HW3

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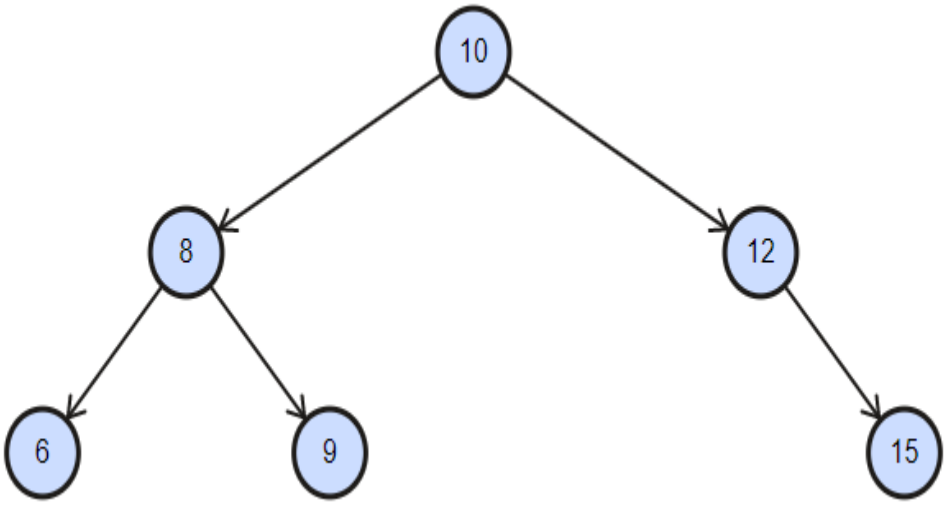
1. I created a binary tree that has 10 as the root, as shown below



2. Here you can see that when I choose 2, it will print the tree in LVR order

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C:\Users\HP\Desktop\E-Learning (Mira)\(4) Second Semester 2020-2021\Data Structure and Algorithms\HW3 Mira Jamous\x64\Debug\HW3 Mira Jamo...
Current tree is 6 8 9 10 12 15
Please choose one of the following options from 1-8:

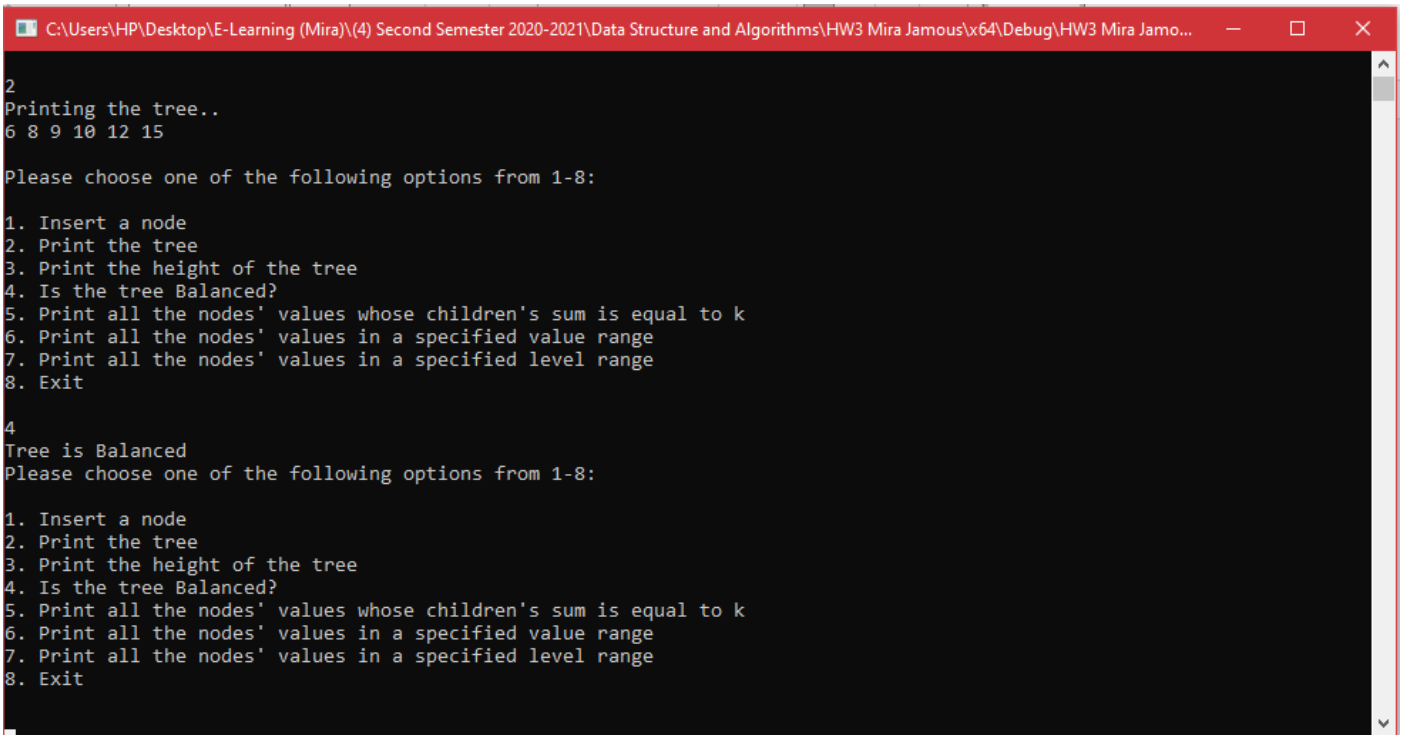
1. Insert a node
2. Print the tree
3. Print the height of the tree
4. Is the tree Balanced?
5. Print all the nodes' values whose children's sum is equal to k
6. Print all the nodes' values in a specified value range
7. Print all the nodes' values in a specified level range
8. Exit

2
Printing the tree..
6 8 9 10 12 15

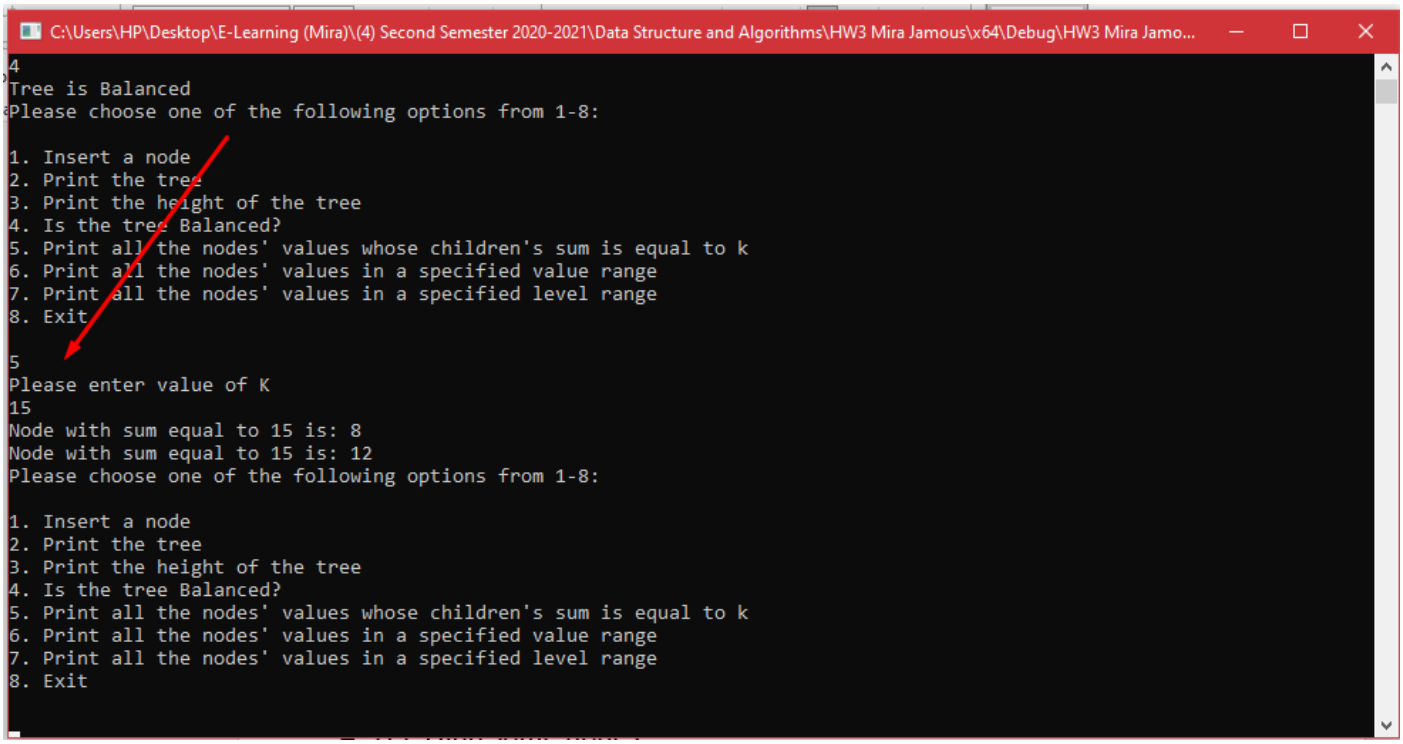
Please choose one of the following options from 1-8:

1. Insert a node
2. Print the tree
3. Print the height of the tree
4. Is the tree Balanced?
5. Print all the nodes' values whose children's sum is equal to k
6. Print all the nodes' values in a specified value range
7. Print all the nodes' values in a specified level range
8. Exit
```

3. When we test the balance function it should say that the tree is balanced because each node in the current tree has a balance factor of 0 or 1. The tree is balanced as you can see



4. Now I will test the function that finds the nodes whose children's sum is equal to k. I used k=15 as a test, it should print 8 and 12 since their children have a sum of 15. And it works.



5.Let's add some nodes. The nodes added are 1,2,11.

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C:\Users\HP\Desktop\E-Learning (Mira)\(4) Second Semester 2020-2021\Data Structure and Algorithms\HW3 Mira Jamous\x64\Debug\HW3 Mira Jamo...
Please enter the value of the node you want to enter
11
Please choose one of the following options from 1-8:

1. Insert a node
2. Print the tree
3. Print the height of the tree
4. Is the tree Balanced?
5. Print all the nodes' values whose children's sum is equal to k
6. Print all the nodes' values in a specified value range
7. Print all the nodes' values in a specified level range
8. Exit

1
Please enter the value of the node you want to enter
2
Please choose one of the following options from 1-8:

1. Insert a node
2. Print the tree
3. Print the height of the tree
4. Is the tree Balanced?
5. Print all the nodes' values whose children's sum is equal to k
6. Print all the nodes' values in a specified value range
7. Print all the nodes' values in a specified level range
8. Exit

1
Please enter the value of the node you want to enter
1
```
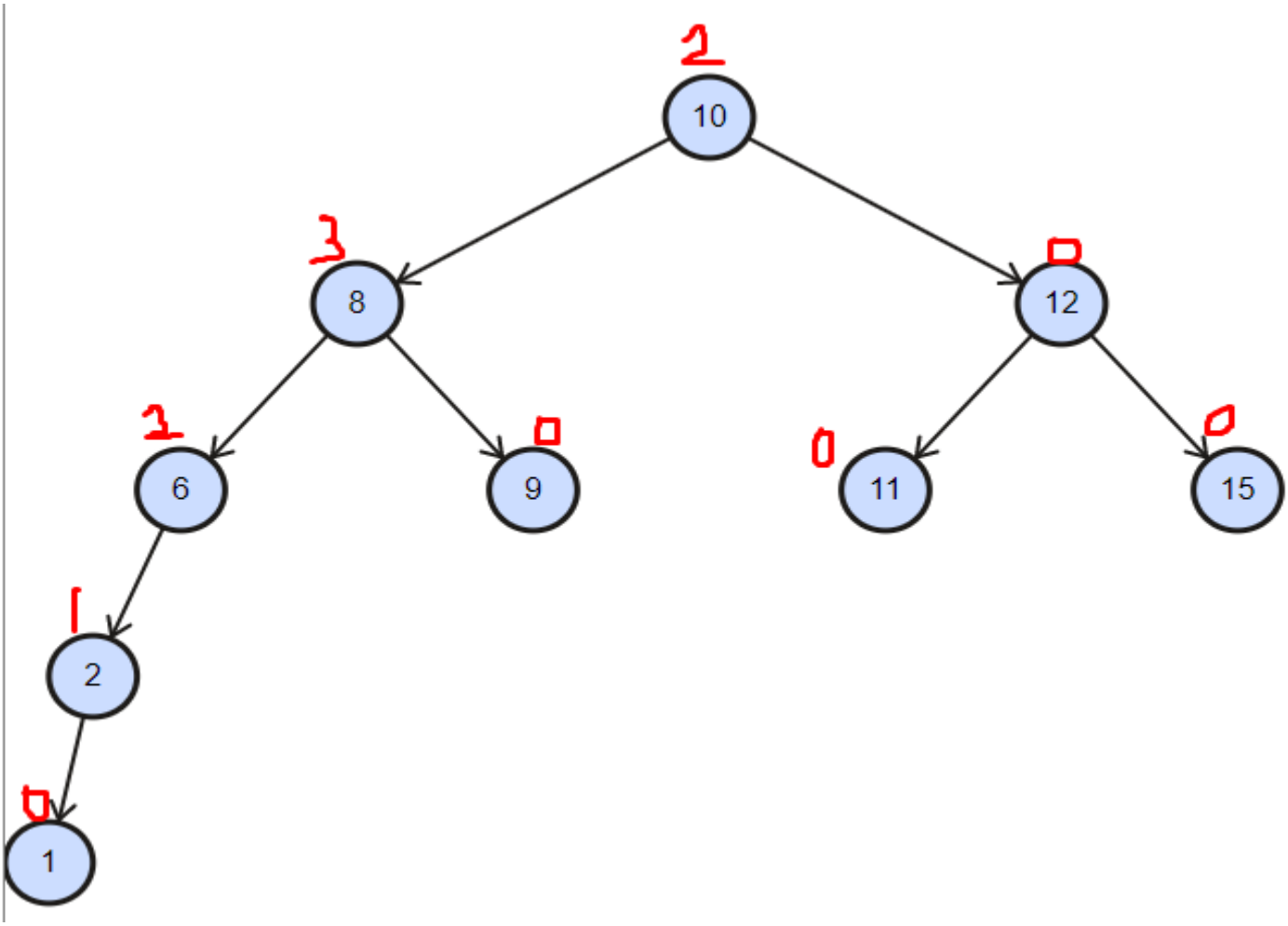
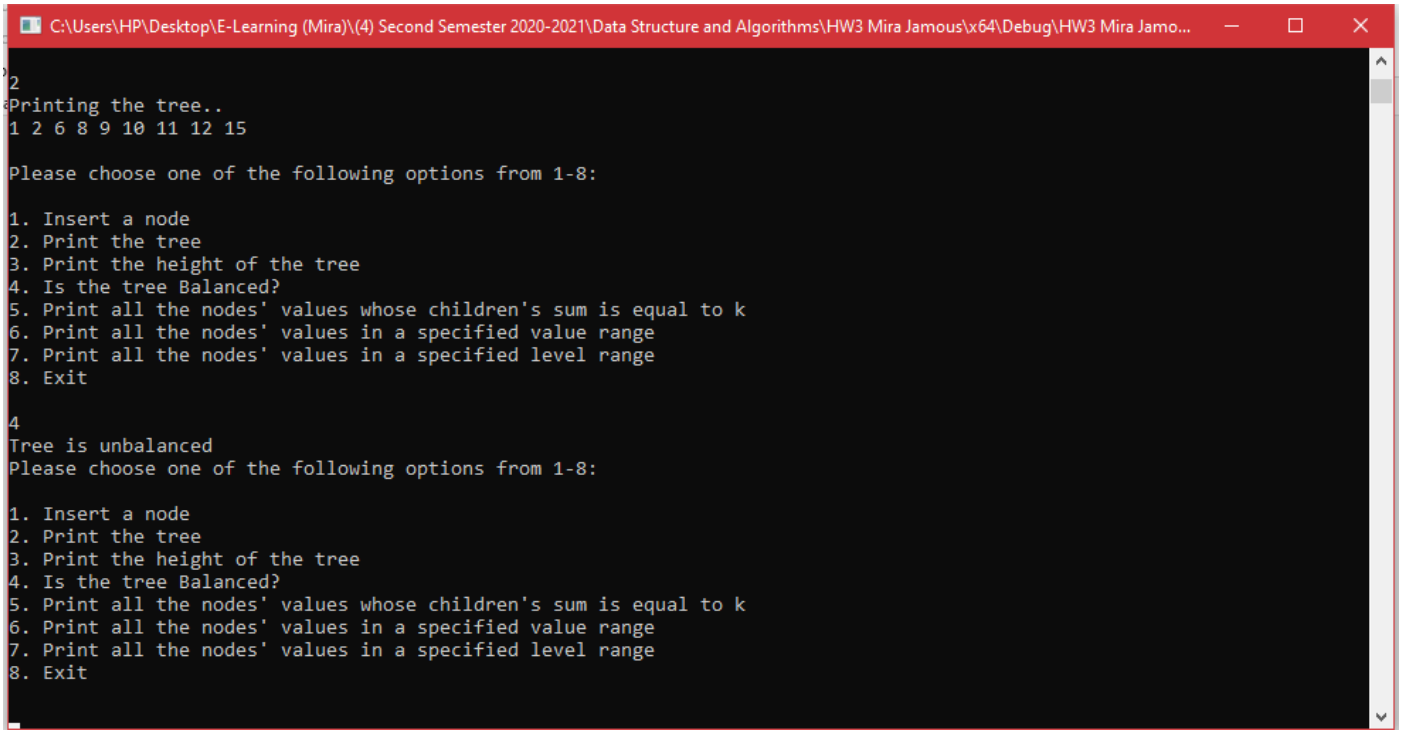
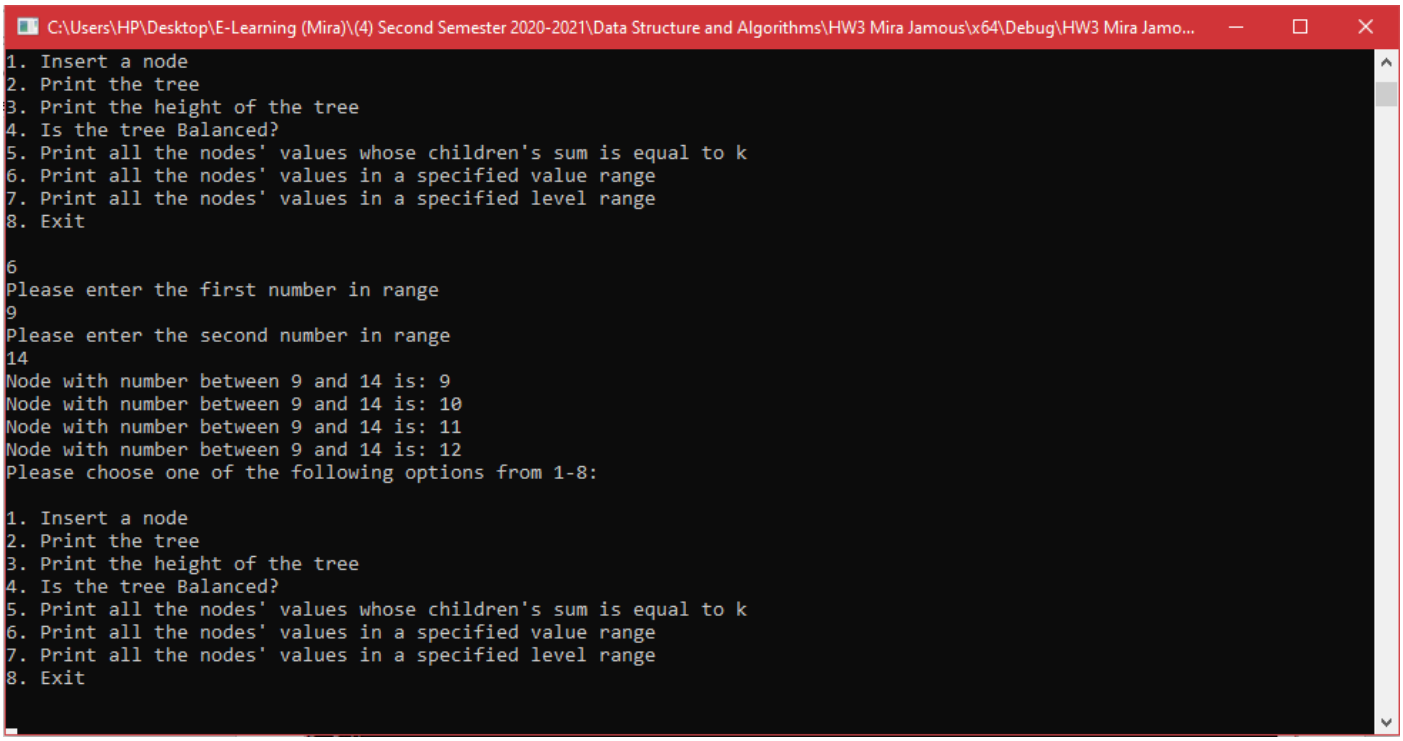

The tree looks like this now:



5.The tree now is unbalanced because as you can see in step 4 , the nodes 6,8, and 10 have a balance factor which is bigger than 1 therefore the tree is unbalanced. As you can see on the command screen, the tree is unbalanced

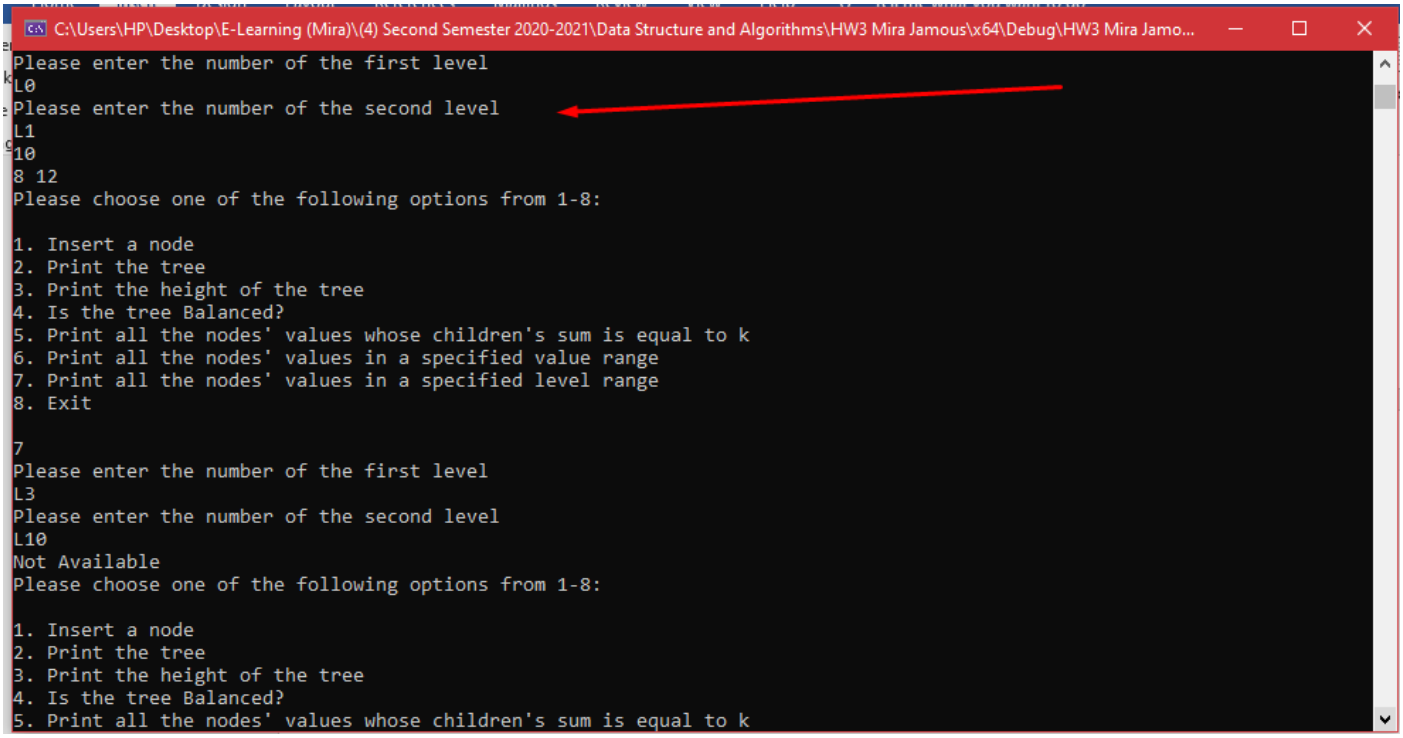


6.Let's see the nodes which have values in a specified range. Here the first value is 9 and the second value is 14. The nodes that fall in the range are 9,10,11,12,14. As you can see the command screen shows exactly what we expect.



7. Let's repeat step 6 but the range is levels.

a. First we'll see what nodes fall between Level0 and Level1. We got the expected result which is 10,8,12



b. Then we'll see what nodes fall between Level3 and Level10. It show not available because Level 10 doesn't exist