**PROJECT Data Encoding - ASCII Code**

**Objective** To create a worksheet that displays ASCII characters.

***PROJECT DESCRIPTION***

This lab project uses MS Excel ® to design a worksheet that displays a table of ASCII characters.

***Information About this Project***

ASCII ( American Standard Code for Information Interchange ), is a character encoding based on the English alphabet. For example, the letter " A " in ASCII is equivalent to the decimal number 65 or the binary number 01000001 and the letter " B " in ASCII is equivalent to the decimal number 66 or the binary number 01000010 , ASCII codes represent text in computers, communications equipment, and other devices that work with text.

***Steps to Complete this Project***

**STEP 1 Open Excel and Complete the Required Spreadsheet**

Open a new MS Excel worksheet. MS Excel is part of the MS Office Suite.

**Figure 1 New MS Excel Worksheet**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |

Design a two - column spreadsheet according to the following instructions:

In your worksheet cell A1 , type the words **ASCII number** and press Enter . In cell B1 , type the words **ASCII character** and press Enter . Center the text in both of these cells. Next, in cell A2 , type the number **1** and in cell A3 , type the number **2** . Now use your mouse to click on cell A2 and then highlight the cell range A2 to A3 . Center these cell values and then, with cells A2 and A3 selected, position your mouse cursor at the lower right corner of cell A3 until it becomes a fill handle. Then, click, drag - and - fill until you reach cell A256 . Releasing your mouse button, you should notice that the cell range A2 to A256

is filled with the numbers 1 through 255 .

Your work sheet should now look similar to **Figure 1** , which shows part of your actual project.

**STEP 2 Complete the Worksheet**

The next step is to use the built - in Excel CHAR function to list the ASCII characters of the integers 1 through 255 . Next, click cell B2 , type the following formula and press Enter . Note: the formula shown does not have any spaces.

= CHAR ( A2 )

Click on cell B2 to make it your active cell, once again. Position your mouse cursor at the lower right corner of cell B2 until it becomes a + or fill handle. Then, click, drag - and - fill until you reach cell B256 . Releasing your mouse button, you should notice that the cell range B2 to B256 is filled with the ASCII characters corresponding to the numbers 1 through 256 .

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**Figure 1 Partially Completed ASCII Table**

|  |  |  |  |
| --- | --- | --- | --- |
|  | A | B | C |
| 1 | **ASCII number** | **ASCII character** |  |
| 2 | 1 |  |  |
| 3 | 2 |  |  |
| 4 | 3 |  |  |
| 5 | 4 |  |  |
| 6 | 5 |  |  |
| 7 | 6 |  |  |

**.**

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|  |  |  |  |
| --- | --- | --- | --- |
| 255 | 254 |  |  |
| 256 | 255 |  |  |

**STEP 3** **Use your Worksheet to Complete the Required Exercises**

After you complete your ASCII worksheet, answer each of the questions below. Display the answers, in an orderly fashion, within your current worksheet.

**(1)** True or False? The number corresponding to ASCII letter " A " is greater in number value than the number corresponding to ASCII letter " a " .

**(2)** True or False? In an Excel worksheet, the formula = CHAR ( 256 ) will displays this message: # VALUE !

**(3)** The ASCII symbol commonly used for displaying a Fahrenheit temperature reading corresponds to which ASCII number?

**(4)** The number of defined ASCII characters is 16 2 − 1 , which equals \_\_\_\_\_\_\_\_\_\_ .

**(5)** TheASCII number \_\_\_\_\_\_\_\_\_\_ represents an empty space.

**(6)** True or False? The Greek letter П is available as one of the standard ASCII characters.

**(7)** Which ASCII number corresponds to an underscore character?

**(8)** Which ASCII number corresponds to a bullet point character?

**(9)** Which ASCII number corresponds to a multiplication character?

**(10)** Which ASCII character would you perhaps use to exclusively identify the commercial source or origin of products or services?

**(11)** What is the range of ASCII numbers corresponding to " a " through " z " ?

**(12)** What is the range of ASCII numbers corresponding to " A " through " Z " ?

**(13)** What is the range of ASCII numbers corresponding to " 0 " through " 9 " ?

**(14)** Which ASCII number corresponds to an inverted question mark?

**(15)** Which ASCII number corresponds to a logical " not " ( negation ) sign?

**STEP 4 Submit the Worksheet**

After completing the worksheet, submit a copy of it for credit.

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**Step 5 Questions and Answers Concerning this Computer Laboratory Project**

Open MS Word and, within a new document, place your responses to these questions. Submit your completed MS Word document for credit.

**(1) ( ASCII and Baudot )**

In 1870 , the five - bit binary Baudot character set code was invented. It was originally intended as a replacement for the Morse Code for wireless telegraphy.

(a) Is the Baudot code ample in bit size to accommodate the standard English alphabet?

(b) Visit the link below and review the content there.

<http://cryptomuseum.com/crypto/baudot.htm>

List five special characters that the Baudot code contains.

**(2) ( ASCII and EBCDIC )**

EBCDIC ( Extended Binary Coded Decimal Interchange Code ) is an

eight - bit character encoding devised by IBM . EBCDIC 193 is a capital

" A " . What would be the ASCII equivalent of this EBCDIC letter?

**(3) ( The Extended / Enhanced ASCII Code )**

The Extended ASCII is an eight - bit character code system that includes the standard seven - bit ASCII code as well as additional characters.

(a) How many characters can Extended ASCII hold?

(b) How many additional characters does the Extended ASCII have compared to the Standard ASCII ?

(c) Basically, which types of characters are added to the Extended ASCII when compared to Standard ASCII ?

**(4) ( Cryptography: ASCII and Positional Shifting )**

In some cryptographic systems, an ASCII position shift is used to encrypt a secret message. What new word would be created if these ASCII decimal numbers were shifted by two positions?

98 , 99 , 108

**(5) ( ASCII Decimal to Binary )**

If we stream the binary equivalent of the ASCII decimals 77 and 69 , with a leading zero to form eight bits, we would have the sequence 0100110101000101 . What English word would be streamed?