

Project #1. Resource Management

Operating systems manage the hardware and software resources on computers. Most operating systems come with built-in tools for monitoring the usage of the resources. Following are some of the well-known tools on Windows platform.

A. Task manager (工作管理員)

You can right click on the Windows tool bar and select 'task manager' to launch the Windows Task Manager as shown in Figure 1 and Figure 2.

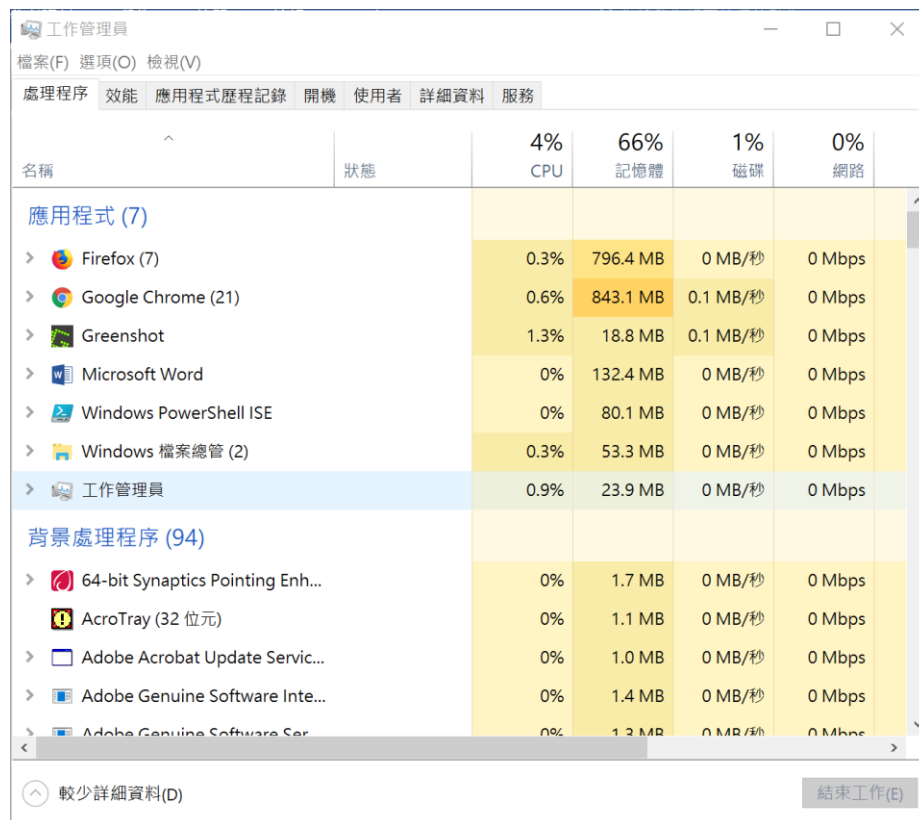


Figure 1. Windows Task Manager showing the list of running processes and their respective resource usages

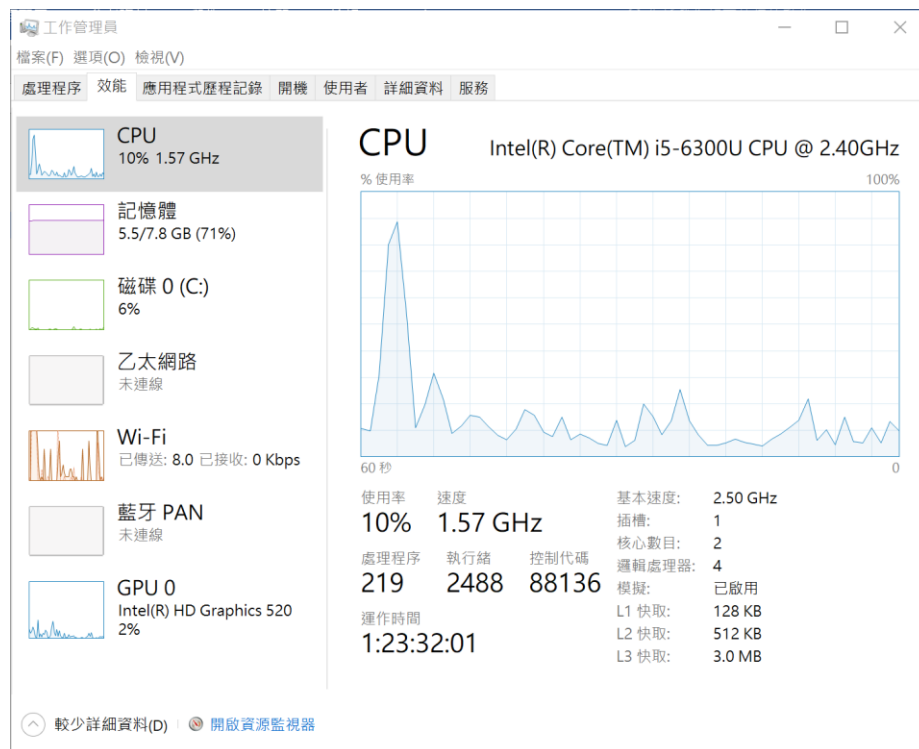


Figure 2. Windows Task Manager showing the overall resource usages on the system

You may find walkthrough articles on the Internet:

<https://www.lifewire.com/task-manager-walkthrough-4029769>

<https://www.howtogeek.com/108742/how-to-use-the-new-task-manager-in-windows-8/>

B. Resource Monitor (資源監視器)

The Windows resource monitor (Figure 3) shows how the resources (CPU, memory, Disk I/O) are consumed by each process.

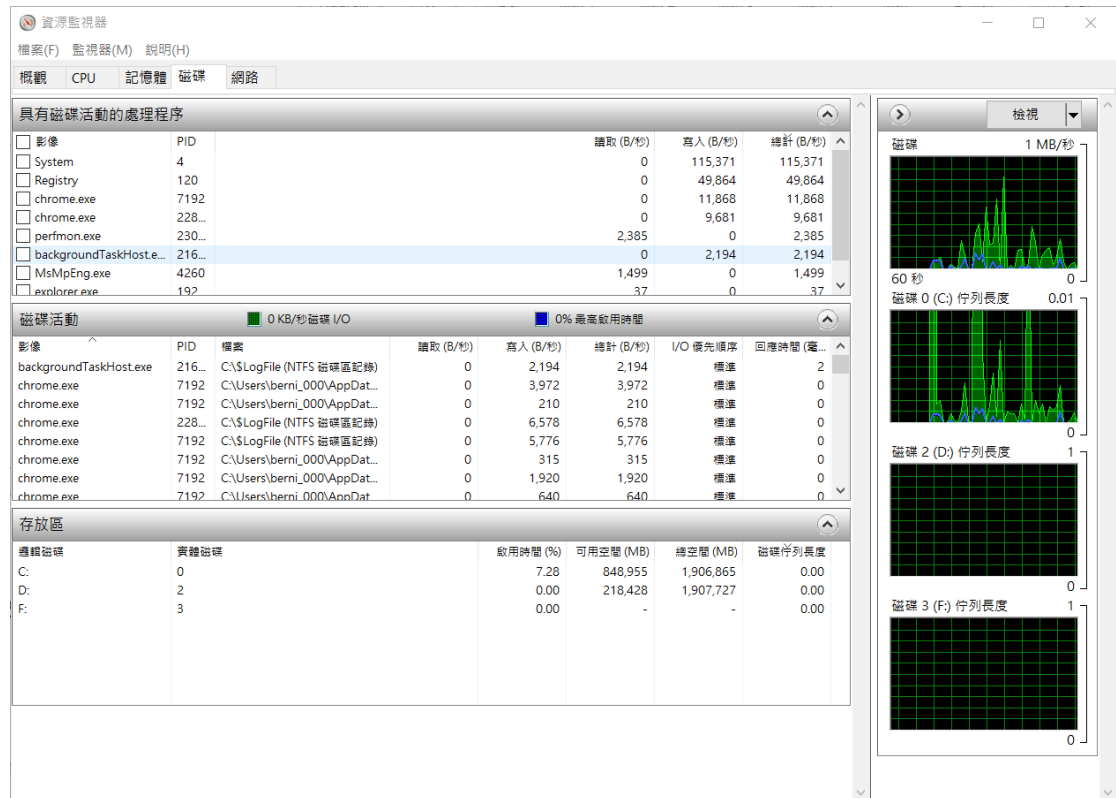


Figure 3. Resource Monitor showing the detailed resource usages

C. Process Explorer

Process explorer is a very popular third-party tool for showing the resource usages by the running processes. It provides a lot more details in which we will cover later in this course. A neat feature is that you can save the monitoring data by clicking File -> Save.

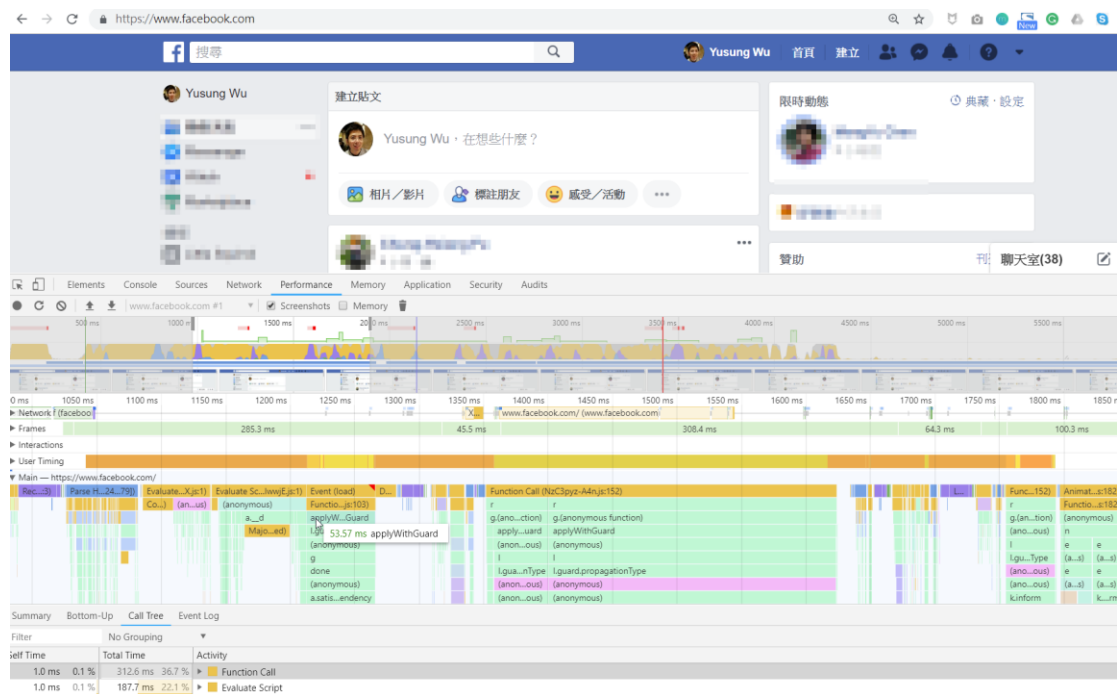
<https://docs.microsoft.com/en-us/sysinternals/downloads/process-explorer>

Process	CPU	I/O Read	I/O Write	Private Bytes	Working Set	PID	Description	Company Name
IntelCpHeciSvc.exe				1,408 K	4,736 K	5384	IntelCpHeciSvc E...	Intel Corporatio
IntelCpHDCPSvc.exe				1,436 K	4,712 K	4644	Intel HD Graphic...	Intel Corporatio
imeBroker.exe				3,060 K	9,660 K	7760	Microsoft IME	Microsoft Corpo.
igfxEM.exe		16.0 MB	34.8 KB	7,564 K	26,596 K	928	igfxEM Module	Intel Corporatio
igfxCUIService.exe				1,740 K	6,248 K	2144	igfxCUIService M...	Intel Corporatio
ibtsiva.exe				1,116 K	3,168 K	4840	Intel(R) Wireles...	Intel Corporatio
ibmpmsvc.exe				2,000 K	5,308 K	2408	Lenovo Power Man...	Lenovo.
googledrivesync.exe		47.8 MB	75.6 MB	2,772 K	3,188 K	14716		
GoogleCrashHandler64.exe				1,656 K	464 K	10456		
GoogleCrashHandler.exe				1,776 K	1,268 K	10448		
fontdrvhost.exe				3,292 K	2,688 K	400		
firefox.exe		95.8 MB	196.0 KB	60,376 K	94,720 K	15204	Firefox	Mozilla Corpora.
firefox.exe		95.6 MB	33.5 KB	21,240 K	34,176 K	15156	Firefox	Mozilla Corpora.
escsvc64.exe				1,596 K	5,568 K	4716	Epson Scanner Se...	Seiko Epson Cor.
Dropbox.exe		112 B	181 B	1,956 K	7,060 K	3040	Dropbox	Dropbox, Inc.
Dropbox.exe			158 B	1,392 K	5,876 K	14548	Dropbox	Dropbox, Inc.
dllhost.exe		7.9 KB		1,580 K	6,228 K	12712	COM Surrogate	Microsoft Corpo.
dllhost.exe		6.9 MB	1.3 MB	2,240 K	9,504 K	7132	COM Surrogate	Microsoft Corpo.
DbxSvc.exe				2,576 K	4,140 K	4792	Dropbox Service	Dropbox, Inc.
dashHost.exe				7,520 K	12,220 K	2872		
CxUtilSvc.exe				1,540 K	5,284 K	4688	Utility Service	Conexant System.
CxAudMsg64.exe				1,948 K	5,752 K	4700	Conexant Audio M...	Conexant System.
ctfmon.exe		1.1 MB		8,636 K	18,636 K	8424		
csrss.exe				1,776 K	4,364 K	628		
conhost.exe				5,352 K	3,400 K	4488		
conhost.exe				5,444 K	520 K	17248	主控台視窗主機	Microsoft Corpo.
cmd.exe				1,952 K	272 K	11936	Windows 命令處理...	Microsoft Corpo.
chrome.exe		113.0 MB	17.9 MB	332,288 K	325,476 K	5452	Google Chrome	Google Inc.
chrome.exe		86.8 MB	244.9 KB	22,460 K	24,468 K	8136	Google Chrome	Google Inc.

CPU Usage: 14.42% Commit Charge: 75.51% Processes: 220 Physical Usage: 68.12%

D. Web Browser Console (網頁主控台)

The web browser by itself is also an operating system. A web application typically consist of multiple components (HTML, Javascript, CSS, plugins, Flash, etc.) from many sources. The web browser console can show the details of the components and resource usages. The console can be invoked by pressing F12 or Ctrl+Shift+I on most browsers (e.g., Firefox, Chrome, etc.)



<https://developers.google.com/web/tools/chrome-devtools/?hl=zh-tw>

<https://developers.google.com/web/tools/chrome-devtools/evaluate-performa>

<nce/timeline-tool?hl=zh-tw>

<https://developer.mozilla.org/zh-TW/docs/Tools>

E. Application Workload

For the tasks of this homework, we will use the following application workloads:

[AW_Download]. Download Windows ISO image from CA.nctu.edu.tw

ftp://ca.nctu.edu.tw/For_Windows/System/Windows/10_64bit/Chinese/%28C%29Windows_10_1511_Education_64bit.ISO

[AW-Decompress]. Decompress the Firefox source code¹

```
7z x firefox-65.0b9.source.tar.xz
```

[AW_Untar]. Untar the Firefox source code

```
7z x firefox-65.0b9.source.tar.xz
```

[AW_Mining]. Run Monero miner on your web browser. Following are a few miners you may give a try

<https://minexmr.stream/>

<https://coinhive.com/>

Use as many ‘threads’ as the number of processor cores on your system.

You can use CPU-Z² to determine the number of processor cores.

The miner may require you to enter your Monero address for receiving earnings from the mining. If you don’t want to bother creating your own address, you may just use the follow address:

```
4B7evqALRhWGnTvQYP1iQBWbLEcwkXkYN52Jf4Eo1EBKW6rEbKkXk  
DsJNfojPxWCL2jPSU6AioPKqghYZMrziivNP5VeTVJ
```

¹ <https://archive.mozilla.org/pub/firefox/releases/65.0b9/source/firefox-65.0b9.source.tar.xz>

² <https://www.cpuid.com/softwares/cpu-z.html>

Tasks

A. Run [AW_Download].

1. Observe and report the resource usages (CPU, Memory, I/O) on your system.
2. Measure the execution time.

B. Run [AW-Decompress].

1. Observe and report the resource usages (CPU, Memory, I/O) on your system.
2. Measure the execution time.

C. Run [AW_Untar].

Observe and report the resource usages (CPU, Memory, I/O) on your system.

D. Run [AW_Mining].

Observe and report the resource usages (CPU, Memory, I/O) on your system.

E. Run [AW_Download] and [AW_Mining] at the same time.

Report whether the execution time of [AW_Download] is affected as compared to the measurement in Task A

F. Run [AW-Decompress] and [AW_Mining] at the same time.

Report whether the execution time of [AW-Decompress] is affected as compared to the measurement in Task B