## String functions

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<td>replaces the first substring within ASCII string $s_1$ that matches $re$ with ASCII string $s_2$ and returns the resulting string</td>
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<td>there is no <code>strcat()</code> function; instead the addition operator is used to concatenate strings</td>
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<td>a synonym for <code>strofreal$(n)$</code></td>
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2 String functions

string(n,s) a synonym for strofreal(n,s)
strtrim(s) s with multiple, consecutive internal blanks (ASCII space character \texttt{char(32)}) collapsed to one blank
strlen(s) the number of characters in ASCII s or length in bytes
strlower(s) lowercase ASCII characters in string s
strltrim(s) s without leading blanks (ASCII space character \texttt{char(32)})
strmatch(s_1,s_2) 1 if \( s_1 \) matches the pattern \( s_2 \); otherwise, 0
strofreal(n) \( n \) converted to a string
strofreal(n,s) \( n \) converted to a string using the specified display format
strpos(s_1,s_2) the position in \( s_1 \) at which \( s_2 \) is first found, 0 if \( s_2 \) does not occur, and 1 if \( s_2 \) is empty
strproper(s) a string with the first ASCII letter and any other letters immediately following characters that are not letters capitalized; all other ASCII letters converted to lowercase
strreverse(s) the reverse of ASCII string s
strrpos(s_1,s_2) the position in \( s_1 \) at which \( s_2 \) is last found, 0 if \( s_2 \) does not occur, and 1 if \( s_2 \) is empty
strrtrim(s) s without trailing blanks (ASCII space character \texttt{char(32)})
strtoname(s[,p]) s translated into a Stata 13 compatible name
strtrim(s) s without leading and trailing blanks (ASCII space character \texttt{char(32)}); equivalent to \texttt{strltrim(strrtrim(s))}
strupper(s) uppercase ASCII characters in string s
subinstr(s_1,s_2,s_3,n) \( s_1 \), where the first \( n \) occurrences in \( s_1 \) of \( s_2 \) have been replaced with \( s_3 \)
subinword(s_1,s_2,s_3,n) \( s_1 \), where the first \( n \) occurrences in \( s_1 \) of \( s_2 \) as a word have been replaced with \( s_3 \)
substr(s,n_1,n_2) the substring of s, starting at \( n_1 \), for a length of \( n_2 \)
tobytes(s[,n]) escaped decimal or hex digit strings of up to 200 bytes of s
uchar(n) the Unicode character corresponding to Unicode code point \( n \) or an empty string if \( n \) is beyond the Unicode code-point range
udstrlen(s) the number of display columns needed to display the Unicode string s in the Stata Results window
udsubstr(s,n_1,n_2) the Unicode substring of s, starting at character \( n_1 \), for \( n_2 \) display columns
uisdigit(s) 1 if the first Unicode character in s is a Unicode decimal digit; otherwise, 0
uisletter(s) 1 if the first Unicode character in s is a Unicode letter; otherwise, 0
ustrcompare(s_1,s_2[,loc]) compares two Unicode strings
ustrcomparex(s_1,s_2,case,cslv,norm,num,alt,fr) compares two Unicode strings
ustrfix(s[,rep]) replaces each invalid UTF-8 sequence with a Unicode character
ustrfrom(s,enc,mode) converts the string s in encoding \( enc \) to a UTF-8 encoded Unicode string
ustrinvalidcnt(s) the number of invalid UTF-8 sequences in s
ustrleft(s,n) the first \( n \) Unicode characters of the Unicode string s
ustrlen(s)
ustrlower(s[,loc])
ustrltrim(s)
ustrnormalize(s,norm)
ustrpos(s1,s2[,n])
ustrregexm(s,re[,noc])
ustrregexra(s1,re,s2[,noc])
ustrregexrf(s1,re,s2[,noc])
ustrregexs(n)
ustrreverse(s)
ustrrtrim(s)
ustrsortkey(s[,loc])
ustrsortkeyex(s,loc,st,case,cslv,norm,num,alt,fr)
ustrtitle(s[,loc])
ustrto(s,enc,mode)
ustrtohex(s[,n])
ustrtoname(s[,p])
ustrtrim(s)
ustrunescape(s)
ustrupper(s[,loc])
ustrword(s,n[,loc])
ustrwordcount(s[,loc])
usubinstr(s1,s2,s3,n)
usustr(s,n1,n2)
word(s,n)

the number of characters in the Unicode string s
lowercase all characters of Unicode string s under the given locale loc
removes the leading Unicode whitespace characters and blanks from the Unicode string s
normalizes Unicode string s to one of the five normalization forms specified by norm
the position in s1 at which s2 is first found; otherwise, 0
performs a match of a regular expression and evaluates to 1 if regular expression re is satisfied by the Unicode string s; otherwise, 0
replaces all substrings within the Unicode string s1 that match re with s2 and returns the resulting string
replaces the first substring within the Unicode string s1 that matches re with s2 and returns the resulting string
subexpression n from a previous ustrregexm() match
the reverse of Unicode string s
the last n Unicode characters of the Unicode string s
the position in s1 at which s2 is last found; otherwise, 0
remove trailing Unicode whitespace characters and blanks from the Unicode string s
generates a null-terminated byte array that can be used by the sort command to produce the same order as ustrcompare()
generates a null-terminated byte array that can be used by the sort command to produce the same order as ustrcompare()
a string with the first characters of Unicode words titlecased and other characters lowercased
converts the Unicode string s in UTF-8 encoding to a string in encoding enc
escaped hex digit string of s up to 200 Unicode characters
string s translated into a Stata name
removes leading and trailing Unicode whitespace characters and blanks from the Unicode string s
the Unicode string corresponding to the escaped sequences of s
uppercase all characters in string s under the given locale loc
the n'th Unicode word in the Unicode string s
the number of nonempty Unicode words in the Unicode string s
replaces the first n occurrences of the Unicode string s2 with the Unicode string s3 in s1
the Unicode substring of s, starting at n1, for a length of n2
the n'th word in s; missing (""") if n is missing
wordbreaklocale(loc,type) the most closely related locale supported by ICU from loc if type is 1, the actual locale where the word-boundary analysis data come from if type is 2; or an empty string is returned for any other type

wordcount(s) the number of words in s

Functions

In the display below, s indicates a string subexpression (a string literal, a string variable, or another string expression) and n indicates a numeric subexpression (a number, a numeric variable, or another numeric expression).

If your strings contain Unicode characters or you are writing programs that will be used by others who might use Unicode strings, read [U] 12.4.2 Handling Unicode strings.

abbrev(s,n)
Description: name s, abbreviated to a length of n

Length is measured in the number of display columns, not in the number of characters. For most users, the number of display columns equals the number of characters. For a detailed discussion of display columns, see [U] 12.4.2.2 Displaying Unicode characters.

If any of the characters of s are a period, “.”, and n < 8, then the value of n defaults to a value of 8. Otherwise, if n < 5, then n defaults to a value of 5. If n is missing, abbrev() will return the entire string s. abbrev() is typically used with variable names and variable names with factor-variable or time-series operators (the period case).

abbrev("displacement",8) is displa-t.

Domain s: strings
Domain n: integers 5 to 32
Range: strings

char(n)
Description: the character corresponding to ASCII or extended ASCII code n; "" if n is not in the domain

Note: ASCII codes are from 0 to 127; extended ASCII codes are from 128 to 255. Prior to Stata 14, the display of extended ASCII characters was encoding dependent. For example, char(128) on Microsoft Windows using Windows-1252 encoding displayed the Euro symbol, but on Linux using ISO-Latin-1 encoding, char(128) displayed an invalid character symbol. Beginning with Stata 14, Stata’s display encoding is UTF-8 on all platforms. The char(128) function is an invalid UTF-8 sequence and thus will display a question mark. There are two Unicode functions corresponding to char(): uchar() and ustrunescape(). You can use uchar(8364) or ustrunescape("\u20AC") to display a Euro sign on all platforms.

Domain n: integers 0 to 255
Range: ASCII characters
uchar($n$)
Description: the Unicode character corresponding to Unicode code point $n$ or an empty string if $n$ is beyond the Unicode code-point range

Note that uchar() takes the decimal value of the Unicode code point. ustrunescape() takes an escaped hex digit string of the Unicode code point. For example, both uchar(8364) and ustrunescape("\u20ac") produce the Euro sign.

Domain $n$: integers $\geq 0$
Range: Unicode characters

collatorlocale($loc$, $type$)
Description: the most closely related locale supported by ICU from $loc$ if $type$ is 1; the actual locale where the collation data comes from if $type$ is 2

For any other $type$, $loc$ is returned in a canonicalized form.

collatorlocale("en_us_texas", 0) = en_US_Texas
collatorlocale("en_us_texas", 1) = en_US
collatorlocale("en_us_texas", 2) = root

Domain $loc$: strings of locale name
Domain $type$: integers
Range: strings

collatorversion($loc$)
Description: the version string of a collator based on locale $loc$

The Unicode standard is constantly adding more characters and the sort key format may change as well. This can cause usstrsortkey() and usstrsortkeyex() to produce incompatible sort keys between different versions of International Components for Unicode. The version string can be used for versioning the sort keys to indicate when saved sort keys must be regenerated.

Range: strings

indexnot($s_1$, $s_2$)
Description: the position in ASCII string $s_1$ of the first character of $s_1$ not found in ASCII string $s_2$, or 0 if all characters of $s_1$ are found in $s_2$

indexnot() is intended for use only with plain ASCII strings. For Unicode characters beyond the plain ASCII range, the position and character are given in bytes, not characters.

Domain $s_1$: ASCII strings (to be searched)
Domain $s_2$: ASCII strings (to search for)
Range: integers $\geq 0$
**plural\((n,s)\)**

Description: the plural of \(s\) if \(n \neq \pm 1\)

The plural is formed by adding “s” to \(s\).

\[
\text{plural}(1, "horse") = "horse"
\]
\[
\text{plural}(2, "horse") = "horses"
\]

Domain \(n\): real numbers

Domain \(s\): strings

Range: strings

**plural\((n,s_1,s_2)\)**

Description: the plural of \(s_1\), as modified by or replaced with \(s_2\), if \(n \neq \pm 1\)

If \(s_2\) begins with the character “+”, the plural is formed by adding the remainder of \(s_2\) to \(s_1\). If \(s_2\) begins with the character “-”, the plural is formed by subtracting the remainder of \(s_2\) from \(s_1\). If \(s_2\) begins with neither “+” nor “-”, then the plural is formed by returning \(s_2\).

\[
\text{plural}(2, "glass", "+es") = "glasses"
\]
\[
\text{plural}(1, "mouse", "mice") = "mouse"
\]
\[
\text{plural}(2, "mouse", "mice") = "mice"
\]
\[
\text{plural}(2, "abcdefg", "-efg") = "abcd"
\]

Domain \(n\): real numbers

Domain \(s_1\): strings

Domain \(s_2\): strings

Range: strings

**real\((s)\)**

Description: \(s\) converted to numeric or missing

Also see \texttt{strofreal()}.

\[
\text{real("5.2")} + 1 = 6.2
\]
\[
\text{real("hello")} = .
\]

Domain \(s\): strings

Range: \(-8e+307\) to \(8e+307\) or missing

**regexcapture\((n)\)**

Description: subexpression \(n\) from a previous \texttt{regexm()} or \texttt{regexmatch()} match

\texttt{regexcapture}(0) returns the entire string that satisfied the regular expression.

Domain \(n\): integers

Range: ASCII strings or missing

**regexcapturenamed\((grp)\)**

Description: subexpression corresponding to matching group named \(grp\) in regular expression from a previous \texttt{regexm()} or \texttt{regexmatch()} match

Domain \(grp\): ASCII strings

Range: ASCII strings or missing
**regexm(s,re)**

Description: a match of a regular expression, which evaluates to 1 if regular expression re is satisfied by the ASCII string s; otherwise, 0

Regular expression syntax is based on Henry Spencer’s NFA algorithm, and this is nearly identical to the POSIX.2 standard. s and re may not contain binary 0 (\0).

regexm() is intended for use only with plain ASCII characters. For Unicode characters beyond the plain ASCII range, the match is based on bytes. For a character-based match, see ustrregexm().

For more advanced regular expression matching, see regexmatch().

**Domain s:** ASCII strings  
**Domain re:** regular expressions  
**Range:** 0, 1, or missing

---

**regexmatch(s,re[ ,noc[ ,std[ ,nlalt ] ] ])**

Description: a match of a regular expression, which evaluates to 1 if regular expression re is satisfied by the ASCII string s; otherwise, 0

regexmatch() is intended for use only with plain ASCII characters. For Unicode characters beyond the plain ASCII range, the match is based on bytes. For a character-based match, see ustrregexm().

If noc is specified and is not 0, a case-insensitive match is performed; otherwise, a case-sensitive match is performed.

std specifies the regular expression standard: 1 for POSIX Extended Regular, 2 for POSIX Basic Regular, 3 for Emacs, 4 for AWK, 5 for grep, 6 for egrep, or any other number for Perl, the default.

If nlalt is specified and is 0, the newline character, char(10), is not treated like alternation operator |; otherwise, newline has the same effect as |.

s and re may not contain binary 0 (\0).

**Domain s:** ASCII strings  
**Domain re:** regular expression  
**Domain noc:** integers  
**Domain std:** integers  
**Domain nlalt:** integers  
**Range:** 0, 1, or missing
**regexr**(*s1*, *re*, *s2*)

Description: replaces the first substring within ASCII string *s1* that matches *re* with ASCII string *s2* and returns the resulting string

If *s1* contains no substring that matches *re*, the unaltered *s1* is returned. *s1* and the result of **regexr**() may be at most 1,100,000 characters long. *s1*, *re*, and *s2* may not contain binary 0 (\0).

**regexr**() is intended for use only with plain ASCII characters. For Unicode characters beyond the plain ASCII range, the match is based on bytes, and the result is restricted to 1,100,000 bytes. For a character-based match, see **ustrregexrf**() or **ustrregexra**().

For more advanced regular expression replacement, see **regexreplace()** and **regexreplaceall()**.

**Domain**: 
- *s1*: ASCII strings
- *re*: regular expressions
- *s2*: ASCII strings
- *noc*: integers
- *fmt*: integers
- *std*: integers
- *nlalt*: integers

**Range**: ASCII strings

---

**regexreplace**(*s1*, *re*, *s2[, noc[, fmt[, std[, nlalt]]]]))

Description: replaces the first substring within ASCII string *s1* that matches *re* with ASCII string *s2* and returns the resulting string

If *noc* is specified and is not 0, a case-insensitive match is performed; otherwise, a case-sensitive match is performed.

*fmt* specifies the format string syntax supported in *s2*: 1 for literal, where *s2* is treated as a string literal (no special character substitution), 2 for sed, or any other number for Perl, the default.

*std* specifies the regular expression standard: 1 for POSIX Extended Regular, 2 for POSIX Basic Regular, 3 for Emacs, 4 for AWK, 5 for grep, 6 for egrep, or any other number for Perl, the default.

If *nlalt* is specified and is 0, the newline character, **char**(10), is not treated like alternation operator |; otherwise, newline has the same effect as |.

If *s1* contains no substring that matches *re*, the unaltered *s1* is returned. *s1*, *s2*, and *re* may not contain binary 0 (\0).

**Domain**: 
- *s1*: ASCII strings
- *re*: regular expression
- *s2*: ASCII strings
- *noc*: integers
- *fmt*: integers
- *std*: integers
- *nlalt*: integers

**Range**: ASCII strings
regexreplaceall($s_1, re, s_2[], noc[], fmt[], std[], nlalt[])[]

Description: replaces all substrings within ASCII string $s_1$ that match $re$ with ASCII string $s_2$ and returns the resulting string.

If $noc$ is specified and is not 0, a case-insensitive match is performed; otherwise, a case-sensitive match is performed.

$fmt$ specifies the format string syntax supported in $s_2$: 1 for literal, where $s_2$ is treated as a string literal (no special character substitution), 2 for sed, or any other number for Perl, the default.

$std$ specifies the regular expression standard: 1 for POSIX Extended Regular, 2 for POSIX Basic Regular, 3 for Emacs, 4 for AWK, 5 for grep, 6 for egrep, or any other number for Perl, the default.

If $nlalt$ is specified and is 0, the newline character, char(10), is not treated like alternation operator |; otherwise, newline has the same effect as |.

If $s_1$ contains no substring that matches $re$, the unaltered $s_1$ is returned. $s_1$, $s_2$, and $re$ may not contain binary 0 (\0).

Domain $s_1$: ASCII strings
Domain $re$: regular expression
Domain $s_2$: ASCII strings
Domain $noc$: integers
Domain $fmt$: integers
Domain $std$: integers
Domain $nlalt$: integers
Range: ASCII strings

regexs($n$)
Description: subexpression $n$ from a previous regexm() or regexmatch() match, where $0 \leq n < 10$

Subexpression 0 is reserved for the entire string that satisfied the regular expression. The returned subexpression may be at most 1,100,000 characters (bytes) long.

For more options to return matching substrings, see regexcapture() and regexcapturenamed().

Domain $n$: 0 to 9
Range: ASCII strings

ustrregexm($s, re[][], noc[][]$

Description: performs a match of a regular expression and evaluates to 1 if regular expression $re$ is satisfied by the Unicode string $s$; otherwise, 0.

If $noc$ is specified and not 0, a case-insensitive match is performed. The function may return a negative integer if an error occurs.

ustrregexm("12345", "([0-9])\{5\}") = 1
ustrregexm("de TRÈS près", "rè"") = 1
ustrregexm("de TRÈS près", "Rè"") = 0
ustrregexm("de TRÈS près", "Rè", 1) = 1

Domain $s$: Unicode strings
Domain $re$: Unicode regular expressions
Domain $noc$: integers
Range: integers
ustrregexrf\( (s_1, re, s_2[, noc]) \)

Description: replaces the first substring within the Unicode string \( s_1 \) that matches \( re \) with \( s_2 \) and returns the resulting string.

If \( noc \) is specified and not 0, a case-insensitive match is performed. The function may return an empty string if an error occurs.

\[
\begin{align*}
\text{ustrregexrf}("très près", "rès", "X") &= "tX près" \\
\text{ustrregexrf}("TRÈS près", "Rès", "X") &= "TRÈS près" \\
\text{ustrregexrf}("TRÈS près", "Rès", "X", 1) &= "TX près"
\end{align*}
\]

Domain \( s_1 \): Unicode strings
Domain \( re \): Unicode regular expressions
Domain \( s_2 \): Unicode strings
Domain \( noc \): integers
Range: Unicode strings

ustrregexra\( (s_1, re, s_2[, noc]) \)

Description: replaces all substrings within the Unicode string \( s_1 \) that match \( re \) with \( s_2 \) and returns the resulting string.

If \( noc \) is specified and not 0, a case-insensitive match is performed. The function may return an empty string if an error occurs.

\[
\begin{align*}
\text{ustrregexra}("très près", "rès", "X") &= "tX pX" \\
\text{ustrregexra}("TRÈS près", "Rès", "X") &= "TRÈS près" \\
\text{ustrregexra}("TRÈS près", "Rès", "X", 1) &= "TX pX"
\end{align*}
\]

Domain \( s_1 \): Unicode strings
Domain \( re \): Unicode regular expressions
Domain \( s_2 \): Unicode strings
Domain \( noc \): integers
Range: Unicode strings

ustrregexs\( (n) \)

Description: subexpression \( n \) from a previous \( \text{ustrregexm()} \) match.

Subexpression 0 is reserved for the entire string that satisfied the regular expression. The function may return an empty string if \( n \) is larger than the maximum count of subexpressions from the previous match or if an error occurs.

Domain \( n \): integers \( \geq 0 \)
Range: strings
soundex(s)
Description: the soundex code for a string, s
The soundex code consists of a letter followed by three numbers: the letter is the first ASCII letter of the name and the numbers encode the remaining consonants. Similar sounding consonants are encoded by the same number. Unicode characters beyond the plain ASCII range are ignored.
soundex("Ashcraft") = "A226"
soundex("Robert") = "R163"
soundex("Rupert") = "R163"
Domain s: strings
Range: strings

soundex_nara(s)
Description: the U.S. Census soundex code for a string, s
The soundex code consists of a letter followed by three numbers: the letter is the first ASCII letter of the name and the numbers encode the remaining consonants. Similar sounding consonants are encoded by the same number. Unicode characters beyond the plain ASCII range are ignored.
soundex_nara("Ashcraft") = "A261"
Domain s: strings
Range: strings

strcat(s_1, s_2)
Description: there is no strcat() function; instead the addition operator is used to concatenate strings
"hello " + "world" = "hello world"
"a" + "b" = "ab"
"Café " + "de Flore" = "Café de Flore"
Domain s_1: strings
Domain s_2: strings
Range: strings

strdup(s_1, n)
Description: there is no strdup() function; instead the multiplication operator is used to create multiple copies of strings
"hello" * 3 = "hellohellohello"
3 * "hello" = "hellohellohello"
0 * "hello" = ""
"hello" * 1 = "hello"
"Здравствуйте " * 2 = "Здравствуйте Здравствуйте "
Domain s_1: strings
Domain n: nonnegative integers 0, 1, 2, ...
Range: strings
string(n)
Description: a synonym for strofreall(n)

string(n,s)
Description: a synonym for strofreall(n,s)

stritrim(s)
Description: s with multiple, consecutive internal blanks (ASCII space character char(32)) collapsed to one blank
stritrim("hello there") = "hello there"
Domain s: strings
Range: strings with no multiple, consecutive internal blanks

strlen(s)
Description: the number of characters in ASCII s or length in bytes
strlen() is intended for use only with plain ASCII characters and for use by programmers who want to obtain the byte-length of a string. Note that any Unicode character beyond ASCII range (code point greater than 127) takes more than 1 byte in the UTF-8 encoding; for example, é takes 2 bytes.
For the number of characters in a Unicode string, see ustrlen().
strlen("ab") = 2
strlen("é") = 2
Domain s: strings
Range: integers \( \geq 0 \)

ustrlen(s)
Description: the number of characters in the Unicode string s
An invalid UTF-8 sequence is counted as one Unicode character. An invalid UTF-8 sequence may contain one byte or multiple bytes. Note that any Unicode character beyond the plain ASCII range (code point greater than 127) takes more than 1 byte in the UTF-8 encoding; for example, é takes 2 bytes.
ustrlen("médiiane") = 7
strlen("médiiane") = 8
Domain s: Unicode strings
Range: integers \( \geq 0 \)
**udstrlen(s)**

Description: the number of display columns needed to display the Unicode string `s` in the Stata Results window

A Unicode character in the CJK (Chinese, Japanese, and Korean) encoding usually requires two display columns; a Latin character usually requires one column. Any invalid UTF-8 sequence requires one column.

```
udstrlen("中值") = 4
ustrlen("中值") = 2
strlen("中值") = 6
```

Domain `s`: Unicode strings

Range: integers ≥ 0

**strlower(s)**

Description: lowercase ASCII characters in string `s`

Unicode characters beyond the plain ASCII range are ignored.

```
strlower("THIS") = "this"
strlower("CAFÉ") = "cafÉ"
```

Domain `s`: strings

Range: strings with lowercased characters

**ustrlower(s[,loc])**

Description: lowercase all characters of Unicode string `s` under the given locale `loc`

If `loc` is not specified, the default locale is used. The same `s` but different `loc` may produce different results; for example, the lowercase letter of “I” is “ı” in English but a dotless “ı” in Turkish. The same Unicode character can be mapped to different Unicode characters based on its surrounding characters; for example, Greek capital letter sigma Σ has two lowercases: ς, if it is the final character of a word, or σ. The result can be longer or shorter than the input Unicode string in bytes.

```
ustrlower("MÉDIANE","fr") = "médiane"
ustrlower("ISTANBUL","tr") = "istanbul"
ustrlower("ΔΥΣΕΣΕΥΣ") = "δυσεψυς"
```

Domain `s`: Unicode strings

Domain `loc`: locale name

Range: Unicode strings

**strltrim(s)**

Description: `s` without leading blanks (ASCII space character `char(32)`)

```
strltrim(" this") = "this"
```

Domain `s`: strings

Range: strings without leading blanks
**ustrltrim(x)**  
**Description:** removes the leading Unicode whitespace characters and blanks from the Unicode string s  
Note that, in addition to char(32), ASCII characters char(9), char(10), char(11), char(12), and char(13) are whitespace characters in Unicode standard.

\[
\text{ustrltrim(" this") = "this"}
\]
\[
\text{ustrltrim(char(9)+"this") = "this"}
\]
\[
\text{ustrltrim(ustrunescape("\\u1680")+" this") = "this"}
\]

**Domain s:** Unicode strings  
**Range:** Unicode strings

**strmatch(s1, s2)**  
**Description:** 1 if \( s_1 \) matches the pattern \( s_2 \); otherwise, 0

\[
\text{strmatch("17.4","1??4") returns 1. In } s_2, "?" \text{ means that one character goes here, and } "*" \text{ means that zero or more bytes go here. Note that a Unicode character may contain multiple bytes; thus, using } "*" \text{ with Unicode characters can infrequently result in matches that do not occur at a character boundary.}
\]

Also see `regexm()`, `regexr()`, and `regexs()`.

\[
\text{strmatch("café", "caf?") = 1}
\]

**Domain s1:** strings  
**Domain s2:** strings  
**Range:** integers 0 or 1

**strofreal(n)**  
**Description:** \( n \) converted to a string

Also see `real()`.

\[
\text{strofreal(4)+"F" = "4F"}
\]
\[
\text{strofreal(1234567) = "1234567"}
\]
\[
\text{strofreal(12345678) = "1.23e+07"}
\]
\[
\text{strofreal(. ) = "."}
\]

**Domain n:** \(-8e+307 \text{ to } 8e+307 \text{ or } \text{missing}\)  
**Range:** strings
** strofreal(n,s)**  
Description:  \(n\) converted to a string using the specified display format

Also see `real()`.

\[
\begin{align*}
\text{strofreal}(4, "\%9.2f") &= "4.00" \\
\text{strofreal}(123456789, "\%11.0g") &= "123456789" \\
\text{strofreal}(123456789, "\%13.0gc") &= "123,456,789" \\
\text{strofreal}(0, "\%td") &= "01jan1960" \\
\text{strofreal}(225, "\%tq") &= "2016q2" \\
\text{strofreal}(225, "not a format") &= ""
\end{align*}
\]

**Domain n:**  
\(-8e+307\) to \(8e+307\) or missing

**Domain s:**  
strings containing `\%fmt` numeric display format

**Range:**  
strings

---

** strpos(s1,s2)**  
Description: the position in \(s_1\) at which \(s_2\) is first found, 0 if \(s_2\) does not occur, and 1 if \(s_2\) is empty

`strpos()` is intended for use only with plain ASCII characters and for use by programmers who want to obtain the byte-position of \(s_2\). Note that any Unicode character beyond ASCII range (code point greater than 127) takes more than 1 byte in the UTF-8 encoding; for example, \(é\) takes 2 bytes.

To find the character position of \(s_2\) in a Unicode string, see `ustrpos()`.

\[
\begin{align*}
\text{strpos("this", "is")} &= 3 \\
\text{strpos("this", "it")} &= 0 \\
\text{strpos("this", "")} &= 1
\end{align*}
\]

**Domain s1:**  
strings (to be searched)

**Domain s2:**  
strings (to search for)

**Range:**  
integers \(\geq 0\)

---

**ustrpos(s1,s2[,n])**  
Description: the position in \(s_1\) at which \(s_2\) is first found; otherwise, 0

If \(n\) is specified and is greater than 0, the search starts at the \(n\)th Unicode character of \(s_1\). An invalid UTF-8 sequence in either \(s_1\) or \(s_2\) is replaced with a Unicode replacement character `\ufffd` before the search is performed.

\[
\begin{align*}
\text{ustrpos("médiane", "édı")} &= 2 \\
\text{ustrpos("médiane", "édı", 3)} &= 0 \\
\text{ustrpos("médiane", "éci")} &= 0
\end{align*}
\]

**Domain s1:**  
Unicode strings (to be searched)

**Domain s2:**  
Unicode strings (to search for)

**Domain n:**  
integers

**Range:**  
integers
strproper($s$)
Description: a string with the first ASCII letter and any other letters immediately following characters that are not letters capitalized; all other ASCII letters converted to lowercase

strproper() implements a form of titlecasing and is intended for use only with plain ASCII strings. Unicode characters beyond ASCII are treated as characters that are not letters. To titlecase strings with Unicode characters beyond the plain ASCII range or to implement language-sensitive rules for titlecasing, see ustrtitle().

\[
\text{strproper("mR. joHn a. sMitH") = "Mr. John A. Smith"}
\]
\[
\text{strproper("jack o’reilly") = "Jack O’Reilly"}
\]
\[
\text{strproper("2-cent’s worth") = "2-Cent’S Worth"}
\]
\[
\text{strproper("vous êtes") = "Vous êtes"}
\]

Domain $s$: strings
Range: strings

ustrtitle($s$, $loc$)
Description: a string with the first characters of Unicode words titlecased and other characters lowercased

If $loc$ is not specified, the default locale is used. Note that a Unicode word is different from a Stata word produced by function word(). The Stata word is a space-separated token. A Unicode word is a language unit based on either a set of word-boundary rules or dictionaries for some languages (Chinese, Japanese, and Thai). The titlecase is also locale dependent and context sensitive; for example, lowercase “ij” is considered a digraph in Dutch. Its titlecase is “IJ”.

\[
\text{ustrtitle("vous êtes", "fr") = "Vous Êtes"}
\]
\[
\text{ustrtitle("mR. joHn a. sMitH") = "Mr. John A. Smith"}
\]
\[
\text{ustrtitle("ijmuiden", "en") = "Ijmuiden"}
\]
\[
\text{ustrtitle("ijmuiden", "nl") = "IJmuiden"}
\]

Domain $s$: Unicode strings
Domain $loc$: Unicode strings
Range: Unicode strings

strreverse($s$)
Description: the reverse of ASCII string $s$

strreverse() is intended for use only with plain ASCII characters. For Unicode characters beyond ASCII range (code point greater than 127), the encoded bytes are reversed.

To reverse the characters of Unicode string, see ustrreverse().

\[
\text{strreverse("hello") = "olleh"}
\]

Domain $s$: ASCII strings
Range: ASCII reversed strings
**ustrreverse**

**Description:** the reverse of Unicode string s

The function does not take Unicode character equivalence into consideration. Hence, a Unicode character in a decomposed form will not be reversed as one unit. An invalid UTF-8 sequence is replaced with a Unicode replacement character \ufffd.

\[
\text{ustrreverse("médiane") = "enaidém"}
\]

**Domain s:** Unicode strings  
**Range:** reversed Unicode strings

**strrpos**

**Description:** the position in \(s_1\) at which \(s_2\) is last found, 0 if \(s_2\) does not occur, and 1 if \(s_2\) is empty

\text{strrpos()} \text{ is intended for use only with plain ASCII characters and for use by programmers who want to obtain the last byte-position of } s_2. \text{ Note that any Unicode character beyond ASCII range (code point greater than 127) takes more than 1 byte in the UTF-8 encoding; for example, é takes 2 bytes. To find the last character position of } s_2 \text{ in a Unicode string, see } \text{ustrrpos().}

\[
\text{strrpos("this","is") = 3}
\]
\[
\text{strrpos("this","is","is") = 6}
\]
\[
\text{strrpos("this","it") = 0}
\]
\[
\text{strrpos("this","","") = 1}
\]

**Domain \(s_1\):** strings (to be searched)  
**Domain \(s_2\):** strings (to search for)  
**Range:** integers \(\geq 0\)

**ustrrpos**

**Description:** the position in \(s_1\) at which \(s_2\) is last found; otherwise, 0

If \(n\) is specified and is greater than 0, only the part between the first Unicode character and the \(n\)th Unicode character of \(s_1\) is searched. An invalid UTF-8 sequence in either \(s_1\) or \(s_2\) is replaced with a Unicode replacement character \ufffd before the search is performed.

\[
\text{ustrrpos("enchanté","n") = 6}
\]
\[
\text{ustrrpos("enchanté","n","n") = 2}
\]
\[
\text{ustrrpos("enchanté","n",6) = 6}
\]
\[
\text{ustrrpos("enchanté","ne") = 0}
\]

**Domain \(s_1\):** Unicode strings (to be searched)  
**Domain \(s_2\):** Unicode strings (to search for)  
**Domain \(n\):** integers  
**Range:** integers

**strrtrim**

**Description:** \(s\) without trailing blanks (ASCII space character \text{char(32)})

\[
\text{strrtrim("this ") = "this"}
\]

**Domain \(s\):** strings  
**Range:** strings without trailing blanks
**ustrtrim(s)**

Description: remove trailing Unicode whitespace characters and blanks from the Unicode string `s`

Note that, in addition to `char(32)`, ASCII characters `char(9)`, `char(10)`, `char(11)`, `char(12)`, and `char(13)` are considered whitespace characters in the Unicode standard.

```
ussrtrim("this ") = "this"
ussrtrim("this"+char(10)) = "this"
ussrtrim("this "+ustrunescape("\u2000")) = "this"
```

Domain `s`: Unicode strings
Range: Unicode strings

**strtoname(s[,p])**

Description: `s` translated into a Stata 13 compatible name

`strtoname()` results in a name that is truncated to 32 bytes. Each character in `s` that is not allowed in a Stata name is converted to an underscore character, `_`. If the first character in `s` is a numeric character and `p` is not 0, then the result is prefixed with an underscore. Stata 14 names may be 32 characters; see [U] 11.3 Naming conventions.

```
strtoname("name") = "name"
strtoname("a name") = "a_name"
strtoname("5",1) = "_5"
strtoname("5:30",1) = "_5_30"
strtoname("5",0) = "5"
strtoname("5:30",0) = "5_30"
```

Domain `s`: strings
Domain `p`: integers 0 or 1
Range: strings

**ustrtoname(s[,p])**

Description: string `s` translated into a Stata name

`ustrtoname()` results in a name that is truncated to 32 characters. Each character in `s` that is not allowed in a Stata name is converted to an underscore character, `_`. If the first character in `s` is a numeric character and `p` is not 0, then the result is prefixed with an underscore.

```
ustrtoname("name",1) = "name"
ustrtoname("the médiane") = "the_médiane"
ustrtoname("0médiane") = "_0médiane"
ustrtoname("0médiane", 1) = "_0médiane"
ustrtoname("0médiane", 0) = "0médiane"
```

Domain `s`: Unicode strings
Domain `p`: integers 0 or 1
Range: Unicode strings
### Strtrim(s)

**Description:**
$s$ without leading and trailing blanks (ASCII space character \texttt{char}(32)); equivalent to \texttt{strltrim(strrtrim(s))}

\[
\text{strtrim}(" \text{this }") = "\text{this}"
\]

**Domain $s$:** strings  
**Range:** strings without leading or trailing blanks

### Ustrtrim(s)

**Description:**
removes leading and trailing Unicode whitespace characters and blanks from the Unicode string $s$

Note that, in addition to \texttt{char}(32), ASCII characters \texttt{char}(9), \texttt{char}(10), \texttt{char}(11), \texttt{char}(12), and \texttt{char}(13) are considered whitespace characters in the Unicode standard.

\[
\text{ustrtrim}(" \text{this }") = "\text{this}"
\]
\[
\text{ustrtrim(\texttt{char(11)}+" \text{this }")\texttt{+char(13)} = "\text{this}"
\]

**Domain $s$:** Unicode strings  
**Range:** Unicode strings

### Strupper(s)

**Description:**
uppercase ASCII characters in string $s$

Unicode characters beyond the plain ASCII range are ignored.

\[
\text{strupper("this") = "THIS"}
\]
\[
\text{strupper("caf\'e") = "CAF\'e"}
\]

**Domain $s$:** strings  
**Range:** strings with uppercased characters

### Ustrupper(s[, loc])

**Description:**
uppercase all characters in string $s$ under the given locale $loc$

If $loc$ is not specified, the default locale is used. The same $s$ but a different $loc$ may produce different results: for example, the uppercase letter of ‘i’ is ‘I’ in English, but ‘I’ with a dot in Turkish. The result can be longer or shorter than the input string in bytes; for example, the uppercase form of the German letter ß (code point \texttt{\u00df}) is two capital letters “SS”.

\[
\text{ustrupper("m\'ediane","fr") = "M\'EDIANE"}
\]
\[
\text{ustrupper("Ru\'ssland","de") = "RUSSLAND"}
\]
\[
\text{ustrupper("istanbul","tr") = "\u0130STANBUL"}
\]

**Domain $s$:** Unicode strings  
**Domain $loc$:** locale name  
**Range:** Unicode strings
subinstr($s_1, s_2, s_3, n$)
Description: $s_1$, where the first $n$ occurrences in $s_1$ of $s_2$ have been replaced with $s_3$

subinstr() is intended for use only with plain ASCII characters and for use by
programmers who want to perform byte-based substitution. Note that any Unicode
character beyond ASCII range (code point greater than 127) takes more than 1 byte
in the UTF-8 encoding; for example, é takes 2 bytes.

To perform character-based replacement in Unicode strings, see usubinstr().

If $n$ is missing, all occurrences are replaced.

Also see regexp(), regexpr(), and regexs().

subinstr("this is the day","is","X",1) = "thX is the day"
subinstr("this is the hour","is","X",2) = "thX X the hour"
subinstr("this is this","is","X",.) = "thX X thX"

Domain $s_1$: strings (to be substituted into)
Domain $s_2$: strings (to be substituted from)
Domain $s_3$: strings (to be substituted with)
Domain $n$: integers $\geq 0$ or missing
Range: strings

usubinstr($s_1, s_2, s_3, n$)
Description: replaces the first $n$ occurrences of the Unicode string $s_2$ with the Unicode string
$s_3$ in $s_1$

If $n$ is missing, all occurrences are replaced. An invalid UTF-8 sequence in $s_1$, $s_2$, or $s_3$ is replaced with a Unicode replacement character \ufffd before replacement is performed.

usubinstr("de très près","ès","es",1) = "de tres près"
usubinstr("de très près","ès","X",2) = "de trX prX"

Domain $s_1$: Unicode strings (to be substituted into)
Domain $s_2$: Unicode strings (to be substituted from)
Domain $s_3$: Unicode strings (to be substituted with)
Domain $n$: integers $\geq 0$ or missing
Range: Unicode strings
subinword($s_1,s_2,s_3,n$)
Description: $s_1$, where the first $n$ occurrences in $s_1$ of $s_2$ as a word have been replaced with $s_3$
A word is defined as a space-separated token. A token at the beginning or end of $s_1$ is considered space-separated. This is different from a Unicode word, which is a language unit based on either a set of word-boundary rules or dictionaries for several languages (Chinese, Japanese, and Thai). If $n$ is missing, all occurrences are replaced.
Also see regexm(), regexr(), and regexs().

subinword("this is the day","is","X",1) = "this X the day"
subinword("this is the hour","is","X",.) = "this X the hour"
subinword("this is this","th","X",.) = "this is this"

Domain $s_1$: strings (to be substituted for)
Domain $s_2$: strings (to be substituted from)
Domain $s_3$: strings (to be substituted with)
Domain $n$: integers $\geq 0$ or missing
Range: strings

substr($s,n_1,n_2$)
Description: the substring of $s$, starting at $n_1$, for a length of $n_2$
substr() is intended for use only with plain ASCII characters and for use by programmers who want to extract a subset of bytes from a string. For those with plain ASCII text, $n_1$ is the starting character, and $n_2$ is the length of the string in characters. For programmers, substr() is technically a byte-based function. For plain ASCII characters, the two are equivalent but you can operate on byte values beyond that range. Note that any Unicode character beyond ASCII range (code point greater than 127) takes more than 1 byte in the UTF-8 encoding; for example, é takes 2 bytes.
To obtain substrings of Unicode strings, see usubstr().

If $n_1 < 0$, $n_1$ is interpreted as the distance from the end of the string; if $n_2 = . (missing)$, the remaining portion of the string is returned.

substr("abcdef",2,3) = "bcd"
substr("abcdef",-3,2) = "de"
substr("abcdef",2,.) = "bcdef"
substr("abcdef",-3,.) = "def"
substr("abcdef",2,0) = ""
substr("abcdef",15,2) = ""

Domain $s$: strings
Domain $n_1$: integers $\geq 1$ and $\leq -1$
Domain $n_2$: integers $\geq 1$
Range: strings
usubstr\(s, n_1, n_2\)
Description: the Unicode substring of \(s\), starting at \(n_1\), for a length of \(n_2\)

If \(n_1 \leq 0\), \(n_1\) is interpreted as the distance from the last character of the \(s\); if \(n_2 = .\) (missing), the remaining portion of the Unicode string is returned.

\[\text{usubstr("médiane",2,3)} = \text{"édi"}\]
\[\text{usubstr("médiane",-3,2)} = \text{"an"}\]
\[\text{usubstr("médiane",2,.)} = \text{"édiane"}\]
Domain \(s\): Unicode strings
Domain \(n_1\): integers \(\geq 1\) and \(\leq -1\)
Domain \(n_2\): integers \(\geq 1\)
Range: Unicode strings

udsubstr\(s, n_1, n_2\)
Description: the Unicode substring of \(s\), starting at character \(n_1\), for \(n_2\) display columns

If \(n_2 = .\) (missing), the remaining portion of the Unicode string is returned. If \(n_2\) display columns from \(n_1\) is in the middle of a Unicode character, the substring stops at the previous Unicode character.

\[\text{udsubstr("médiane",2,3)} = \text{"édi"}\]
\[\text{udsubstr("中值",1,1)} = \text{""}\]
\[\text{udsubstr("中值",1,2)} = \text{"中"}\]
Domain \(s\): Unicode strings
Domain \(n_1\): integers \(\geq 1\)
Domain \(n_2\): integers \(\geq 1\)
Range: Unicode strings

tobytes\(s[n]\)
Description: escaped decimal or hex digit strings of up to 200 bytes of \(s\)

The escaped decimal digit string is in the form of \(\text{\textd\textDDD}\). The escaped hex digit string is in the form of \(\text{\textxhh}\). If \(n\) is not specified or is 0, the decimal form is produced. Otherwise, the hex form is produced.

\[\text{tobytes("abc") = "\textd097\textd098\textd099"}\]
\[\text{tobytes("abc", 1)} = \text{"\textx61\textx62\textx63"}\]
\[\text{tobytes("café") = "\textd099\textd097\textd102\textd195\textd169"}\]
Domain \(s\): Unicode strings
Domain \(n\): integers
Range: strings

uisdigit\(s\)
Description: 1 if the first Unicode character in \(s\) is a Unicode decimal digit; otherwise, 0

A Unicode decimal digit is a Unicode character with the character property \Nd according to the Unicode standard. The function returns \(-1\) if the string starts with an invalid UTF-8 sequence.

Domain \(s\): Unicode strings
Range: integers
uisletter(s)
Description: 1 if the first Unicode character in s is a Unicode letter; otherwise, 0
A Unicode letter is a Unicode character with the character property L according to the Unicode standard. The function returns -1 if the string starts with an invalid UTF-8 sequence.
Domain s: Unicode strings
Range: integers

ustrcompare(s₁,s₂,[loc])
Description: compares two Unicode strings
The function returns -1, 1, or 0 if s₁ is less than, greater than, or equal to s₂. The function may return a negative number other than -1 if an error happens. The comparison is locale dependent. For example, z < ö in Swedish but ö < z in German. If loc is not specified, the default locale is used. The comparison is diacritic and case sensitive. If you need different behavior, for example, case-insensitive comparison, you should use the extended comparison function ustrcompareex(). Unicode string comparison compares Unicode strings in a language-sensitive manner. On the other hand, the sort command compares strings in code-point (binary) order. For example, uppercase “Z” (code-point value 90) comes before lowercase “a” (code-point value 97) in code-point order but comes after “a” in any English dictionary.
ustrcompare("z", "ö", "sv") = -1
ustrcompare("z", "ö", "de") = 1
Domain s₁: Unicode strings
Domain s₂: Unicode strings
Domain loc: Unicode strings
Range: integers

ustrcompareex(s₁,s₂,loc,case,cslv,norm,num,alt,fr)
Description: compares two Unicode strings
The function returns -1, 1, or 0 if s₁ is less than, greater than, or equal to s₂. The function may return a negative number other than -1 if an error occurs. The comparison is locale dependent. For example, z < ö in Swedish but ö < z in German. If loc is not specified, the default locale is used.
st controls the strength of the comparison. Possible values are 1 (primary), 2 (secondary), 3 (tertiary), 4 (quaternary), or 5 (identical). -1 means to use the default value for the locale. Any other numbers are treated as tertiary. The primary difference represents base letter differences; for example, letter “a” and letter “b” have primary differences. The secondary difference represents diacritical differences on the same base letter; for example, letters “a” and “ä” have secondary differences. The tertiary difference represents case differences of the same base letter; for example, letters “a” and “A” have tertiary differences. Quaternary strength is useful to distinguish between Katakana and Hiragana for the JIS 4061 collation standard. Identical strength is essentially the code-point order of the string, hence, is rarely useful.
ustrcompareex("café","cafe","fr", 1, -1, -1, -1, -1, -1, -1) = 0
ustrcompareex("café","cafe","fr", 2, -1, -1, -1, -1, -1, -1) = 1
ustrcompareex("Café","café","fr", 3, -1, -1, -1, -1, -1, -1) = 1
case controls the uppercase and lowercase letter order. Possible values are 0 (use order specified in tertiary strength), 1 (uppercase first), or 2 (lowercase first). -1 means to use the default value for the locale. Any other values are treated as 0.

\[
\text{ustrcompareex("Café","café","fr", -1, 1, -1, -1, -1, -1, -1) = -1}
\]
\[
\text{ustrcompareex("Café","café","fr", -1, 2, -1, -1, -1, -1, -1) = 1}
\]

cslv controls whether an extra case level between the secondary level and the tertiary level is generated. Possible values are 0 (off) or 1 (on). -1 means to use the default value for the locale. Any other values are treated as 0. Combining this setting to be “on” and the strength setting to be primary can achieve the effect of ignoring the diacritical differences but preserving the case differences. If the setting is “on”, the result is also affected by the case setting.

\[
\text{ustrcompareex("café","Cafe","fr", 1, -1, -1, -1, -1, -1, -1) = -1}
\]
\[
\text{ustrcompareex("café","Cafe","fr", 1, 1, -1, -1, -1, -1, -1) = 1}
\]

norm controls whether the normalization check and normalizations are performed. Possible values are 0 (off) or 1 (on). -1 means to use the default value for the locale. Any other values are treated as 0. Most languages do not require normalization for comparison. Normalization is needed in languages that use multiple combining characters such as Arabic, ancient Greek, or Hebrew.

\[
\text{ustrcompareex("100","20","en", -1, -1, -1, 0, -1, -1) = -1}
\]
\[
\text{ustrcompareex("100","20","en", -1, -1, -1, 1, -1, -1) = 1}
\]

num controls how contiguous digit substrings are sorted. Possible values are 0 (off) or 1 (on). -1 means to use the default value for the locale. Any other values are treated as 0. If the setting is “on”, substrings consisting of digits are sorted based on the numeric value. For example, “100” is after value “20” instead of before it. Note that the digit substring is limited to 254 digits, and plus/minus signs, decimals, or exponents are not supported.

\[
\text{ustrcompareex("100","20","en", -1, -1, -1, 0, -1, -1) = -1}
\]
\[
\text{ustrcompareex("100","20","en", -1, -1, -1, 1, -1, -1) = 1}
\]

alt controls how spaces and punctuation characters are handled. Possible values are 0 (use primary strength) or 1 (alternative handling). Any other values are treated as 0. If the setting is 1 (alternative handling), “onsite”, “on-site”, and “on site” are considered equals.

\[
\text{ustrcompareex("onsite","on-site","en", -1, -1, -1, -1, 1, -1) = 0}
\]
\[
\text{ustrcompareex("onsite","on site","en", -1, -1, -1, -1, 1, -1) = 0}
\]
\[
\text{ustrcompareex("onsite","on-site","en", -1, -1, -1, -1, 0, -1) = 1}
\]

fr controls the direction of the secondary strength. Possible values are 0 (off) or 1 (on). -1 means to use the default value for the locale. All other values are treated as “off”. If the setting is “on”, the diacritical letters are sorted backward. Note that the setting is “on” by default only for Canadian French (locale fr_CA).

\[
\text{ustrcompareex("coté","côté","fr_CA",-1,-1,-1,-1,0) = -1}
\]
\[
\text{ustrcompareex("coté","côté","fr_CA",-1,-1,-1,-1,-1,1) = 1}
\]
\[
\text{ustrcompareex("coté","côté","fr_CA",-1,-1,-1,-1,-1,-1) = 1}
\]
\[
\text{ustrcompareex("coté","côté","fr",-1,-1,-1,-1,-1,-1) = 1}
\]
Domain $s_1$: Unicode strings
Domain $s_2$: Unicode strings
Domain $loc$: Unicode strings
Domain $st$: integers
Domain $case$: integers
Domain $cslv$: integers
Domain $norm$: integers
Domain $alt$: integers
Domain $fr$: integers
Range: integers

`ustrfix(s[, rep])`

Description: replaces each invalid UTF-8 sequence with a Unicode character

In the one-argument case, the Unicode replacement character \ufffd is used. In the two-argument case, the first Unicode character of $rep$ is used. If $rep$ starts with an invalid UTF-8 sequence, then Unicode replacement character \ufffd is used. Note that an invalid UTF-8 sequence can contain one byte or multiple bytes.

```
ustrfix(char(200)) = ustrunescape("\ufffd")
ustrfix("ab"+char(200)+"cdé", ") = "abcdé"
ustrfix("ab"+char(229)+char(174)+"cdé", "é") = "abécdé"
```

Domain $s$: Unicode strings
Domain $rep$: Unicode character
Range: Unicode strings

`ustrfrom(s, enc, mode)`

Description: converts the string $s$ in encoding $enc$ to a UTF-8 encoded Unicode string

$mode$ controls how invalid byte sequences in $s$ are handled. The possible values are 1, which substitutes an invalid byte sequence with a Unicode replacement character \ufffd; 2, which skips any invalid byte sequences; 3, which stops at the first invalid byte sequence and returns an empty string; or 4, which replaces any byte in an invalid sequence with an escaped hex digit sequence %Xhh. Any other values are treated as 1. A good use of value 4 is to check what invalid bytes a Unicode string $ust$ contains by examining the result of `ustrfrom(ust, "utf-8", 4)`.

Also see `ustrto()`.

```
ustrfrom("caf"+char(233), "latin1", 1) = "café"
ustrfrom("caf"+char(233), "utf-8", 1) =
    "caf"+ustrunescape("\ufffd")
ustrfrom("caf"+char(233), "utf-8", 2) = "caf"
ustrfrom("caf"+char(233), "utf-8", 3) = ""
ustrfrom("caf"+char(233), "utf-8", 4) = "caf%XE9"
```

Domain $s$: strings in encoding $enc$
Domain $enc$: Unicode strings
Domain $mode$: integers
Range: Unicode strings
ustrinvalidcnt($s$)
Description: the number of invalid UTF-8 sequences in $s$

An invalid UTF-8 sequence may contain one byte or multiple bytes.

\[\begin{align*}
\text{ustrinvalidcnt("médiane")} &= 0 \\
\text{ustrinvalidcnt("médiane"+char(229))} &= 1 \\
\text{ustrinvalidcnt("médiane"+char(229)+char(174))} &= 1 \\
\text{ustrinvalidcnt("médiane"+char(174)+char(158))} &= 2
\end{align*}\]

Domain $s$: Unicode strings
Range: integers

ustrleft($s$, $n$)
Description: the first $n$ Unicode characters of the Unicode string $s$

An invalid UTF-8 sequence is replaced with a Unicode replacement character \ufffd.

\[\begin{align*}
\text{ustrleft("Экспериментальные",3)} &= "Экс" \\
\text{ustrleft("Экспериментальные",5)} &= "Экспе"
\end{align*}\]

Domain $s$: Unicode strings
Domain $n$: integers
Range: Unicode strings

ustrnormalize($s$, $norm$)
Description: normalizes Unicode string $s$ to one of the five normalization forms specified by $norm$

The normalization forms are nfc, nfd, nfkc, nfkd, or nfkcc. The function returns an empty string for any other value of $norm$. Unicode normalization removes the Unicode string differences caused by Unicode character equivalence.

nfc specifies Normalization Form C, which normalizes decomposed Unicode code points to a composited form. nfd specifies Normalization Form D, which normalizes composited Unicode code points to a decomposed form. nfc and nfd produce canonical equivalent form. nfkc and nfkd are similar to nfc and nfd but produce compatibility equivalent forms. nfkcc specifies nfkc with casefolding. This normalization and casefolding implement the Unicode Character Database.

In the Unicode standard, both “i” (\u0069 followed by a diaeresis \u0308) and the composite character \u00ef represent “i” with 2 dots as in “naïve”. Hence, the code-point sequence \u0069\u0308 and the code point \u00ef are considered Unicode equivalent. According to the Unicode standard, they should be treated as the same single character in Unicode string operations, such as in display, comparison, and selection. However, Stata does not support multiple code-point characters; each code point is considered a separate Unicode character. Hence, \u0069\u0308\u00ef is displayed as two characters in the Results window. ustrnormalize() can be used with "nfc" to normalize \u0069\u0308\u00ef to the canonical equivalent composited code point \u00ef.

\[\text{ustrnormalize(ustrunescape("\u0069\u0308\u00ef"), "nfc") = "i"}\]
The decomposed form nfd can be used to removed diacritical marks from base letters. First, normalize the Unicode string to canonical decomposed form, and then call `ustrto()` with mode `skip` to skip all non-ASCII characters.

Also see `ustrfrom()`.

```
ustrto(ustrnormalize("café", "nfd"), "ascii", 2) = "cafe"
```

**ustrright(s,n)**

Description: the last $n$ Unicode characters of the Unicode string $s$

An invalid UTF-8 sequence is replaced with a Unicode replacement character \ufffd.

```
ustrright("Экспериментальные",3) = "ные"
ustrright("Экспериментальные",5) = "льные"
```

**ustrsortkey(s[,loc])**

Description: generates a null-terminated byte array that can be used by the `sort` command to produce the same order as `ustrcompare()`

The function may return an empty array if an error occurs. The result is locale dependent. If `loc` is not specified, the default locale is used. The result is also diacritic and case sensitive. If you need different behavior, for example, case-insensitive results, you should use the extended function `ustrsortkeyex()`.

See [U] 12.4.2.5 Sorting strings containing Unicode characters for details and examples.
ustrsortkeyex(s, loc, case, cslv, norm, num, alt, fr)

Description: generates a null-terminated byte array that can be used by the sort command to produce the same order as ustrcompare().

The function may return an empty array if an error occurs. The result is locale dependent. If loc is not specified, the default locale is used. See [U] 12.4.2.5 Sorting strings containing Unicode characters for details and examples.

st controls the strength of the comparison. Possible values are 1 (primary), 2 (secondary), 3 (tertiary), 4 (quaternary), or 5 (identical). -1 means to use the default value for the locale. Any other numbers are treated as tertiary. The primary difference represents base letter differences; for example, letter “a” and letter “b” have primary differences. The secondary difference represents diacritical differences on the same base letter; for example, letters “á” and “ä” have secondary differences. The tertiary difference represents case differences of the same base letters; for example, letters “a” and “A” have tertiary differences. Quaternary strength is useful to distinguish between Katakana and Hiragana for the JIS 4061 collation standard. Identical strength is essentially the code-point order of the string and, hence, is rarely useful.

case controls the uppercase and lowercase letter order. Possible values are 0 (use order specified in tertiary strength), 1 (uppercase first), or 2 (lowercase first). -1 means to use the default value for the locale. Any other values are treated as 0.

cslv controls if an extra case level between the secondary level and the tertiary level is generated. Possible values are 0 (off) or 1 (on). -1 means to use the default value for the locale. Any other values are treated as 0. Combining this setting to be “on” and the strength setting to be primary can achieve the effect of ignoring the diacritical differences but preserving the case differences. If the setting is “on”, the result is also affected by the case setting.

norm controls whether the normalization check and normalizations are performed. Possible values are 0 (off) or 1 (on). -1 means to use the default value for the locale. Any other values are treated as 0. Most languages do not require normalization for comparison. Normalization is needed in languages that use multiple combining characters such as Arabic, ancient Greek, or Hebrew.

num controls how contiguous digit substrings are sorted. Possible values are 0 (off) or 1 (on). -1 means to use the default value for the locale. Any other values are treated as 0. If the setting is “on”, substrings consisting of digits are sorted based on the numeric value. For example, “100” is after “20” instead of before it. Note that the digit substring is limited to 254 digits, and plus/minus signs, decimals, or exponents are not supported.
alt controls how spaces and punctuation characters are handled. Possible values are 0 (use primary strength) or 1 (alternative handling). Any other values are treated as 0. If the setting is 1 (alternative handling), “onsite”, “on-site”, and “on site” are considered equals.

fr controls the direction of the secondary strength. Possible values are 0 (off) or 1 (on). -1 means to use the default value for the locale. All other values are treated as “off”. If the setting is “on”, the diacritical letters are sorted backward. Note that the setting is “on” by default only for Canadian French (locale fr_CA).

ustrto(s, enc, mode)
Description: converts the Unicode string s in UTF-8 encoding to a string in encoding enc

See \[D\] \texttt{unicode encoding} for details on available encodings. Any invalid sequence in s is replaced with a Unicode replacement character \texttt{"\ufffd"}. mode controls how unsupported Unicode characters in the encoding enc are handled. The possible values are 1, which substitutes any unsupported characters with the enc’s substitution strings (the substitution character for both \texttt{ascii} and \texttt{latin1} is char(26)); 2, which skips any unsupported characters; 3, which stops at the first unsupported character and returns an empty string; or 4, which replaces any unsupported character with an escaped hex digit sequence \texttt{"\uhhhh" or \Uhhhhhhhh}. The hex digit sequence contains either 4 or 8 hex digits, depending if the Unicode character’s code-point value is less than or greater than \texttt{"\uffff"}. Any other values are treated as 1.

\begin{verbatim}
ustrto("café", "ascii", 1) = "caf"+char(26)
ustrto("café", "ascii", 2) = "caf"
ustrto("café", "ascii", 3) = ""
ustrto("café", "ascii", 4) = "caf\u00E9"
\end{verbatim}

ustrto() can be used to removed diacritical marks from base letters. First, normalize the Unicode string to NFD form using ustrnormalize(), and then call ustrto() with value 2 to skip all non-ASCII characters.

Also see ustrfrom().

\begin{verbatim}
ustrto(ustrnormalize("café", "nfd"), "ascii", 2) = "cafe"
\end{verbatim}
ustrtohex(s[n])
Description: escaped hex digit string of s up to 200 Unicode characters

The escaped hex digit string is in the form of \uhhhh for code points less than \uffff or \Uhhhhhhhh for code points greater than \uffff. The function starts at the nth Unicode character of s if n is specified and larger than 0. Any invalid UTF-8 sequence is replaced with a Unicode replacement character \ufffd. Note that the null terminator char(0) is a valid Unicode character. Function ustrunescape() can be applied on the result to get back the original Unicode string s if s does not contain any invalid UTF-8 sequences.

Also see ustrunescape().

ustrtohex("NotNull") = "\u043d\u0443\u043b\u044e"
ustrtohex("NotNull", 2) = "\u0443\u043b\u044e"
ustrtohex("i"+char(200)+char(0)+"s") = "\u0069\ufffd\u0000\u0073"

Domain s: Unicode strings
Domain n: integers ≥ 1
Range: strings

ustrunescape(s)
Description: the Unicode string corresponding to the escaped sequences of s

The following escape sequences are recognized: 4 hex digit form \uhhhh; 8 hex digit form \Uhhhhhhhh; 1–2 hex digit form \xhh; and 1–3 octal digit form \ooo, where h is [0–9A–Fa–f] and o is [0–7]. The standard ANSI C escapes \a, \b, \t, \n, \v, \f, \r, \e, \", \`, \?, \\ are recognized as well. The function returns an empty string if an escape sequence is badly formed. Note that the 8 hex digit form \Uhhhhhhhh begins with a capital letter “U”.

Also see ustrtohex().

ustrunescape("\u043d\u0443\u043b\u044e") = "нотт"

Domain s: strings of escaped hex values
Range: Unicode strings

word(s,n)
Description: the nth word in s; missing ("") if n is missing

Positive numbers count words from the beginning of s, and negative numbers count words from the end of s. (1 is the first word in s, and -1 is the last word in s.) A word is a set of characters that start and terminate with spaces. This is different from a Unicode word, which is a language unit based on either a set of word-boundary rules or dictionaries for several languages (Chinese, Japanese, and Thai).

Domain s: strings
Domain n: integers
Range: strings
ustrword(\(s, n[, loc]\))

Description: the \(n\)th Unicode word in the Unicode string \(s\)

Positive \(n\) counts Unicode words from the beginning of \(s\), and negative \(n\) counts Unicode words from the end of \(s\). For examples, \(n\) equal to 1 returns the first word in \(s\), and \(n\) equal to \(-1\) returns the last word in \(s\). If \(loc\) is not specified, the default locale is used. A Unicode word is different from a Stata word produced by the \texttt{word()} function. A Stata word is a space-separated token. A Unicode word is a language unit based on either a set of word-boundary rules or dictionaries for some languages (Chinese, Japanese, and Thai). The function returns missing (""") if \(n\) is greater than \(cnt\) or less than \(-cnt\), where \(cnt\) is the number of words \(s\) contains. \(cnt\) can be obtained from \texttt{ustrwordcount()}(). The function also returns missing (""") if an error occurs.

\[
\begin{align*}
\text{ustrword("Parlez-vous français", 1, "fr")} &= \text{"Parlez"} \\
\text{ustrword("Parlez-vous français", 2, "fr")} &= \text{"-"} \\
\text{ustrword("Parlez-vous français",-1, "fr")} &= \text{"français"} \\
\text{ustrword("Parlez-vous français",-2, "fr")} &= \text{"vous"}
\end{align*}
\]

Domain \(s\): Unicode strings

Domain \(loc\): Unicode strings

Domain \(n\): integers

Range: Unicode strings

\\
wordbreaklocale(\(loc, type\))

Description: the most closely related locale supported by ICU from \(loc\) if \(type\) is 1, the actual locale where the word-boundary analysis data come from if \(type\) is 2; or an empty string is returned for any other \(type\)

\[
\begin{align*}
\text{wordbreaklocale("en_us_texas", 1)} &= \text{en_US} \\
\text{wordbreaklocale("en_us_texas", 2)} &= \text{root}
\end{align*}
\]

Domain \(loc\): strings of locale name

Domain \(type\): integers

Range: strings

\\
wordcount(\(s\))

Description: the number of words in \(s\)

A word is a set of characters that starts and terminates with spaces, starts with the beginning of the string, or terminates with the end of the string. This is different from a Unicode word, which is a language unit based on either a set of word-boundary rules or dictionaries for several languages (Chinese, Japanese, and Thai).

Domain \(s\): strings

Range: nonnegative integers 0, 1, 2, \ldots
ustrwordcount($s$, $loc$)

Description: the number of nonempty Unicode words in the Unicode string $s$

An empty Unicode word is a Unicode word consisting of only Unicode whitespace characters. If $loc$ is not specified, the default locale is used. A Unicode word is different from a Stata word produced by the `word()` function. A Stata word is a space-separated token. A Unicode word is a language unit based on either a set of word-boundary rules or dictionaries for some languages (Chinese, Japanese, and Thai). The function may return a negative number if an error occurs.

ustrwordcount("Parlez-vous français", "fr") = 4

Domain $s$: Unicode strings
Domain $loc$: Unicode strings
Range: integers

References


Also see

[FN] Functions by category
[D] egen — Extensions to generate
[D] generate — Create or change contents of variable
[M-4] String — String manipulation functions
[U] 12.4.2 Handling Unicode strings
[U] 13.2.2 String operators
[U] 13.3 Functions