Consider the following abstract syntax together with its associated Montague-like semantics:

\[
\begin{align*}
\text{EVERYBODY} & : \text{NP} \\
\text{SOMEBODY} & : \text{NP} \\
\text{NEED} & : \text{NP} \rightarrow \text{NP} \rightarrow \text{S} \\
\text{TRACE} & : \text{NP}_X \\
\text{MOVE} & : (\text{NP} \rightarrow \text{NP} \rightarrow \text{S}) \rightarrow \text{NP}_X \rightarrow \text{NP} \rightarrow S_X \\
\text{QR} & : \text{NP} \rightarrow S_X \rightarrow \text{S} \\
\end{align*}
\]

where:

\[
\begin{align*}
\text{human} & : e \rightarrow t \\
\text{need} & : e \rightarrow (e \rightarrow t) \\
\end{align*}
\]

1. Compute the semantic representation of the sentence \textit{everybody needs somebody}, the abstract syntax of which is given by the following term:

\[
(\text{NEED \ SOMEBODY}) \text{ EVERYBODY}
\]

2. Assume that:

\[
\text{MOVE\ NEED} \rightarrow_\beta \lambda qsz. s (\lambda x. qz (\lambda y. \text{need} x y))
\]

Compute another semantic representation of the sentence \textit{everybody needs somebody}, the alternative abstract syntax of which is given by the following term:

\[
\text{QR \ SOMEBODY \ (MOVE \ NEED \ TRACE \ EVERYBODY)}
\]

3. Assign an appropriate semantic interpretation to \textit{MOVE} such that:

\[
\text{MOVE\ NEED} \rightarrow_\beta \lambda qsz. s (\lambda x. qz (\lambda y. \text{need} x y))
\]

4. Discuss the difference between the two interpretations you have obtained for the sentence \textit{everybody needs somebody}.  
