Digital Planet: Tomorrow's Technology and You

Chapter 4 Software Basics

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Chapter 4 Objectives

- √ Describe three <u>fundamental categories((</u> الفئات) of software and their relationships
- \checkmark Explain the relationship of algorithms to software
- ✓ Compare and <u>contrast</u>(تناقض او تباین او مغایرة) PC (تناقض او تباین او مغایرة) applications and Web applications
- Describe the role of the operating system in a modern computer system

Objectives (cont.)

- ✓ Explain how file systems are organized
- ✓ Outline the evolution of user interfaces from machine-language programming to <u>futuristic</u> <u>interfaces(</u>للمواجهات المستقبلية)
- Describe some challenges of applying intellectual property laws to software

Computer System Components

✓ Hardware : Equipment associated with system

✓**Software** : instructions tell the computer what to do (programs).

√Users:

•Programmers.

○End-users.

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Processing with Programs

- ✓ Software enables people to communicate certain types of problems to the computer.
- ✓ Software makes it possible for computers to communicate solutions back to people.
- An *algorithm* is a set of step-by-step procedures for <u>accomplishing</u> (إنجاز) a task.
- Programmer's job is to turn the algorithm into a program by adding details, testing procedures, and <u>debugging</u>(المعالجة) or correcting errors.

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Categories of Software

انواع البرمجيات

✓ Software applications (تطبيقات برمجية)

- Serve as productivity tools to help users solve problems. E.g. MS Word, Google Chrome.
- √ System software (برمجيات النظام)
 - Coordinates hardware operations. E.g. OS.
- √ *Compilers* and translator programs (المترجمات)
 - Enable programmers to create other software.

A Fast, Stupid Machine

✓ Typical computer is only capable of:

- Performing basic arithmetic operations(عمليات حسابية)
 - Such as 7 + 3 and 15 8
- Performing simple logical comparisons (عمليات منطقية)
 - Is this number less than that number?
 - 5 >? 3 230 <? 150
 - Are these two values identical? 200 =? 200 60=?70

✓ Computers seem smart because they perform these operations quickly and accurately.

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The Language of Computers

✓ Every computer processes instructions in *machine language*.

- Numeric codes used to represent basic operations:
 - Adding and subtracting numbers (اضافة و طرح)
 - Comparing numbers (مقارنة)
 - Moving numbers and data. (نقل ارقام او بیانات)
 - Repeating instructions (تكرار تعليمات)
- ✓ Programmers use *high-level languages*.
 - C++, Java, and Visual Basic

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Software applications: 1- Consumer Applications

- Thousands of software titles are available:
 - Accounting software
 - Graphics programs
 - Educational titles
 - Games
 - Personal-information managers
 - Publishing programs
 - And more

Consumer Applications (cont.)

✓ *Documentation*:

Instructions for installing and using software—may be printed manuals or digital files

√ Updating (fix bug(إصلاح عطل او علة)

✓ **Upgrading** (add new feature) software.

✓ *Compatibility:* Read system requirements

Consumer Applications (cont.)

اٍخلاء المسؤولية Disclaimer ا

—an *end-user license agreement (EULA)*—protects companies from errors in programs.

✓ *Licensing:* Buy software license not program.

 \checkmark Distribution by direct sales or download from Web

Includes *public-domain software* and *shareware*

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Software applications: 2- Web Applications

✓ Growing trend toward using applications that run on remote Internet servers instead of local PCs.

التوجه الآن ان تكون التطبيقات موجودة على الويب، دون الحاجة الى ان تكون على اجهزتنا

- Google Docs
- Photoshop.com
- Webmail programs: Gmail, Hotmail, Yahoo! Mail
- Multiplayer games
- Wikis: Wikipedia
- <u>Retail sites</u>(مواقع البيع بالتجزئة): Amazon.com and online <u>auctions</u>(مزادات), eBay

• Online communities: Facebook Copyright © 2012 Pearson Education, Inc. publishing as Prentice Hall STUDENTS-HUB.com

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Vertical-Market Applications 3-Custom Software

✓ Basic office applications are used in homes, schools, government offices, and all types of businesses.

✓ Other applications are job specific, e.g.,:

- Medical billing software (نظام الفوترة في المستشفيات)
- Library cataloging software (نظام المكتبة)
- Legal reference software (نظام المكتبة القانونية)
- Restaurant management software (نظام ادارة لمطعم)

✓ Tend to cost <u>far more than</u>(أكثر بكثير من) mass-market applications.

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System Software: The Hardware-Software Connection

- ✓ System software (برمجيات النظام): Class of software that includes: 1-operating system 2-utility programs
- Handles low-level details and hundreds of other tasks behind the scenes
- \checkmark User does not need to be concerned about details.

مثل :نظام ادارة الملفات، نظام اعادة ترتيب ال HardDisk، وغيرها

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What the Operating System Does مهمات نظام التشغيل

✓ Every computer depends on an *operating system* to:

- Keep hardware running efficiently
- Make process of communication with hardware easier
- Maintains file system.
- Supports *multitasking:* <u>concurrent execution</u>)
 (of multiple applications.
- Manages *virtual memory*

✓ Operating system runs continuously when computer is on

تشغيل البرامج الأخرى، ادارة الملفات على الجهاز، ادارة الذاكرة والذاكرة الأفتراضية، تمكين البرامج من العمل بشكل متوازي، وغيرها STUDENTS-HUB.com Uploaded By: anonymous

What the Operating System Does



The User's View

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√ Serve as tools for doing system maintenance (صيانة) and repairs (اصلاح) not handled by operating system

 \checkmark Utilities make it easier for users to:

- Copy files between storage devices (نسخ ملفات)
- Repair damaged data files (اصلاح اعطال)
- Translate files so different programs can read them
- Guard against viruses and other harmful programs
- Compress files so they take up less space



- ✓ Small programs that enable input/output devices to communicate with the computer, such as:
 - Keyboards
 - Mice
 - Printers
- √ Many *device drivers* are <u>bundled</u>(المجمعة) with peripherals

\checkmark Others are sold as separate products

المشغلات هي برامج تمكن الجهاز من الادارة والتعامل مع الاجهزة والملحقات المتصلة بالجهازي مثل الطابعة، نظام الصوت، الكاميرا، ،غيرها STUDENTS-HUB.com

Where the Operating System Lives اين يخزن نظام التشغيل

- ✓ Some computers store operating systems in ROM. Such as OS for smart phones or game machines.
- Handheld devices may store operating system in flash memory
- ✓ Most modern PCs hold only a small portion of the operating system in ROM, rest is hold in Hard disk.
- Remainder of operating system is loaded during *booting*, when computer is turned on.

The Operating System

When you turn on the computer, the CPU automatically begins executing instructions stored in ROM. The operating system (OS) loads from the disk into part of the system's memory.

عند تشغيل الجهاز، يبدأ المعالج الرئيسي (CPU)بتنفيذ التعليمات المخزنة ب ال (ROM)، وتكون هذه التعليمات هي احضار نظام التشغيل من (harddisk)الى الذاكرة، ومن ثم يقوم الجهاز بتنفيذ تعليمات نظام التشغيل



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The Operating System (cont.)

The OS loads the application program into memory and remains in memory, so it can provide services to the application program—display on-screen menus, communicate with the printer, and perform other common actions.



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The Operating System (cont.)

To avoid losing your data file when the system is turned off, save it to the disk. When you reopen the file, the OS locates it on the disk and copies it into memory.



The User Interface: The Human–Machine Connection

- *User interface (פוجه المستخدم)*: Critically important
 component of software
- √ Early users spent <u>tedious</u> (شاقة ،مملة) hours writing and <u>debugging</u> (تصحيح ،معالجة) machine-language instructions.
- Later users programmed using easier languages that were still challenging.
- ✓ Now, most users work with preprogrammed applications.

Desktop Operating Systems

✓ MS-DOS: Standard on IBM-compatible computers in 1981

- Used *command-line interface* that required users to type commands.
- E.g. cd C:\ , del, cls , etc...

✓ Apple Macintosh introduced windows, icons, and mouse-driven, drop-down menus in 1984.

✓ Windows and Mac OS started as single-user operating systems but today support multiple users.

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UNIX and Linux

✓ UNIX: Command-line, character-based OS

- Internet is populated with computers running UNIX
- Enables timesharing computer to communicate with several other computers at one time
- OS of choice for workstations and mainframes in research and academic settings
- Favored by many who require an industrial-strength, multiuser OS

✓ Linux, a UNIX clone, is distributed and supported free

Hardware and Software Platforms

Microsoft Windows 7: Introduced in 2009 is latest version. Used for PC.

- ✓ Microsoft Windows Server: Runs on small servers to <u>the mightiest</u> (الأقوى) hardware
- ✓ Windows Embedded CE: Designed for devices such as robots, voting machines, music players, etc.
- ✓ Windows Phone 7: New OS for mobile phones
- ✓ Mac OS X (10): Standard for the Mac

Hardware and Software Platforms (cont.)

- ✓ **iOS**: Used for iPhone, iPad, and iPod
- ✓ Linux, Sun Solaris, and other Unix variations
- ✓ Google Chrome OS: Linux based OS for low-cost PCs, netbooks, and tablet devices
- ✓ **Google Android:** Designed for smart phones
- √ Blackberry OS: Proprietary (يمتلك) multitasking OS
- ✓ Palm WebOS: Proprietary smart phone OS

(قضايا التوافق) Compatibility Issues



- Operating systems are designed to run on particular hardware platforms.
- Applications are designed to run on particular operating systems.
- Most cloud applications are designed to run on multiple platforms.

Software Piracy and Intellectual Property Laws

- √ Software piracy (قرصنة): Illegal duplication of متفشي .copyrighted software—is rampant
- Few software companies use physical copy protection methods and that makes copying easy
- ✓ Many people unaware of laws
- \checkmark Others simply look the other way

The Piracy Problem

- √ Software industry loses billions of dollars every year to software pirates (القراصنة).
- ✓ <u>Business Software Alliance</u>(تحالف برامج الأعمال)(BSA) estimates that more than one-third of software in use is <u>illegally copied</u> (تم نسخها بشكل غير قانوني).
- \checkmark Piracy is particularly hard on small companies.
- ✓ Piracy rates are highest in developing countries.
- √ Industry organizations work with law enforcement agencies (وكالات تنفيذ القانون) to crack down (القضاء على) on piracy.

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Intellectual Property and the Law

- Includes the results (ملكية فكرية) Includes the results of intellectual activities in the arts, science, and industry
- ✓ Copyright laws (حقوق ملكية): Protects books, plays, songs, paintings, photographs, and movies
- √ *Trademark* law (علامة تجارية): Protects symbols, pictures, sounds, colors, and smells.
- √ Patent law (براءة اختراع): Protects mechanical inventions
- √ *Contract* law (عقود): Covers trade secrets

\checkmark Under the law, software does not fit in these categories.

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