

Characters

/Reference manual

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2. Introduction

At the most elementary level, a Z specification can be viewed as a sequence of characters. Given the ubiquity of ASCII keyboards, preparation of a Z specification may have to begin one step back from its sequence of characters, using a mark-up language such as [LaTeX](#) or [troff](#). An understanding of the characters to which mark-up is converted is useful when preparing mark-up.

The characters comprising a Z specification are those of ISO/IEC 10646 Universal Multiple-Octet Coded Character Set (UCS). The code positions of characters in UCS are the same as their code positions in Unicode.

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Characters are classified into several categories, such as *LETTER*, *DIGIT*, *SYMBOL* and *SPECIAL*, according to their UCS general property. This provides a basis for [lexing](#) a specification.

When characters are exchanged between tools, their code positions are encoded according to one of several alternative schemes. A specific scheme can be chosen using one of the following command-line options to the tools: `-UTF8`, `-UTF16BE` and `-UCS4`. The default scheme is `UTF8`. No other schemes are yet implemented by CADiZ. The well-known scheme `UCS2` is not applicable to Z, as it cannot encode the \mathbb{A} and \mathbb{F} characters.

More discussion of these issues may be found in [?].

The characters are formalized below using [syntactic metalanguage](#).

3. ISO Standard characters

3.1. Formal definition of characters

This formal definition is public domain material, and appears as it appears in ISO/IEC 13568:2002 (the Z standard).

$$ZCHAR = DIGIT \mid LETTER \mid SPECIAL \mid SYMBOL;$$

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$$\begin{aligned} \text{DIGIT} &= \text{DECIMAL} \\ &| \quad ?\text{other UCS chars with Number property but Number, Decimal Digit (as supported)} \\ &; \end{aligned}$$

$$\begin{aligned} \text{DECIMAL} &= '0' | '1' | '2' | '3' | '4' | '5' | '6' | '7' | '8' | '9' \\ &| \quad ?\text{any other UCS chars with Number, Decimal Digit property (as supported)} \\ &; \end{aligned}$$

$$\begin{aligned} \text{LETTER} &= \text{LATIN} | \text{GREEK} | \text{OTHERLETTER} \\ &| \quad ?\text{any characters of the mathematical toolkit with letter property (as supported)} \\ &| \quad ?\text{any other UCS characters with letter property (as supported)?} \\ &; \end{aligned}$$

$$\begin{aligned} \text{LATIN} &= 'A' | 'B' | 'C' | 'D' | 'E' | 'F' | 'G' | 'H' | 'I' \\ &| \quad 'J' | 'K' | 'L' | 'M' | 'N' | 'O' | 'P' | 'Q' | 'R' \\ &| \quad 'S' | 'T' | 'U' | 'V' | 'W' | 'X' | 'Y' | 'Z' \\ &| \quad 'a' | 'b' | 'c' | 'd' | 'e' | 'f' | 'g' | 'h' | 'i' \\ &| \quad 'j' | 'k' | 'l' | 'm' | 'n' | 'o' | 'p' | 'q' | 'r' \\ &| \quad 's' | 't' | 'u' | 'v' | 'w' | 'x' | 'y' | 'z' \\ &; \end{aligned}$$

$$\text{GREEK} = '\Delta' | '\Xi' | '\theta' | '\lambda' | '\mu';$$

$$\text{OTHERLETTER} = '\mathbb{A}' | '\mathbb{N}' | '\mathbb{P}';$$

$$\text{SPECIAL} = \text{STROKECHAR} | \text{WORDGLUE} | \text{BRACKET} | \text{BOXCHAR} | \text{NLCHAR};$$

$$\text{STROKECHAR} = ' ' | '!' | '?';$$

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$$\begin{aligned} \text{WORDGLUE} &= ' \nearrow ' | ' \swarrow ' | ' \searrow ' | ' \nwarrow ' | ' - ' ; \\ \text{BRACKET} &= '(| ')' | '[' | ']' | '{' | '}' | '\langle' | '\rangle' | '\ll' | '\gg' ; \\ \text{BOXCHAR} &= \text{ZEDCHAR} | \text{AXCHAR} | \text{SCHCHAR} | \text{GENCHAR} | \text{ENDCHAR} ; \\ \text{SYMBOL} &= ' \& ' | ' \vdash ' | ' \wedge ' | ' \vee ' | ' \Rightarrow ' | ' \Leftrightarrow ' | ' \neg ' | ' \forall ' | ' \exists ' | ' / ' | ' = ' | ' \in ' | ' : ' | ' ; ' | ' , ' | ' . ' | ' \\ &| \text{?any characters of the mathematical toolkit with neither letter or} \\ &| \text{number property (as supported)?} \\ &| \text{?any other UCS characters with neither letter or} \\ &| \text{number property and that are not in SPECIAL (as supported)?} \\ &; \end{aligned}$$

4. CADiZ-specific characters

CADiZ “supports” use of all UCS characters, each classified according to its general property. However, CADiZ is able to display only some characters in the most desirable form; others are displayed as nameplates showing their code numbers.

The CADiZ core language uses not only the characters enumerated in the above formal definition from ISO Standard Z but also ' \forall ', ' \vdash ', ' \oplus ' and ' \prime ' as additional characters in the *SYMBOL* class. The uses of these additional characters are documented in [extensions](#). To check that a Z specification uses only ISO Standard notations, [invoke cadiz](#) with the `-ws` option.

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