Clicker Question - History

Who invented lambda calculus?

A  John von Neumann
B  Alonzo Church
C  Kurt Gödel
D  Grace Hopper
E  John McCarthy
Group Problem - count-edges

;;; A Node is a Sym
;;; A Graph is a (listof (list Node (listof Node)))
(define graph-a
  '((A (C E))
    (B ())
    (C (B))
    (D (A B E))
    (E (D)))))

Write count-edges that consumes a Graph and produces the number of edges of that node. You may write one solution using ALFs and another solution using recursion.
(count-edges graph-a) ⇒ 7
Let the graph shown above be denoted by $G$.

;; A NodeAlt is a Num
;; A GraphAlt is a (listof (list NodeAlt (listof NodeAlt)))

Write \texttt{reachable-sum} that consumes a NodeAlt and a directed acyclic GraphAlt and outputs the sum of the nodes that are reachable from the input node, including the input node itself. We assume the node exists in the graph and there is an unique path from the node to any of its reachable nodes. This means in the above graph, only nodes 3,4,5,6,7 are valid inputs.

\[
\text{reachable-sum\ 6\ G} \Rightarrow 13 \\
\text{reachable-sum\ 3\ G} \Rightarrow 21
\]
Discussion - reachable-sum

What if the graph given in the previous question does not satisfy the assumption that there is an unique path from the node to any of its reachable nodes? What problems arise with our current code and how should we improve our code? What happens if we have a cyclic graph?
Midterm Question - find-upgrades

This question can be found under the 'Solution Request' tab on the course website.
Assignment Question - subsequence

Write a function, \((\text{subsequence } \text{lst from to})\), that consumes a list and two natural numbers. It produces the subsequence from \(\text{lst}\) that begins at index \(\text{from}\) and ends just before index \(\text{to}\). Indexing starts at 0.
Assignment Question - foreign-coin-total

Other countries have different coins. For example, the fictional nation of Bergawfulstan also has 5 coins: the ’kaf (worth 2), the ’riwu (worth 4), the ’teyne (worth 10), the ’spok (worth 16), and the ’dekaf (worth 20).

We can represent this using an association list as follows

(define berg-coins '((kaf 2) (riwu 4) (teyne 10) (spok 16) (dekaf 20)))

Note that the coin names are keys, and must be unique.

Write the function foreign-coin-total that consumes an association list like the above, as well as a list of symbols representing coins, and produces the total value of those coins, using the association list as the value of the coins. The function should treat any symbols not in the association list as having no value, just like in part (a).
Assignment Question - replace-vowels

Write a function, replace-vowels, that consumes a string and replaces each vowel with a number of x’s: the first vowel is replaced with 1 x, the second with 2 x’s and the n-th with n x’s. You may use append for this question. A vowel is one of (a, e,i,o,u). Recursion should occur on a list of characters, not on the string.