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CS340

Part A: Describe and give an overview of the Unix and Windows Operating System.

There are many operating systems in today's computerized world.  Two of the most popular operating systems today are Windows and Unix.  Unix was designed to let multiple users access a single computer and share its resources.  The Unix operating system coordinates the use of the computers resources  allowing multiple users to use the computer simultaneously. Unix was originally designed by programmers for programming.

Unix was first introduced in 1969 designed by Bell Laboratories PDP-7. Since Unix was first introduced, it had an i-list. A list of nodes containing information about a file.  The information contained file size, authorizations ( who is allowed to do what to the file), type and the physical blocks that were holding the content.  A number was specified to a specific file or folder. Important system calls were also available at the time, such as Read, Write, Open, Close.  Although path names in the early Unix system were missing and the Unix System simply took the file-name as an argument instead of today's “/usr/bin/file.txt”.  This made it hard to use sub-directories and in the  early Unix System, there was no way to create a directory while the system was running.  Directories were made from paper tape while the system was undergoing recreation of the file system.

            The early Unix System PDP-7 also had process control which allowed the created of process creation and use.  The early system only had one process control command which was “exit” as opposed to the PDP-11 which had “fork”, “wait”, “exec” and “exit”.  In the early Unix Systems PDP-7, everything was written in assembly. In the PDP-11 system, only the assembler itself is written in assembly while everything else is written in C.

            Unix has three main components which consists of the kernel, the shell , and tools and applications.  The kernel controls all the hardware and is responsible for turning parts of the system on and off at the user’s discretion.   The shell is used to send commands to the system which is interpreted and executed.  The tools and applications are programs which can be run in Unix such as word processors, program applications, and etc.  Another great aspect of Unix is that it is freeware, meaning that you don't need to buy it to use it.

Windows operating system came after Unix.  Even though Unix was first, Windows is the most popular operating system today.  Windows operating system was started by Microsoft.  In its early form, the operating system consisted of MS-DOS, which was effective but difficult for common user to comprehend.  In November 1985, Windows allowed users to simply use a mouse to click on the screen and give it commands that way.  This was very easy to learn and use from a user perspective, which made Microsoft very appealing. With this also came Generation 1 computers. User were able to use multiple programs at once.  There was no need to close one program to open another.  Windows 2.0 is released in December 9, 1987 with improved speed, graphics and user control interfaces.  Windows 95 was released in August 24, 1995.  Windows 95 had built in Internet support, dial up networking and the new Plug and Play capabilities to easily install and detect new hardware. With the release of Windows 98, came discs, DVDs, and USB devices.  With the introduction of Windows NT (New Technology) came the micro-kernel. Newer versions such as Windows XP, Windows Vista, and Windows 7 continued to improve user interfaces and increase performance of programs.  Along with increased performance, memory and applications, windows also worked to secure the operating system and the information in memory.  Security was a key concern.   Although Windows was more user friendly, Windows also needed to be purchased.

Part A Resources

<http://www.bell-labs.com/history/unix/tutorial.html>

<http://cm.bell-labs.com/cm/cs/who/dmr/hist.html>

<http://windows.microsoft.com/en-US/windows/history>

Part B: Give Examples of Real-Time Operating Systems.

Real-Time operating system must be able to very reliable and run programs with precise timing.  Each operation performed must have a known maximum time for the operation to finish. Some examples of Real-Time Operating Systems are :

LynxOS

OSE

QNX

RTLinux

VxWorks

Windows CE

Are Embedded Systems the same as Real-Time Systems?

Embedded Systems are designed to handle a specific task as opposed to a PC which can handle a variety of task.  Embedded Systems are oftern programmed with Real-Time computing constraints. Because Embedded Systems are designed to handle a specific task, the task can be optimized for efficiency and reliability.  Embedded Systems are not the same as Real-Time Systems, since Real-Time Systems require a set amount of time for a task to finish while Embedded Systems can have a set amount of time for a task to finish but is not required. Embedded Systems can range from a variety of devices such as digital watches, MP3 Players, hand-held computers and etc.

Describe Multithreaded System.

Multithreaded systems allow for a single process to have multiple threads.  The single process can execute these multiple threads and each thread can be executed independently.  This is more efficient since a thread in a certain process may not be in use and can be stalled or terminated if the process is no longer using it.

Part B Resources

<http://zone.ni.com/devzone/cda/tut/p/id/3938>

<http://en.wikipedia.org/wiki/Real-time_operating_system#Examples>

<http://zone.ni.com/devzone/cda/tut/p/id/3938>

<http://en.wikipedia.org/wiki/Embedded_system>

<http://en.wikipedia.org/wiki/Real-time_operating_system#Examples>

<http://kevinhaghighat.com/Papers/Multithreading.pdf>

<http://en.wikipedia.org/wiki/Thread_%28computer_science%29>

Part C: Overview of Interrupts and Interrupt Request.

An interrupt is an event that causes the processor to stop what it is currently doing, save its current state so that it can execute and interuption handler.  The act of interrupting is known as and Interrupt Request. When working with hardware, an interupt can be the act of removing or installing devices.

<http://en.wikipedia.org/wiki/Interrupt_request>

<http://en.wikipedia.org/wiki/Interrupt>

Unix man trap

Trap takes an argument and applies that argument to the specified signal. If no argument is given then the default action will be implemented associated with the specified signal.