Jason Chen
CMSC 256
Assignment 3

Questions

1. a, b, d, h, i, e, j, c, f, k, g, l, m

2.
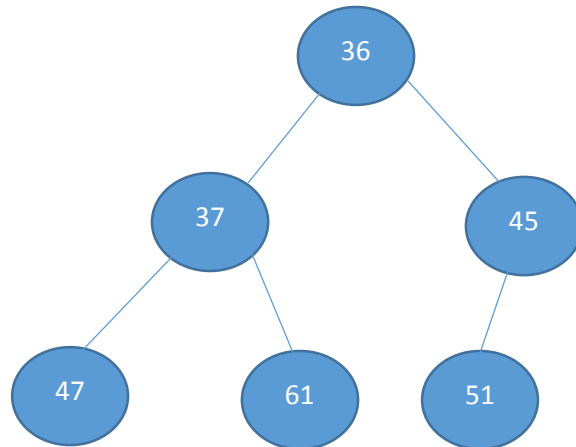
3.
a. False
b. True
c. True
d. True

4.

Index	0	1	2	3	4	5	6
Hash code	0	7	1	3	11	9	

5.

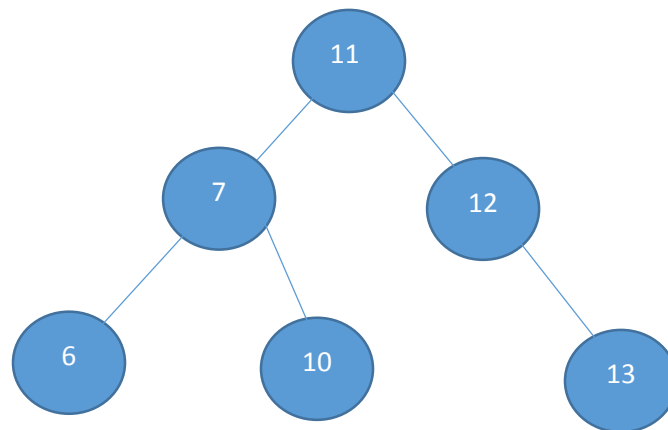| Expression	Dominant term(s)	O(…)
$500n+100n^2+200n\log_{10}n$	$100n^2$	$O(n^2)$
$0.3n+10n^{1.5}+5n^{1.75}$	$5n^{1.75}$	$O(n^{1.75})$
$0.003\log_4 n + \log_2\log_2 n$	$\log_2\log_2 n$	$O(\log_2\log_2 n)$
$0.01n\log_2 n+n(\log_2 n)^2$	$n(\log_2 n)^2$	$O(n(\log_2 n)^2)$
$n^2\log_2 n+n(\log_2 n)^2$	$n^2\log_2 n$	$O(n^2\log_2 n)$

6.
1) Empty tree
2)

3)

```
        7
       / \
      6   12
```

4)

```
          11
         /  \
        7    12
       / \     \
      6  10    13
```

5)

```
           11
          /  \
         7    13
        / \   / \
       6  10 12  14
```
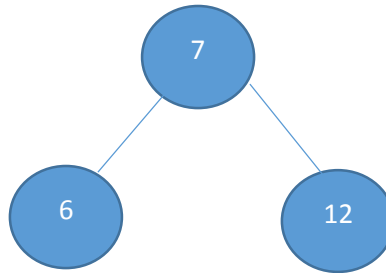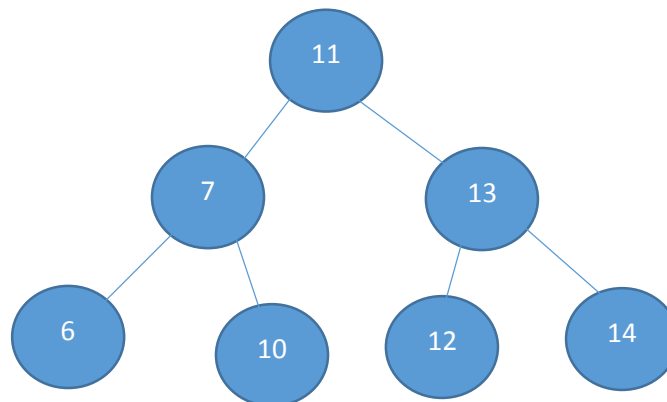
Bonus Question:

3^n has a higher growth rate than $n*2^n$, because exponentials grow very fast, especially one with a higher base. $N*2^n$ just grow not fast enough to keep up with 3^n. The result for all the numbers from 1 and up I plugged in for n are higher for 3^n.

References

Fung, Carol. "Linked List." Lecture.

Goodrich, Michael T., and Roberto Tamassia. Data Structures and Algorithms in Java. New York: John Wiley, 2014. Print.