Exam Practice Quiz #1

Due: TBA

1 Fill-in The Blanks

Consider the following scenario with a distributed storage system with the following node IDs: 121, 492, 982,1832, 92, and 384. Note: you may need to use Mod operator to get the node IDs to fit within the ID-space discussed below.

a. Consider a system only using Consistent hashing with an 8 bit-ID space.

- At which server, will the following keys be stored:

key-ID	server-ID
12	
352	
500	
892	
9831	

- if a new server is added with ID 182, which keys will get moved to this server?

- When the new server with ID 182 is added, where will the keys come from? (i.e., from which servers will the keys be moved.)

b. Consider a system running Tapestry with the same server-IDs as above. Tapestry is setup with Base 4 and 10 bit-ID space.

(a) How many rows are in each node's Tapestry routing table?

(b) How many columns are in each node's Tapestry routing table?

(c) Which nodes are in the first row of Node 121.

(d) If a new server with ID 294 is added to this network, which servers are the need to know nodes?

2 Open-Ended Questions

a. "Causal order implies FIFO order". *True or False? Why?*

b. Given the following set of snapshots from each process:

- P1: (1,0,0); (3,4,0)
- P2: (0,1,0); (0,3,0); (0,6,4)
- P3: (0,0,1); (0,2,3); (4,4,6)

Recall, vector clocks get incremented when a process either (1) receives a msg, (2) sends a msg, or (3) processes an independent event.

If you select the latest snapshot of each process – (3,4,0), (0,6,4), and (4,4,6) – *do you have a globally consistent snapshot? Why or why not?*

c. DNS maps domain names to IP addresses on the Internet. *Explain how hierarchies allow DNS to scale.*

d. If you are designing an RPC system and you know that all RPCs will be idempotent, *how does that make your design simpler?*