HW 5
Name: Jiacheng Zhao

Resources. (All people, books, articles, web pages, etc. that have been consulted when producing your answers to this homework)

Textbook and instructor's slides

On my honor, as an Aggie, I have neither given nor received any unauthorized aid on any portion of the academic work included in this assignment. Furthermore, I have disclosed all resources (people, books, web sites, etc.) that have been used to prepare this homework. This work is my own and is written in my own words.

Signature: <u>JIACHENG ZHAO</u>

Problem 1. Consider a chord system with m=7. There are 42 servers. The IDs are: 3,6,9,....,126. A file has a hash value of 70. Where is it stored?

Solution.

Since files are stored at first peer with id greater than or equal to its key, a file that has a hash value of 70 should be stored at the peer with the value of 72.

Problem 2. For the same above, List the finger table of node 30 and for node 15.
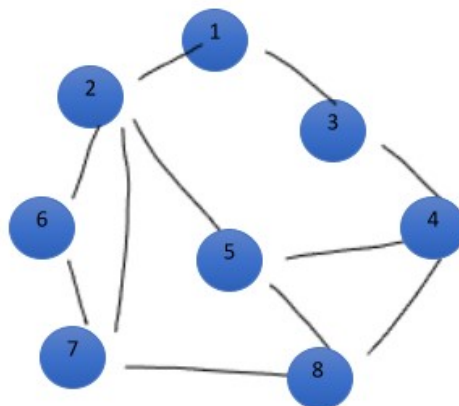
Solution.

Finger Table

N30

i	$ft[i]$
0	33
1	33
2	36
3	39
4	48
5	63
6	96

N15

i	$ft[i]$
0	18
1	18
2	21
3	24
4	33
5	48
6	81

Problem 3. The following is an overlay of Gnutella. Suppose node 7 starts a query with TTL = 2. Which nodes receive the query? Explain your answer

Solution.

2

Since TTL decrements at each hop and from the problem we can know that node 7 starts a query with TTL of 2, this query can only be passed through 2 hops. In that case, all nodes except node 7(initiator) and 3 (too far from node 7) will receive the query.

Problem 4. Exercise 10.7

Solution.

If the routing mechanism is secure, then the object and route messages can only be accessed via secure hash functions. Moreover, if the routing mechanism and some nodes are indeed compromised, a client can request to check the content and its validity of the object. The secure hash function must be a one-way function, which means that it's possible to generate two objects with the same hash function results, or any hacker could store one object and replace the original with it easily.

Problem 5.

5) Consider a Pastry system and a node of ID − 48E175. The following is snap of its routing table.

P	GUID prefixes and corresponding node handles														
0	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
1	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E
2	480	481	482	483	484	485	486	487	488	489	48A	48B	48C	48D	48E
3	48E0	48E1	48E2	48E3	48E4	48E5	48E6	48E7	48E8	48E9	48EA	48EB	48EC	48E D	48EE

this node has to send packets to nodes,
a) 48E322 and b) 54A666,

Explain how the routing takes place to send packets to the nodes given above.

Solution.

a) From the problem we can see that the longest common prefix of nodes with ID 48E175 and 48E322 is 48E and according to the routing table, node with ID-48E175 knows a node with ID- 48E3xx. In this case, node 48E175 will send packets to the node with ID-48E3xx and it will continue to find the target node with ID-48E322 afterwards.

b) Since there is no common prefix with these two nodes, the node with ID-48E175 will send the packet to a node it knows with ID-5xxxxx. The node with ID-5xxxxx will carry on searching the target node with ID-54A666.