Char and Int Conversion, Ordering of Characters

<https://csci-1301.github.io/about#authors>

June 21, 2021 (08:42:50 PM)

Table of Contents

## Reading and Understanding

Characters are represented by integers: cf. <https://en.wikipedia.org/wiki/ASCII#Printable_characters> for a mapping between the glyphs (i.e., space, !, etc.) and **dec**imal values (to be read as “integer code”, i.e., 32, 33, 34, etc.). Note that the characters are divided in groups, and that there are 95 printable characters.

## Converting

Copy the following snippet of code in a Main method:

int intVar = (int)'C';  
char charVar = (char)84;  
Console.WriteLine($"'C' is represented as {intVar}\n"  
 + $"{charVar} corresponds to the value 84");

And note that we can explicitely convert int into char, and char into int.

Actually, the conversion from char to int could be done implicitly by C#: replace the previous first line with

int intVar = 'C';

And note that your program would still compile. Can you also convert implicitly int into char?

## Comparing

Exactly as is less than , the character associated to , A, is less than the character associated with , a. You can convince yourself by executing the following code:

if ('A' > 'a')  
 Console.Write("A is greater than a");  
else  
 Console.Write("A is less than a");

## Testing for Equality

Note that you can also test if a character is equal to an other by using ==, as for integer values. This is particularly useful when we want to ask the user for a “yes” / “no” decision.

Write a snippet of code that

* Ask the user for a character,
* Display on the screen “The user said yes” if the user entered “Y” or “y”,
* Display on the screen “The user said no” if the user entered “N” or “n”,
* Display on the screen “The user entered an incorrect value” if the user entered any other character.

To read *a single character* (instead of a whole string), use

Console.WriteLine("Press y or Y for Yes, n or N for No:");  
char answer = Console.ReadKey().KeyChar;

# Pushing Further (Optional)

This lab’s pushing further suggests to take some advance in two topics we will be covering soon: for loops and string comparison

## char and for loop

Try to understand what the following code does:

for (int i = 32; i <= 126; i++)  
 Console.Write((char)i);

Compile it, execute it, understand what its purpose is, and what its structure is.

## String Comparison

Comparing strings cannot be done with > and < operators. To compare them, we have to use the [CompareOrdinal](https://docs.microsoft.com/en-us/dotnet/api/system.string.compareordinal?view=netframework-4.7.1) method of the [String](https://msdn.microsoft.com/en-us/library/system.string(v=vs.110).aspx) class. It works as follow:

if (String.CompareOrdinal("A", "a") > 0)  
{  
 Console.Write("A is greater than a");  
}  
else  
{  
 Console.Write("A is less than a");  
}

Note that CompareOrdinal returns an integer, that we then compare with .

* If the value returned is , then the strings are the same,
* If the value returned is less than , then the first string is less than the second one,
* If the value returned is greater than , then the first string is greater than the second one.

In the previous example, we tested string made of only one character, but we can compare arbitrarily complex strings:

if (String.CompareOrdinal("Augusta", "Auguste") > 0)  
{  
 Console.Write("Augusta is greater than Auguste");  
}  
else  
{  
 Console.Write("Augsta is less than Auguste");  
}

To conclude with this topic, note that the integer returned actually has a precise value: examine the following code to understand it.

if (String.CompareOrdinal("A", "a") == ((int)'A' - (int)'a'))  
 Console.WriteLine("Ok, I get it now");  
  
if (String.CompareOrdinal("Ab", "az") == (((int)'A' + (int)'b') - ((int)'a' + (int)'z')))  
 Console.WriteLine("Yes, I really do.");  
else if (String.CompareOrdinal("Ab", "az") == ((int)'A' - (int)'a'))  
 Console.WriteLine("Or do I?");  
   
if (String.CompareOrdinal("ABCDEf", "ABCDEF") == (int)'f' - (int)'F')  
 Console.WriteLine("Ok, now I'm good.");

Do you understand how the returning value is computed for these strings?