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Introduction to computer forensics for windows

- Forensics involves gathering evidence of activities performed on a computer.
- Forensic artifacts are essential pieces of information that provide evidence of human activity
- Windows saves your activities to make the computer more personalized

Questions

1.

Answer the questions below

What is the most used Desktop Operating System right now?

Microsoft Windows

✓ Correct Answer

Windows Registry and Forensics

- Windows registry is a collection of databases that contains the system's configuration data, which could be about the hardware, software or data about recent used files.
- Windows Registry consists of keys and values.
- Windows Registry has five root keys which include:
 - HKEY_CURRENT_USER -
 - HKEY_USERS
 - HKEY_LOCAL_MACHINE
 - HKEY_CLASSES_ROOT
 - HKEY_CURRENT_CONFIG
- We can find these keys on regedit.exe

Questions

1.

Answer the questions below

What is the short form for HKEY_LOCAL_MACHINE?

HKLM

✓ Correct Answer

🔍 Hint

Accessing registry hives offline

- Majority of hives are located in c:\windows\System32\Config\.....
- There is also another two hives containing user information that can be found in user profile directory.
- The transaction log is also a vital source of forensic data. It can be considered as the journal of the changelog of the registry hive.
- They are stored as a .LOG file and are located in c:\windows\system32\config

Questions

Answer the questions below

What is the path for the five main registry hives, DEFAULT, SAM, SECURITY, SOFTWARE, and SYSTEM?

C:\Windows\System32\Config

✓ Correct Answer

🔍 Hint

What is the path for the AmCache hive?

C:\Windows\AppCompat\Programs\Amcache.hve

✓ Correct Answer

Data Acquisition

- Acquisition involves making a copy of required data or use the image of the system and perform forensics on it.
- KAPE is a live data acquisition tool that which can be used to acquire registry data.
- Autopsy allows us to either acquire data from live systems or from disk image.
- FTK imager works like autopsy but this allows us to mount the disk image or drive in FTK imager

Exploring Windows Registry

- Registry viewer loads one hive at a time
- Registry explorer, can load multiple hive simultaneously and add data from transaction logs into the hive.
- RegRipper a tool that takes registry as input and output report that extracts data from some of the important keys.

System information and System Account

- We can find the OS version from the data that was pulled through Software\Microsoft\windows NT\currentVersion
- Current Control sets are hives containing machines configuration data used for controlling system startup
- location is system\controlset...
- Current control is set when machine is live.
- We can find the computer name from
SYSTEM\CurrentControlSet\Control\ComputerName\computerName
- To find the time zone location
SYSTEM\CurrentControlSet\Control\TimeZoneInformation
- To find network Interface
SYSTEM\CurrentControlSet\Services\Tcpip\Parameters\Interfaces
- Information about services are found in SYSTEM\CurrentControlSet\Service

Questions

1.

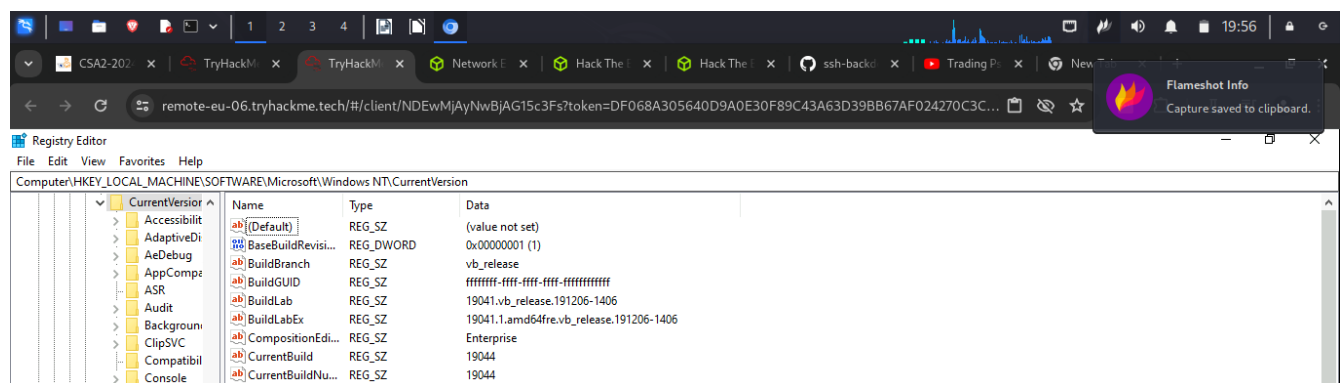
expiry, password policy and password hint, and any groups that the user is a part of.

Answer the questions below

What is the Current Build Number of the machine whose data is being investigated?

✓ Correct Answer

Hint



2.

What is the Computer Name of the computer?

✓ Correct Answer

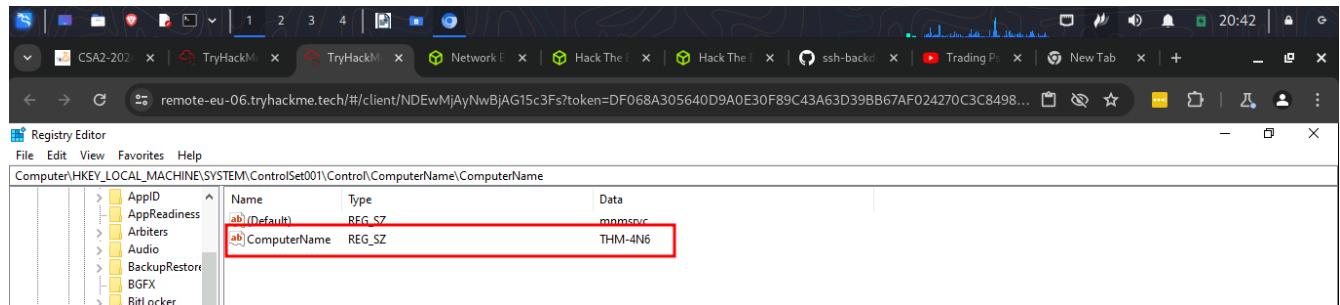
3.

What is the Computer Name of the computer?

THM-4n6

✓ Correct Answer

What is the value of the TimeZoneKeyName?



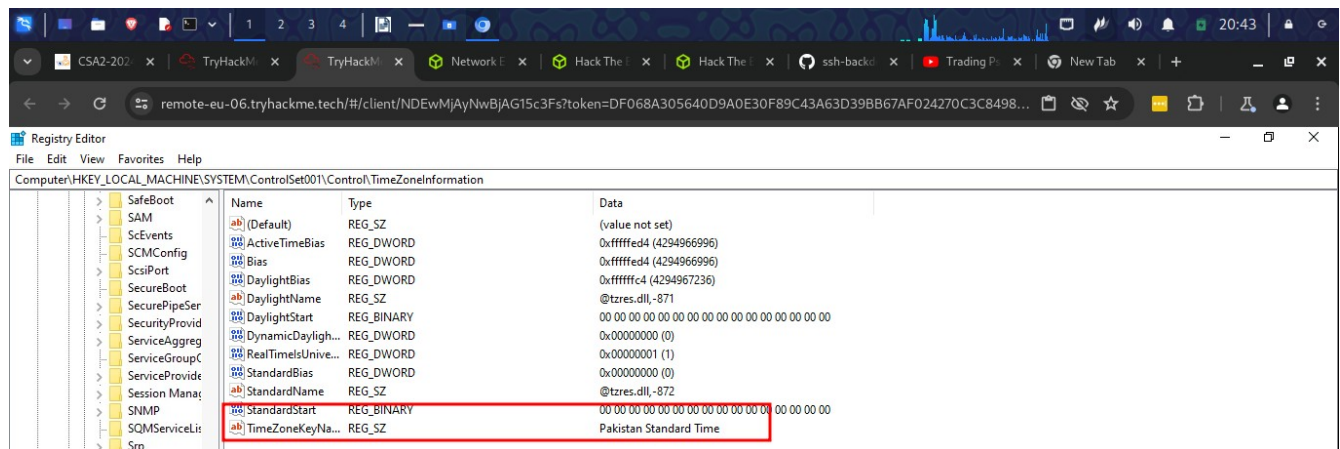
4.

What is the value of the TimeZoneKeyName?

Pakistan Standard Time

✓ Correct Answer

What is the DHCP IP address

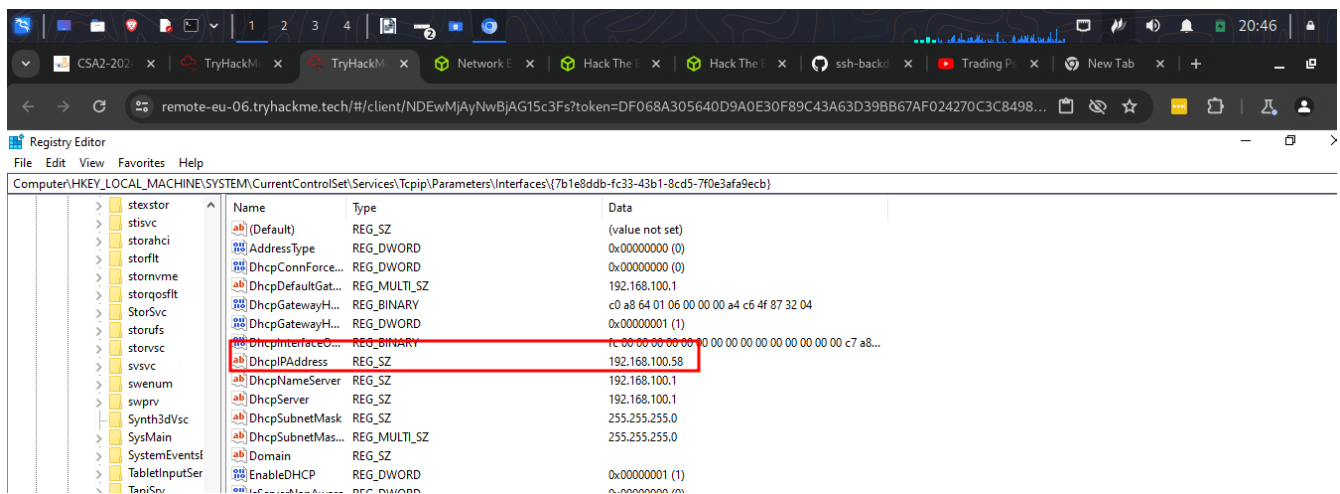


5.

What is the DHCP IP address

192.168.100.58

✓ Correct Answer



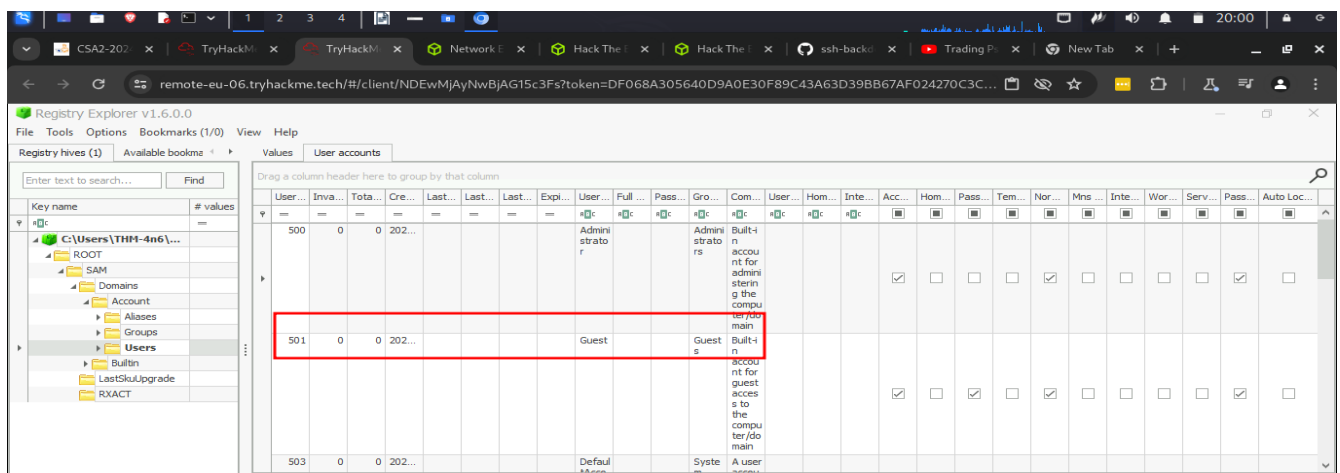
6.

What is the RID of the Guest User account?

501

✓ Correct Answer

🔍 Hint



Usage or knowledge of files/folders

- Registry allows us to sort data contained in registry keys quickly, so recent document tab arranges the most recent used file at the top of the list (mru)
- Windows maintains a list of recently opened files for each user. It is stored in the NTUSER hive.

NTUSER.DAT\Software\microsoft\windows\currentVersion\Explorer\RecentDocs

- Registry explorer allows us to sort data contained in registry keys quickly.
- Arranges files such that the most recent file is shown at the top of the list.
- There are extension keys like .pdf, .jpg which provide information about the last used files of a specific file extension
- Microsoft office also provide list of recent accessed documents.

Questions

1.

Answer the questions below

When was EZtools opened?

2021-12-01 13:00:34

✓ Correct Answer

🔍 Hint

Extension	Value Name	Target Name	Link Name	Mru Position	Opened On	Extension Last Opened
*.lnk	*.lnk	*.lnk	*.lnk	0	2021-12-01 13:00:34	
RecentDocs	7	EZtools	EZtools.Link	0		2021-11-30 10:56:23
RecentDocs	6	Settings	Settings.Link	1		2021-11-30 10:56:21
RecentDocs	5	WallpaperSettings.xml	WallpaperSettings.Link	2		2021-11-30 10:56:21
RecentDocs	4	System and Security	System and Security.Link	3		2021-11-30 10:56:21
RecentDocs	3	\\.\(B806C0E4-D293-4F75-8A90-CB058647E8D)	System.Link	4		2021-11-30 10:56:21
RecentDocs	1	KAPE	KAPE.Link	5		2021-11-24 18:18:48
RecentDocs	0	Get-KAPEUpdate.ps1	Get-KAPEUpdate.Link	6		2021-11-24 18:18:48
RecentDocs	2	ChangeLog.txt	ChangeLog.Link	7		2021-11-24 18:18:48
Folder	2	Settings	Settings.Link	0	2021-11-30 10:56:23	2021-11-24 18:18:48
Folder	1	System and Security	System and Security.Link	1		2021-11-24 18:18:48
Folder	0	KAPE	KAPE.Link	2		2021-11-24 18:18:48

2.

At what time was My Computer last interacted with?

2021-12-01 13:06:47

✓ Correct Answer

🔍 Hint

Value	Icon	Shell Type	Mru Pos...	Created On	Modified On	Accessed On	First Interacted	Last Interacted	Has Explored	Miscellaneous
My Computer	No icon	Root folder: GUID	0					2021-12-01 13:06:47	✓	NTFS file system
KAPE		Directory	1	2021-11-25 03:34:14	2021-11-25 03:34:14	2021-11-25 03:34:14			✓	
Home Folder		Root folder: GUID	2				2021-11-24 16:20:02		✓	
Search Folder		Users property view	3				2021-11-30 11:08:01		✓	
Search Folder		Users property view	4				2021-11-30 11:08:52		✓	
Control Panel		Root folder: GUID	5						✓	

3.

What is the Absolute Path of the file opened using notepad.exe?

C:\Program Files\Amazon\Ec2ConfigService\Settings

✓ Correct Answer

NTUSER.DAT\Software\Microsoft\Windows\CurrentVersion\Explorer\ComDlg32\LastVisitedPidLMRU

This is how Registry Explorer shows this registry key. Take a look to answer Question # 3 and 4.

Value Name	Mru Position	Executable	Absolute Path	Opened On
0	0	notepad.exe	My Computer\c:\Program Files\Amazon\Ec2ConfigService\Settings	2021-11-30 10:56:19

4.

When was this file opened?

2021-11-30 10:56:19

✓ Correct Answer

🔍 Hint

This is how Registry Explorer shows this registry key. Take a look to answer Question # 3 and 4.

Value Name	Mru Position	Executable	Absolute Path	Opened On
0	0	notepad.exe	My Computer\c:\Program Files\Amazon\Ec2ConfigService\Settings	2021-11-30 10:56:19

Evidence of Execution

- Windows keeps track of applications launched by the user using windows Explorer for statistical purposes in the user Assist registry keys
- ShimCache is a mechanism used to keep track of applications compatibility with OS and track all applications launched on the machine
- AmCache – perform similar functions like ShimCache
- BAM/DAM – Background Activity Monitor keeps a tab on the activity of background applications
- Desktop Activity Moderator is a part of windows that optimizes power consumption

Questions

1.

Answer the questions below

How many times was the File Explorer launched?

26

✓ Correct Answer

🔍 Hint

Take a look at the below screenshot from Registry Explorer and answer Question #1.

Value Name	Mru Position	Executable	Absolute Path	Opened On
0	0	notepad.exe	My Computer\c:\Program Files\Amazon\Ec2ConfigService\Settings	2021-11-30 10:56:19

2.

What is another name for ShimCache?

AppCompatCache

✓ Correct Answer

3.

Which of the artifacts also saves SHA1 hashes of the executed programs?

AmCache

✓ Correct Answer

Which of the artifacts stores the full path of the executed programs?

Key name	Timestamp	Path	Name	Product Name	Publisher	Version	SHA1
C:\Users\THH-4n6\Desktop\NTUSER...	2021-12-01 12:45:37	c:\program files\windowsapps\microsoft\office\7.21077.2012.0_x64..._viewer.exe	3DViewer.exe	view 3d	microsoft corporation	7.2.107.7012.0	1b384b00a12304b64648
ROOT	2021-12-01 12:55:19	c:\program files\7-ap\7z.exe	7z.exe	7-ap	igor pavlov	19.00	6c7ea8bd435163ae3911
C:\Users\THH-4n6\Desktop\SYSTEM...	2021-12-01 12:55:19	c:\program files\7-ap\7zfm.exe	7zfm.exe	7-ap	igor pavlov	19.00	e48e158607c6d738824eca
(115.1367C-E7D0-4c20-9619-79AB117134)	2021-12-01 12:55:19	c:\program files\7-ap\7zip.exe	7zip.exe	7-ap	igor pavlov	19.00	d721612647d94940451310de
Root	2021-12-01 13:00:29	c:\program files(x86)\google\update\download\96.0.4664.45_chrome_installer.exe	96.0.4664.45_chrome_installer.exe		google llc	96.0.4664.45	c280b26c77152fab11f10f
Device Census	2021-12-01 12:55:49	c:\program files\amazon\son\amazon-son-agent.exe	amazon-son-agent.exe				e57061919765937085d809
DriverPackageExtended	2021-12-01 12:57:38	c:\programdata\package-cache\71a5d047-fae7-4dc7-8d46-60511a9f83\amazon-son-agent-setup.exe	AmazonSMDAgentSetup.exe	amazon son agent	amazon web services	3.1.138.0	41944544615d43875e4816a
InventoryApplication	2021-12-01 13:00:20	c:\users\thm-4n6\desktop\amcacheparser.exe	AmcacheParser.exe	amcacheparser	eric zimmerman	1.4.0.0	13ab202176ff4322664c12
InventoryApplicationAppr							
InventoryApplicationFile							
InventoryApplicationFramework							
InventoryApplicationHerbuit							
InventoryDeviceContainer							
InventoryDeviceInterface							
InventoryDeviceMediaClass							
	Total rows: 596						

BAM/DAM

4.

Which of the artifacts saves the full path of the executed programs?

BAM/DAM

✓ Correct Answer

External Devices/USB devices forensics

- Usb keys plugged into a system are kept in system\currentcontrol\enum\usb

Questions

1.

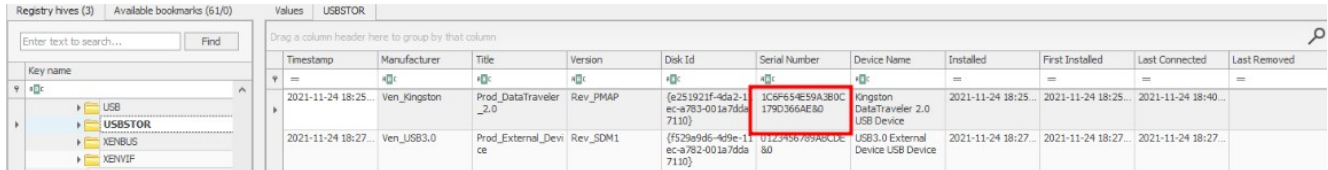
Answer the questions below

What is the serial number of the device from the manufacturer 'Kingston'?

1C6f654E59A3B0C179D366AE&0

✓ Correct Answer

Registry Explorer shows this information in a nice and easy-to-understand way. Take a look at this and answer Questions # 1 and 2.



Timestamp	Manufacturer	Title	Version	Disk Id	Serial Number	Device Name	Installed	First Installed	Last Connected	Last Removed
2021-11-24 18:25...	Ven_Kingston	Prod_DataTraveler_2.0	Rev_PMAP	{e251921f-4da2-11ec-a783-001a7dda7110}	1C9F654E59A380C179C366AE80	Kingston DataTraveler 2.0 USB Device	2021-11-24 18:25...	2021-11-24 18:25...	2021-11-24 18:40...	
2021-11-24 18:27...	Ven_USB3.0	Prod_External_Device	Rev_SDM1	{f529a9d6-4d9e-11ec-a782-001a7dda7110}	0123456789ABCD80	USB3.0 External Device USB Device	2021-11-24 18:27...	2021-11-24 18:27...	2021-11-24 18:27...	

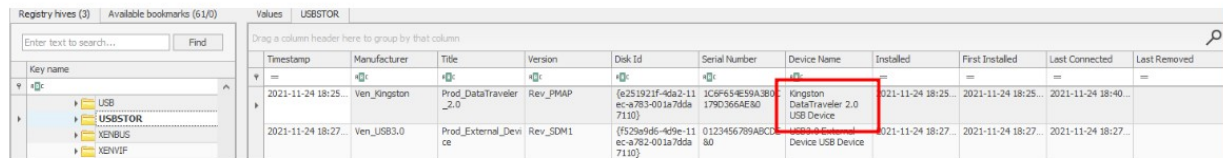
2.

What is the name of this device?

Kingston Data Traveler 2.0 USB Device

✓ Correct Answer

Registry Explorer shows this information in a nice and easy-to-understand way. Take a look at this and answer Questions # 1 and 2.



Timestamp	Manufacturer	Title	Version	Disk Id	Serial Number	Device Name	Installed	First Installed	Last Connected	Last Removed
2021-11-24 18:25...	Ven_Kingston	Prod_DataTraveler_2.0	Rev_PMAP	{e251921f-4da2-11ec-a783-001a7dda7110}	1C9F654E59A380C179C366AE80	Kingston DataTraveler 2.0 USB Device	2021-11-24 18:25...	2021-11-24 18:25...	2021-11-24 18:40...	
2021-11-24 18:27...	Ven_USB3.0	Prod_External_Device	Rev_SDM1	{f529a9d6-4d9e-11ec-a782-001a7dda7110}	0123456789ABCD80	USB3.0 External Device USB Device	2021-11-24 18:27...	2021-11-24 18:27...	2021-11-24 18:27...	

First/Last Times:

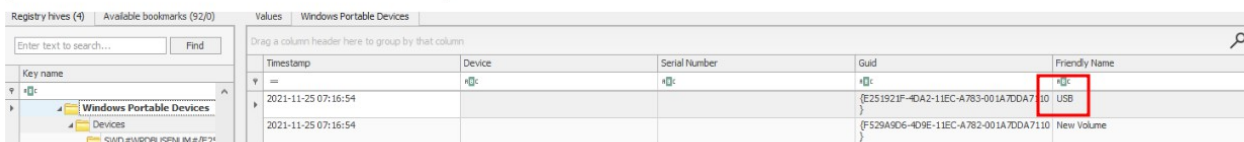
3.

What is the friendly name of the device from the manufacturer 'Kingston'?

USB

✓ Correct Answer

SOFTWARE\Microsoft\Windows Portable Devices\Devices



Timestamp	Device	Serial Number	Guid	Friendly Name
2021-11-25 07:16:54			{E251921F-4DA2-11EC-A783-001A7DDA7110}	USB
2021-11-25 07:16:54			{F529A9D6-4D9E-11EC-A782-001A7DDA7110}	New Volume

Hands on challenge

1.

Answer the questions below

How many user created accounts are present on the system?

3

✓ Correct Answer

🔍 Hint

Drag a column header here to group by that column

User...	Inva...	Tota...	Crea...	Last ...	Last ...	Last ...	Expi...	User...	Full ...	Pass...	Grou...	Com...	User...	Hom...	Inte...	Acco...	Hom...	Pass...	Tem...	Nor...	Mns ...	Inte...	Wor...	Serv...	Pass...	Auto Lo...
=	=	=	=	=	=	=	=	=	THM-4n6	count	Administrators					<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1001	0	19	202...	202...	202...	202...		thm-user		null	Users					<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1002	0	2	202...	202...				thm-user2		null	Users					<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1003	0	0	202...													<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

2.

What is the username of the account that has never been logged in?

thm-user2

✓ Correct Answer

🔍 Hint

File Tools Options Bookmarks (1/0) View Help

Registry hives (1) Available bo

Values User accounts

Enter text to search Find

Key name

q

q

C:\Users\THM-4n6\Desktop

ROOT

SAM

Domains

Account

Aliases

Drag a column header here to group by that column

	User...	Inva...	Tota...	Crea...	Last Login Time	Las...	Las...	Exp...	Use...	Full ...	Pas...	Gro...	Co...	Use...	Ho...	Int...
q	=	=	=	=	=	=	=	=	q	q	q	q	q	q	q	q
	1001	0	19	202...	2021-12-01 12:32:11	202...	202...		THM-4n6		count	Administrators				
	1002	0	2	202...	2021-11-24 18:39:50				thm-user		null	Users				
	1003	0	0	202...					thm-user2		null	Users				

3.

What's the password hint for the user THM-4n6?

count

✓ Correct Answer

🔍 Hint

Values

User accounts

Drag a column header here to group by that column

	User...	Inva...	Tota...	Crea...	Last ...	Last ...	Last ...	Expi...	User...	Full ...	Pass...	Grou...	Com...	User...	Hom...	Inte...	Acco...	Hom...	Pass...	Tem...	Nor...	Mns ...	Inte...	Wor...	Serv...	Pass...	Auto Lo...
▼	=	=	=	=	=	=	=	=	■□c	■□c	■□c	■□c	■□c	■□c	■□c	■□c	■	■	■	■	■	■	■	■	■	■	■
	1001	0	19	202...	202...	202...	202...		THM-4n6	count	Administrators						<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	1002	0	2	202...	202...				thm-user	null	Users						<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
▶	1003	0	0	202...					thm-user2	null	Users						<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

4.

When was the file 'Changelog.txt' accessed?

2021-11-21 18:18:48

✓ Correct Answer

🔍 Hint

What is the complete path from where the python 3.8.2 installer was run?

Extension	Value Name	Target Name	Link Name	Mru Position	Opened On	Extension Last Opened
*Bk	*Bk	*Bk	*Bk	---	---	---
RecentDocs	7	EZtools	EZtools.Link	0	2021-12-01 13:00:34	---
RecentDocs	6	Settings	Settings.Link	1	---	2021-11-30 10:56:23
RecentDocs	5	WallpaperSettings.xml	WallpaperSettings.Link	2	---	2021-11-30 10:56:21
RecentDocs	4	System and Security	System and Security.Link	3	---	---
RecentDocs	3	::{B805C0E4-D293-4F75-8A90-CB05B6477EEE}	System.Link	4	---	---
RecentDocs	1	KAPE	KAPE.Link	5	---	---
RecentDocs	0	Get-KAPEUpdate.ps1	Get-KAPEUpdate.Link	6	---	---
RecentDocs	2	ChangeLog.txt	ChangeLog.Link	7	---	2021-11-24 18:18:48
Folder	2	Settings	Settings.Link	0	2021-11-30 10:56:23	---
Folder	1	System and Security	System and Security.Link	1	---	---
Folder	0	KAPE	KAPE.Link	2	---	---
.xml	0	WallpaperSettings.xml	WallpaperSettings.Link	0	2021-11-30 10:56:21	---
.txt	0	ChangeLog.txt	ChangeLog.Link	0	2021-11-24 18:18:48	---
.ps1	0	Get-KAPEUpdate.ps1	Get-KAPEUpdate.Link	0	2021-11-24 18:18:48	---

5.

What is the complete path from where the python 3.8.2 installer was run?

Z:\setups\python-3.8.2.exe

✓ Correct Answer

🔍 Hint

Count	Value Name	Target Name	Link Name	Mru Position	Opened On	Extension Last Opened
(A3D53349-6E61-455)	(A3D53349-6E61-455)	(A3D53349-6E61-455)	(A3D53349-6E61-455)	---	---	---
Count	Count	Count	Count	---	---	---
(B267E3AD-A825-4A0)	(B267E3AD-A825-4A0)	(B267E3AD-A825-4A0)	(B267E3AD-A825-4A0)	---	---	---
Count	Count	Count	Count	---	---	---
(BCB48336-4DD0-48F)	(BCB48336-4DD0-48F)	(BCB48336-4DD0-48F)	(BCB48336-4DD0-48F)	---	---	---
Count	Count	Count	Count	---	---	---
(CAA59E3C-4792-41A)	(CAA59E3C-4792-41A)	(CAA59E3C-4792-41A)	(CAA59E3C-4792-41A)	---	---	---
Count	Count	Count	Count	---	---	---
(CEBFF5CD-ACE2-4F4)	(CEBFF5CD-ACE2-4F4)	(CEBFF5CD-ACE2-4F4)	(CEBFF5CD-ACE2-4F4)	---	---	---
Count	Count	Count	Count	---	---	---
(F2A1CB5A-E3CC-4A2)	(F2A1CB5A-E3CC-4A2)	(F2A1CB5A-E3CC-4A2)	(F2A1CB5A-E3CC-4A2)	---	---	---
(F4E57C4B-2036-49F)	(F4E57C4B-2036-49F)	(F4E57C4B-2036-49F)	(F4E57C4B-2036-49F)	---	---	---
(FA99DFC7-6AC2-455)	(FA99DFC7-6AC2-455)	(FA99DFC7-6AC2-455)	(FA99DFC7-6AC2-455)	---	---	---

6.

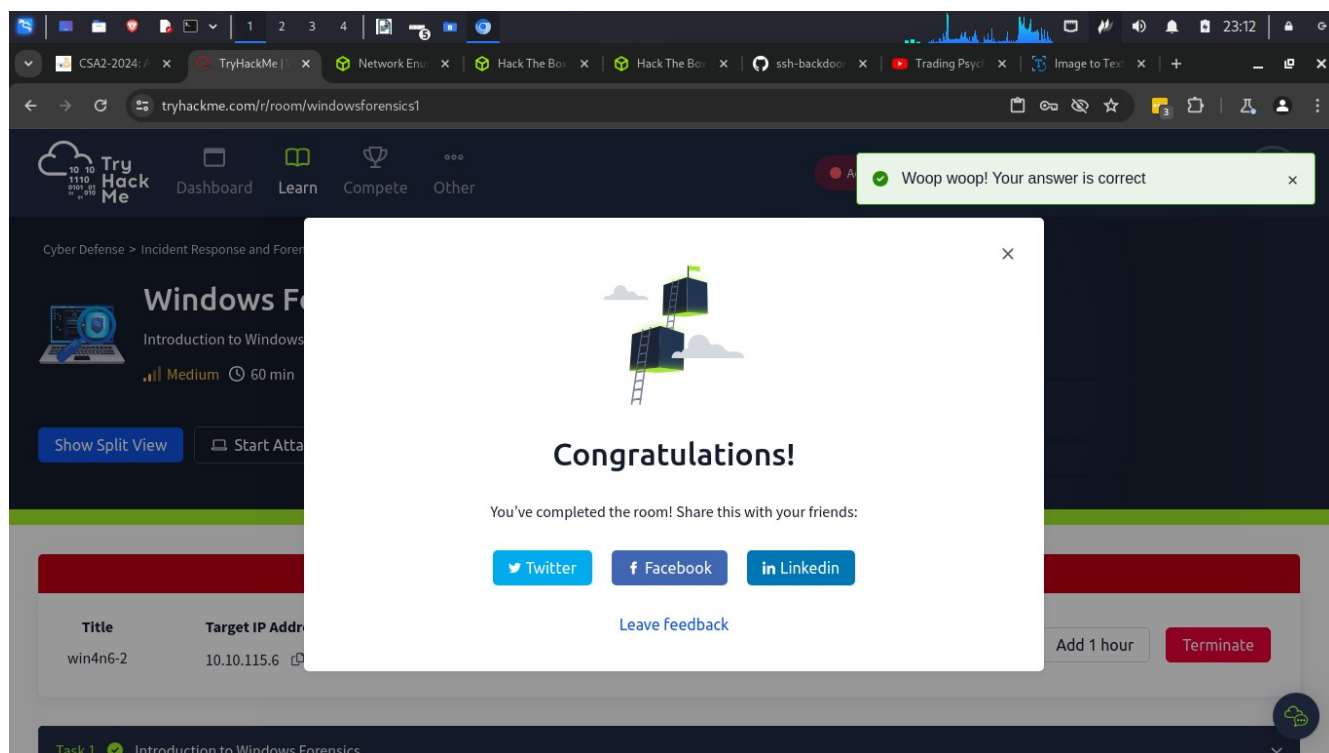
When was the USB device with the friendly name 'USB' last connected?

2021-11-24 18:40:06

✓ Correct Answer

🔍 Hint

Timestamp	Manufacturer	Title	Version	Disk Id	Serial Number	Device Name	Installed	First Installed	Last Connected	Last Removed
2021-11-24 18:2...	Ven_Kingston	Prod_DataTraveler_2.0	Rev_PMAP	{E251921F-4da2-11ec-a783-001a7dd8a7110}	1C6F654E59A3B0C1790366AE80	Kingston DataTraveler 2.0 USB Device	2021-11-24 18:2...	2021-11-24 18:2...	2021-11-24 18:4...	---
2021-11-24 18:2...	Ven_USB3.0	Prod_External_Dev	Rev_SDM1	{F529a9d6-4d9e-11ec-a782-001a7dd8a7110}	0123456789ABCDEF80	USB3.0 External Device USB Device	2021-11-24 18:2...	2021-11-24 18:2...	2021-11-24 18:2...	---



Conclusion

In this room I have learnt a lot about windows registry. I have learnt how to gather information about a windows computer and its users, to identify which files they used, Which program they ran and any external devices connected to them. I also downloaded the cheat sheet that I will be using to practice what I have learn.