Adam Aji Purnama - 2540118486
Kenn Christoval Candra - 2540119715
I Pasek Made Gatha Perbawa Putra - 2540123302
Stephen Mario Wijaya - 2501972524

Objectives:

- Use HashCalc to determine the hash values of the files.
- Use HxD Hex Editor to change a single byte in a file.
- Use Hashcalc Re-hash the files.
- Use HxD Hex Editor to examine the end of each file and determine the difference.

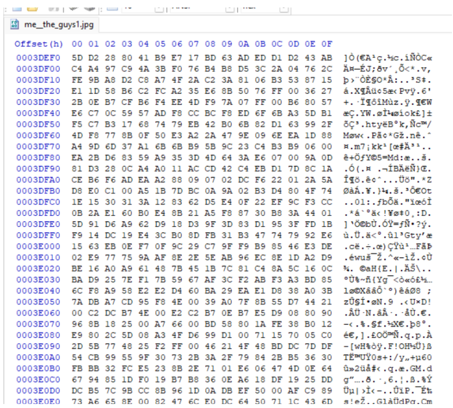
1. Open / Install Access Data's FTK Imager 3
2. Select File > Add Evidence Item > Select Image File > Browse to *Vader_Home_Computer.001* image and add it.
3. Navigate to the *C:\Documents and Settings\Owner\My Documents\Secret pics* folder.
4. Export the "Secret Pics" folder to your local hard drive.
5. On your computer, examine the three pictures inside the Secret pics folder. Using Windows, right click on the three provided pictures and record the size of each file.
   me & the guys1.jpg size: 252 KB
   me & the guys2.jpg size: 252 KB
   me & the guys3.jpg size: 252 KB
6. Open each image and describe the contents.
   me & the guys1.jpg Description: 7 Characters from Star Wars
   me & the guys2.jpg Description: 7 Characters from Star Wars
   me & the guys3.jpg Description: 7 Characters from Star Wars
7. Are the pictures all identical? Yes, identical but not 100% the same. Especially for me & the guys2.jpg, it has a different hash calculation result. It means, it had something embedded in it.
8. Install Hashcalc.exe.
9. Use Hashcalc to calculate the hashes of all 3 files. Record the Md5 Hash value for each file.
   me & the guys1.jpg Md5 Hash: d4fcd76163e62c26de6324339d5ec874
   me & the guys2.jpg Md5 Hash: ee3b991ab3e70476cd122a235b09c7ee
   me & the guys3.jpg Md5 Hash: d4fcd76163e62c26de6324339d5ec874
10. Install the HxD Hex Editor on your computer and open it.

11. In HxD, select “open” under the file menu. Open one of 2 duplicate files. You know they are duplicate because they have an identical hash.

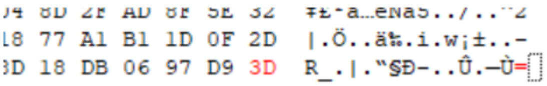
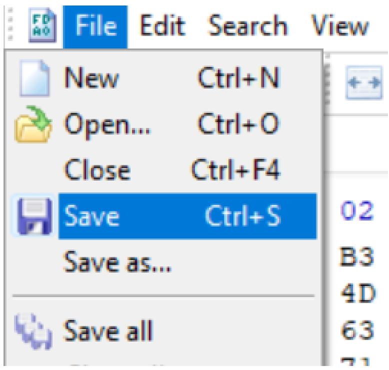
12. Go to the bottom of the file and change the last byte by selecting it and typing any character.

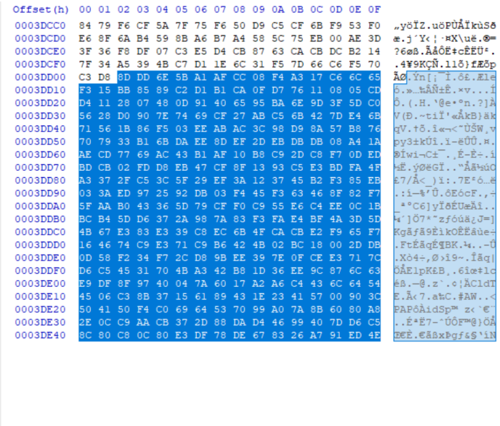
13. Select “Save as” under “File” and save this picture under a different name.

Documentation 11 - 13

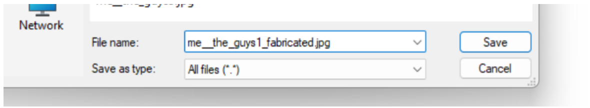
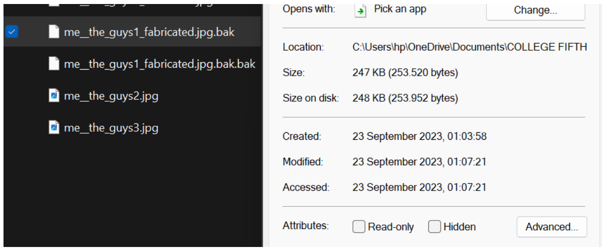
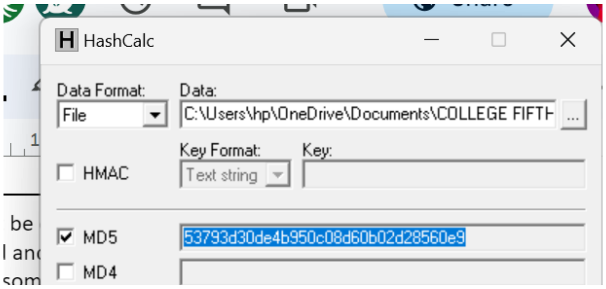
<table>
<tr>
<td>


<pre>
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

0003DEF0 5D D2 28 80 41 B9 E7 17 BD 63 AD ED D1 D2 43 AB]Ò(€A¹ç.½c.íÑÒC«
0003DF00 C4 A4 97 C9 4A 3B F0 76 B4 B8 D5 3C 2A 04 76 2C Ä¤—ÉJ;ðv´¸Õ<*.v,
0003DF10 FE 9B A8 D2 C8 A7 4F 2A C2 3A 81 06 B3 53 87 15 þ›¨ÒÈ§O*Â:..³S‡.
0003DF20 E1 1D 58 B6 C2 FC A2 35 E6 8B 50 76 FF 00 36 27 á.X¶Âü¢5æ‹Pvÿ.6'
0003DF30 2B 0E B7 CF B6 F4 EE 4D F9 7A 07 FF 00 B6 80 57 +.·Ï¶ôîMùz.ÿ.¶€W
0003DF40 E6 C7 0C 59 57 AD F8 CC BC F8 ED 6F 6B A3 5D B1 æÇ.YW.øÌ¼øíok£]±
0003DF50 F5 C7 B3 17 68 74 79 EB 42 B0 6B 82 D1 63 99 2F õÇ³.htyëB°k‚Ñc™/
0003DF60 4D F8 77 8B 0F 50 E3 A2 2A 47 9E 09 6E EA 1D 88 Møw‹.Pã¢*Gž.nê.ˆ
0003DF70 A4 9D 6D 37 A1 6B 6B B9 5B 9C 23 C4 B3 B9 06 00 ¤.m7¡kk¹[œ#Ä³¹..
0003DF80 EA 2B D6 83 59 A9 35 3D 4D 64 3A E6 07 00 9A 0D ê+ÖƒY©5=Md:æ..š.
0003DF90 81 D3 28 0C A4 A0 11 AC CD 42 C4 EB D1 7D 8C 1A .Ó(.¤ .¬ÍBÄëÑ}Œ.
0003DFA0 CE B6 F6 AD EA A2 88 09 07 02 DC F6 22 01 2A 5A Î¶ö.ê¢ˆ...Üö".*Z
0003DFB0 D8 E0 C1 00 A5 1B 7D BC 0A 9A 02 B3 D4 80 4F 74 ØàÁ.¥.}¼.š.³Ô€Ot
0003DFC0 1E 15 30 31 3A 12 83 62 D5 E4 0F 22 EF 9C F3 CC ..01:.ƒbÕä."ïœóÌ
0003DFD0 0B 2A E1 60 B0 E4 8B 21 A5 F8 87 30 B8 3A 44 01 .*á`°ä‹!¥ø‡0¸:D.
0003DFE0 5D 91 D6 A9 62 D9 18 D3 9F 3D 83 D1 95 3F FD 1B]‘Ö©bÙ.ÓŸ=ƒÑ•?ý.
0003DFF0 F9 14 DC 19 E4 3C B0 8D FB 31 B3 47 74 79 92 E6 ù.Ü.ä<°.û1³Gty’æ
0003E000 15 63 EB 0E F7 0F 9C 29 C7 9F F9 B9 85 46 E3 DE .cë.÷.œ)ÇŸù¹…FãÞ
0003E010 02 E9 77 75 9A AF 8E 2E 5E AB 96 EC 8E 1D A2 D9 .éwuš¯Ž.^«–ìŽ.¢Ù
0003E020 BE 16 A0 A9 61 48 7B 45 1B 7C 81 C4 8A 5C 16 0C ¾. ©aH{E.|.ÄŠ\..
0003E030 BA D9 25 7E F1 7B 59 67 AF 3C F2 AB F3 A3 BD 85 ºÙ%~ñ{Yg¯<ò«ó£½…
0003E040 6C F8 A9 58 E2 E2 D4 60 BA 29 EA E1 D8 38 A0 3B lø©XââÔ`º)êáØ8 ;
0003E050 7A DB A7 CD 95 F8 4E 00 39 A0 7F 8B 55 D7 44 21 zÛ§Í•øN.9 .‹U×D!
0003E060 00 C2 DC B7 4E 00 E2 C2 B7 0E B7 E5 D9 08 80 90 .ÂÜ·N.âÂ·.·åÙ.€.
0003E070 96 8B 18 25 00 A7 66 00 BD 58 80 1A FE 38 B0 12 –‹.%.§f.½X€.þ8°.
0003E080 E9 80 2C 5D 08 A3 4F D6 99 D1 00 71 15 70 05 C0 é€,].£OÖ™Ñ.q.p.À
0003E090 2D 5B 77 48 25 F2 FF 00 46 21 4F 48 BD DC 7D DF -[wH%òÿ.F!OH½Ü}ß
0003E0A0 54 CB 99 55 9F 30 73 2B 3A 2F 79 84 2B B5 36 30 TË™UŸ0s+:/y„+µ60
0003E0B0 FB BB 32 FC E5 23 8B 2E 71 01 E6 06 47 4D 0E 64 û»2üå#‹.q.æ.GM.d
0003E0C0 67 94 85 1D F0 19 B7 B8 36 0E A6 18 DF 19 25 DD g”….ð.·¸6.¦.ß.%Ý
0003E0D0 DC B5 7C 9B CC 8B 96 1D 0A DB EF 50 00 AF C9 89 Üµ|›Ì‹–..ÛïP.¯É‰
0003E0E0 73 A6 65 8E 00 82 47 6C E0 DC 64 50 71 1C 43 6D s¦eŽ.‚GlàÜdPq.Cm
</pre>
</td>
<td>Open the first file, since the first (me & the guys1.jpg) is one of the identical hash.</td>
</tr>
<tr>
<td>

<pre>
)4 8D 2F AD 8F 5E 32   ‡£¯a…eÑa5../..¨2
18 77 A1 B1 1D 0F 2D |.Ö..ä‰.i.w¡±..–
3D 18 DB 06 97 D9 3D   R_.|.“§Ð–..Û.—Ù=
</pre>
</td>
<td>Change two of the bytes into the D9 3D.</td>
</tr>
<tr>
<td>



<pre>
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

0003DCC0 84 79 F6 CF 5A 7F 75 F6 50 D9 C5 CF 6B F9 53 F0 „yöÏZ.uöPÙÅÏkùSð
0003DCD0 E6 8F 6A B4 59 8B A6 B7 A4 58 5C 75 EB 00 AE 3D æ.j´Y‹¦·¤X\uë.®=
0003DCE0 3F 36 F8 DF 07 C3 E5 D4 CB 87 63 CA CB DC B2 14 ?6øß.ÃåÔË‡cÊËÜ².
0003DCF0 7F 34 A5 39 4B C7 D1 1E 6C 31 F5 7D 66 C6 F5 70 .4¥9KÇÑ.l1õ}fÆõp
0003DD00 C3 D8 8D DD 6E 5B A1 AF CC 08 F4 A3 17 C6 6C 65 ÃØ.Ýn[¡¯Ì.ô£.Æle
0003DD10 F3 15 BB 85 89 C2 D1 B1 CA 0F D7 76 11 08 05 CD ó.»…‰ÂÑ±Ê.×v...Í
0003DD20 D4 11 28 07 48 0D 91 40 65 95 BA 6E 9D 3F 5D C0 Ô.(.H.‘@e•ºn.?]À
0003DD30 56 28 D0 90 7E 74 69 CF 27 AB C5 6B 42 7D E4 6B V(Ð.~tiÏ'«ÅkB}äk
0003DD40 71 56 1B 86 F5 03 EE AB AC 3C 98 D9 8A 57 B8 76 qV.†õ.î«¬<˜ÙŠW¸v
0003DD50 70 79 33 B1 6B DA EE 8D EF 2D EB DB DB 08 A4 1A py3±kÚî.ï-ëÛÛ.¤.
0003DD60 AE CD 77 69 AC 43 B1 AF 10 B8 C9 2D C8 F7 0D ED ®Íwi¬C±¯.¸É-È÷.í
0003DD70 BD CB 02 FD D8 EB 47 CF 8F 13 93 C5 E3 BD FA 4F ½Ë.ýØëGÏ..“Åã½úO
0003DD80 A3 37 2F C5 3C 5F 29 EF 3A 12 37 45 B2 F3 85 EB £7/Å<_)ï:.7E²ó…ë
0003DD90 03 3A ED 97 25 92 DB 03 F4 45 F3 63 46 8F 82 F7 .:í—%’Û.ôEócF.‚÷
0003DDA0 5F AA B0 43 36 5D 79 CF F0 C9 55 E6 C4 EE 0C 1B _ª°C6]yÏðÉUæÄî..
0003DDB0 BC B4 5D D6 37 2A 98 7A 83 F3 FA E4 BF 4A 3D 5D ¼´]Ö7*˜zƒóúä¿J=]
0003DDC0 4B 67 E3 83 E3 39 C8 EC 6B 4F CA CB E2 F9 65 F7 Kgãƒã9ÈìkOÊËâùe÷
0003DDD0 16 46 74 C9 E3 71 C9 B6 42 4B 02 BC 18 00 2D DB .FtÉãqÉ¶BK.¼..-Û
0003DDE0 0D 58 F2 34 F7 2C D8 9B EE 39 7E 0F CE E3 71 7C .Xò4÷,Ø›î9~.Îãq|
0003DDF0 D6 C5 45 31 70 4B A3 42 B8 1D 36 EE 9C 87 6C 63 ÖÅE1pK£B¸.6îœ‡lc
0003DE00 E9 DF 8F 97 40 04 7A 60 17 A2 A6 C4 43 6C 64 54 éß.—@.z`.¢¦ÄCldT
0003DE10 45 06 C3 8B 37 15 61 89 43 1E 23 41 57 00 90 3C E.Ã‹7.a‰C.#AW..<
0003DE20 50 41 50 F4 C0 69 64 53 70 99 A0 7A 8B 60 80 A8 PAPôÀidSp™ z‹`€¨
0003DE30 2E 0C C9 AA CB 37 2D 88 DA D4 46 99 40 7D D6 C5 ..ÉªË7-ˆÚÔF™@}ÖÅ
0003DE40 8C 80 C8 0C 80 E3 DF 78 DE 67 83 26 A7 91 ED 4E Œ€È.€ãßxÞgƒ&§‘íN
</pre>
</td>
<td>Save As and rename the file into me_the_guys1_fabricated.jpg and delete some to reduce the original size</td>
</tr>
</table>

 Network File name: me__the_guys1_fabricated.jpg Save as type: All files (*.*) Save Cancel	
 me__the_guys1_fabricated.jpg.bak me__the_guys1_fabricated.jpg.bak.bak me__the_guys2.jpg me__the_guys3.jpg Opens with: Pick an app Change... Location: C:\Users\hp\OneDrive\Documents\COLLEGE FIFTH Size: 247 KB (253.520 bytes) Size on disk: 248 KB (253.952 bytes) Created: 23 September 2023, 01:03:58 Modified: 23 September 2023, 01:07:21 Accessed: 23 September 2023, 01:07:21 Attributes: ☐ Read-only ☐ Hidden Advanced...	As we can see, the jpg file can't be displayed as a jpg file anymore. It is fabricated and converted into bak file. Which means the sum of bytes had been modified.
 HashCalc Data Format: File Data: C:\Users\hp\OneDrive\Documents\COLLEGE FIFTH ☐ HMAC Key Format: Text string Key: ☑ MD5 53793d30de4b950c08d60b02d28560e9 ☐ MD4	Calculate the Md5 Hash with HashCalc

14. Use Windows to record the file size and hash calc for the md5 hash of the new file.

New File: me__the_guys1_fabricated.jpg.bak

Description: The file cant be shown as jpg anymore. It is fabricated by modified bytes and converted to .bak file.

Size: 247 KB

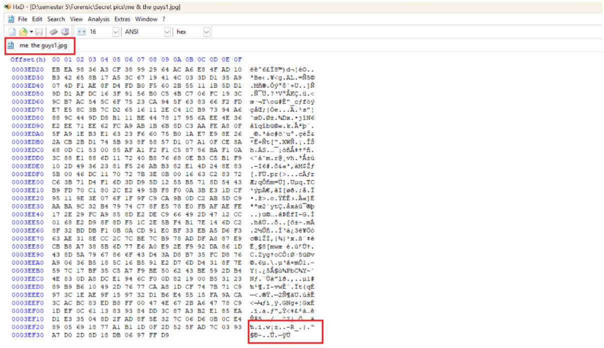
Md5 Hash: 53793d30de4b950c08d60b02d28560e9

15. Based on the results of this test, what are your thoughts on the reliability of Md5 as a "digital fingerprint"?

MD5 is a widely known cryptographic hash function used to create digital fingerprints. However, it is now considered unreliable due to its vulnerability to collisions and preimage vulnerability, as well as its high speed, which makes it easier for attackers to compromise. Therefore, security experts and organizations have switched to more secure hash functions such as SHA-256 and and SHA-3 for cryptographic purposes, as these options are more suitable against attacks.MD5 is no longer recommended for digital fingerprinting or other security-critical tasks and has been replaced by more secure alternatives.

16. Use HxD to examine the last few bytes of each of the files provided and record anything that might be of suspicion.

- image me&the guys 1 and me&the guys 3



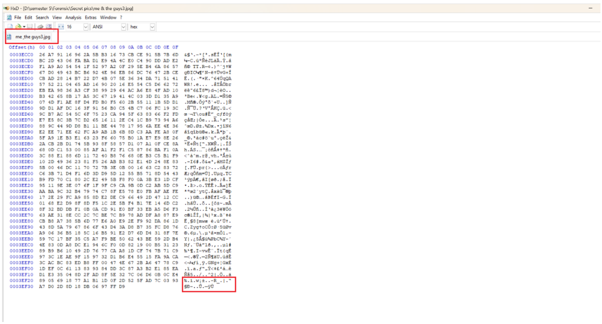
HxD - [D:\semester 5\Forensic\Secret pics\me & the guys1.jpg]
File Edit Search View Analysis Extras Window ?
16
ANSI
hex
me the guys1.jpg

```
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

0003ED20  EB EA 98 36 A3 CF 38 99 29 64 AC A6 E8 4F AD 10  ëê˜6£Ï8™)d¬¦èO..
0003ED30  B3 42 65 8B 17 A5 3C 67 19 41 4C 03 3D D1 35 A9  ³Be‹.¥<g.AL.=Ñ5©
0003ED40  07 4D F1 AE 8F D4 FD B0 F5 60 2B 55 11 1B 5D D1  .Mñ®.Ôý°õ`+U..]Ñ
0003ED50  9D D1 AF DC 16 3F 91 56 B0 C5 4B C7 06 FC 19 3C  .Ñ¯Ü.?‘V°ÅKÇ.ü.<
0003ED60  9C B7 AC 54 5C 6F 75 23 CA 94 5F 63 83 66 F2 FD  œ·¬T\ou#Ê”_cƒfòý
0003ED70  E7 E5 8C 3B 7C D2 65 16 11 2E C4 1C B9 73 94 A6  çåŒ;|Òe...Ä.¹s”¦
0003ED80  88 9C 44 9D D8 B1 11 BE 44 78 17 95 6A EE 4E 36  ˆœD.Ø±.¾Dx.•jîN6
0003ED90  E2 EE 71 EE 62 FC A9 AB 1B 6B 8D C3 AA FE A8 0F  âîqîbü©«.k.Ãªþ¨.
0003EDA0  5F A9 1E B3 E1 63 23 F6 60 75 B0 1A E7 E9 8E 26  _©.³ác#ö`u°.çéŽ&
0003EDB0  2A CB 2B D1 74 5B 93 8F 58 57 D1 07 A1 0F CE 8A  *Ë+Ñt[“.XWÑ.¡.ÎŠ
0003EDC0  68 0D C1 53 00 85 AF A1 F2 F1 C5 87 86 BA F1 0A  h.ÁS.…¯¡òñÅ‡†ºñ.
0003EDD0  3C 88 E1 88 6D 11 72 40 B8 76 68 0E B3 C5 B1 F9  <ˆáˆm.r@¸vh.³Å±ù
0003EDE0  10 2D 49 36 23 81 F5 26 AB B3 82 E1 4D 24 8E 83  .-I6#.õ&«³‚áM$Žƒ
0003EDF0  5B 00 46 DC 11 70 72 7B 3E 0B 00 16 63 C2 83 72  [.FÜ.pr{>...cÂƒr
0003EE00  C6 3B 71 D4 F1 6D 3D D9 5D 12 55 B5 71 8D 54 43  Æ;qÔñm=Ù].Uµq.TC
0003EE10  B9 FD 70 C1 80 2C E2 49 5B F8 F0 0A 3B E3 1D CF  ¹ýpÁ€,âI[øð.;ã.Ï
0003EE20  95 11 9E 3E 07 6F 1F 9F C9 CA 9B 0D C2 AB 5D C9  •.ž>.o.ŸÉÊ›.Â«]É
0003EE30  AA BA 9C 32 B4 79 74 C7 8F E5 78 E0 FB AF AE FE  ªºœ2´ytÇ.åxàû¯®þ
0003EE40  17 2E 29 FC A9 85 8D E2 DE C9 66 49 2D 47 12 CC  ..)ü©….âÞÉfI-G.Ì
0003EE50  01 68 E2 D9 8F 8D F5 1C 2E 5B F4 B1 7E 14 6D C2  .hâÙ..õ..[ô±~.mÂ
0003EE60  8F 32 BD DB F1 0B 0A CD 91 E0 BF 33 EB A5 D6 F3  .2½Ûñ..Í‘à¿3ë¥Öó
0003EE70  63 AE 31 8E CC 2C 7C BE 7C B9 78 AD DF A8 87 E9  c®1ŽÌ,|¾|¹x.ß¨‡é
0003EE80  CB B8 A7 38 5B 6D 77 E6 A0 E9 2E F9 92 DA 86 1D  Ë¸§8[mwæ é.ù’Ú†.
0003EE90  43 8D 5A 79 67 86 6F 43 D4 3A D8 B7 35 FC D8 76  C.Zyg†oCÔ:Ø·5üØv
0003EEA0  A9 06 36 B5 18 5C 16 B5 91 E2 D7 6D D4 31 8F 7E  ©.6µ.\.µ‘â×mÔ1.~
0003EEB0  59 7C 17 BF 35 C5 A7 F9 BE 50 62 43 BE 59 2D B4  Y|.¿5Å§ù¾PbC¾Y-´
0003EEC0  4E 83 0D A8 DC E1 94 6C F0 0D 82 19 00 B5 31 23  Nƒ.¨Üá”lð.‚..µ1#
0003EED0  89 B9 B6 10 49 2D 76 77 CA A8 1D CF 74 7B 71 C9  ‰¹¶.I-vwÊ¨.Ït{qÉ
0003EEE0  97 3C 1E AE 9F 15 97 32 D1 B6 E4 55 15 FA 9A CA  —<.®Ÿ.—2Ñ¶äU.úšÊ
0003EEF0  3C AC BC 83 ED B8 FF 00 47 4E 67 2B A6 47 78 C9  <¬¼ƒí¸ÿ.GNg+¦GxÉ
0003EF00  1D EF 0C 61 13 83 93 84 DD 3C 87 A3 B2 E1 85 EA  .ï.a.ƒ“„Ý<‡£²á…ê
0003EF10  D1 E3 35 04 8D 2F AD 8F 5E 32 7C 06 D6 0B 0C E4  Ñã5../..^2|.Ö..ä
0003EF20  89 05 69 18 77 A1 B1 1D 0F 2D 52 5F AD 7C 03 93  ‰.i.w¡±..-R_.|.“
0003EF30  A7 D0 2D 8D 18 DB 06 97 FF D9                    §Ð-..Û.—ÿÙ
```

In image "me & the guys 1" , we can see that the last few bytes of this image is :

‰.i.w¡±..-R_.|.“§Ð-..Û.—ÿÙ



HxD - [D:\semester 5\Forensic\Secret pics\me & the guys3.jpg]
File Edit Search View Analysis Extras Window ?
16
ANSI
hex
me_the guys3.jpg

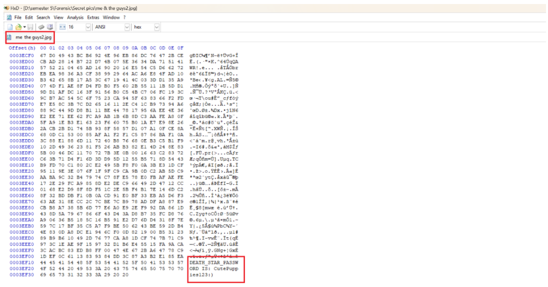
```
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

0003ECC0  26 A7 91 16 96 2A 5B B3 16 73 CB CE 91 5B 7B 6D  &§‘.–*[³.sËÎ‘[{m
0003ECD0  BC 2D 43 06 FA BA D1 E9 4A 4C E0 C4 90 DD AD E2  ¼-C.úºÑéJLàÄ.Ý.â
0003ECE0  F1 A9 A0 54 54 1F 52 97 A2 0F 29 5E B4 6A 86 57  ñ© TT.R—¢.)^´j†W
0003ECF0  67 D0 49 43 BC B6 92 4E 96 EB 86 DC 76 47 2B CE  gÐIC¼¶’N–ë†ÜvG+Î
0003ED00  CB AD 28 14 B7 22 D7 4B 07 5E 36 34 DA 71 51 41  Ë.(.·"×K.^64ÚqQA
0003ED10  57 52 21 04 65 AD 16 90 20 16 E5 54 C5 D6 62 72  WR!.e... .åTÅÖbr
0003ED20  EB EA 98 36 A3 CF 38 99 29 64 AC A6 E8 4F AD 10  ëê˜6£Ï8™)d¬¦èO..
0003ED30  B3 42 65 8B 17 A5 3C 67 19 41 4C 03 3D D1 35 A9  ³Be‹.¥<g.AL.=Ñ5©
0003ED40  07 4D F1 AE 8F D4 FD B0 F5 60 2B 55 11 1B 5D D1  .Mñ®.Ôý°õ`+U..]Ñ
0003ED50  9D D1 AF DC 16 3F 91 56 B0 C5 4B C7 06 FC 19 3C  .Ñ¯Ü.?‘V°ÅKÇ.ü.<
0003ED60  9C B7 AC 54 5C 6F 75 23 CA 94 5F 63 83 66 F2 FD  œ·¬T\ou#Ê”_cƒfòý
0003ED70  E7 E5 8C 3B 7C D2 65 16 11 2E C4 1C B9 73 94 A6  çåŒ;|Òe...Ä.¹s”¦
0003ED80  88 9C 44 9D D8 B1 11 BE 44 78 17 95 6A EE 4E 36  ˆœD.Ø±.¾Dx.•jîN6
0003ED90  E2 EE 71 EE 62 FC A9 AB 1B 6B 8D C3 AA FE A8 0F  âîqîbü©«.k.Ãªþ¨.
0003EDA0  5F A9 1E B3 E1 63 23 F6 60 75 B0 1A E7 E9 8E 26  _©.³ác#ö`u°.çéŽ&
0003EDB0  2A CB 2B D1 74 5B 93 8F 58 57 D1 07 A1 0F CE 8A  *Ë+Ñt[“.XWÑ.¡.ÎŠ
0003EDC0  68 0D C1 53 00 85 AF A1 F2 F1 C5 87 86 BA F1 0A  h.ÁS.…¯¡òñÅ‡†ºñ.
0003EDD0  3C 88 E1 88 6D 11 72 40 B8 76 68 0E B3 C5 B1 F9  <ˆáˆm.r@¸vh.³Å±ù
0003EDE0  10 2D 49 36 23 81 F5 26 AB B3 82 E1 4D 24 8E 83  .-I6#.õ&«³‚áM$Žƒ
0003EDF0  5B 00 46 DC 11 70 72 7B 3E 0B 00 16 63 C2 83 72  [.FÜ.pr{>...cÂƒr
0003EE00  C6 3B 71 D4 F1 6D 3D D9 5D 12 55 B5 71 8D 54 43  Æ;qÔñm=Ù].Uµq.TC
0003EE10  B9 FD 70 C1 80 2C E2 49 5B F8 F0 0A 3B E3 1D CF  ¹ýpÁ€,âI[øð.;ã.Ï
0003EE20  95 11 9E 3E 07 6F 1F 9F C9 CA 9B 0D C2 AB 5D C9  •.ž>.o.ŸÉÊ›.Â«]É
0003EE30  AA BA 9C 32 B4 79 74 C7 8F E5 78 E0 FB AF AE FE  ªºœ2´ytÇ.åxàû¯®þ
0003EE40  17 2E 29 FC A9 85 8D E2 DE C9 66 49 2D 47 12 CC  ..)ü©….âÞÉfI-G.Ì
0003EE50  01 68 E2 D9 8F 8D F5 1C 2E 5B F4 B1 7E 14 6D C2  .hâÙ..õ..[ô±~.mÂ
0003EE60  8F 32 BD DB F1 0B 0A CD 91 E0 BF 33 EB A5 D6 F3  .2½Ûñ..Í‘à¿3ë¥Öó
0003EE70  63 AE 31 8E CC 2C 7C BE 7C B9 78 AD DF A8 87 E9  c®1ŽÌ,|¾|¹x.ß¨‡é
0003EE80  CB B8 A7 38 5B 6D 77 E6 A0 E9 2E F9 92 DA 86 1D  Ë¸§8[mwæ é.ù’Ú†.
0003EE90  43 8D 5A 79 67 86 6F 43 D4 3A D8 B7 35 FC D8 76  C.Zyg†oCÔ:Ø·5üØv
0003EEA0  A9 06 36 B5 18 5C 16 B5 91 E2 D7 6D D4 31 8F 7E  ©.6µ.\.µ‘â×mÔ1.~
0003EEB0  59 7C 17 BF 35 C5 A7 F9 BE 50 62 43 BE 59 2D B4  Y|.¿5Å§ù¾PbC¾Y-´
0003EEC0  4E 83 0D A8 DC E1 94 6C F0 0D 82 19 00 B5 31 23  Nƒ.¨Üá”lð.‚..µ1#
0003EED0  89 B9 B6 10 49 2D 76 77 CA A8 1D CF 74 7B 71 C9  ‰¹¶.I-vwÊ¨.Ït{qÉ
0003EEE0  97 3C 1E AE 9F 15 97 32 D1 B6 E4 55 15 FA 9A CA  —<.®Ÿ.—2Ñ¶äU.úšÊ
0003EEF0  3C AC BC 83 ED B8 FF 00 47 4E 67 2B A6 47 78 C9  <¬¼ƒí¸ÿ.GNg+¦GxÉ
0003EF00  1D EF 0C 61 13 83 93 84 DD 3C 87 A3 B2 E1 85 EA  .ï.a.ƒ“„Ý<‡£²á…ê
0003EF10  D1 E3 35 04 8D 2F AD 8F 5E 32 7C 06 D6 0B 0C E4  Ñã5../..^2|.Ö..ä
0003EF20  89 05 69 18 77 A1 B1 1D 0F 2D 52 5F AD 7C 03 93  ‰.i.w¡±..-R_.|.“
0003EF30  A7 D0 2D 8D 18 DB 06 97 FF D9                    §Ð-..Û.—ÿÙ
```

In image "me & the guys 3" , we can see that the last few bytes of this image are the same as "me and the guys 1":

‰.i.w¡±..-R_.|.“§Ð-..Û.—ÿÙ

- image me&the guys 2



HxD - [D:\semester 5\Forensic\Secret pics\me & the guys2.jpg]
File Edit Search View Analysis Extras Window ?
16
ANSI
hex
me the guys2.jpg

```
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

0003ECF0  67 D0 49 43 BC B6 92 4E 96 EB 86 DC 76 47 2B CE  gÐIC¼¶’N–ë†ÜvG+Î
0003ED00  CB AD 28 14 B7 22 D7 4B 07 5E 36 34 DA 71 51 41  Ë.(.·"×K.^64ÚqQA
0003ED10  57 52 21 04 65 AD 16 90 20 16 E5 54 C5 D6 62 72  WR!.e... .åTÅÖbr
0003ED20  EB EA 98 36 A3 CF 38 99 29 64 AC A6 E8 4F AD 10  ëê˜6£Ï8™)d¬¦èO..
0003ED30  B3 42 65 8B 17 A5 3C 67 19 41 4C 03 3D D1 35 A9  ³Be‹.¥<g.AL.=Ñ5©
0003ED40  07 4D F1 AE 8F D4 FD B0 F5 60 2B 55 11 1B 5D D1  .Mñ®.Ôý°õ`+U..]Ñ
0003ED50  9D D1 AF DC 16 3F 91 56 B0 C5 4B C7 06 FC 19 3C  .Ñ¯Ü.?‘V°ÅKÇ.ü.<
0003ED60  9C B7 AC 54 5C 6F 75 23 CA 94 5F 63 83 66 F2 FD  œ·¬T\ou#Ê”_cƒfòý
0003ED70  E7 E5 8C 3B 7C D2 65 16 11 2E C4 1C B9 73 94 A6  çåŒ;|Òe...Ä.¹s”¦
0003ED80  88 9C 44 9D D8 B1 11 BE 44 78 17 95 6A EE 4E 36  ˆœD.Ø±.¾Dx.•jîN6
0003ED90  E2 EE 71 EE 62 FC A9 AB 1B 6B 8D C3 AA FE A8 0F  âîqîbü©«.k.Ãªþ¨.
0003EDA0  5F A9 1E B3 E1 63 23 F6 60 75 B0 1A E7 E9 8E 26  _©.³ác#ö`u°.çéŽ&
0003EDB0  2A CB 2B D1 74 5B 93 8F 58 57 D1 07 A1 0F CE 8A  *Ë+Ñt[“.XWÑ.¡.ÎŠ
0003EDC0  68 0D C1 53 00 85 AF A1 F2 F1 C5 87 86 BA F1 0A  h.ÁS.…¯¡òñÅ‡†ºñ.
0003EDD0  3C 88 E1 88 6D 11 72 40 B8 76 68 0E B3 C5 B1 F9  <ˆáˆm.r@¸vh.³Å±ù
0003EDE0  10 2D 49 36 23 81 F5 26 AB B3 82 E1 4D 24 8E 83  .-I6#.õ&«³‚áM$Žƒ
0003EDF0  5B 00 46 DC 11 70 72 7B 3E 0B 00 16 63 C2 83 72  [.FÜ.pr{>...cÂƒr
0003EE00  C6 3B 71 D4 F1 6D 3D D9 5D 12 55 B5 71 8D 54 43  Æ;qÔñm=Ù].Uµq.TC
0003EE10  B9 FD 70 C1 80 2C E2 49 5B F8 F0 0A 3B E3 1D CF  ¹ýpÁ€,âI[øð.;ã.Ï
0003EE20  95 11 9E 3E 07 6F 1F 9F C9 CA 9B 0D C2 AB 5D C9  •.ž>.o.ŸÉÊ›.Â«]É
0003EE30  AA BA 9C 32 B4 79 74 C7 8F E5 78 E0 FB AF AE FE  ªºœ2´ytÇ.åxàû¯®þ
0003EE40  17 2E 29 FC A9 85 8D E2 DE C9 66 49 2D 47 12 CC  ..)ü©….âÞÉfI-G.Ì
0003EE50  01 68 E2 D9 8F 8D F5 1C 2E 5B F4 B1 7E 14 6D C2  .hâÙ..õ..[ô±~.mÂ
0003EE60  8F 32 BD DB F1 0B 0A CD 91 E0 BF 33 EB A5 D6 F3  .2½Ûñ..Í‘à¿3ë¥Öó
0003EE70  63 AE 31 8E CC 2C 7C BE 7C B9 78 AD DF A8 87 E9  c®1ŽÌ,|¾|¹x.ß¨‡é
0003EE80  CB B8 A7 38 5B 6D 77 E6 A0 E9 2E F9 92 DA 86 1D  Ë¸§8[mwæ é.ù’Ú†.
0003EE90  43 8D 5A 79 67 86 6F 43 D4 3A D8 B7 35 FC D8 76  C.Zyg†oCÔ:Ø·5üØv
0003EEA0  A9 06 36 B5 18 5C 16 B5 91 E2 D7 6D D4 31 8F 7E  ©.6µ.\.µ‘â×mÔ1.~
0003EEB0  59 7C 17 BF 35 C5 A7 F9 BE 50 62 43 BE 59 2D B4  Y|.¿5Å§ù¾PbC¾Y-´
0003EEC0  4E 83 0D A8 DC E1 94 6C F0 0D 82 19 00 B5 31 23  Nƒ.¨Üá”lð.‚..µ1#
0003EED0  89 B9 B6 10 49 2D 76 77 CA A8 1D CF 74 7B 71 C9  ‰¹¶.I-vwÊ¨.Ït{qÉ
0003EEE0  97 3C 1E AE 9F 15 97 32 D1 B6 E4 55 15 FA 9A CA  —<.®Ÿ.—2Ñ¶äU.úšÊ
0003EEF0  3C AC BC 83 ED B8 FF 00 47 4E 67 2B A6 47 78 C9  <¬¼ƒí¸ÿ.GNg+¦GxÉ
0003EF00  1D EF 0C 61 13 83 93 84 DD 3C 87 A3 B2 E1 85 EA  .ï.a.ƒ“„Ý<‡£²á…ê
0003EF10  44 45 41 54 48 5F 53 54 41 52 5F 50 41 53 53 57  DEATH_STAR_PASSW
0003EF20  4F 52 44 20 49 53 3A 20 43 75 74 65 50 75 70 70  ORD IS: CutePupp
0003EF30  69 65 73 31 32 33 3A 29 20 20                    ies123:)
```

In Image "me & the guys 2", we can see that the last few bytes of this image are different from image "me&the guys 1 and me & the guys 3". This image give us some information that is:

DEATH_STAR_PASSWORD IS:
CutePuppies123:)

17. Based on your answer to the previous question, do you think it may be possible for criminals to effectively hide information within a jpeg file? Why?

    Yes it is possible, because you can embed something to file such a jpeg without anyone noticing it. Development of cryptographics is very possible for someone to commit a crime with that method. The reason why jpeg is one of the tools they use, because jpeg has a relatively large file size compared to plain text or the others. Moreover criminals can encrypt the data they want to hide, so it adds another layer of security.