CS 512 - Programming Assignment 2

Summary

In this assignment, you will implement a distributed hash(DHT) table based system to resolve key-to-address lookup.

Description

The DHT mechanism is described in Section 5.2.3 in the textbook. Your program will randomly generate a system of **n** nodes and keys where **n** is a predefined macro. For example:

```
#define n 32
```

Not all **n** nodes will be online(actual node). A node has 30% chance of being online. The output of your program should include the list of actual nodes and their finger tables, followed by 5 random lookup requests.
Here is how your program should work:

```
hb117@uxb4:~$ gcc dht.c -Wall -o dht
hb117@uxb4:~$ ./dht
Node 2: { 30 31 0 1 2 }
Finger table:
1         4
2         4
3         6
4         15
5         21

Node 4: { 3 4 }
Finger table:
1         6
2         6
3         8
4         15
5         21

Node 6: { 5 6 }
Finger table:
1         8
2         8
3         15
4         15
5         24

Node 8: { 7 8 }
Finger table:
1         15
2         15
3         15
4         21
5         24

Node 15: { 9 10 11 12 13 14 15 }
Finger table:
1         21
2         21
3         21
4         24
5         2

Node 21: { 16 17 18 19 20 21 }
Finger table:
1         24
2         24
3         29
4         29
5         6
```

```
Node 24: { 22 23 24 }
Finger table:
1         29
2         29
3         29
4         2
5         8

Node 29: { 25 26 27 28 29 }
Finger table:
1         2
2         2
3         2
4         6
5         15

Look up k = 12 from node  4: 4->8->15
Look up k = 25 from node  2: 2->21->24->29
Look up k = 27 from node 24: 24->29
Look up k =  7 from node  8: 8
Look up k =  2 from node 21: 21->29->2
```

Your program should produce a different output everytime.
Make sure to test your program with different **n**.

Grading

This assignment is worth 100 points. Grade will be based on:
1. Correct implementation of DHT-based system generation: 50 points.
2. Correct implementation of lookup function: 40 points.
3. Indent/comment your code properly: 10 points.

Turning in

Upload your source code (dht.c) to Western Online Dropbox. Programming Assignment 2 is due on Friday, October 16th at midnight

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