$$
\begin{aligned}
\text{LDL}_f \textit{ formula } \varphi &::= \varphi_1 \mid \varphi_1 \text{ `->` } \varphi \\
\varphi_1 &::= \varphi_2 \mid \varphi_1 \text{ `|` } \varphi_2 \\
\varphi_2 &::= \varphi_3 \mid \varphi_2 \text{ `&` } \varphi_3 \\
\varphi_3 &::= \text{`last`} \mid \alpha \mid \text{`!` } \varphi_3 \mid \text{`<`} \rho \text{ `>` } \varphi_3 \mid \text{`[`} \rho \text{ `]` } \varphi_3 \mid \text{`(` } \varphi \text{ `)`} \\
\textit{Regular path } \rho &::= \rho_1 \mid \rho \text{ `+` } \rho_1 \\
\rho_1 &::= \rho_2 \mid \rho_1 \text{ `;` } \rho_2 \\
\rho_2 &::= \rho_3 \mid \text{`\{` } \varphi \text{ `\}` `?`} \mid \rho_3 \text{ `*`} \\
\rho_3 &::= \text{`\{` } \psi \text{ `\}`} \mid \text{`!` } \rho_3 \mid \text{`(` } \rho \text{ `)`} \\
\textit{Proposition } \psi &::= \psi_1 \mid \psi_1 \text{ `->` } \psi \\
\psi_1 &::= \psi_2 \mid \psi_1 \text{ `|` } \psi_2 \\
\psi_2 &::= \psi_3 \mid \psi_2 \text{ `&` } \psi_3 \\
\psi_3 &::= \alpha \mid \text{`!` } \psi_3 \mid \text{`(` } \psi \text{ `)`} \\
\textit{Atomic proposition } \alpha &::= \text{`true`} \mid \text{`false`} \mid \textit{symbol}
\end{aligned}
$$