

```

-- Model solution for Tut05
--
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module Tut05
where

-- the following definitions are given their maximally generic type - even if
-- the tutorial question didn't ask for it

-- Delete all occurrences of the given value from a list
--
-- Example: delete 'x' "x-files sux" = "-files su"
--
delete :: Eq a => a -> [a] -> [a]
delete x [] = []
delete x (y:ys) | x == y = delete x ys
                 | otherwise = y : delete x ys

-- Substitute elements in a list
--
-- Example: substitute 'e' 'i' "eigenvalue" = "iiginvalui"
--
substitute :: Eq a => a -> a -> [a] -> [a]
substitute x y [] = []
substitute x y (z:zs) | x == z = y : substitute x y zs
                       | otherwise = z : substitute x y zs

-- Determine the shortest and the longest string in a list
--
-- Examples: shortestAndLongest ["abc"] = ("abc","abc")
--           shortestAndLongest ["This", "sentence", "is", "ridiculous"] =
--             ("is","ridiculous")
--
shortestAndLongest :: [String] -> (String, String)
shortestAndLongest [] = error "shortestAndLongest: empty list"
shortestAndLongest [str] = (str, str)
shortestAndLongest (str:strs) =
  let
    (shortest, longest) = shortestAndLongest strs
  in
    if length str < length shortest
    then
      (str, longest)
    else if length str > length longest
    then
      (shortest, str)
    else
      (shortest, longest)

-- Yield a list of all the properties associated with all occurrences of a key
-- in an association list
--
-- Examples: lookupAll
--           "Plates"
--           [("Forks", 10), ("Plates", 5), ("Cups", 0), ("Plates", 1)] =
--           [5,1]
--           lookupAll
--           "Knives"
--           [("Forks", 10), ("Plates", 5), ("Cups", 0), ("Plates", 1)] =
--           []
--
lookupAll :: Eq a => a -> [(a, b)] -> [b]
lookupAll key [] = []
lookupAll key ((key', val) : keyVals)
  | key == key' = val : lookupAll key keyVals
  | otherwise = lookupAll key keyVals

```