

## Part 1

Q1. Look at the data on the file system (Click on Data Sources and look at the hex values on the right). The file system has no files, but why are we able to find items on the disk image? Explain why the file system has no files but there are items that can be found on the disk image.

**ANS** เมื่อผู้ใช้ส่งลับไฟล์ระบบปฏิบัติการจะดำเนินการเพียงแค่ ลบหรือทำลาย Metadata และรายงานว่าพื้นที่ดังกล่าวเป็นพื้นที่ที่ยังไม่ได้ใช้ ซึ่งการลบข้อมูลเมตาไม่ได้หมายความว่าระบบจะ ลบเนื้อหาไฟล์ (File Content) จริงๆ ที่อยู่ในเซกเตอร์ดิสก์ ทันที ข้อมูลดิบของไฟล์ยังคงอยู่บนดิสก์ในพื้นที่ที่ถูกลบเครื่องหมายว่าเป็น "ว่าง" จนกว่าจะมีไฟล์ใหม่ถูกเขียนทับลงไป

Q2. How many objects can you find?

**ANS** 14

Q3. List all the objects here and report on whether or not the content is accessible

or damaged/corrupted. Also note which files were actually already deleted.

(open as logical file and read only text)

Name	S	C	O	Modified Time	Change Time	Access Time	Created Time	Size	Flags(Dir)	Flags(Meta)	Known
f0023981_wword60.zip				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	78899	Unallocated	Unallocated	unknown
f0023957.ppt				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	11264	Unallocated	Unallocated	unknown
f0021929.wmv				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	1036994	Unallocated	Unallocated	unknown
f0020853_moon.mov				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	550653	Unallocated	Unallocated	unknown
f0020841.gif				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	5498	Unallocated	Unallocated	unknown
<b>f0020645.jpg</b>				<b>0000-00-00 00:00:00</b>	<b>0000-00-00 00:00:00</b>	<b>0000-00-00 00:00:00</b>	<b>0000-00-00 00:00:00</b>	<b>99256</b>	<b>Unallocated</b>	<b>Unallocated</b>	<b>unknown</b>
f0019777.jpg				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	444314	Unallocated	Unallocated	unknown
f0019771.jpg				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	29885	Unallocated	Unallocated	unknown
f0019477.pdf				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	122434	Unallocated	Unallocated	unknown
f0016741_Pudent_Engineering_Practice_for_Crypto				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	1399508	Unallocated	Unallocated	unknown
f0016693.xls				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	23040	Unallocated	Unallocated	unknown
f0016021.wav				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	318894	Unallocated	Unallocated	unknown
f0000321.wmv				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	8037267	Unallocated	Unallocated	unknown
f0000281_Nick_is_a.pretty_man_with_a.2003_docur				0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	19968	Unallocated	Unallocated	unknown

Hex Text Application File Metadata OS Account Data Artifacts Analysis Results Context Annotations Other Occurrences

0% 39% Tags Menu



Q4. Think securely: If we want to delete files on a magnetic hard disk and not have them be recovered by any tool, what do we need to do? And how much time do you think you need to wipe a 1TB magnetic hard disk?

**ANS** การเขียนทับอย่างน้อย 7 รอบ ประมาณ 14 ชั่วโมง หรือใช้แม่เหล็กแรงๆ ในไม่กี่นาที

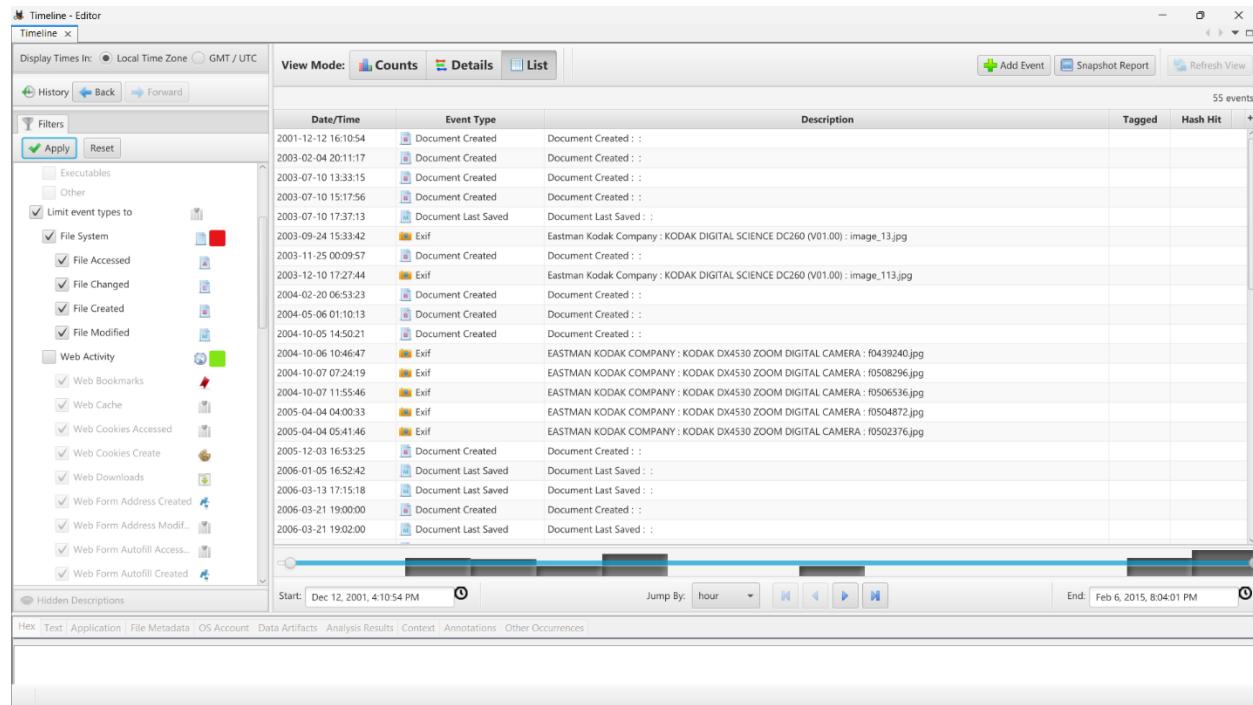
Q5. Will file carving be able to recover deleted files on an SSD? Why or why not?

**ANS** ไม่สามารถคืนได้ หรือทำได้ยากมาก SSD ใช้คำสั่ง TRIM หรือ UNMAP ซึ่ง คอนโทรลเลอร์ SSD จะตอบสนองโดยการฟังข้อมูลจริง

## Part2

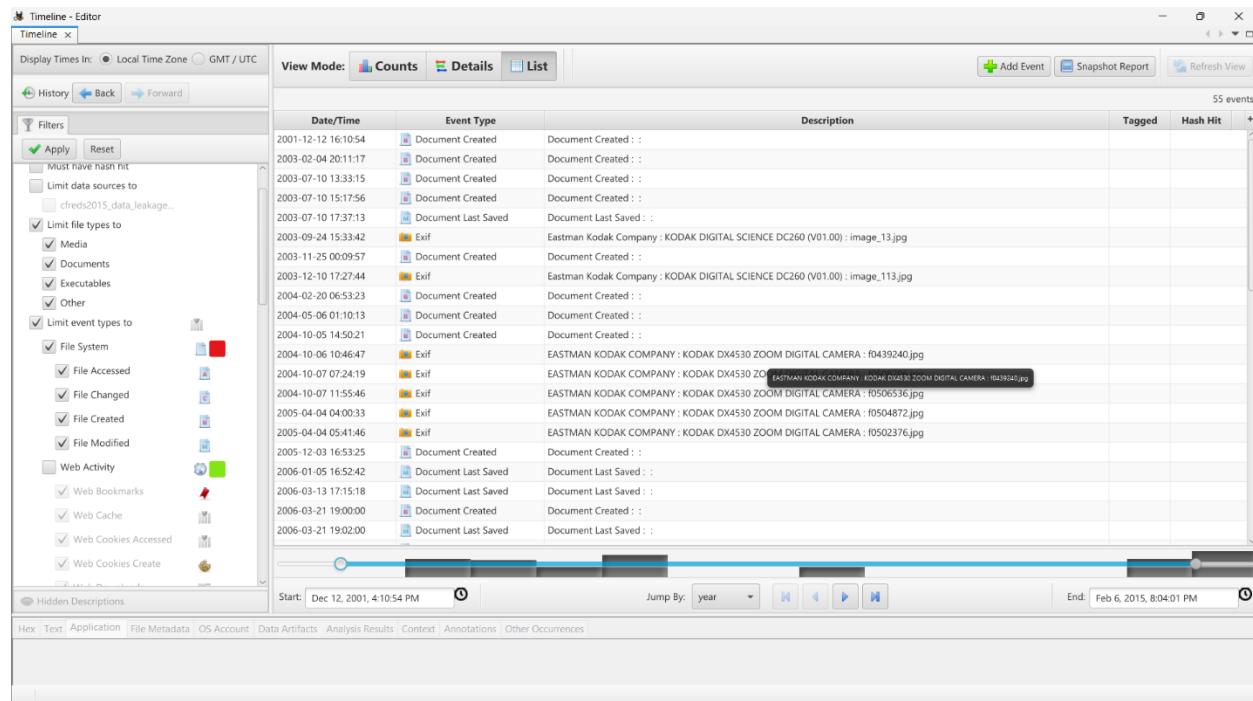
1. List all directories that were traversed in 'RM#2'.

**ANS** found 55 events



2. List all files that were opened in 'RM#2'.

**ANS** I don't know what do ya mean traversed and opend?



### 3. Recover deleted files from USB drive 'RM#2'. What files were you able to recover?

**ANS** ឧបស្ថាយឲ្យអាចរៀបចំឡើងពេលវេលាដែលត្រូវបានលើកឡើងដោយ

Two screenshots of the Autopsy 4.22.1 forensic analysis tool interface showing recovered files from a USB drive.

**Screenshot 1:** The top screenshot shows the "Listing" view of recovered files. The table includes columns for Name, S, C, O, Modified Time, Change Time, Access Time, Created Time, Size, Flags(Dir), Flags(Meta), and Know. A thumbnail preview of a file named "f0389800.gif" is shown, displaying a photograph of a dish with various toppings. The date "03/30/2013" is visible at the bottom of the image.

Name	S	C	O	Modified Time	Change Time	Access Time	Created Time	Size	Flags(Dir)	Flags(Meta)	Know
f0393960.bmp	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	8798374	Unallocated	Unallocated	unkno
f0389800.gif	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	3352929	Unallocated	Unallocated	unkno
f0383240.gif	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	6717692	Unallocated	Unallocated	unkno
f0370088.gif	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	921654	Unallocated	Unallocated	unkno
f0368264.bmp	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	2048	Unallocated	Unallocated	unkno
f0368232.fat	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	9773451	Unallocated	Unallocated	unkno
f0338504.mp4	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	15209466	Unallocated	Unallocated	unkno
f0336744.mp4	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	885072	Unallocated	Unallocated	unkno
f0327048.mp4	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	4949421	Unallocated	Unallocated	unkno
f0325864_skipped.mov	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	590588	Unallocated	Unallocated	unkno
f0306760_skipped.mov	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	9773451	Unallocated	Unallocated	unkno
f0300712.wmv	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	3085265	Unallocated	Unallocated	unkno

**Screenshot 2:** The bottom screenshot shows the same recovered files table, but the thumbnail preview for "f036744.mp4" is now blank, indicating playback is not supported.

Name	S	C	O	Modified Time	Change Time	Access Time	Created Time	Size	Flags(Dir)	Flags(Meta)	Know
f0393960.bmp	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	8798374	Unallocated	Unallocated	unkno
f0389800.gif	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	3352929	Unallocated	Unallocated	unkno
f0383240.gif	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	6717692	Unallocated	Unallocated	unkno
f0370088.gif	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	921654	Unallocated	Unallocated	unkno
f0368264.bmp	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	2048	Unallocated	Unallocated	unkno
f0368232.fat	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	9773451	Unallocated	Unallocated	unkno
f0338504.mp4	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	15209466	Unallocated	Unallocated	unkno
f0336744.mp4	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	885072	Unallocated	Unallocated	unkno
f0327048.mp4	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	4949421	Unallocated	Unallocated	unkno
f0325864_skipped.mov	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	590588	Unallocated	Unallocated	unkno
f0306760_skipped.mov	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	9773451	Unallocated	Unallocated	unkno
f0300712.wmv	1			0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	3085265	Unallocated	Unallocated	unkno

Playback of deleted videos is not supported, use an external player.

#### 4. What actions were performed for anti-forensics on USB drive ‘RM#2’?

[Hint: this can be inferred from the results of the above question]

**ANS** หักมีการพยายามลบหลักฐานทิ้ง และ มีการปิดคอมแม่พลาฟอร์แมตไฟล์ สังเกตว่า มีชื่อไฟล์แปลงที่ตั้งชื่อลงท้ายด้วย .txt แต่เนื้อหาข้างในไม่น่าใช่ จึงลองเปลี่ยน TYPE เป็น .ppt

#### 5. Recover hidden files from the CD-R ‘RM#3’. What files were you able to

recover?

**ANS** found 15 files

Name	S	C	O	Modified Time	Change Time	Access Time	Created Time	Size	Flags(Dir)	Flags(Meta)	Known
f0208644.jpg	0	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	620888	Unallocated	Unallocated	uninc
f0207124.jpg	0	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	777835	Unallocated	Unallocated	uninc
f0205596.jpg	0	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	780831	Unallocated	Unallocated	uninc
f0204148_secret_project_technical_review_3.ppt	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	325120	Unallocated	Unallocated	uninc
f0199536_secret_project_technical_review_3.doc	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	2360832	Unallocated	Unallocated	uninc
f0198632.xml	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	1531	Unallocated	Unallocated	uninc
f0113264.docx	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	27414	Unallocated	Unallocated	uninc
f0104588.docx	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	440235	Unallocated	Unallocated	uninc
f0104472_secret_project_progress_3.doc	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	57344	Unallocated	Unallocated	uninc
f0084376_secret_project_market_shares.xls	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	10289152	Unallocated	Unallocated	uninc
f0064380.xlsx	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	10237535	Unallocated	Unallocated	uninc
f0064184.xlsx	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	100078	Unallocated	Unallocated	uninc
f0061720_secret_project_price_analysis_2.xls	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	1260544	Unallocated	Unallocated	uninc
f0029724.pptx	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	16381123	Unallocated	Unallocated	uninc
f0001308_secret_project_revised_points.ppt	2	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	14547968	Unallocated	Unallocated	uninc

#### 6. What actions were performed for anti-forensics (data hiding) on CD-R

‘RM#3’?

**ANS** นำจะแค่ลบไฟล์ทำลายหลักฐานทิ้ง มั้ง