CHAPTER 5

Current Trends and Developments in ICT

Outline

- Computer Crime
- Computer Security
- Software Piracy
- Trends in ICT

Computer Crime

- Computer Crime is an illegal use of computers and software
- Computers allow crimes like embezzlement, theft, sabotage, and vandalism to be carried out faster and with a lower chance of discovery.
- A Hacker is a programmer who breaks into computer systems in order to steal or change or destroy information.
- **The Ethiopian Penal Code of 2005 has articles on data and computer related crimes.**

Computer Crime

Computer crime includes:

- Unauthorized use of the computers
- Creating or releasing a malicious computer programs

Computer Crime

Unauthorized use of the computer for

- Stealing
  - user name and password
  - money by transferring it from one bank account to another
- Changing data (modifying bank account to increase money amount)
- Deleting data

Computer Crime

Creating or releasing a malicious computer program:

- The most sophisticated threats to computer systems are through malicious software, sometimes called malware.
- Malware attempts to cause damage to, or consume the resources of a target system.
  - Viruses
  - Worms
  - Trojan horses
  - Logic bomb
  - Trap door
  - Zombie

Viruses

- It is a software program capable of reproducing itself and causes great harm to computer files and programs.
- It can spread through sharing software, downloading files from the internet or logging on to a computer network.
- Major Effects of viruses include erasing files, formatting hard disk, allowing others to access the machine across a network with out authorization.

Worms

- It is a software program capable of reproducing itself that can spread from one computer to another over a network/Internet.
- Worms can automatically send and receive files found on many computers.
- Unlike a virus, it does not need to attach itself to an existing program.

Trojan horses

- It is a program that appears desirable but actually contains something harmful
- Secretly downloading a virus or some other type of mal-ware on to your computers.
- The contents of a Trojan horse can be a virus or a worm

Computer Security

- Computer security refers to methods or systems to prevent any event or action that could cause a loss or damage to:
  - Computer Hardware
  - Computer Software
  - Data and Information

Computer Security Solutions

Security measures to safeguard the computer system:

- Maintain backup copies of all your data
- Write-protect the disk that contains the software programs; this prevents anyone from adding other data to that disk.
- Don't copy software from a questionable origin
- Don't let other people use your program disks or your computer
- Remember that the internet contains contaminated software

Computer Security Solutions

Anti-Virus

- Antivirus software prevents a virus from taking effect/affecting the computer.
- The three services of an Antivirus software are prevention, diagnosis, and recovery
- If you have a virus on your computer, the antivirus program can recognize the identifying codes and then help eliminate the virus by erasing the infected files.

Disaster Recovery

- What if something happens to your computers or your data?
- Disaster recovery teams are the experts whose job is to help recover data that may have been destroyed by fire, flood, or virus attack.
- Any businesses can suffer when their normal functions are interrupted.

The Disaster recovery experts suggest the following:

- Make a backup power supply in case of power failure.
- Create backup copies of programs and data and store them at another location
- Share resources with a similar business.
- Accumulate backup spare parts for your computers to minimize “down” time.

Software Piracy

- Software piracy is the unauthorized copying or distribution of copyrighted software.

- Software Piracy can be done by copying, downloading, sharing, selling, or installing multiple copies of a software onto personal or work computers.

Software Piracy

- When you purchase software, you are actually purchasing a license to use it, not the actual software.
- This license is what tells you how many times you can install the software, so it's important to read it.
- If you make more copies of the software than the license permits, you are pirating.

Software Piracy

Addressing the problems of software piracy are:

- Legal means
- Ethical means
- Technical means

Legal Means

- Legal means are based on the fear of consequences of violating piracy laws.
- Legal means is considered as bad publicity for the software owner and can take a long time.

Ethical Means

- Ethical measures relate to making software piracy morally unappealing.
- Ethical means takes more effort and time to change the moral standards of a large group of people.

Technical means

- Technical methods such as "Locking" the programs to keep the buyer from making unauthorized copies are possible.
- Once this protection is broken no further steps can be taken to protect the intellectual property.

Trends in ICT

- Hardware Trends
- software Trends
- Communication Trends
- User interface advances

Hardware trends

- Nanotechnology
- Parallel processing
- Optical computer
- Personal Digital Assistant (PDA)

Nanotechnology

- A field whose theme is the control of matter on an atomic and molecular scale.
- Involves developing materials or devices with the smallest in size
- Helps to build computers a billion times faster and a million times smaller than the existing ones
- Manufacturing costs are also greatly reduced

Parallel processing

- Operating of large problems by dividing into smaller ones, which are then solved concurrently or simultaneously.
- Works by linking many processors so that greater volumes of data are processed simultaneously instead of in sequence, as with single processor computers.
- Was previously available only in supercomputers, but microprocessor improvements have brought parallel processing to personal computers.

Optical Computer

- Uses “laser beams” instead of electrical signals to perform digital computations.
- The enhancement of optical computers offers the possibility of robots with “eyesight”
- Potential uses are in high-speed graphic (image) processing

Personal Digital Assistant (PDA)

- It is a handheld computer, also known as a palmtop computer used as mobile phones, web browsers, or portable media players.
- PDA has a touch screen for entering data, a memory card slot for data storage and wireless connectivity, an appointment calendar, to-do list, an address book for contacts and some sort of note program.
- Connected PDAs also typically include E-mail and Web support.

Software Trends

- ✓ Interoperability
- ✓ Artificial intelligence (AI)
  - Expert systems
  - Natural language processing (NLP)
  - Neural networks

Interoperability

- It is referred to as using hardware and software from different vendors interchangeably.
- Application programs would "look and feel" the same on any system and data from one application service providers
- Interoperability should lead to increased productivity and competitiveness for businesses.

Artificial intelligence (AI)

Artificial intelligence (AI)

- It is the capability of computers to simulate the functions of the human brain
- AI incorporates parts of other concepts such as
  - Expert systems
  - Natural language processing
  - Neural networks

Expert systems

- Software programs that store the knowledge of a human expert and then serve as consultants in particular fields.
- NASA increasingly depends on expert systems and advanced computers to prepare for retirement of experienced personnel

Expert systems

- Thus, when current scientists and engineers retire, the agency will maintain the same quality of decision making and train new personnel simultaneously
- Expert systems in medicine are instrumental in diagnosing illness
- Service/repair technicians use them in analyzing equipment malfunctions

Natural language processing

- It is the capacity of a computer to "understand" human language and translate it into instruction upon which to act.
- For example, you could request a list of customers from a computer by typing, "Print a list of customer with a salary greater than 10,000 Birr".
- It is expected that future systems using language processing software will understand language input in any form, from any speaker, and translate it into any other language.

Neural networks

- Another way to give machines human "intelligence" is through neural network computing.
- A regular computer processes information in a chainlike preprogrammed sequence, but neural networks are organized like a grid where information is shared and tasks are performed simultaneously just as the brain does.

Neural networks

Communication trends

- Wireless Connection
- Broadband Connection

Wireless computing

- It implements the technologies of cellular, infrared, and radio frequencies so that computer communicate without a conducting medium such as fiber optics, twisted pair cable or copper wire.

Broadband Connection

- As costs drop, installations get easier, and hardware and software applications evolve, broadband connections will be as widespread
- Broadband provides new services that will be accessible on a wide range of appliances, from PCs and TVs to cellular telephones, personal digital assistants and other mobile devices.
- Broadband can be used to videoconference, link up with suppliers at a moment's notice, continually stay in touch with customers, and boost productivity by letting employees telecommute.

User Interface (UI) Trends

- User interface begins as soon as you turn on the computer
- It is probably the most important part of computing, especially to the novice user.
- UI helps users to communicate the computer easily by clicking on icons, graphics and buttons.
- Types of User Interface
  - Speech Recognition
  - Virtual reality

Speech Recognition

- Speech input helps users to enter a spoken words and then converts to machine-readable input
  - Voice dialing. E.g. speaking "Call home" to a mobile phone will dial the phone number associated with the home.
  - Domestic appliance control. E.g. intelligent houses can respond to human voice such as "Turn off the light".
  - Speech-to-text processing. E.g. word processors can accept speech input via microphones and translate them into written words.

Virtual reality

- It is a technology which allows a user to interact with a computer-simulated environment using visual experiences, sounds dispersions
- Experiments using virtual reality can be conducted without encountering the costly or destructive trial-and-error process that occurs in real-life situations.
- Flight simulators help pilots learn conditions such as fuel loss, engine failure, low visibility or insufficient runway space.

Virtual reality

THANK YOU