Department of Computing

**Hong Kong Polytechnic University**

**Comp 5527 Mobile Computing and Data Management**

**Tutorial Five**

1. The Anti-entropy protocol is used in Bayou system to propagate local updates to all replicated servers. As discussed in the lecture, there are three ways to implement it: *push*, *pull* and *push-pull.* Assume there is a set *S* of *n* servers and each stores a copy of a database. A record in the database has the format of (*k, v, t*), where *k* is the key, *v* is the value, and *t* is the timestamp.
2. Write the pseudo code for each server to implement *push*, *pull* and *push-pull* versions of the anti-entropy protocol.
3. Another way to propagate updates is using *direct mail*. In direct mail, each new update is immediately mailed from its local server to all other servers. Write the pseudo code for the direct mail method.
4. Compare the two methods, and describe the advantages and disadvantages of them.
5. The Coda system supports disconnected operations to achieve high availability. *Pessimistic* and *optimistic* are two strategies in replicating a file for disconnected operation. A pessimistic approach requires a client to acquire shared or exclusive control of a cached object prior to disconnection, and to retain such control until reconnection. Possession of exclusive control by a disconnected client would preclude reading or writing at all other replicas. Possession of shared control would allow reading at other replicas, but writes would still be forbidden everywhere. An optimistic approach allows reading or writing everywhere, even at the same time. However, there needs a machinery in the system for conflict detection and resolution. Compare these two strategies and justify why Coda chooses the optimistic approach.
6. If you are going to provide a location-based application to your customers, you will need to obtain the location information about your customers from a mobile positioning service. Describe the general system architecture, and the steps of operations required.