

1. hi

$$\begin{aligned}\langle S \rangle &\Rightarrow \langle PP \rangle \\ &\Rightarrow \langle NP \rangle \langle VP \rangle \langle PP \rangle\end{aligned}$$

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$$\begin{aligned}\langle S \rangle &\Rightarrow \langle NP \rangle \langle VP \rangle \langle PP \rangle \\ &\Rightarrow \langle NP \rangle \langle VP \rangle \langle PP \rangle \\ &\Rightarrow \langle det \rangle \langle n \rangle \langle aux \rangle \langle VP \rangle \langle p \rangle \langle NP \rangle \\ &\Rightarrow \langle det \rangle \langle n \rangle \langle aux \rangle \langle v \rangle \langle NP \rangle \langle p \rangle \langle det \rangle \langle n \rangle \\ &\Rightarrow \langle det \rangle \langle n \rangle \langle aux \rangle \langle v \rangle \langle n \rangle \langle p \rangle \langle det \rangle \langle n \rangle\end{aligned}$$

$$\begin{aligned}\langle S \rangle &\Rightarrow \langle NP \rangle \langle VP \rangle \langle PP \rangle \\ &\Rightarrow \langle NP \rangle \langle VP \rangle \langle PP \rangle \\ &\Rightarrow thestudentscould \langle VP \rangle to \langle NP \rangle \\ &\Rightarrow thestudentscouldbring \langle NP \rangle to the professor \\ &\Rightarrow thestudentscouldbring snacksto the professor\end{aligned}$$