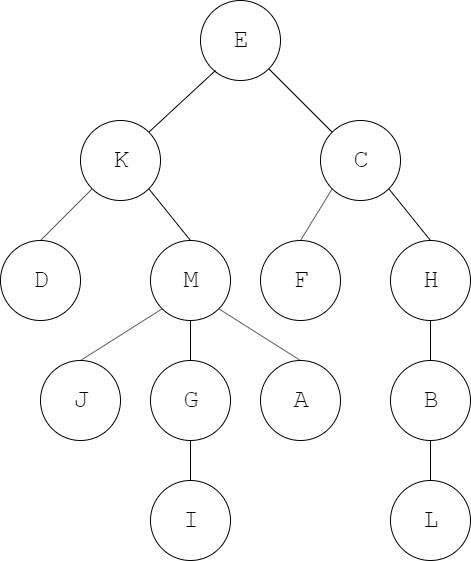
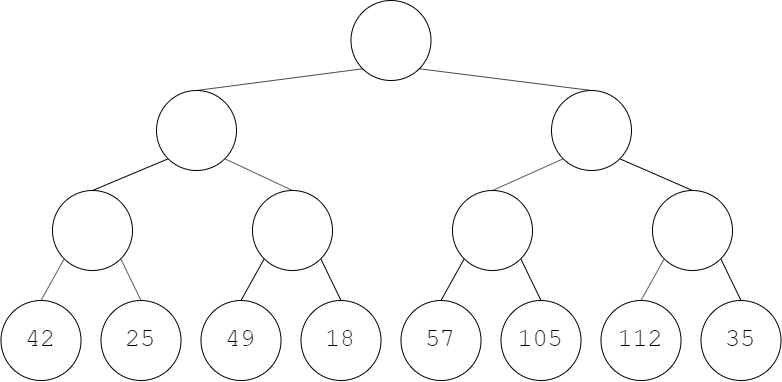
Xie, Weiliang  
40100475  
COMP352

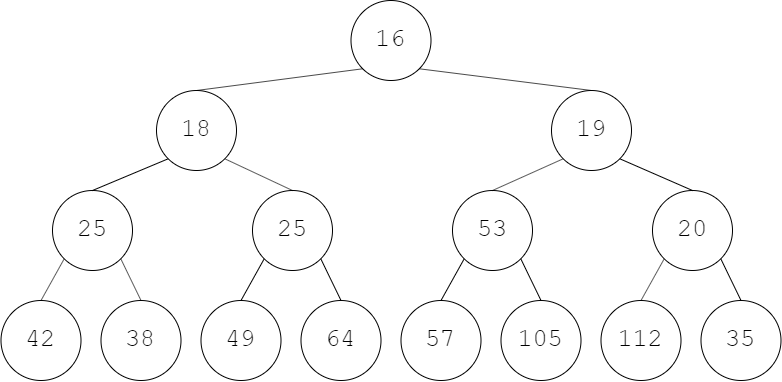
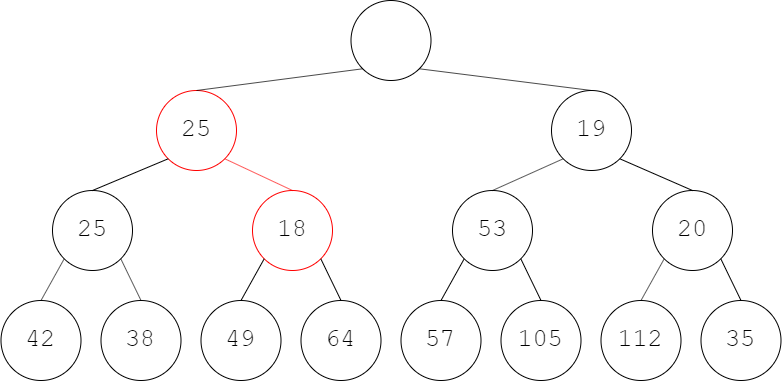
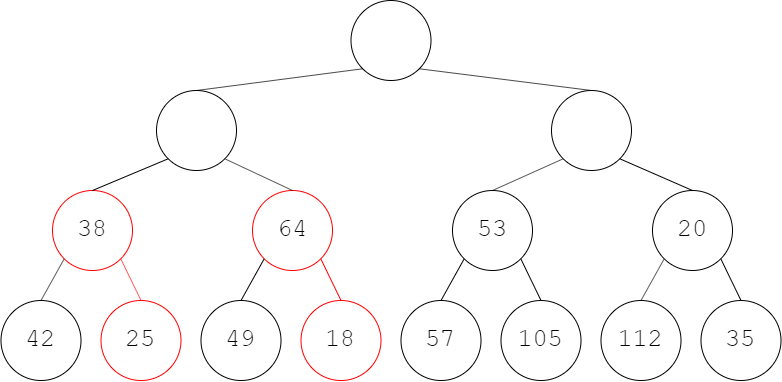
**Assignment 3-4**

**Question 1:**

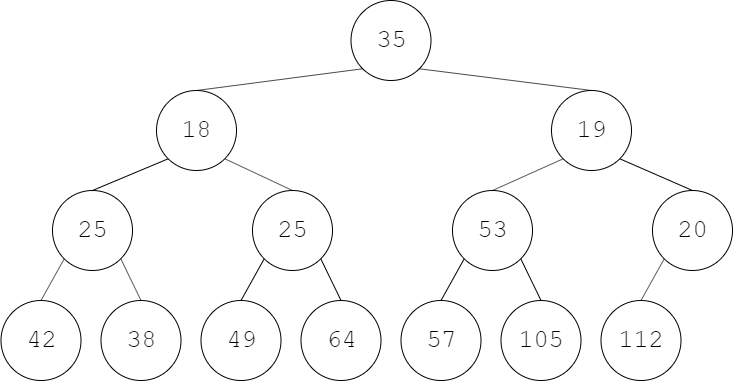


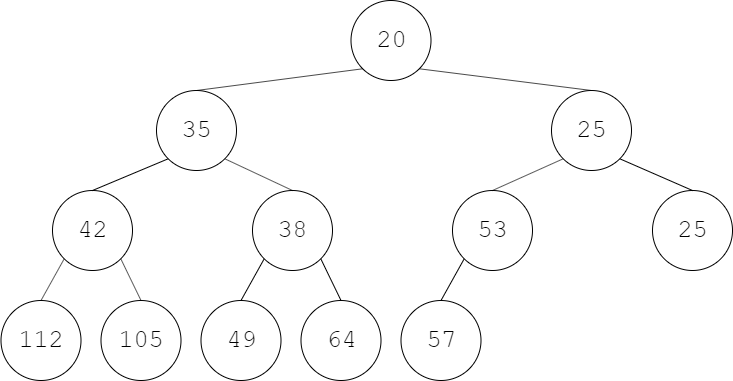
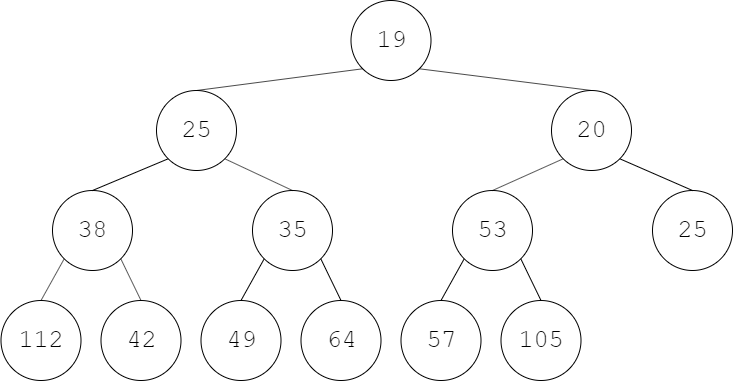
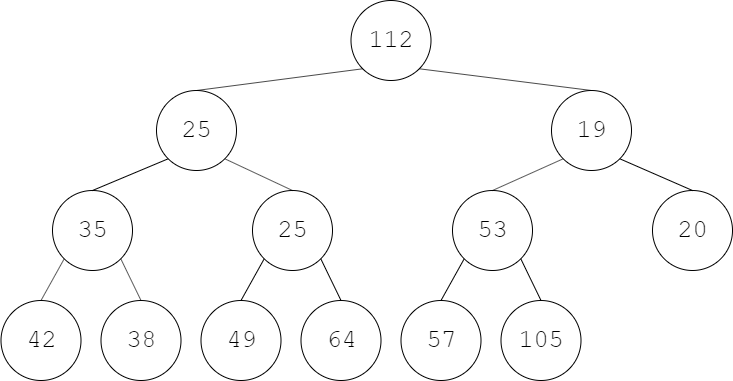
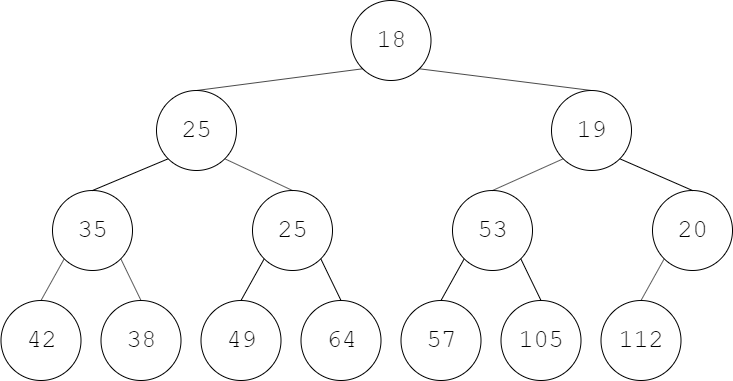
**Question 3:**





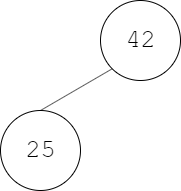
Performing first removeMin

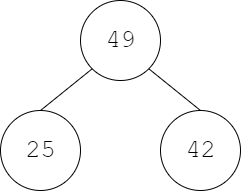
****

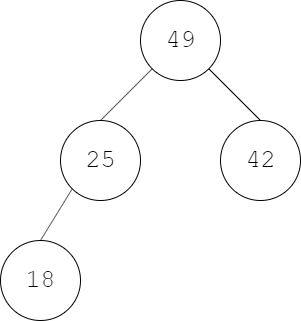
****

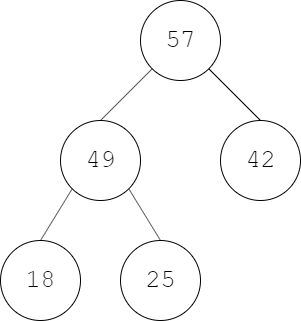
**Question 4:**

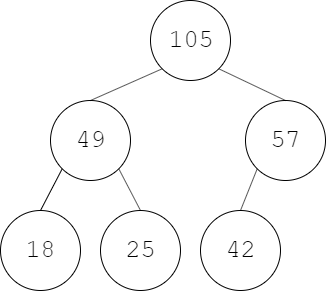


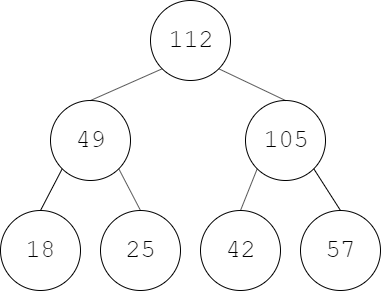


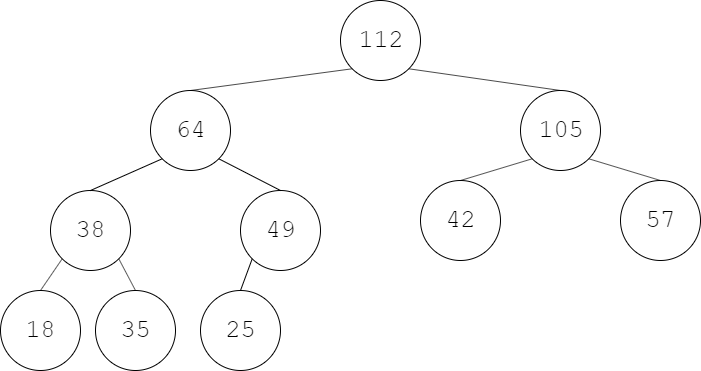
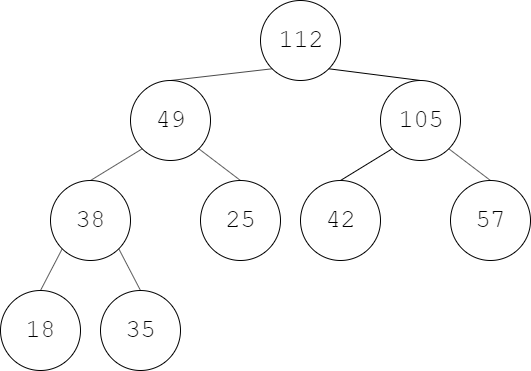


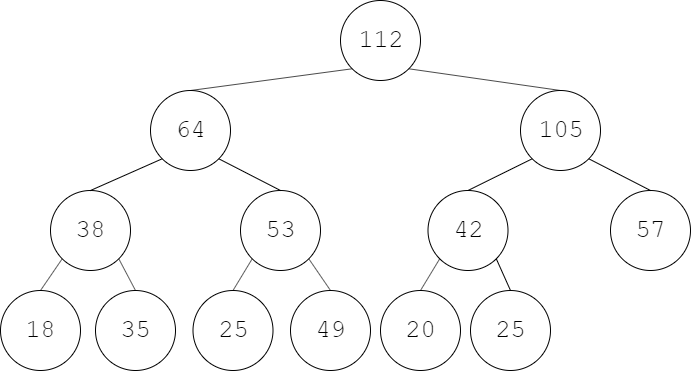
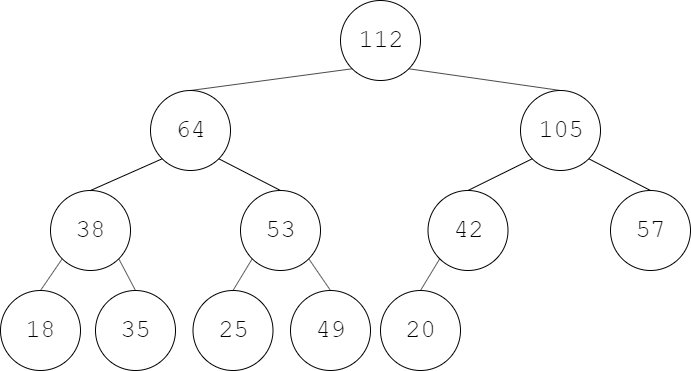
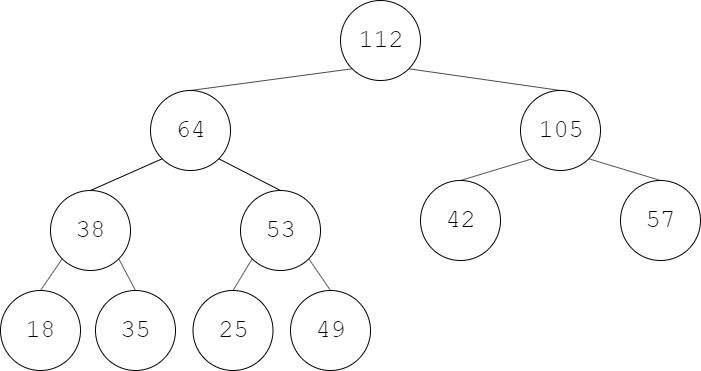


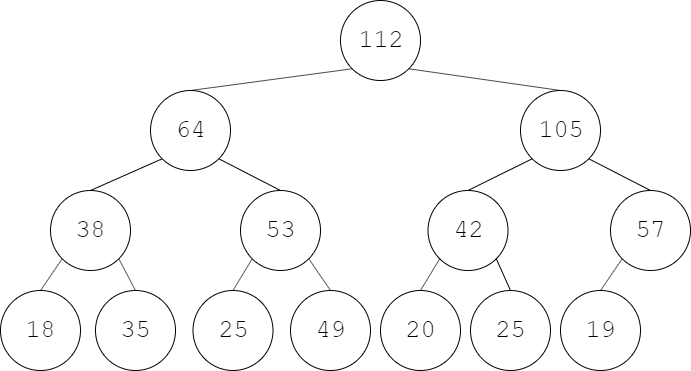


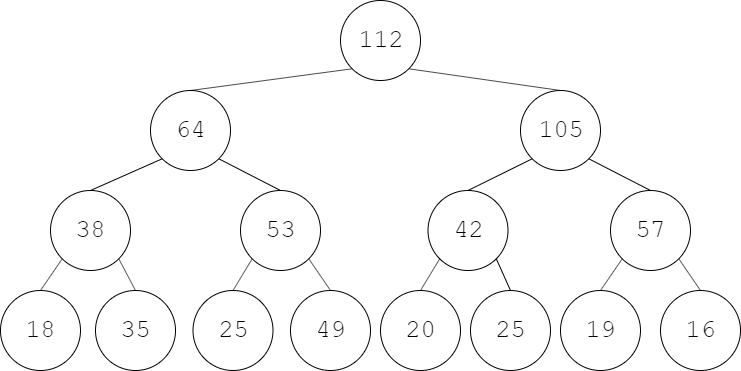




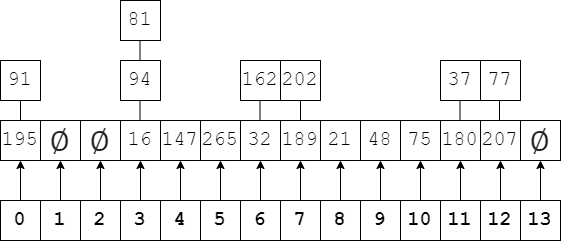








**Question 7:**

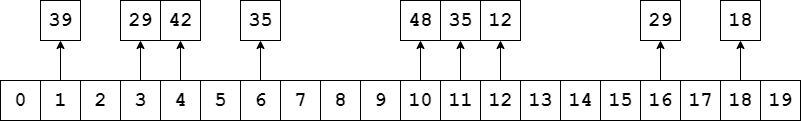
1. After insertions:
2. There are 7 collisions in total.

**Question 8:**

There would be no difference because the hash function changes alongside the problem size. A bigger problem size means that there are just as many chances of collision as a smaller problem size with its size as a coefficient in the hash function.

**Question 9:**

1. After all operations:

****

1. The longest cluster is of size 3
2. Total of 10 collisions
3. The load factor is

**Question 10:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 91 | 411 | 832 | 172 | 292 | 682 | 243 | 573 | 326 | 96 | 489 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 411 | 326 | 836 | 243 | 172 | 573 | 682 | 489 | 91 | 96 | 292 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 91 | 96 | 172 | 243 | 292 | 326 | 411 | 489 | 573 | 682 | 836 |

**Question 11**

1. The first error comes from the deepest child (Node with key 81) because it unbalances the tree and violates the AVL tree property (A height difference of at most 1 with both sub-children). The node with key 2 also is in the wrong place, causing the tree to not be a BST. The corrected tree is as follows:

