CS 213 Parallel and Distributed Processing

Test 2, 30 points

1. (a) What is the difference between invalidate and update cache protocols? Which is better and why? …. 3 pts
(b) Draw the organization of a directory to maintain cache coherence in a CC-NUMA multiprocessor. How does it work for read and write misses. … 3 pts
(b) Consider the switch cache organization, where a small cache is put in a switch in the network. How is cache coherence achieved in such a structure? … 3 pts

2. (a) What are the Dir(i)B and Dir(i)NB protocols? Explain how they work. … 4 pts
(b) Assume i=2. Derive the saving in directory memory in those protocols compared to the full-map directory in a 16-node multiprocessor? … 3 pts

3. (a) Explain the following terms: lockup-free cache, cache pollution, and degree of prefetching. … 3 pts
(b) What are different costs associated with page replication and migration? Draw a flowchart of the decision process to replicate/migrate a page in a CC-NUMA multiprocessor. …. 4 pts

4. (a) How is a DNS based scheduling in a distributed web server different from normal scheduling in a distributed system? What is the characteristic of a Zipf distribution and why is it used to model the behavior of web clients? … 4 pts
(b) What are the advantages and disadvantages of web caching? Where are they put in the network? …. 3 pts