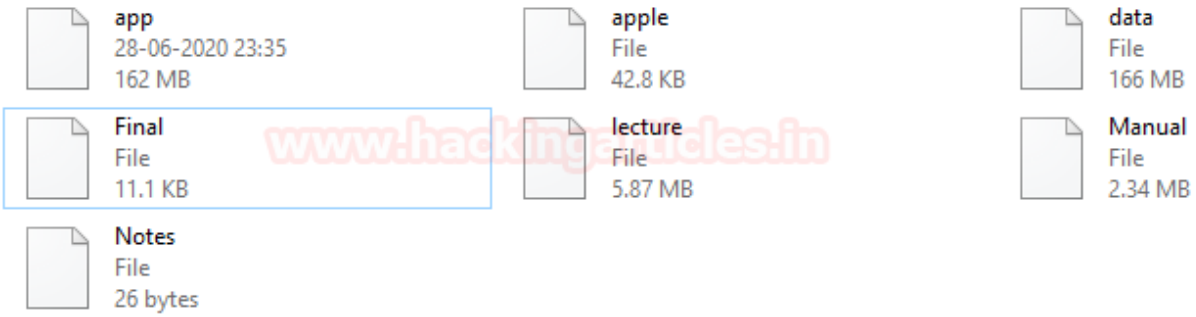
Forensic Investigation: Examining Corrupted File Extension

July 8, 2020 By Raj Chandel

In this article, we will learn how we can Examine Corrupted File Extension to identify the basic file header in a Forensic Investigation.

Let's understand this with the following Scenario

In this Scenario, a forensic investigator has gone for an investigation and found out a suspicious folder where no file has any kind of file extension. Now, what will he do to proceed in his forensic investigation?



Objective: Learn to use various techniques in Forensic Investigation to analyse and examine the various file headers

- Examining Corrupted File Extension using Windows Platform.
- Examining Corrupted File Extension using Linux Platform.

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- Analyze in Linux

Cheatsheet for Hex File Header

We all know that the hex file header is used to identify any file by examining the first 4 or 5 bytes of its hexadecimal content.

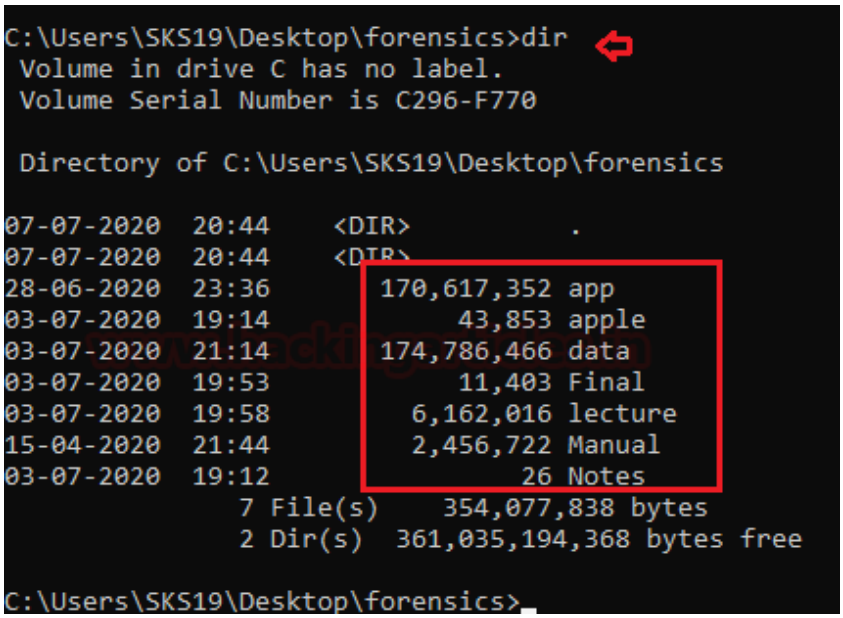
We have created our very own cheat sheet to examine these values more appropriately; Which contains all the basic files extensions and its 4 to 5 bytes starter hexadecimal value along with its ASCII translation.

File Extensions	STARTER HEX VALUE	STARTER ASCII TRANSLATION
exe	4D 5A 50 00	MZP
exe	4D 5A 80 00	MZ
dll	4D 5A 90 00	MZ
png	89 50 4E 47	PNG
mp3	49 44 33 2E	ID3
mp3	49 44 33 03	ID3
docx	50 4B 03 04 14 00 06	PK
zip	50 4B 03 04	PK
rar	52 61 72 21	Rar!
PDF	25 50 44 46	%PDF
jpg	FF D8 FF E0	ÿØÿà
jpeg	FF D8 FF FE	JFIF
Linux bin	7F 45 4C 46	ELF
ani	52 49 46 46	RIFF
gif	47 49 46 38 39 61	GIF89a
gif	47 49 46 38 37 61	GIF87a
cab	4D 53 43 46	MSCF
au	2E 73 6E 64	Snd
bmp	42 4D F8 A9	BM
bmp	42 4D 62 25	BMp%
bmp	42 4D 76 03	BMv
OFT	4F 46 54 32	OFT2
sfw	43 57 53 06/08	cws

Examining Corrupted File Extension using Windows Platform

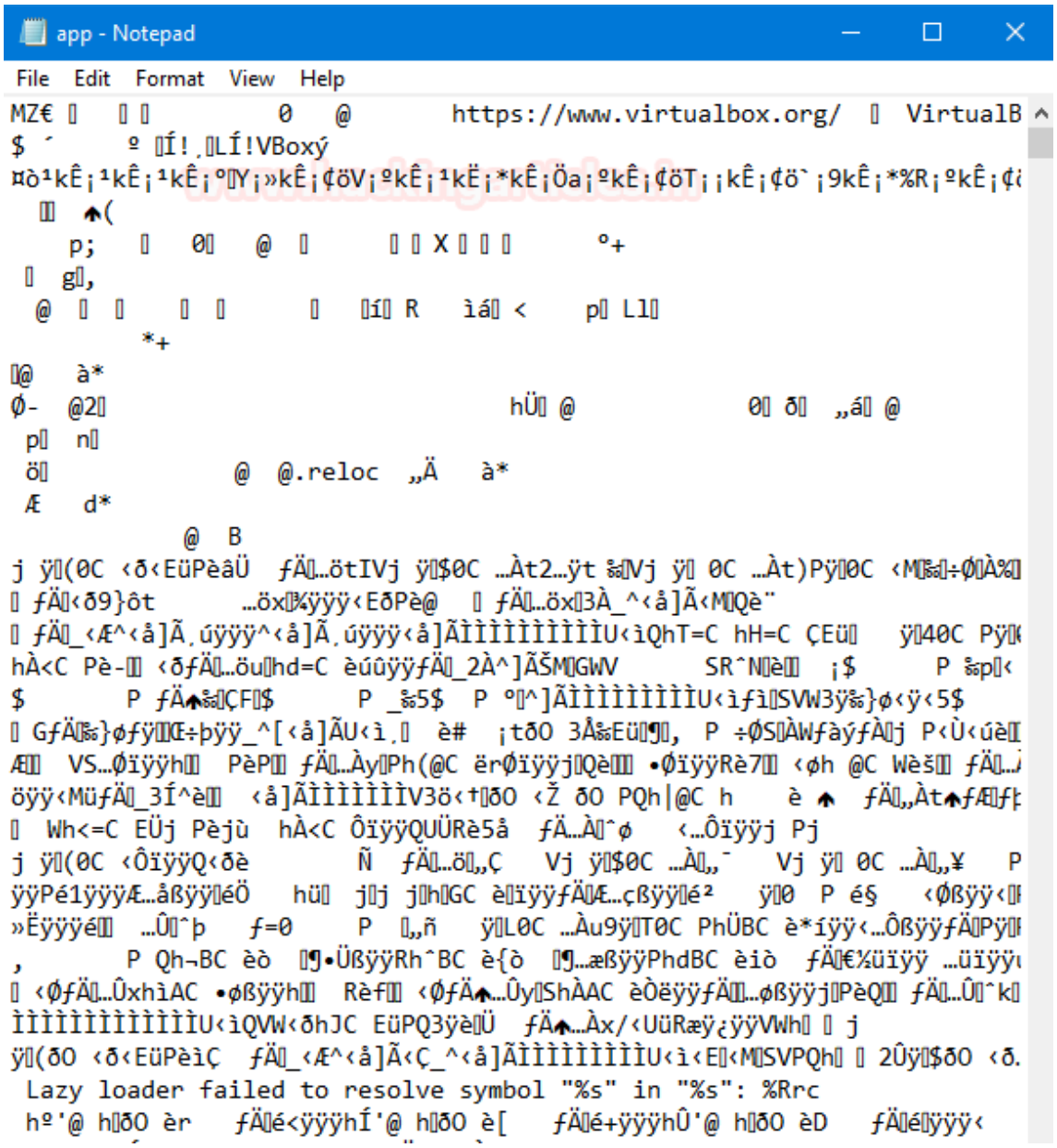
As per the given scenario, the first thing which comes into our mind that let's check these files in the command prompt [cmd]. Nevertheless, nothing is visible to the investigator.

Now Let's try to examine each file we found this folder and try to restore them in their original format.



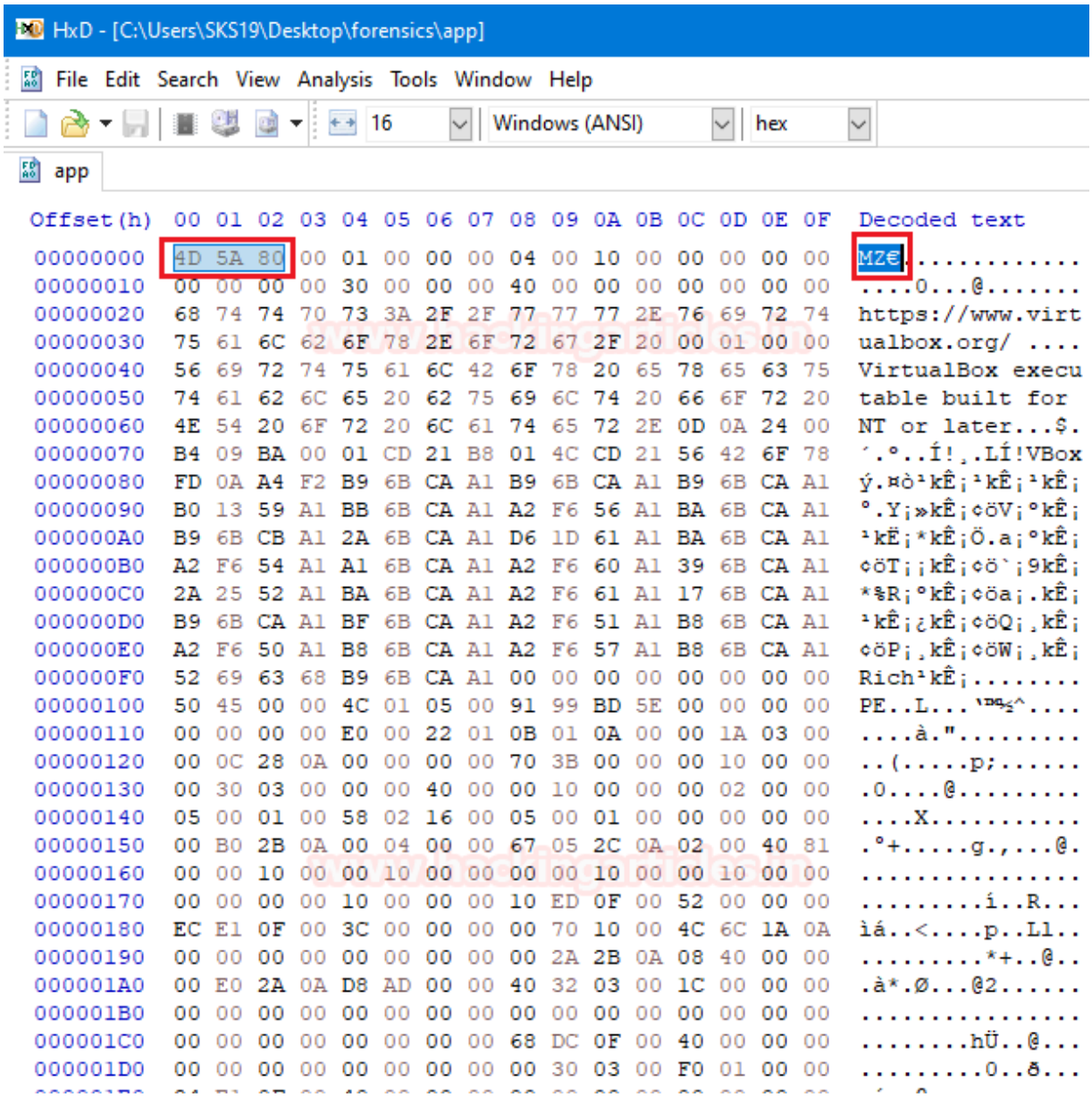
File #1: app

The first file, which we got is app. The first thing that comes into our mind is to open this file with the help of notepad. We are doing it to show you guys that the file is in an unreadable format.



Now, we examine hexadecimal values of these files with Hexadecimal editor. We can use any kind of hexadecimal editor, that can show us a hexadecimal value of any file. After opening that file, we need to examine its stating hexadecimal value to know about the file type.

So, I have used Hex Workshop which you can download from **here**.



After, analyzing its starting bytes with our cheat sheet. We come to know that it is a **.exe file** with its **ASCII translation MZ**. MZ is the initials of Mark Zbikowski, he is the designer of the DOS executable file format. We have successfully investigated the first file as a .exe file.

Now, we have two methods to rename that file extension.

Method 1: With the help of the command line.

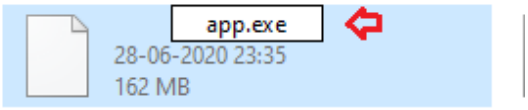
Follow this command to rename this file extension.

```
rename *app. *.exe
```

This command helps us to select only the app file to rename only this file extension. Because others are yet to be examined.

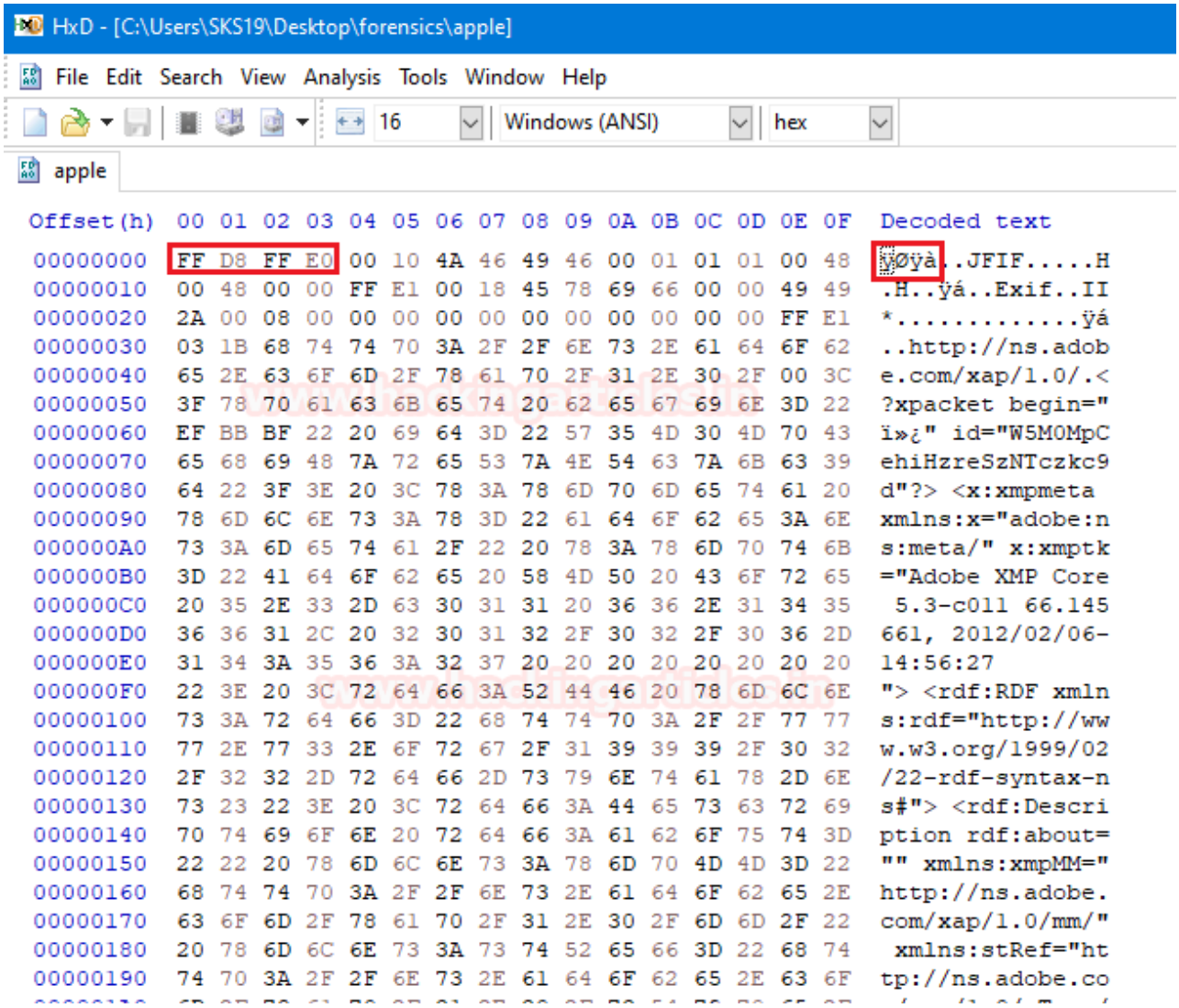
```
C:\Users\SKS19\Desktop\forensics>rename *app. *.exe
```

Method 2: We can simply change it directly by renaming the file name and providing it with an extension which we already find above.



File #2: apple

Now, it's time to examine the second file all we know about that file is its name apple. Straight away we opened that file in the hexadecimal editor. To start analyzing its hexadecimal values.



As we have to try to match its starting 4 bytes with our cheat sheet. We were quickly able to find out it is a **.jpg** file with **ASCII translation ÿØÿà**.

Now, just rename this file with the help of this command.

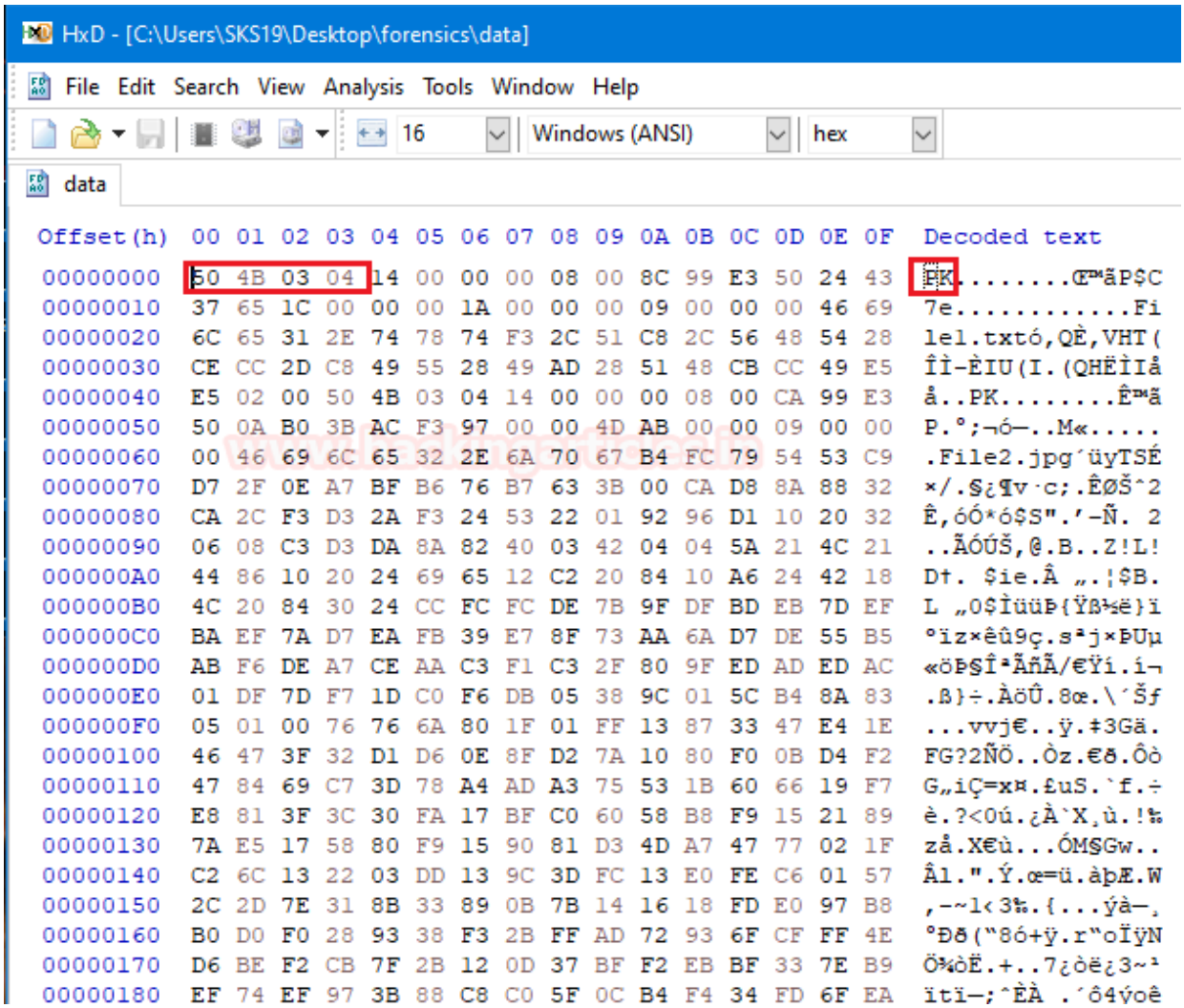
```
rename *apple. *.jpg
```

This command will only change the apple file to a .jpg file. Because others are yet to be examined.

```
C:\Users\SKS19\Desktop\forensics>rename *apple. *.jpg
```

File #3: data

Time to examine the third file which name is data. We are opening that file into a hexadecimal editor, to examine its hexadecimal values.



Now, try to match it first 4 bytes with our cheat sheet which we provide above. In a few moments, we find out that it is a **.zip** file with **ASCII translation PK**.

Change the file name and provide it with an extension with the help of rename command.

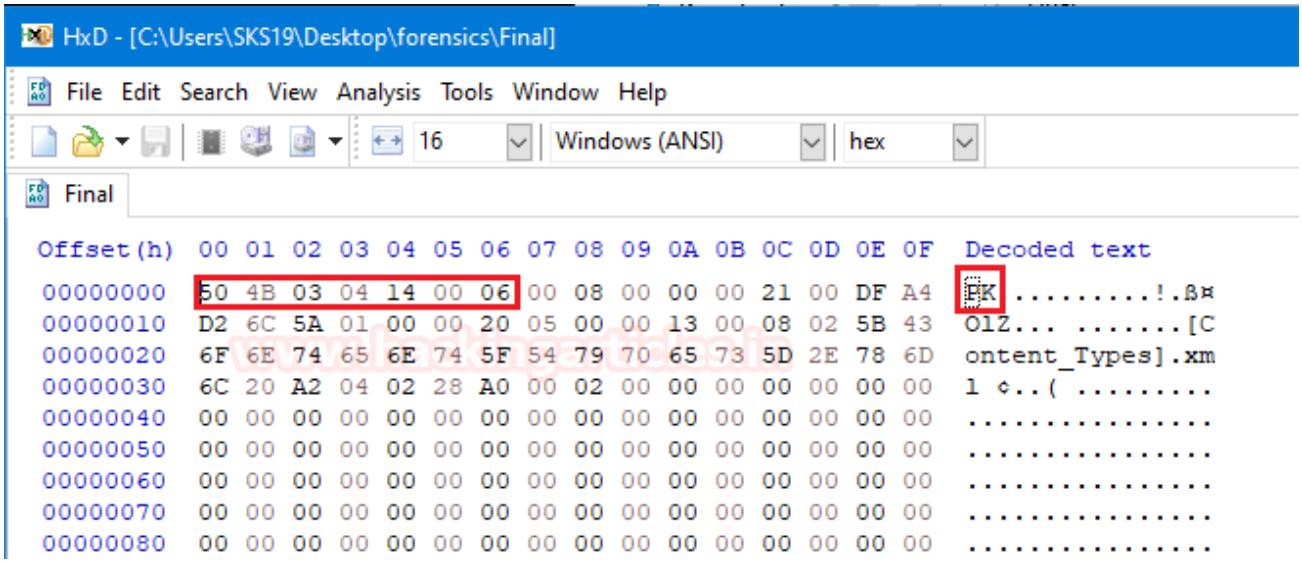
```
rename *data. *.zip
```

As we know it will only make changes in data and change it into a .zip file.

```
C:\Users\SKS19\Desktop\forensics>rename *data. *.zip
```

File #4: Final

Here comes the fourth file which name is Final. Now, open that file in a hexadecimal editor to analyse its hexadecimal values.



After opening that file, try to match its first seven bytes with our cheat sheet. In a few moments, we found out that its values match with a .docx file. So, it is a **.docx** file with ASCII translation **PK**.

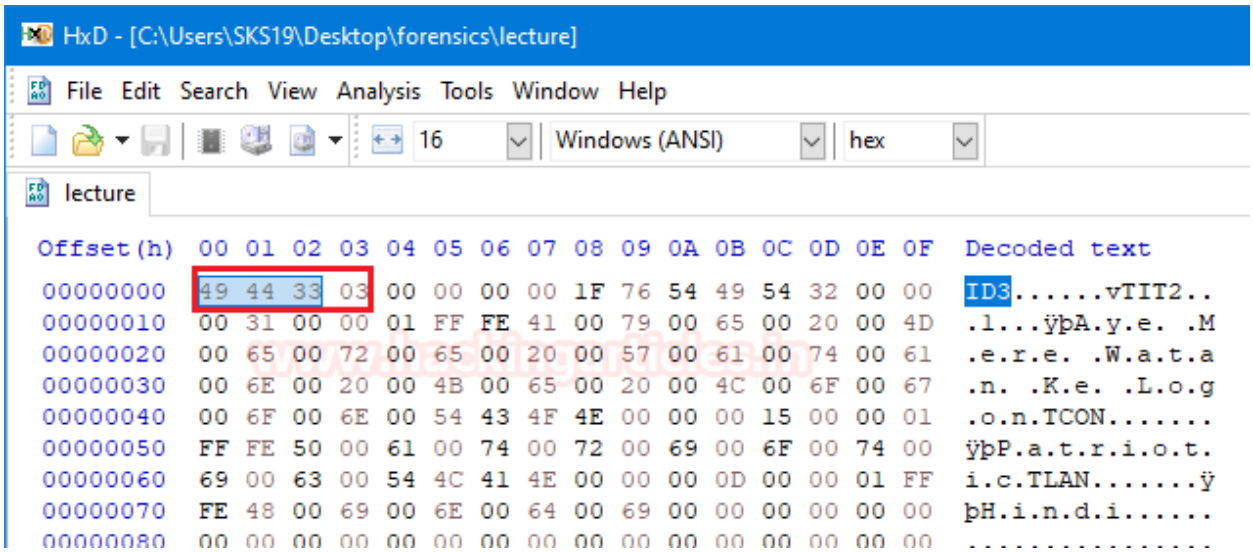
Just change its name and provide it with a .docx extension with the help of [rename] command.

```
rename *Final. *.docx
```

```
C:\Users\SKS19\Desktop\forensics>rename *Final. *.docx
```

File #5: lecture

The fifth file named as a lecture; we try to open that file in a hexadecimal editor. To analyse its hexadecimal values, which helps us to identify its file type.



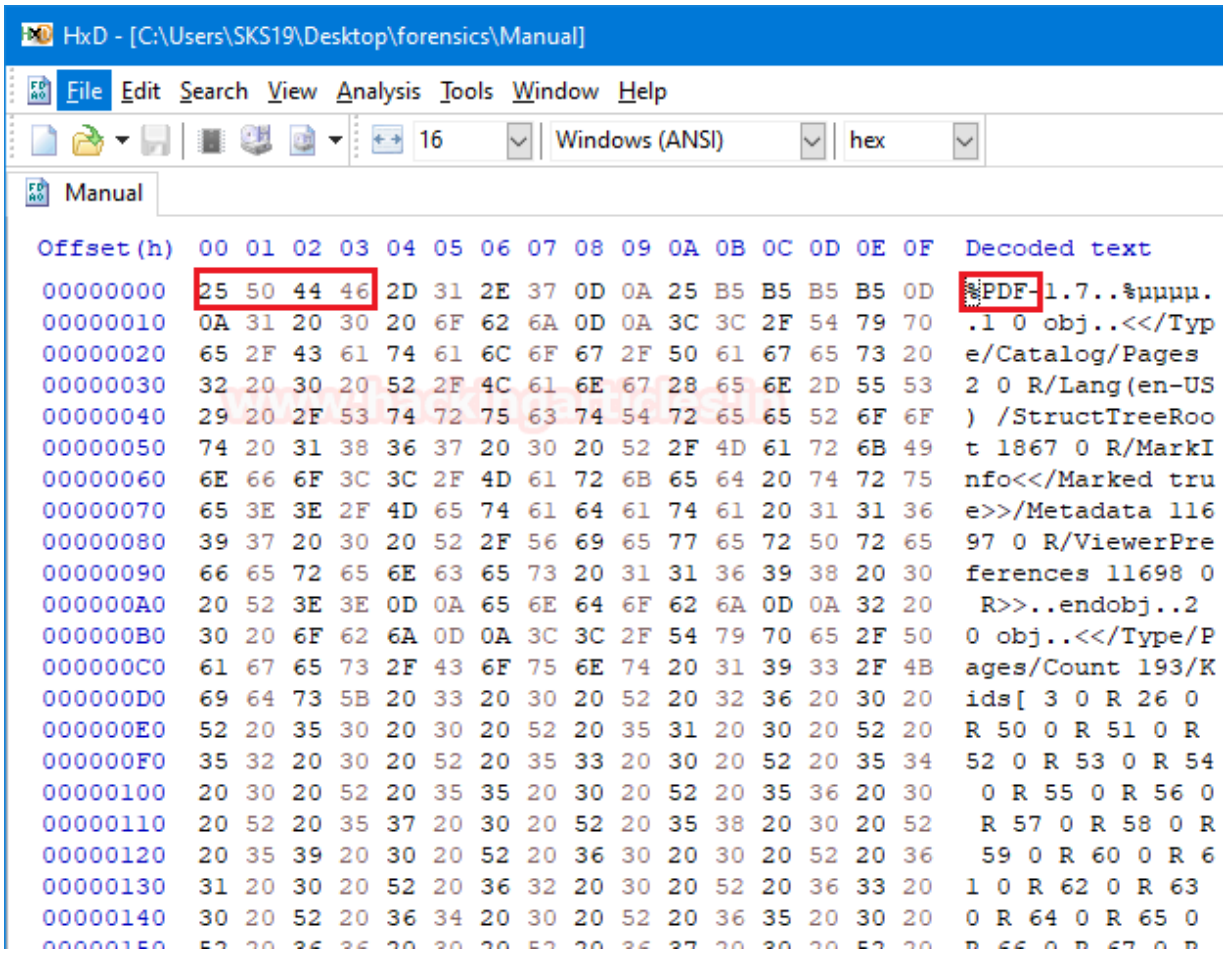
Now, try to match its first four bytes. In a moment we found out that it is a .**mp3** file with an **ASCII translation ID3**. Just provide that file a .mp3 extension with the help of [rename] command.

```
rename *lecture. *.mp3
```

```
C:\Users\SKS19\Desktop\forensics>rename *lecture. *.mp3
```

File #6: Manual

The second last file in that folder named Manual. Open that file in a hexadecimal editor to examine its hexadecimal values.



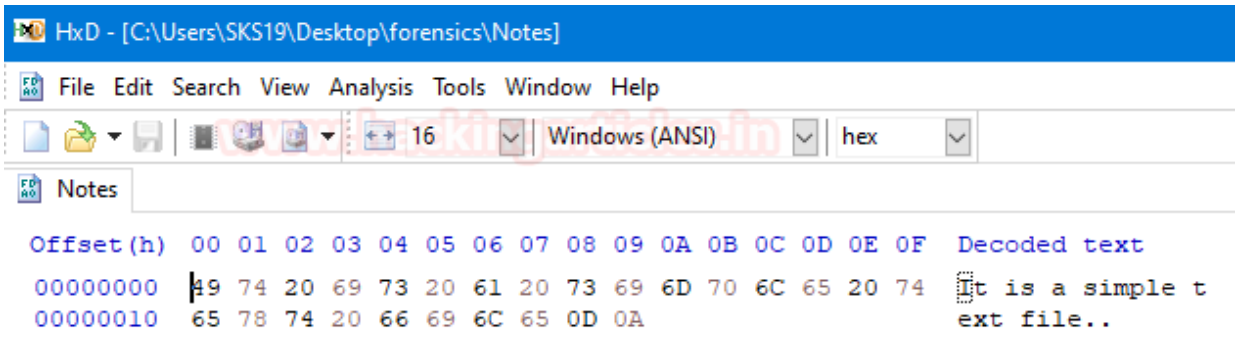
Now, try to match its four bytes with our cheat sheet. Then we come to know that it is a **.pdf** file with **ASCII translation %PDF**. Change its name and provide .pdf extension to it, with the help of rename command.

```
rename *Manual. *.pdf
```

```
C:\Users\SKS19\Desktop\forensics>rename  *Manual. *.pdf
```

File #7: Notes

Finally, we have reached to the file in the folder named Notes. Straight away we opened that file in a Hexadecimal editor to examine its hexadecimal values.



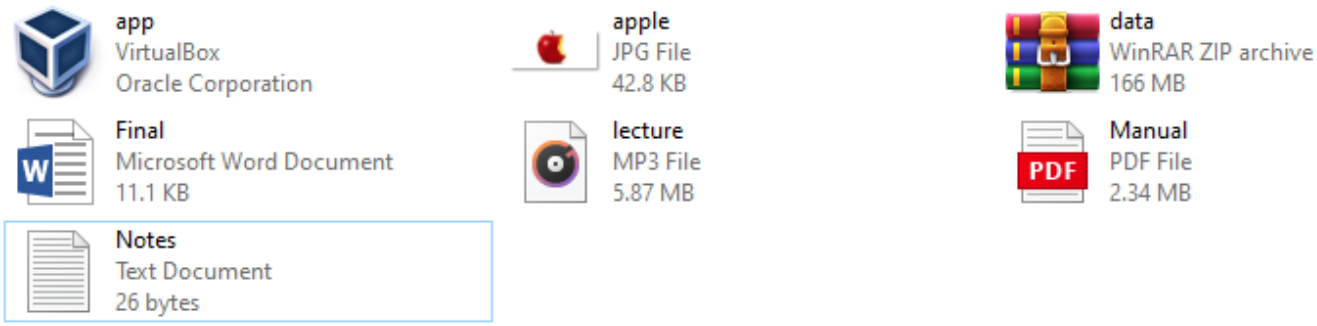
After opening it is saying that "**It is a simple text file**.". so, we provided **a .txt** extension with the help of [rename] command.

```
rename *Notes. *.txt
```

```
C:\Users\SKS19\Desktop\forensics>rename  *Notes. *.txt
```

Recovered all File successfully

Now, look at the folder which itself saying that we have recovered all the files successfully.



And we can also see that these files were recovered in the command prompt along with its original extension, with the help of [dir] command.

```
C:\Users\SKS19\Desktop\forensics>dir
 Volume in drive C has no label.
 Volume Serial Number is C296-F770

 Directory of C:\Users\SKS19\Desktop\forensics

07-07-2020  21:51    <DIR>          .
07-07-2020  21:51    <DIR>          ..
28-06-2020  23:36       170,617,352 app.exe
03-07-2020  19:14            43,853 apple.jpg
03-07-2020  21:14       174,786,466 data.zip
03-07-2020  19:53            11,403 Final.docx
03-07-2020  19:58         6,162,016 lecture.mp3
15-04-2020  21:44         2,456,722 Manual.pdf
03-07-2020  19:12                26 Notes.txt
               7 File(s)    354,077,838 bytes
               2 Dir(s)  361,037,729,792 bytes free
```

Examining Corrupted File Extension using Linux Platform

Now suppose in your investigation, you are in the same scenario where the file extension is missing but this time the Victim machine operates on Linux Environment and you are not allowed to copy this folder on another machine. Then How would you handle this situation?

Analysis using the File command

The file command is a Linux utility that analyzes each argument in an attempt to classify it. Hence, we can examine this forensic investigation in a Linux environment with the help of file command.

We are using the [ls] command to show you guys, these are the same files and the same scenario that we already explained above.

```
root@kali:/home/kali/Desktop/forensics# ls
app  apple  data  Final  lecture  Manual  Notes
```

We just need to use [file] along with the file name, to know about the originality of that file. Pick the first file and use this command. It shows that it is an MS Windows executable file.

```
file app
```

```
root@kali:/home/kali/Desktop/forensics# file app
app: PE32 executable (GUI) Intel 80386, for MS Windows
```

Let us try the same technique with the second file named apple. Apply [file] command and provide its file name. It shows that it is a jpeg image along with its internal pieces of information.

```
file apple
```

```
root@kali:/home/kali/Desktop/forensics# file apple
apple: JPEG image data, JFIF standard 1.01, resolution (DPI), density 72×72
, segment length 16, Exif Standard: [TIFF image data, little-endian, dirent
ries=0], baseline, precision 8, 1024×440, components 3
```

This article will help us to identify the true identity of a file during a Forensic Investigation in both the Windows and Linux environments.