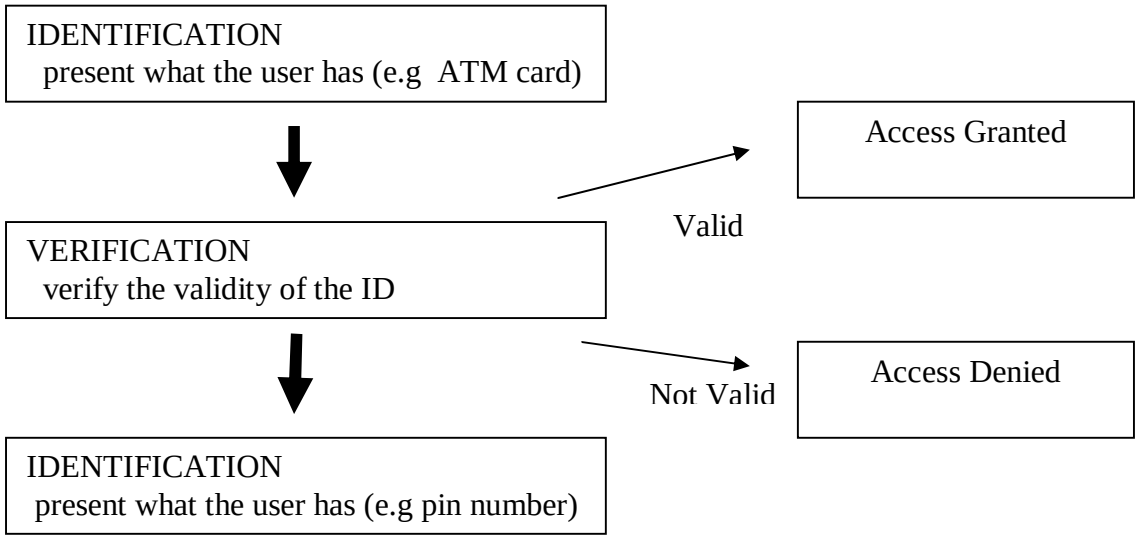
WHY IS AUTHENTICATION IMPORTANT?

Authentication is important in order to safeguard against the unauthorised access and use.

LESSON 11
VERIFICATIONS

VERIFICATION

Verification is the act of proving or disproving the correctness of a system with respect to a certain formal specification.



METHODS OF VERIFICATION

There are two methods commonly used in verification, which are user identification and processed object.

User identification refers to the process of validating the user.

Processed object refers to something the user has such as identification card, security token and cell phone.

USER IDENTIFICATION

The examples of validating process using the user identification are:

- **Key in the user name to log-in to a system and the system will verify whether the user is valid or invalid user**
- **Show the exam slip to verify that you are the valid candidate for the exam.**
- **show a passport before departure.**

PROCESSED OBJECT

The examples of validating process using the processed object are:

- **the policeman will check on the driver's license to identify the valid driver**
- **employees have to swipe their security card to enter the building**
- **buy blouses at the mall using a credit card**

LESSON 12
CONTROVERSIAL CONTENT

CONTROVERSIAL CONTENT

A controversial content is information that causes disagreement in opinions and may cause the disruption of peace because different people or culture will have different views about the contents.

ISSUES ON CONTROVERSIAL CONTENTS

The issues on controversial contents are always focusing on pornography and slander. Malaysia considers pornography and slander as illegal.

Pornographic and slanderous activities can be in the forms of plots and actions displayed on video games, controversial rhythm or lyrics of music, controversial contents of books and controversial issues on religion and philosophy.

Pornography ***Creative activity (writing or pictures or films etc.) of no literary or artistic value other than to stimulate sexual desire.***

Slander ***Oral communication of false statements injurious to a person's reputation. A false and malicious statement or report about someone.***

PORNOGRAPHY

What is pornography? Why is pornography considered "negative" content?

Both pictures are very cute pictures of innocent babies. Neither can be considered pornographic by normal standards.

DEFINITION OF PORNOGRAPHY

The definition of pornography is any form of media or material (like books or photographs) that depicts erotic behaviour and is intended to cause sexual excitement.

Pornography tends to exploit men, women and children in a distasteful manner.

SLANDER

Slander is another example of controversial content.

Slander is a legal term for false and malicious statement (meaning knowing that it is false, or "reckless disregard" that it was false) about someone.

Examples :

You wrote an e-mail that a fellow classmate was having an affair with a teacher, even though it was not true. You then sent it to five other friends.

Ahmad is a muslim. One day, he received a "spam" e-mail stating that his favourite soda drink "Soda Moda" uses non-halal food colouring, but he does not know if the source of the content is credible or true. He decides to forward the e-mail to 50 of his friends.

Chin Wei spreads a rumour that a Government Minister is receiving bribes from an enemy government.

IMPACTS ON MALAYSIAN SOCIETY

What can you conclude about the impact of controversial content on the Malaysian society?

Pornography

- **can lead to criminal acts such as exploitation of women and children**
- **can lead to sexual addiction or perversion**
- **can develop low moral value towards other men, women or children**

- **can erode good religious, cultural and social beliefs and behaviour**

Slander

- **can develop into a society that disregards honesty and truth**
- **can develop bad habit of spreading untruths and rumours**
- **can lead to unnecessary argument**
- **can cause people to have negative attitudes towards another person**

LESSON 13
THE PROCESS OF INTERNET FILTERING

INTERNET FILTERING

It is our responsibility to ensure that the teenagers are protected from these corruptions of the mind by filtering access to the Internet.Internet filtering is a process that prevents or blocks access to certain materials on the Internet.

It is our responsibility to ensure that the teenagers are protected from these corruptions of the mind by filtering access to the Internet.

What is Internet filtering?
Internet filtering is a process that prevents or blocks access to certain materials on the Internet. Filtering is most commonly used to prevent children from accessing inappropriate material and to keep employees productive on the Internet.

CONTROLLING ACCESS TO THE INTERNET

Controlling access to the internet by means of filtering software has become a growing industry in Malaysia and elsewhere. Its use has increase as the mandatory response to the current plague of society, namely internet pornography, politically incorrect site, hatred, violence, hate and in general anything viewed to be unpleasant or threatening.

The current preferred method of choice to limit access on the Internet is to filter content either by:

- **keyword blocking**
- **site blocking**
- **web rating systems**

These methods require software to be installed at a client of server level.

KEYWORD BLOCKING

One of the strategies is by using the keyword blocking method.This method uses a list of banned words or objectionable terms.

As the page is downloading, the filter searches for any of these words. If found, it will block the page completely, stop downloading the page, block the banned words and even shut down the browser.

SITE BLOCKING

- **software company maintains a list of 'dubious Internet sites'**
- **the software prevents access to any sites on this list**
- **'denial lists' regularly updated**
- **some software provides control over what categories of information you block**
- **Who decides what goes on the 'denial list' and what criteria are they using?**
- **can you keep track of the whole of the Internet?**
- **filters can use both site blocking and word blocking**

WEB RATING SYSTEMS

Web sites are rated in terms of nudity, sex, violence and language. The Recreational Software Advisory Council (RSACI) is responsible for the rating of the websites on the content on the internet.

- **ratings done either by the web page author or by the independent bureau.**
- **browsers set to only accept pages with certain levels of ratings.**

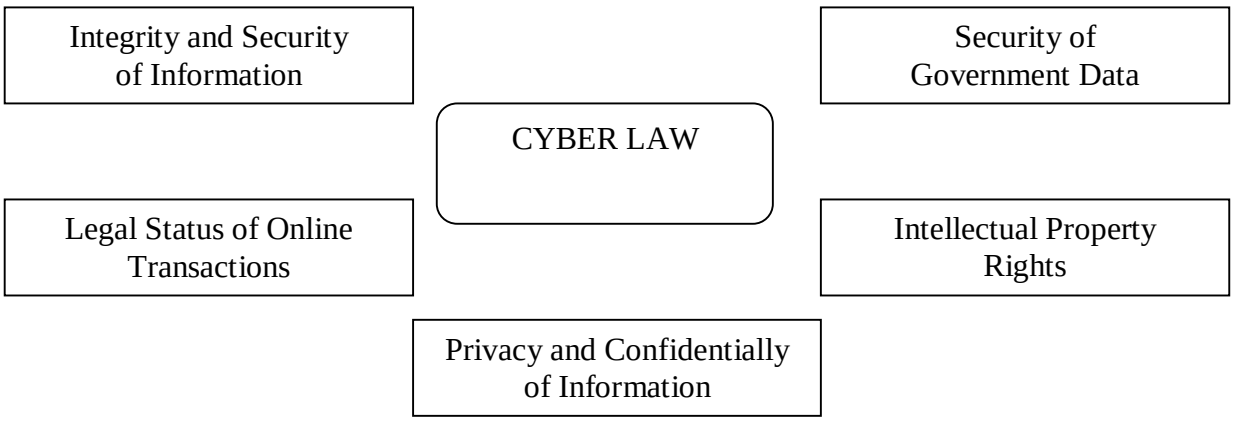
LESSON 14
CYBER LAW

What is Cyber Law?

Cyber law refers to any laws relating to protecting the Internet and other online communication technologies.

NEEDS FOR CYBER LAW

In the recent years, many concerns and issues were raised on the integrity and security of information, legal status of online transactions, privacy and confidentiality of information, intellectual property rights and security of government data placed on the Internet.



These concerns and issues clearly indicate why cyber laws are needed in online activities.

THE CYBER LAW ACTS IN MALAYSIA

The Malaysian Government has already passed several cyber laws to control and reduce the Internet abuse.

These cyber laws include:

- **Digital Signature Act 1997**
- **Computer Crimes Act 1997**
- **Telemedicine Act 1997**
- **Communications and Multimedia Act 1998**

Beside these cyber laws, there are three other cyber laws being drafted.

- **Private Data Protection Bill**
- **Electronic Government Activities Bill**
- **Electronic Transactions Bill**

DIGITAL SIGNATURE ACT 1997

The Digital Signature Act 1997 secures electronic communications especially on the Internet.

Digital Signature is an identity verification standard that uses encryption techniques to protect against e-mail forgery. The encrypted code consists of the user's name and a hash of all the parts of the message.

By attaching the digital signature, one can ensure that nobody can eavesdrop, intercept or temper with transmitted data.

COMPUTER CRIMES ACT 1997

The Computer Crimes Act 1997 gives protection against the misuses of computers and computer criminal activities such as unauthorised use of programmes, illegal transmission of data or messages over computers and hacking and cracking of computer systems and networks.

By implementing the Computer Crimes Act 1997, users can protect their rights to privacy and build trust in the computer system. At the same time, the government can have control at a certain level over cyberspace to reduce cyber crime activities.

TELEMEDICINE ACT 1997

The Telemedicine Act 1997 ensures that only qualified medical practitioners can practice telemedicine and that their patient's rights and interests are protected.

These act provides the future development and delivery of healthcare in Malaysia.

COMMUNICATIONS AND MULTIMEDIA ACT 1998

The implementation of Communication and Telecommunication Act 1998 ensures that information is secure, the network is reliable and the service is affordable all over Malaysia.

This Act also ensures high level of user's confidence in the information and communication technology industry.

LESSON 15
COMPUTER CRIMES

COMPUTER CRIMES

A computer crime is defined as any criminal activity that is related to the use of computers. These activities include computer fraud, copyright infringement, computer theft and computer attack.

COMPUTER FRAUD

Computer fraud is defined as having an intention to take advantage over or causing loss to other people, mainly on monetary basis through the use of computers.

There are many forms of computer fraud which include e-mail hoaxes, programme fraud, investment schemes, sales promotions and claims of expertise on certain fields.

Students need to be aware of other computer frauds such as health frauds, scams and hacking. Students will also most likely get false information while researching information on the Internet.

COPYRIGHT INFRINGEMENT

Copyright infringement is defined as a violation of the rights secured by a copyright. Copyright infringement involves illegal copy or reproduction of copyrights material by the black market group. The open commercial sale of pirated item is also illegal.

With the current technology, the most perfect copy of the original copy can be downloaded from the internet.

COMPUTER THEFT

Computer theft is defined as the unauthorised use of another person's property with the intention to deny the owner the rightful possession of that property or its use.

Examples of computer theft include:

- **transfer of payments to the wrong accounts**
- **tap into data transmission lines on database at no cost**
- **divert goods to the wrong destination**

COMPUTER ATTACK

Computer attack may be defined as any activities taken to disrupt the equipment of computer systems, change processing control or corrupt stored data.

Computer attack can be in the forms of:

- **physical attack that disrupt the computer facility or its transmission lines.**
- **an electronic attack that uses the power of electromagnetic energy to overload computer circuitry.**
- **a computer network attack that uses a malicious code to exploit a weakness in software, or in the computer security practices of a computer user**