

TELE 4363 Tutorial

Week 13

31 May 2004

The following questions relate to the concepts of packet classification covered in lectures. To make them a little more “user-friendly”, they have been expressed in terms of classifying names of people. These identifiers are equivalent to variable-length network addresses. If you don’t care for such “user-friendliness” and are really keen for close correspondence between binary network addresses and these identifiers, then try answering the questions using the binary ASCII representation of the names.

A “switch” has a database that stores the direction for sending information to reach 8 people: Alice, Bob, Charlie, Eave, Joanne, John, Joseph, and Trudy.

Q1: If the database consists of the names sorted in alphabetical order in a table, then how many table lookups are needed to locate the entry corresponding to Charlie when using a binary search? (Assume that when a mid-point needs to be determined and it lies between two names, then the name that is on the left is chosen.)

Q2: If the frequency with which people receive information is proportional to the length of their name (e.g. Charlie, 6 letters, receives twice as much information as Bob, 3 letters) and the database is implemented as a linked list, then what would be a reasonable ordering of the names in the linked list so as to maximise performance?

Q3: If the database is implemented by using the first letter of a name as a hash value to index a table with 26 entries, then what problem can arise, and how could a switch address this problem by adding linked lists?

Q4: Draw a trie structure that holds the information contained in this database, using one letter position for each level of the trie. Show the path that would be traversed when searching the trie for the name “Jon”.