

INTRODUCTION TO ICT

Lesson 4 Computer software

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CONCEPT

- All operations of computer are based on programs, created by human and stored in computer
- A computer program is a collection of instructions that direct the computer to performs a specific task
- A Computer software = program + data

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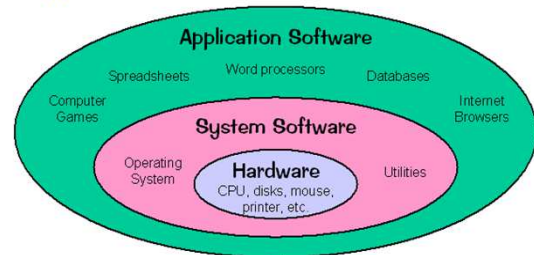
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CLASSIFICATION

- System software
- Application software



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Classification

- System software:
 - Operating system
 - Utility programs
 - Drivers
 - Compilers/Translators

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Classification

- Operating Systems:
 - A collection of programs that make the computer hardware conveniently available to the user and also hide the complexities of the computer's operation
 - An interface between the application software & computer
 - E.g.: Windows 10, Linux
- Utility programs:
 - Small, powerful programs with a limited capability
 - Usually operated by the user to maintain a smooth running of the computer system.
 - E.g.: file management (copy, paste, delete, file searching), disk defragmenter, disk cleanup.

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Classification

- **Drivers:**
 - Control IO devices
 - E.g.: GPU driver, NIC driver
- **Compilers/Translators:**
 - A computer program (or a set of programs) that transforms source code written in a high level programming language into computer language
 - E.g.: dev C, gcc, gfortran

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Classification

- **Application software:**
 - Software designed to help the user to perform specific tasks
 - E.g.: Computer games, Word processors, Spreadsheets, Databases, Internet browsers, ...
 - Specialized application software: graphics software, Audio and Video software, Multimedia software, Internet browser, Artificial intelligence software, Mobile app
 - Application software store: Apple App Store, Google Play Store, Microsoft Windows Store

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Other classification

- **Based on copy right:**
 - Commercial software
 - Public-domain software
 - Share software
 - Free software
 - Rental software
 - Open-source software

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Other classification

- **Commercial software**
 - Sell to the users
 - User need right/permission/license to use
 - Three types of license:
 - Site licenses: allows software to be used on all computers in the specified location
 - Concurrent-user licenses: Allow some copies of the same used simultaneously
 - Multiple-user license: determine how many people can use the software
 - Single-user license: limited software for one user only

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Other classification

- **Public-domain software**
 - No copyright
 - Free to copy
- **Share software**
 - Copyright register
 - Free to use
 - User should share finance
- **Free software**
 - Copyright register
 - Free to use

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Other classification

- **Rental software**
 - Copyright
 - For rent
- **Open-source software**
 - Provide source code
 - Free
 - The users can adapt, improve, develop
 - E.g.: Linux, Ubuntu, Open office, Firefox

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Other classification

- **Based on area of application and environment:**
 - Real-time software
 - Business software
 - Engineering and science software
 - Embedded software
 - Web-based software
 - Artificial Intelligence software

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OPERATING SYSTEM

- OS is a collection of programs that controls the basic operations of computers
- OS is the most important software of the computer
- So-called platform software

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Functions of OS

- **Manage computer resources:**
 - Manage and coordinate CPU, Memory, IO devices
 - Monitor performance of the system
 - Provide the ability for computer security
 - Start the computer
- **Provides user interface:**
 - Command line interface based on characters (Old OS)
 - Graphical user interface (Graphic User Interface - GUI)
- **Load and run the application program:**
 - Most of the OS supports multitasking (multitasking): allows to run multiple applications simultaneously
 - Management of applications running on the computer

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Features of OS

- Desktop: provides interface to access computing resources
- Icons: graphically represent for programs or data file
- Pointer
- Windows: Display information
- Menu: provides a list of options or commands
- Toolbars: consist of the number of buttons for quick access to control commands
- Dialog box: provides information or ask users to enter data.
- Help: provides manual of OS

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Classification of OS

- **Stand-alone OS**
 - Use on desktop or laptop
 - Installed on HDD or SSD
 - E.g.: Microsoft Windows, Apple Mac OS, Linux
- **Embedded OS**
 - Use on mobile devices or embedded computers
 - Stored in ROM or flash memory
 - E.g.: iOS, Android, Windows Phone
- **Network OS**
 - Control and coordination of networked computers
 - Installed on HDD of server
 - E.g.: Windows Servers, Unix / Solaris / BSD, Linux

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Main operations of OS

- Start computer
- Manage CPU
- Manage Memory
- Manage File
- Manage Task
- Manage safety

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Main operations of OS

- Start computer
 - Cold boot: Power up the computer (turn on)
 - Warm boot: Restart the computer (restart)
 - Boot Disk:
 - Use CD or flash drive containing all the files to boot OS
 - Used when the hard drive containing the OS broken.

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Main operations of OS

- Manage CPU
 - Is the kernel of OS
 - Stored in the main memory when the computer is running
 - Load and run other programs which are not resident in the main memory

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Main operations of OS

- Manage Memory
 - Divide and manage the area in the main memory to store programs and data
 - Exchange between main memory and the external memory
 - Memory management:
 - Partitioning: split memory into separate stacks, each stack can contain programs or data.
 - Foreground / Background: the program is located in the foreground has a higher priority.
 - Queues: the program is waiting in hard disk (First-In First-Out). The queue stored temporary programs or data.

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Main operations of OS

- Manage File
 - File is a collection of related information
 - Files can be programs or data
 - Files are stored in external storage
 - OS manage files on external storage: store, copy, delete, rename, move.
 - Folder (directory): contains files or subdirectories.

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Main operations of OS

- Manage Task
 - Single-tasking OS:
 - Allow a single application/program running at a time
 - User must close running program before opening another application
 - Multitasking OS:
 - Allows multi - application/program running at a time
 - Today: popular OSs are multitasking

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Main operations of OS

- Manage safety
 - Manage access of computer from/to network
 - Manage User name (ID) and Password

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Quy trình phát triển phần mềm máy tính

- B1: Xác định bài toán:
 - Xác định yêu cầu người dùng
- B2: Phân tích bài toán:
 - Tìm hiểu nhiệm vụ (chức năng) mà phần mềm cần xây dựng phải có và các dữ liệu cần thiết.
 - Xây dựng các giải pháp khả thi.
 - Tìm hiểu **hệ thống là gì? Và làm gì? (What)**
- B3: Thiết kế hệ thống:
 - Thực hiện thiết kế kiến trúc hệ thống, thiết kế các mô đun chương trình, thiết kế giao tiếp, thiết kế an toàn,....
 - Thiết kế mô đun chính là xây dựng giải thuật cho mô đun đó và cách diễn tả giải thuật.
 - Hệ thống cần được làm **như thế nào? (How)**

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Quy trình phát triển phần mềm máy tính (tiếp)

- B4: Xây dựng chương trình:
 - Viết mã nguồn (source code) cho các mô đun theo ngôn ngữ lập trình đã xác định.
- B5: Kiểm thử chương trình:
 - Nhằm kiểm tra tính đúng đắn của từng mô đun và cả hệ thống trước khi bàn giao cho khách hàng.
- B6: Triển khai:
 - Cài đặt, triển khai cho khách hàng (người dùng) sử dụng chương trình
 - Viết tài liệu hướng dẫn sử dụng cho phần mềm
- B7: Bảo trì:
 - Sửa các lỗi trong quá trình người sử dụng dùng thử chương trình trong thời gian đầu.

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