Process Management - Windows

OPS102 Week 5 Class 2

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Outline

Processes Recap

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- Everything that runs on a computer is a process
  - Mostly – “threads” are kind of like lightweight processes inside a larger one
- Processes in Linux are hierarchical – every process has a parent
- We have tools like `"ps"`, `"pstree"`, and `"top"`
- The shell allows foreground, stopped, and background processes
- We can send signals to processes with the `"kill"` command
  - Signals have default actions, and can usually be caught or ignored by a process e.g. for cleanup steps
- In code: fork(), exec() (family of similar functions), wait()

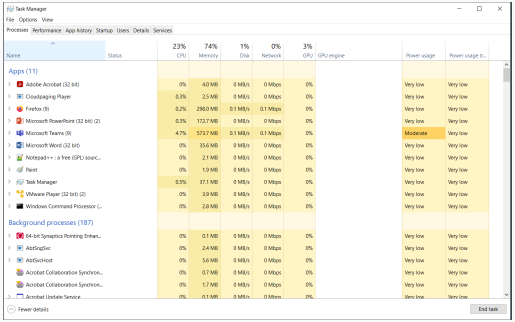
Processes in Windows

Processes in Windows

- Windows generally says “task” rather than “process”
- Generally a hierarchy of parent and child processes
- Running as different users
- In code: CreateProcess(), WaitForSingleObject(), CloseHandle()
- https://learn.microsoft.com/en-us/windows/win32/procthread/processes-and-threads

Monitoring Processes in Windows

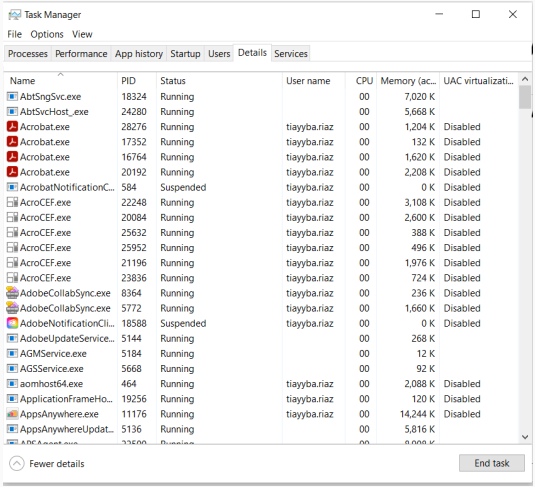
- Task manager is the unified user interface for monitoring processes in Windows
- You can bring task manager by right clicking in the task bar and selecting the task manager in the context menu.



- Typical view:
- Monitor resource usage e.g.:
  - CPU
  - Memory
  - Disk
  - Network
  - GPU

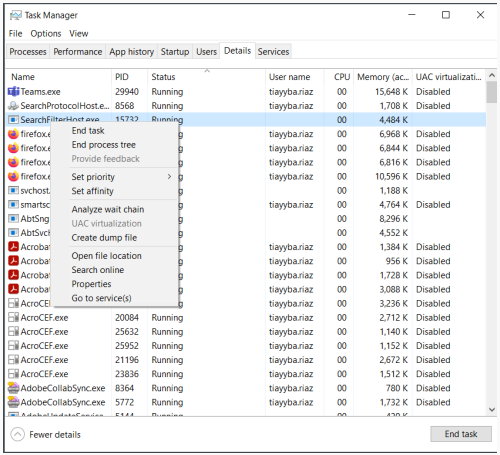
Process States in Windows

The Details tab of Task Manager shows the process states.



Process Control in Windows

- Whenever an application is started, a process is created.
- This can be viewed in the task manager
- Right clicking on the process name shows actions that can be taken on the specific process. This includes(among others):
  - End task
  - Set Priority
  - Set Affinity

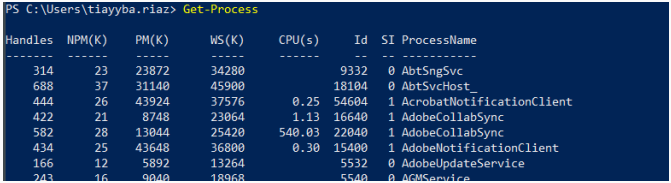


Managing Processes Using PowerShell

- Windows PowerShell provides the following commands for managing process.

Get-Process	Get a list of running Windows processes
Start-Process	Start a process/program
Stop-Process	Forcibly stop (kill) a process
Debug-Process	Debug a process
Wait-Process	Wait until a process ends

- Monitoring processes using Get-Process



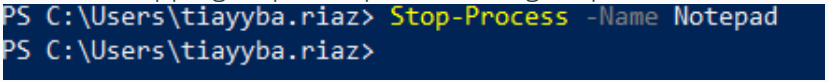
Monitoring a specific process using Get-Process

```
PS C:\Users\tiayyba.riaz> Get-Process firefox

Handles  NPM(K)    PM(K)      WS(K)     CPU(s)      Id  SI ProcessName
-------  ------    -----      -----     ------      --  -- -----------
    218      14    20292      19464       0.17   17132   1 firefox
    881      67   298540     322252      24.38   23620   1 firefox
    253      18    26428      31548       0.08   28196   1 firefox
    322      31    65148      95496       8.72   29760   1 firefox
   1875     114   248104     333156      42.95   42932   1 firefox
    329      22    39708      34388       0.17   43640   1 firefox
    317      49   130784     158768       6.80   43680   1 firefox
    316      25    37392      53520       0.41   50812   1 firefox
    253      17    20708      19748       0.14   51880   1 firefox
    253      18    26528      31700       0.08   55476   1 firefox
    253      18    26540      31652       0.09   56896   1 firefox
    183      14    20860      18164       0.06   63492   1 firefox
    339      27    41328      69204       0.70   64508   1 firefox
    345      51   195056     233072      21.73   64860   1 firefox
    210      18    20324      18416       0.06   65256   1 firefox
    317      30    51260      78016       1.31   66640   1 firefox
    314      22    27872      42884       0.25   67532   1 firefox
```

Managing Processes Using PowerShell

Stopping a specific process using Stop-Process



Summary – Same as Last Class

- Process management is an important component of every operating system.
- As users, we should monitor the processes for better system performance.