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BSIT – 301

Name	Type	Status	Publisher	PID	Process name	Command line
Apps (7)						
> 📊 Calculator (2)	App	🌿				
> 🔵 Google Chrome (20)	App		Google LLC			
> 🟠 Groove Music (2)	App	🌿				
> 🔵 Microsoft Edge (11)	App		Microsoft Corporation			
> 📄 Notepad	App		Microsoft Corporation	6724	notepad.exe	"C:\Windows\system32\notepad.exe"
> 🖥 Task Manager	App		Microsoft Corporation	8748	Taskmgr.exe	"C:\Windows\System32\Taskmgr.exe" /3
> 🖼 Windows Wordpad Application	App		Microsoft Corporation	4368	wordpad.exe	"C:\Program Files\Windows NT\Accessories\...

The top of the column also shows the total resource usage of all the processes on your system Type: The category of the process, which is App, Background process, or Windows process. Status: If a program appears to be frozen, "Not Responding" will appear here. Programs sometimes begin responding after a bit of time and sometimes stay frozen. If Windows has suspended a program to save power, a green leaf will appear in this column. Publisher: The name of the program's publisher. For example, Chrome displays "Google Inc." and Microsoft Word displays "Microsoft Corporation." PID: The process identifier number Windows has associated with the process. The process ID may be used by certain functions or system utilities. Windows assigns a unique process ID each time it starts a program, and the process ID is a way of distinguishing between several running processes if multiple instances of the same program are running. Process Name: The file name of the process. For example, File Explorer is explorer.exe, Microsoft Word is WINWORD.EXE, and the Task Manager itself is Taskmgr.exe. Command Line: The full command line used to launch the process. This shows you the full path to the processes .exe file (for example, "C:\WINDOWS\Explorer.EXE") as well as any command-line options used to launch the program.

Part II

1. Search for relative studies and/or literature regarding the process and thread concepts of the following operating systems.

   A. Linux OS

A process in LINUX is a single program running in its own virtual space on the operating system. To create a process in LINUX, the 'parent process' initiate a fork().
Fork () suggests that the process creates a copy of itself. A process in LINUX is represented by a data structure (like PCB) is called 'task-struct'. It contains the all information about the process.

2.

Provide a diagram showing the process and thread construct of the operating system. (5 points)
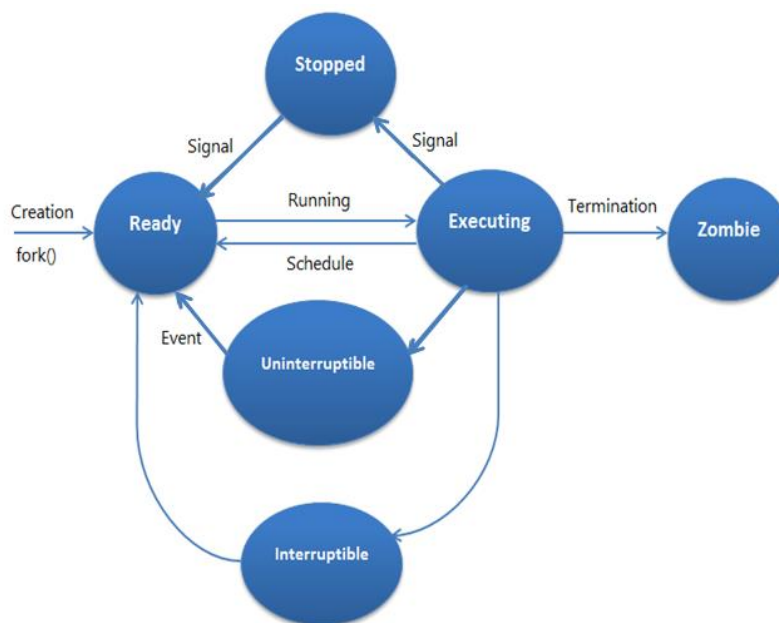

Fig: Process / Thread States in LINUX

• Briefly explain the diagram that you have provided. (5 points)

Running: It includes two states, Ready and Executing. Interruptible: It is a suspended state when the process or thread is waiting for an event, then it enters into an interruptible state. Uninterruptible: It is another suspended state, here the process or thread is waiting directly on Hardware conditions. Stopped: The process or thread has been halted and it can only resume by a positive action from another process or thread. Zombie: It terminates when the execution completes.

• How does the operating system support or implement multithreading? (5 points)

In Linux OS Simultaneous multithreading is also referred to as SMT or Hyper-Threading in the context of Linux. When multithreading is enabled, Linux maps a single physical core to many logical CPUs. As a result, during each cycle, many threads may simultaneously send instructions to a core.

 • Is it possible to increase the number of threads within processes without affecting the average response time of this operating system? Why or why not? (5 points)

Yes, by expanding total virtual memory, one can increase the number of threads per process. The restriction is more likely to be the maximum stack size per thread than anything else. Another method to raise the overall number of threads is to decrease the per-thread stack size.

• What are the possible effects of multithreading in the central processing unit (CPU) utilization of this operating system? Rationalize your answers. (5 points)

It is advantageous to use multithreading to fully utilize a processor's processing capabilities. A parallel application will spawn numerous worker threads that do the same computation on various portions of the data.

• Properly cite all your references (i.e., books, articles, dissertations, websites, etc.). (5 points)

https://www.ibm.com/docs/en/linux-on-systems?topic=mc-simultaneous-multithreading-4

https://webeduclick.com/linux-process-and-thread-management/

https://www.linkedin.com/pulse/importance-task-manager-fahimhusain-raydurg

https://www.baeldung.com/linux/max-threads-per-process

https://www.sciencedirect.com/topics/computer-science/multithreading