ITS 413 – QUIZ 6 ANSWERS

First name: _____ Last name: _____

ID: _____ Total Marks: _____
out of 10

- When asked to *describe* or *explain* something, your answer must be clear, concise and unambiguous. Usually about 1 to 4 sentences.

Question 1 [3 marks]

Explain how a super-peer architecture like that used in the Fasttrack P2P network provides advantages offered by both fully-distributed networks (e.g. Gnutella) and centralised networks (e.g. Naptster).

Answer:

It provides an advantage of fault-tolerance similar to fully-distributed networks because the super-peers have multiple neighbours and are organised in a distributed manner. If one fails, another super-peer can be contacted.

It provides an advantage of efficiency similar to centralised networks because in many cases the peers must only access their super-peer (rather than a full broadcast).

Question 2 [2 marks]

a) If a system using Chord Distributed Hash Tables (DHTs) allows up to 256 nodes, how many unique key values are possible?

Answer: 256. The key space and node ID space must be the same.

b) If a resource maps to a key K in Chord, but no corresponding node K exists, what does Chord do?

Answer: The resource (or a pointer to the resource) is stored on a node with ID that is the next highest integer from K. For example, if K = 3, and node 5 exists, but nodes 3 and 4 do not, the resource will be stored on node 5.

Question 3 [3 marks]

In Chord routes are maintained to only a selection of other nodes (e.g. 1, 2, 4, 8, … positions aways). Explain an advantage and disadvantage of instead maintaining routes to nodes 2, 4, 6, 8, … positions away.

Advantage: Faster search. You will know a lot more of the routers ($n/2$, where n is the number of nodes), and therefore have almost immediate routes to the destination.

Disadvantage: Higher traffic overhead. You need to maintain links to each router, and therefore there are much higher overheads in maintaining the routing tables (e.g. as nodes join, leave).

Question 4 [1 mark]

Napster's performance is of order 1 for both latency (time to get search result) and number of messages sent. Whereas Gnutella is of order log(n) for latency and order n for messages sent (where n is the number of peers). What is a disadvantage of Napster compared to Gnutella?

Answer: Napster is not fault-tolerant. A failure of the directory server means the service is no longer useable. Also Naspter requires much more storage on the directory server (in Gnutella the index storage is distributed across all nodes).

Question 5 [1 mark]

A default value of the number of permanent peers (C) in Gnutella is 4. What is a disadvantage of increasing this value?

Answer: If the number of peers is increased then, assuming the TTL remains the same, the number of messages sent out will increase, causing higher network overhead.