What are the types of the following functions?

\[ f \quad [] = [] \]
\[ f \ y \ (x:xs) = [y..x] ++ xs \]

\[ g \quad [] = "" \]
\[ g \ (x:xs) = \text{let} \ z = xs ++ "s" \ \text{in} \ (g \ xs) ++ z \]

\[ h \quad [] = [] \]
\[ h \ b \ (x:xs) \]
\[ \mid b = x:(h \ False \ xs) \]
\[ \mid \text{otherwise} = h \ True \ xs \]

\[ j \ x = [(a,b) \mid a \leftarrow [1..x], b \leftarrow [(-1),(-2)..(-5)], b \ast b = a] \]
Write a function \( \texttt{exists} :: (a \to \text{Bool}) \to [a] \to \text{Bool} \) which takes a predicate and a list and returns True if and only if at least one element in the list satisfies the predicate.

- Using pattern matching? Guards?
- Using \texttt{foldr/foldl}?
- Using \texttt{filter/map}?

How would you use \texttt{exists} to write a function \texttt{greaterThan} that takes an element and a list and returns True if any elements in the list is larger than the given element?

\[
\texttt{greaterThan} :: \text{Ord a} \Rightarrow a \to [a] \to \text{Bool}
\]
What do the following evaluate to?

\[ \text{foldr} (-) 0 [8,7,6,5] \]

\[ \text{foldl} (-) 0 [8,7,6,5] \]

Use \texttt{foldr} to define a function \texttt{sumSquares} which takes an integer \( n \) as its argument and returns the sum of the squares of the integers from 1 to \( n \). Do this both with and without \texttt{map}.