4th Class
Computers & Data Security
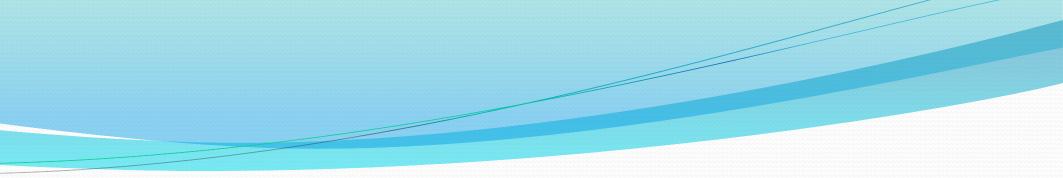
أمنية الحاسوب والبيانات

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Chapter 1
Basic Data Security Concepts

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Why is the Computer Security Important?

- Provide support for the critical business processes.
- Provide protection for the personal and sensitive information.

What will happen if your computer gets hacked?

- It could be used to hide some programs.
- It could generate a large amount of unwanted traffic.
- Some one could send illegal software from your computer to others without you realize it.
- Someone could access personal information.
- Someone could record all your keys that are used like passwords.

Good Security Standards :-

- If follows the rule of 90/10, it means that 10% of security are *technical* while 90% of security depends on *computer user* (you).

  - For example:- the lock of the door represent the 10% while the remembering to lock the door, checking if the door is closed, etc., this represents the 90%. So we need the both 90 and 10 to get the effective security.

Definitions

- **Computer Security :-** is the protection of computing systems and the data that they store or access. It refers to the technological safeguards and managerial procedures that can be applied to computer hardware, programs, and data.

- **Information systems security** is the ability to provide the services required by the user community while simultaneously preventing unauthorized use of system resources

- **Data Security :-** refers to the protection of data from accidental, or unauthorized modifications or destructions, or disclosure to unauthorized persons.

- **Privacy :-** it is the right of an individual to decide what information he wish to share with others and what information he will accept from others.

- **Identification :-** the identification of a user, file, program, or other object is the unique name or number assigned to that object.

- **Security Mechanism** :- means the mechanism that is designed to detect, prevent, or recover from security attack. Remember that no single mechanism will support all functions required.

- ***Privacy on Internet :-*** It means the measures to protect data during their transmission over a collection of interconnected networks. Social networking sites like Facebook, personal web pages have also become public sources of personal information.

- **Network Security** - measures to protect data during their transmission

- **Internet Security** - measures to protect data during their transmission over a collection of interconnected networks

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Information Access Problems

- There are several types of software that can be used to gain access to unauthorized data or information:-

a) *Trapdoors:* - A set of access points that are put in the system by programmer for the following possibility points:-

    1. To identify future modification of the system.

    2. To access to mistakes in the future.

    3. Allowing the designer of accessing to the program after the completion of its design.

- **Causes of Trapdoors:-**
- Usually the programmer must remove these points during program development but it can be found in the programs for the following reasons:-

    1. The programmer forgot to delete these points.

    2. Programmer usually leaves these points in order to help the rest of the parts of the program test or to assist in the maintenance of that program.

- So we note that the advantage of *Trapdoors* is that we can test the performance of the system, while the disadvantages are that it is used by the programmer for a break.

Information Access Problems

b) *Trojan Horse*

- For the similarity of his work with the legend of Trojan Horse wooden which hid by a number of soldiers Greeks and they were the reason to open the city of Trojan.
- It is a kind of software which is loaded with major program and doing some hidden functions that are often concentrated to penetrate the system.
- Trojan horses may steal information or damage the host computer systems and may be used for the download by search engines or by installing online games or applications based on internet taking advantage of security gaps that allow unauthorized access to the system.

c) *Salami Attack*

- Is a process similar to the process slicer where small deducted ((يستقطع)money from each account an amount so that this part is not observed in the normal case.
- This type of software is attacking the banks where the decimals deduct each amount daily and will be transferred to another account without being noticed and within days or months will get the beneficiary on the huge amounts of money.
- Also the customer who will be deducted from his account decimals will not demanding to clarify the matter because it will be regarded as the amount deducted is worthwhile.

Program Development Controls against Program Attacks

a) *Modularity:-* is the process of dividing a program into subtasks called (Modules), each task do certain function. There are several advantages from writing program into partial tasks:-

- **1. Maintainability:-** The maintenance of the system be directed process where only the specific module maintenance.
- **2. Understandability:-** Program which consists of several parts is easy to understand and know his work compared to if large.
- **3. Correctability:-** Easy follow-up errors as they arise and this will lead to speed in correcting these errors.

b) *Encapsulation:-* The concept of modularity lead to the independence of each module from the other, where each module is an independent object and this is known as the principle of encapsulation. When making a program, each module will be surrounded by a shield preventing unwanted access from the outside, so that the process of encapsulation does not mean isolating modules from other parts of the program but sets handle modules with each other, and this will reduce the covert channel used to penetrate the system.

c) *Information Hiding:-* Means hide the data and instructions of a module and this will lead to hide the function of module. This process is desired in terms prevents the programmer from doing penetrate the module unless it is to know how the module works.