A Syntax of `if-fi` in a Scheme-like V^-

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We present a grammar of a guarded `if` in V^-:

⟨*guarded-if*⟩ ::= (`if` ({ ⟨*guarded-exp*⟩ }) `fi`)

⟨*guarded-exp*⟩ ::= ⟨*exp*⟩
| (`exists` [⟨*logical-var*⟩] ⟨*guarded-exp*⟩)
| (`exists` ⟨*logical-var*⟩ {⟨*logical-var*⟩} ⟨*guarded-exp*⟩) ⋆
| ((`<->` ⟨*logical-var*⟩ ⟨*exp*⟩) ⟨*guarded-exp*⟩)

⟨*logical-var*⟩ ::= a fresh name (cannot be lambda- or `exists`-bound in this scope).

A ⋆ indicates syntactic sugar.
The desugaring of a multi-name `exists` is:

$$(\texttt{exists}\ lv_1\ \ldots\ \langle guarded\text{-}exp\rangle) \triangleq (\texttt{exists}\ lv_1\ (\texttt{exists}\ \ldots\ \langle guarded\text{-}exp\rangle))$$

1 Forms of Judgement for V^-:

In english:
A series of equations is either is solved to produce a value or gets stuck.
A single sub-equation of the form x = e , where eq is an equation or an expression, either is solved to produce an environment or gets stuck.
An equation x = e can only be solved if e contains no unbound logical variables.

2 Rules for V^-:

In progress

$$(\texttt{if fi}) \triangleq (\texttt{wrong})$$