The Language HOL

BNF-converter

January 19, 2009

This document was automatically generated by the BNF-Converter. It was generated together with the lexer, the parser, and the abstract syntax module, which guarantees that the document matches with the implementation of the language (provided no hand-hacking has taken place).

The lexical structure of HOL

Literals

Idents literals are recognized by the regular expression \( ⟨letter⟩ + ⟨digit⟩* | ⟨digit⟩+ \)

PredId literals are recognized by the regular expression \( ⟨upper⟩⟨letter⟩* ‘(‘ \)

FunctId literals are recognized by the regular expression \( ⟨lower⟩⟨letter⟩* ‘(‘ \)

Reserved words and symbols

The set of reserved words is the set of terminals appearing in the grammar. Those reserved words that consist of non-letter characters are called symbols, and they are treated in a different way from those that are similar to identifiers. The lexer follows rules familiar from languages like Haskell, C, and Java, including longest match and spacing conventions.

The reserved words used in HOL are the following:

\[
\begin{align*}
\text{and} & \quad \text{else} & \quad \text{exists} \\
\text{false} & \quad \text{forall} & \quad \text{if} \\
\text{implies} & \quad \text{in} & \quad \text{let} \\
\text{not} & \quad \text{or} & \quad \text{then} \\
\text{true} &
\end{align*}
\]

The symbols used in HOL are the following:
Comments

Single-line comments begin with ‘−−’.
There are no multiple-line comments in the grammar.

The syntactic structure of HOL

Non-terminals are enclosed between ⟨ and ⟩. The symbols ::= (production), |
(union) and ϵ (empty rule) belong to the BNF notation. All other symbols
are terminals.

⟨PROGRAM⟩ ::= ⟨ListSENT⟩

⟨SENT6⟩ ::= ⟨PredId⟩ ⟨ListTERMS⟩
    | true
    | false
    | ⟨Idents⟩
    | ⟨TERM⟩ = ⟨TERM⟩
    | ( ⟨SENT⟩ )

⟨SENT5⟩ ::= not ⟨SENT5⟩
    | ⟨SENT6⟩

⟨SENT4⟩ ::= if ⟨SENT3⟩ then ⟨SENT3⟩ else ⟨SENT3⟩
    | let ⟨ListDEF⟩ in ⟨SENT2⟩
    | ⟨SENT5⟩

⟨SENT3⟩ ::= ⟨SENT3⟩ and ⟨SENT4⟩
    | ⟨SENT3⟩ or ⟨SENT4⟩
    | ⟨SENT4⟩

⟨SENT2⟩ ::= ⟨SENT2⟩ implies ⟨SENT3⟩
    | ⟨SENT3⟩

⟨DEF⟩ ::= ⟨Idents⟩ = ⟨SENT⟩

⟨SENT⟩ ::= forall ⟨ListTERM⟩ . ⟨SENT⟩
    | exists ⟨ListTERM⟩ . ⟨SENT⟩
    | ⟨SENT1⟩
\( \langle \text{TERM} \rangle ::= \langle \text{FunctId} \rangle \langle \text{ListTERMS} \rangle \)
| \( \langle \text{TERM1} \rangle \)

\( \langle \text{TERM1} \rangle ::= \langle \text{Idents} \rangle \)
| ( \( \langle \text{TERM} \rangle \) )

\( \langle \text{TERMS} \rangle ::= \langle \text{ListTERM} \rangle \)

\( \langle \text{ListTERMS} \rangle ::= \epsilon \)
| \( \langle \text{TERMS} \rangle \)
| \( \langle \text{TERMS} \rangle \) ( \( \langle \text{ListTERMS} \rangle \) )

\( \langle \text{ListDEF} \rangle ::= \epsilon \)
| \( \langle \text{DEF} \rangle \)
| \( \langle \text{DEF} \rangle , \langle \text{ListDEF} \rangle \)

\( \langle \text{ListSENT} \rangle ::= \epsilon \)
| \( \langle \text{SENT} \rangle ; \langle \text{ListSENT} \rangle \)

\( \langle \text{SENT1} \rangle ::= \langle \text{SENT2} \rangle \)

\( \langle \text{ListTERM} \rangle ::= \epsilon \)
| \( \langle \text{TERM} \rangle \)
| \( \langle \text{TERM} \rangle , \langle \text{ListTERM} \rangle \)