

naive-ebnf: L^AT_EX Package for EBNF in Plain Text*

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1 Introduction

This package helps render an [Extended Backus-Naur Form](#) using plain text notation:

$\langle \lambda\text{-Expr} \rangle \rightarrow \langle \text{Var} \rangle$ $\quad \text{ "}\lambda\text{" } \langle \text{Var} \rangle \text{ "}. \text{" } \langle \text{Expr} \rangle$ $\quad \text{ "(" } \langle \text{Expr} \rangle \langle \text{Expr} \rangle \text{ ")" }$	<pre>1 \documentclass{minimal} 2 \usepackage{naive-ebnf} 3 \usepackage{mathtools} 4 \begin{document} 5 \begin{ebnf} 6 <\$\lambda\$-Expr> := <Var> 7 "\$\lambda\$" <Var> "." <Expr> 8 "\$\lparen\$" <Expr> <Expr> "\$\rparen\$" 9 \end{ebnf} 10 \end{document}</pre>
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ebnf The `ebnf` environment *doesn't* add any formatting to the paragraph, but only replaces the plain text symbols, such as “:=” and “<Var>” with proper L^AT_EX commands. The following syntax is understood inside the `ebnf` environment:

- := separates the left-hand side from the right-hand side of the production rule;
- < . . . > denotes a non-terminal (variable);
- " . . . " denotes a terminal symbol;
- (. . . | . . .) denotes a series of options to choose from;
- [. . .] denotes an optional substitution;
- { . . . } denotes a zero or more times repetition;

Attention: The usage of some symbols is prohibited inside terminals. Instead, the following substitutions are recommended:

- `\lparen` and `\rparen` instead of “(” and “)” (from the [mathtools](#) package);
- `\langle` and `\rangle` instead of “<” and “>”;

*The sources are in GitHub at [yegor256/naive-ebnf](#)

- `\lbrace` and `\rbrace` instead of “{” and “}” (also `mathtools`);
- `\lbrack` and `\rbrack` instead of “[” and “]” (also `mathtools`);
- `\vert` instead of “|”.

`\terminal` Inside the text, terminals and non-terminals may be formatted using two supplementary commands:

The non-terminal $\langle \text{Var} \rangle$ in λ -calculus may be equal to v_1, v_2, \dots . Application starts with “(” and ends with “)”.	<pre> 6 The non-terminal \nonterminal{Var} 7 in \$\lambda\$-calculus may be equal 8 to \$v_1, v_2, \dots\$. Application 9 starts with \terminal{() and ends 10 with \terminal{)}. </pre>
---	--

It’s possible to use them in math-mode too, for example:

If “($f_1 \langle \lambda\text{-Var} \rangle$)” is always true, then f_1 is a tautology.	<pre> 6 If \$\terminal{() f_1 7 \nonterminal{\$\lambda\$-Var} 8 \terminal{)}\$ is always true, then 9 \$f_1\$ is a tautology. </pre>
--	--

2 Package Options

It’s possible to configure the behavior of the package with the help of a few package options:

`bw` By default, some colors are used in the rendered grammar. However, the `bw` package option disables any colors and makes sure the grammar is black-and-white:

```
\usepackage[bw]{naive-ebnf}
```

3 Implementation

First, we process package options:

```

1 \RequirePackage{pgfopts}
2 \pgfkeys{
3   /ebnf/.cd,
4   bw/.store in=\ebnf@bw,
5 }
6 \ProcessPgfPackageOptions{/ebnf}

```

Then, we include a few packages, mostly to deal with \LaTeX expressions:

```

7 \RequirePackage{filecontentsdef}
8 \RequirePackage{expl3}

```

`\ebnf@color` Then, we include `xcolor` to colorize the output a bit:

```

9 \makeatletter\ifdefined\ebnf@bw\else
10 \RequirePackage{xcolor}
11 \fi
12 \newcommand\ebnf@color[2]
13   {\ifdefined\ebnf@bw#2\else\textcolor{#1}{#2}\fi}
14 \makeatother

```

`\terminal` Then, we a command to render a single terminal:

```

15 \makeatletter
16 \newcommand\terminal[1]{%
17   \relax\ifmmode\else\ttfamily\fi%
18   \ebnf@color{gray}{\relax\ifmmode\textsf{''}\else\sffamily''\fi}%
19   #1%
20   \ebnf@color{gray}{\relax\ifmmode\textsf{''}\else\sffamily''\fi}}
21 \makeatother

```

`\nonterminal` Then, we a command to render a single non-terminal:

```

22 \makeatletter
23 \newcommand\nonterminal[1]{%
24   \ebnf@color{gray}{\relax\ifmmode\langle\else\(\langle\)\fi}%
25   \relax\ifmmode\textsf{#1}\else\sffamily#1\fi%
26   \ebnf@color{gray}{\relax\ifmmode\rangle\else\(\rangle\)\fi}}
27 \makeatother

```

Then, we define supplementary commands:

```

28 \makeatletter
29 \newcommand\ebnf@optional[1]
30   {\ebnf@color{gray}{[]#1\ebnf@color{gray}{}}}
31 \newcommand\ebnf@repetition[1]
32   {\ebnf@color{gray}{\{}#1\ebnf@color{gray}{\}}}
33 \newcommand\ebnf@grouping[1]
34   {\ebnf@color{gray}{\{}#1\ebnf@color{gray}{\}}}
35 \ExplSyntaxOn
36 \newcommand\ebnf@terminal[1]{
37   \tl_set:Nn \l_ebnf_tl { }
38   \tl_set_rescan:Nno \l_ebnf_tl { } { #1 }
39   \terminal{\l_ebnf_tl}
40 }
41 \newcommand\ebnf@nonterminal[1]{
42   \tl_set:Nn \l_ebnf_tl { }
43   \tl_set_rescan:Nno \l_ebnf_tl { } { #1 }
44   \nonterminal{\l_ebnf_tl}
45 }
46 \ExplSyntaxOff
47 \newcommand\ebnf@to
48   {\ebnf@color{gray}{\(\to\)}}
49 \newcommand\ebnf@alternation
50   {\ebnf@color{gray}{\(\vert\)}}
51 \newcommand\ebnf@eol{\}
52 \makeatother

```

`ebnf` Then, we define the ebnf environment:

```

53 \ExplSyntaxOn
54 \cs_generate_variant:Nn \tl_replace_all:Nnn {Nx}
55 \NewDocumentEnvironment{ebnf}{}{\filecontentsdefmacro\l__ebnf_tmp_tl}{
56   \endfilecontentsdefmacro
57   \str_set:NV \l__ebnf_tmp_tl \l__ebnf_tmp_tl
58   \str_set:Nx \l__ebnf_tmp_tl {\str_range:Nnn \l__ebnf_tmp_tl {1} {-2}}
59   \regex_replace_all:nnN { \{(.\+?)\} }
60     {\c{ebnf@repetition}{1}} \l__ebnf_tmp_tl
61   \regex_replace_all:nnN { \((.\+?)\)}

```

```

62   {\c{ebnf@grouping}{\1}} \l__ebnf_tmp_tl
63   \regex_replace_all:nnN { \[([^\]]+?)\] }
64   {\c{ebnf@optional}{\1}} \l__ebnf_tmp_tl
65   \regex_replace_all:nnN { <([>]+)> }
66   {\c{ebnf@nonterminal}{\1}} \l__ebnf_tmp_tl
67   \regex_replace_all:nnN { "([^\"]+)" }
68   {\c{ebnf@terminal}{\1}} \l__ebnf_tmp_tl
69   \regex_replace_all:nnN { \^M\s*\| }
70   {\^M :=} \l__ebnf_tmp_tl
71   \regex_replace_all:nnN { \| }
72   {\c{ebnf@alternation}{}} \l__ebnf_tmp_tl
73   \regex_replace_all:nnN { \^M\s*:= }
74   {\^M \c{-}\c{hspace}{3em}\c{ebnf@alternation}{}} \l__ebnf_tmp_tl
75   \regex_replace_all:nnN { := }
76   {\c{ebnf@to}{}} \l__ebnf_tmp_tl
77   \regex_replace_all:nnN { \^M }
78   {\c{ebnf@eol}{}} \l__ebnf_tmp_tl
79   \tl_put_left:Nn \l__ebnf_tmp_tl {}
80   \tl_put_right:Nn \l__ebnf_tmp_tl {}
81   \l__ebnf_tmp_tl
82 }
83 \ExplSyntaxOff

84 \endinput

```

Change History

0.0.1		rendering terminal symbols
General: First draft.	2	outside of the <code>ebnf</code> environment. . . 3
0.0.2		0.0.3
General: Proper parsing of grouping. . .	2	<code>\terminal</code> : Quotes fixed in both text
Substitutions suggested for special		and math modes.
symbols.	2	3
<code>\nonterminal</code> : New command		0.0.4
<code>\nonterminal</code> added, to enable		<code>ebnf</code> : Any symbols are allowed inside
rendering non-terminal symbols		<code>\nonterminal</code> commands and
outside of the <code>ebnf</code> environment. . .	3	inside the <code>ebnf</code> environment,
<code>\terminal</code> : New command		where non-terminals are
<code>\terminal</code> added, to enable		mentioned.
		3

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