

MET MA 603:
Assignment Project Exam Help
SAS Programming and
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Understanding '09'x

What is '09'x ?

Why does '09'x correspond to TAB? The answer, of course, is that '09'x is the hexadecimal ASCII code representation of TAB.

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In order to understand this definition we need to know what is meant by **hexadecimal** and by **ASCII**.

Hexadecimal

Hexadecimal is a numbering system that uses a base of 16 (most of the time we use a base of 10).

In computing, it is common to use a base of 2 (i.e., binary), where each number is represented by 1's and 0's.

In hexadecimal, 0 to 9 represent the same numbers as they do in base 10, while the numbers from 10 to 15 are represented with the letters A-F.

For example, the number 33 in base 10 would be represented as 21 in hexadecimal ($2 \times 16^1 + 1 \times 16^0$). The number 1514 in base 10 corresponds to 5EA in hexadecimal ($5 \times 16^2 + 14 \times 16^1 + 10 \times 16^0$).

ASCII

ASCII stands for the “American Standard Code for Information Interchange”. It’s a system, often used in computing, for representing characters with code.

Note that the concept of ASCII is similar to Morse code, which represents the letters of the alphabet with dots and dashes.

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For example, the ASCII code for the letter A is 65. In hexadecimal, this corresponds to 41.

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ASCII Table

The table below shows some of the ASCII codes for different characters in base 10 and in base 16 (Hex).

ASCII Hex Symbol	ASCII Hex Symbol	ASCII Hex Symbol	ASCII Hex Symbol
0 NUL	16 10 NLE	32 20 (space)	48 30 0
1 1 SOH	17 11 DC1	33 21 !	49 31 1
2 2 STX	18 12 DC2	34 22 "	50 32 2
3 3 ETX	19 13 DC3	35 23 #	51 33 3
4 4 EOT	20 14 DC4	36 24 \$	52 34 4
5 5 ENQ	21 15 NAK	37 25 %	53 35 5
6 6 ACK	22 16 SYN	38 26 &	54 36 6
7 7 BEL	23 17 ETB	39 27 '	55 37 7
8 8 BS	24 18 CAN	40 28 (56 38 8
9 9 TAB	25 19 EM	41 29)	57 39 9
10 A LF	26 1A SUB	42 2A *	58 3A :
11 B VT	27 1B ESC	43 2B +	59 3B ;
12 C FF	28 1C FS	44 2C ,	60 3C <
13 D CR	29 1D GS	45 2D -	61 3D =
14 E SO	30 1E RS	46 2E .	62 3E >
15 F SI	31 1F US	47 2F /	63 3F ?
ASCII Hex Symbol	ASCII Hex Symbol	ASCII Hex Symbol	ASCII Hex Symbol
64 40 @	80 50 P	96 60 `	112 70 p
65 41 A	81 51 Q	97 61 a	113 71 q
66 42 B	82 52 R	98 62 b	114 72 r
67 43 C	83 53 S	99 63 c	115 73 s

Back to '09'x

As seen in the table on the previous slide, 09 is the ASCII representation of TAB, both in base 10 and in base 16.

SAS uses hexadecimal ASCII to represent each character. When we use the symbol '09'x we are telling SAS that we want to use the symbol that is represented by the ASCII code 09 in the hexadecimal system (indicated by the x).

Note that for most purposes, the single and double quotes have the same function in SAS. In this case, "09"x will produce the same result as '09'x.

To test your understanding: one of the examples in the code for lesson 007 imports the file city_populations7.txt using DLM=".". Can you modify your code so that it uses the ASCII code for dash instead?

Readings

- <http://ascii.cl/>

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