

Troff mark-up

/Reference manual

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2. Introduction

A troff mark-up for Z specifications is defined here by its conversion to a sequence of Z (UCS) characters. Cadiz performs this conversion to [Z characters](#), which it then [lexes](#). Only the core Z notation is considered here; the troff mark-up of symbols defined in the toolkit is documented [elsewhere](#).

The ISO standard does not define a troff mark-up. However, the sequence of Z characters to which cadiz converts troff mark-up is checked for conformance to the ISO standard.

3. ISO Standard mark-up

3.1. White space and comments

Spaces and tabs in the mark-up are converted to *SPACE* characters. Newlines characters in the mark-up are converted to *NLCHAR* characters.

Text from `--` to the end of that line is a comment and is ignored.

3.2. Mark-up directives

Non-ASCII symbols may be marked-up using their troff codenames, e.g. `\(dg` is mark-up for a † character.

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Alternatively, in the style of the `eqn` preprocessor, mnemonic names may be associated with non-ASCII symbols using mark-up directives. These mark-up directives are usually written immediately before the definition of the corresponding Z symbol. For example, those for toolkit symbols are in toolkit sections, and those for the core notation are in the prelude section. Hence you write mark-up directives only for new symbols that you define in your sections of your Z specification.

The conversion of a name to a specific UCS character is defined by a directive like the following.

```
.Zo Delta U+0394
.Zo arithmos U-0001D538
```

If a name is to be converted to more than one character, a directive like the following is used.

```
.Zw thrm vdash?
```

The conversions of all such names include a *SPACE* character before and after them.

In the following sections, mark-up directives are given to define the conversions of all the names for the core notation. Any core notation for which no name is defined is ASCII and is marked-up as itself.

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3.3. Greek letters

The Greek letters of the core Z language are converted according to the following mark-up directives.

Z character	\LaTeX mark-up
θ	.Zo theta U+03B8
λ	.Zo lambda U+03BB
μ	.Zo mu U+03BC

Occurrences of Δ and Ξ as prefixes of Z names cannot be marked-up using mnemonic names because of the insertion of *SPACE* around the expansions of mark-up names. Instead, use $\backslash(*D$ and $\backslash(*C$.

3.4. Other letters

Other letters of the core Z language are converted according to the following mark-up directives.

Z character	\LaTeX mark-up
\mathbb{A}	.Zo arithmos U-0001D538
\mathbb{N}	.Zo nn U+2115
\mathbb{P}	.Zo ps U+2119

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3.5. Special characters

Special characters of the core Z language are converted according to the following mark-up directives.

Z character	L ^A T _E X mark-up
⟨	.Zo << U+300A
⟩	.Zo >> U+300B
◁	.Zo opbind U+2989
▷	.Zo clbind U+298A

Subscripts may be marked-up as follows.

L ^A T _E X mark-up	Z characters
[^] subscript	\searrow <i>subscript</i> \swarrow

For example, \exists_1 is marked-up as `exists^1`.

Superscripts and subscripts may also be marked-up using mnemonic names for the motions.

Z character	L ^A T _E X mark-up
\nearrow	.Zo nearrow U+2197
\swarrow	.Zo swarrow U+2199
\searrow	.Zo searrow U+2198
\nwarrow	.Zo nwarrow U+2196

The troff mark-up from which box characters are converted is discussed [below](#).

The troff mark-up for *NLCHAR* and *SPACE* characters is discussed [above](#).

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3.6. Symbol characters

Symbol characters of the core Z language are converted according to the following mark-up directives.

Z character	L ^A T _E X mark-up
\vdash	<code>.Zo vdash U+22A2</code>
$\vdash?$	<code>.Zw thrm vdash?</code>
\wedge	<code>.Zo and U+2227</code>
\vee	<code>.Zo or U+2228</code>
\Rightarrow	<code>.Zo imp U+21D2</code>
\Leftrightarrow	<code>.Zo iff U+21D4</code>
\neg	<code>.Zo neg U+00AC</code>
\forall	<code>.Zo forall U+2200</code>
\exists	<code>.Zo exists U+2203</code>
\times	<code>.Zo cp U+00D7</code>
\in	<code>.Zo mem U+2208</code>
\bullet	<code>.Zo dot U+2981</code>
\backslash	<code>.Zo zhide U+29F9</code>
\uparrow	<code>.Zo zproj U+2A21</code>
$\overset{o}{9}$	<code>.Zo zfrc U+2A1F</code>
\gg	<code>.Zo zpipe U+2A20</code>

3.7. Section header mark-up

Section headers are delimited from surrounding informal text or neighbouring paragraphs by `.ZH` and `.ZE` which, like the troff requests they resemble, must each be at the beginning of a line.

```
.ZH
section name parents ...
.ZE
```

These `.ZH` and `.ZE` brackets are converted to *ZEDCHAR* and *ENDCHAR* respectively.

Names introduced by mark-up directives are not recognised in section headers.

3.8. Paragraph mark-up

Outlined paragraphs are delimited by `.ZS` and `.ZE`, the `.ZS` being converted to box characters and the `.ZE` being converted to an *ENDCHAR*. Non-outlined paragraphs are delimited by `.ZH` and `.ZE`, the `.ZH` being converted to a *ZEDCHAR* and the `.ZE` being converted to an *ENDCHAR*. Any middle line in an outlined paragraph may be marked-up using `.ZM`, which is converted to a | character with *SPACE* characters around it.

For each outlined paragraph, its mathematical representation, Z characters, and troff mark-up are given below.

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3.8.1. Axiomatic description paragraph mark-up

Mathematical representation

<i>DeclPart</i>
<i>Predicate</i>

Z characters

AXCHAR

Declpart

|

Predicate

ENDCHAR

Troff mark-up

.ZS

DeclPart

.ZM

Predicate

.ZE

3.8.2. Generic axiomatic description paragraph mark-up

Mathematical representation

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[Formals]

DeclPath

Predicate

Z characters

GENCHAR AXCHAR [Formals]

DeclPart

|

Predicate

ENDCHAR

Troff mark-up

.ZS [Formals]

DeclPart

.ZM

Predicate

.ZE

3.8.3. Schema definition paragraph mark-up

Mathematical representation

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NAME

DeclPart

Predicate

Z characters

SCHCHAR NAME

DeclPart

|

Predicate

ENDCHAR

Troff mark-up

.ZS NAME

DeclPart

.ZM

Predicate

.ZE

3.8.4. Generic schema definition paragraph mark-up

Mathematical representation

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<i>NAME</i> [<i>Formals</i>]	
<i>DeclPart</i>	
<i>Predicate</i>	

Z characters

GENCHAR SCHCHAR NAME [*Formals*]

DeclPart

|

Predicate

ENDCHAR

Troff mark-up

.ZS NAME [*Formals*]

DeclPart

.ZM

Predicate

.ZE

4. CADiZ-specific mark-up

The following names are defined for marking-up CADiZ extensions to standard Z. They are all defined in the prelude section, and are not noticed by the **-ws** option.

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CADiZ would conform better to the standard if this mark-up were introduced in a separate CADiZ-specific section.

4.1. Symbol characters

Symbol characters of the core Z language are converted according to the following mark-up directives.

Z character	LaTeX mark-up
†	.Zo dagger U+2020
⊕	.Zo zov U+2295
⊖	.Zo xor U+22BB

4.2. Tool directives

The troff mark-up recognised by cadiz also includes that of various [tool directives](#).

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