MODULE *ASCII*

https://*github.com*/ahelwer/tla-experiments/blob/master/*Hex.tla*

LOCAL INSTANCE *Naturals*
LOCAL INSTANCE *Sequences*
LOCAL INSTANCE *TLC*

LOCAL $PrintVal(id,\ exp) \triangleq Print(\langle id,\ exp\rangle,\ \text{TRUE})$

LOCAL $ismod \triangleq \langle$":", "1", "1", "0", "3", "0", "0", "6", "B", "0", "0", "0", "3", "7", "E", "\r", "\n"$\rangle$

LOCAL *usableASCII* $\triangleq$ " !\"#$%&'()*+, -./0123456789:; ≡ ?@*ABCDEFGHIJKLMNOPQRSTUVWXYZ*[\ \]^_`*abcdefgh*

$usableASCII \triangleq \langle$" ", "!", "\"", "#", "$", "%", "&", "'", "(", ")",
"*", "+", ",", "-", ".", "/", "0", "1", "2", "3",
"4", "5", "6", "7", "8", "9", ":", ";", "<", "=",
">", "?", "@", "A", "B", "C", "D", "E", "F", "G",
"H", "I", "J", "K", "L", "M", "N", "O", "P", "Q",
"R", "S", "T", "U", "V", "W", "X", "Y", "Z", "[",
"\\", "]", "^", "_", "`", "a", "b", "c", "d", "e",
"f", "g", "h", "i", "j", "k", "l", "m", "n", "o",
"p", "q", "r", "s", "t", "u", "v", "w", "x", "y",
"z", "{", "|", "}", "~"$\rangle$

LOCAL $specialChars \triangleq \{$"\t", "\r", "\n", "\f"$\}$

LOCAL $Range(T) \triangleq \{T[x] : x \in \text{DOMAIN } T\}$

$SetOfASCII \triangleq Range(usableASCII) \cup specialChars$

$CharToNum(char) \triangleq$ IF $char \in Range(usableASCII)$
THEN $31 + \text{CHOOSE } i \in 1 \,..\, 95 : usableASCII[i] = char$
ELSE CASE $char =$ "\t" $\to 9$ tab
$\square$ $char =$ "\r" $\to 13$
$\square$ $char =$ "\n" $\to 10$
$\square$ $char =$ "\f" $\to 12$ form feed
$\square$ OTHER $\to 0$

$NumToChar(num) \triangleq$ IF $num \in 32 \,..\, 126$
THEN $usableASCII[num - 31]$
ELSE CASE $num = 9 \to$ "\t" tab
$\square$ $num = 13 \to$ "\r" carrage return
$\square$ $num = 10 \to$ "\n" line feed
$\square$ $num = 12 \to$ "\f" form feed
$\square$ OTHER $\to$ ""

$NumTupleToStrTuple(numTuple) \triangleq [x \in \text{DOMAIN } numTuple \mapsto NumToChar(numTuple[x])]$

RECURSIVE $SeqToString(\_)$

$SeqToString(ascii) \triangleq$

IF $ascii = \langle\rangle$

THEN ""

ELSE $Head(ascii) \circ SeqToString(Tail(ascii))$

RECURSIVE $StrTupleToNumTuple(\_)$

$StrTupleToNumTuple(str) \triangleq [x \in \text{DOMAIN } str \mapsto CharToNum(str[x])]$

$IsUsableASCII(str) \triangleq str = SelectSeq(str, \text{LAMBDA } x : x \in SetOfASCII)$

$SanityCheck \triangleq usableASCII = NumTupleToStrTuple(StrTupleToNumTuple(usableASCII))$

Tests

ASSUME $PrintVal(\text{"}ASCIIToString\text{"}, SeqToString(\langle\text{" : "},\text{"}1\text{"},\text{"}1\text{"},\text{"}0\text{"},\text{"}3\text{"},\text{"}0\text{"},\text{"}0\text{"},\text{"}6\text{"},\text{"}B\text{"},\text{"}0\text{"},\text{"}0\text{"},\text{"}0\text{"},\text{"}3\text{"},\text{"}7\text{"},\text{"}E\text{"},\text{"}\backslash r\text{"},\text{"}\backslash n\text{"}\rangle)$

$= \text{" : 1103006}B\text{00037}E\backslash r\backslash n\text{"})$

ASSUME $PrintVal(\text{"}Range\text{"}, Range(usableASCII))$

ASSUME $PrintVal(\text{"}StrArrayToNumArray\text{"}, StrTupleToNumTuple(ismod)) =$

$\langle 58, 49, 49, 48, 51, 48, 48, 54, 66, 48, 48, 48, 51, 55, 69, 13, 10\rangle)$

ASSUME $PrintVal(\text{"}Sanity\ Check\text{"}, SanityCheck)$

* Modification History

* Last modified *Wed Jun* 12 13:21:22 *EDT* 2019 by *mehdi*

* Last modified *Mon* May 14 12:45:14 *EDT* 2018 by *SabraouM*

* Created *Thu* May 10 13:34:02 *EDT* 2018 by *SabraouM*