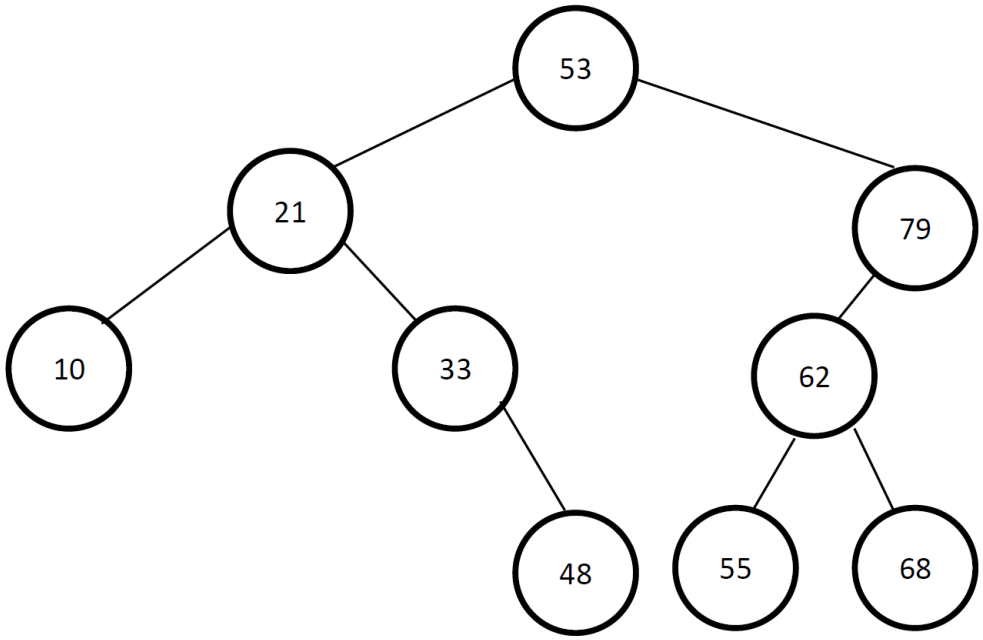
1. **Arithmetic Notation using Stack**
   a. **[LO 1 & LO 2, 10 points]** Given the following infix notation:
      (A + B) * (C / (D – E)) + F ^ G
      If your NIM is odd, convert the Infix notation above to **Postfix** notation using Stack.
      If your NIM is even, convert the Infix notation above to **Prefix** notation using Stack.

   b. **[LO 1 & LO 2, 10 points]** Given the following notations.
      If your NIM is odd, evaluate given **Prefix** notation using Stack:
      ***/*2+54^32-86**
      If your NIM is even, evaluate the given **Postfix** notation using Stack:
      37+5/23^13+-+

2.

[LO 1 & LO 2, 10 points] Given the current condition of the Binary Search Tree below.



Simulate the insertion process with the following values: **26**, **19**, and **75**.

Then, simulate the deletion process of the following values: **33** and **79** with:
- if your NIM is odd, left most child of right subtree approach
- If your NIM is even, right most child of left subtree approach

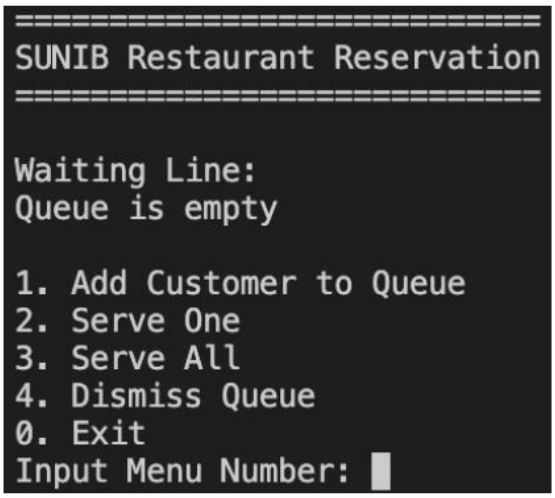
Draw the final result of the Binary Search Tree.

3.

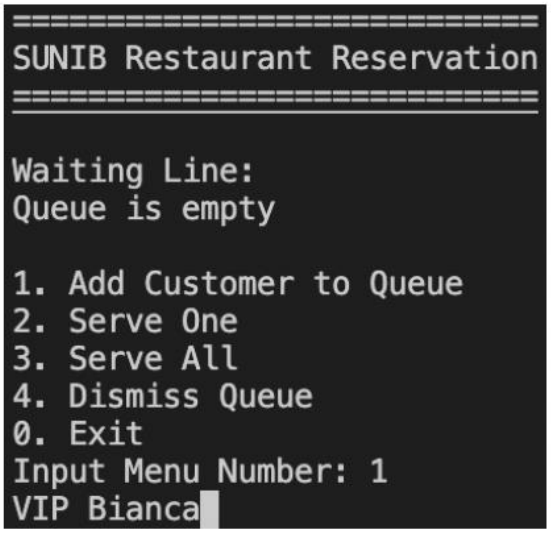
[LO 1, LO 2 & LO 3, 40 points] SUNIB restaurant wants to create a program to manage the queue reservation. You are asked to create the program with the following additional information:

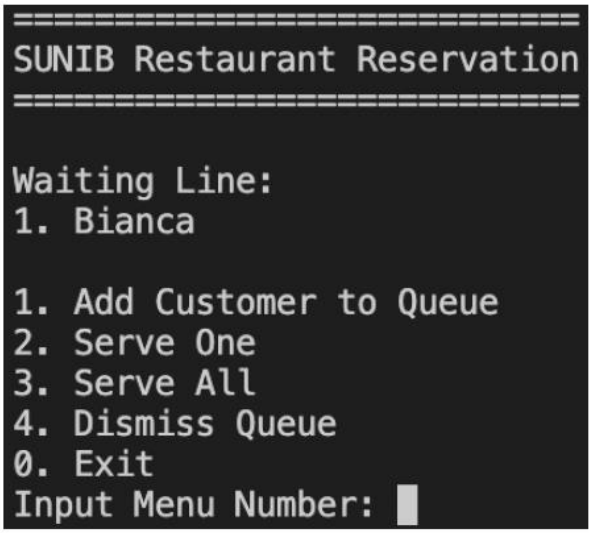
1. SUNIB restaurant manages the queue based on the membership system they have. The membership status is in the following order: VVIP, VIP, Member, and Guest.
2. If the customer has the same membership status, then it is First In First Serve.
3. There are five menus that have to be available in the program: Add Customer to Queue, Serve One, Serve All, Dismiss Queue, and Exit.
4. Add Customer to Queue à to add the customer along with the information to the queue. The customer information should be inputted in the following format: "[Membership Status] [Customer Name]"
5. Serve One à to call the first customer in line with the following statements:
   a. If membership is VVIP, "Attention! [customer-name] is being served at VVIP table."
   b. If membership is VIP, "Attention! [customer-name] is being served at the VIP table."
   c. If membership is Member, "Attention! Member [customer-name] is being served at regular table."
   d. If membership is Guest, "Attention! Guest [customer-name] is being served at a regular table."

   After serving a customer, pop or remove the customer from the queue line.
6. Serve All à to call all the remaining customers in line using the same statements at point 5 for each customer. Pop or remove all customers from the queue line.
7. Dismiss Queue à display "End of the day." and pop or remove all customers from queue line.
8. Exit à to exit the program.
9. When the main program is executed, the program will always display the waiting line conditions.
10. Run the menu by simply inputting the menu number.

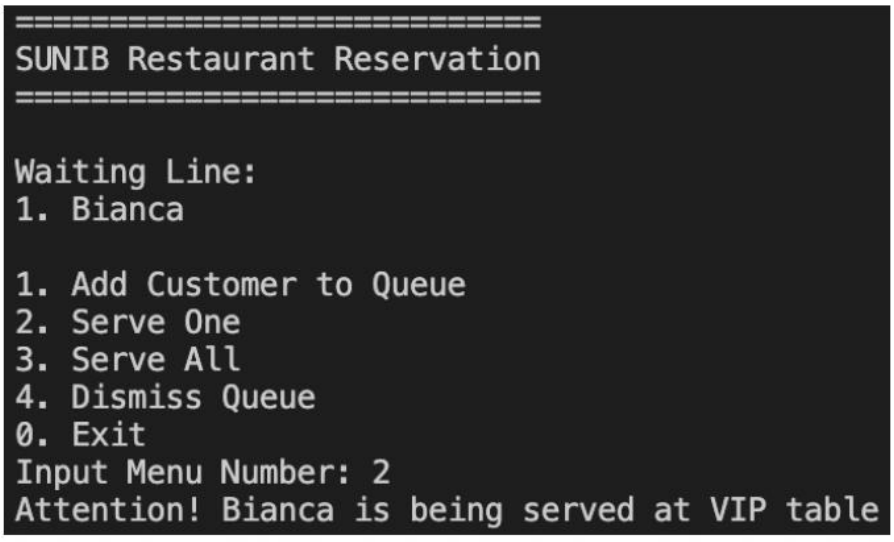


Sample Menu 1:





Sample Menu 2:



Sample Menu 3:

```
============================
SUNIB Restaurant Reservation
============================

Waiting Line:
1. Gilberto
2. Richard
3. Thanos

1. Add Customer to Queue
2. Serve One
3. Serve All
4. Dismiss Queue
0. Exit
Input Menu Number: 3
Attention! Gilberto is being served at VVIP table
Attention! Member Richard is being served at regular table
Attention! Member Thanos is being served at regular table
```

Sample Menu 4:

```
============================
SUNIB Restaurant Reservation
============================

Waiting Line:
1. James
2. Erick

1. Add Customer to Queue
2. Serve One
3. Serve All
4. Dismiss Queue
0. Exit
Input Menu Number: 4
End of the day!
```