

## 1. Testing PHBInsert using AVLTreePhoneNo

Input:

```
avlTreePhBook.PhbBInsert("Tina", "0000000030");
avlTreePhBook.PhbBInsert("Rosy", "1111113467");
avlTreePhBook.PhbBInsert("Isha", "4356789234");
avlTreePhBook.PhbBInsert("Alie", "2134567890");
avlTreePhBook.PhbBInsert("Dave", "8608302732");
avlTreePhBook.PhbBInsert("Jane", "6437890667");
avlTreePhBook.PhbBInsert("Zain", "7324456889");
avlTreePhBook.PhbBInsert("Sami", "9997778989");
avlTreePhBook.PhbBInsert("Cari", "3567892341");
```

Output:

Printing AVL Tree after inserting using AVLTreePhoneNo:

```
Name: Tina, Phone Number: 0000000030
Name: Rosy, Phone Number: 1111113467
Name: Alie, Phone Number: 2134567890
Name: Cari, Phone Number: 3567892341
Name: Isha, Phone Number: 4356789234
Name: Jane, Phone Number: 6437890667
Name: Zain, Phone Number: 7324456889
Name: Dave, Phone Number: 8608302732
Name: Sami, Phone Number: 9997778989
```

## 2. Testing PHBInsert using AVLTreeName

Input:

```
avlTreePhBook.PhbBInsert("Tina", "0000000030");  
avlTreePhBook.PhbBInsert("Rosy", "1111113467");  
avlTreePhBook.PhbBInsert("Isha", "4356789234");  
avlTreePhBook.PhbBInsert("Alie", "2134567890");  
avlTreePhBook.PhbBInsert("Dave", "8608302732");  
avlTreePhBook.PhbBInsert("Jane", "6437890667");  
avlTreePhBook.PhbBInsert("Zain", "7324456889");  
avlTreePhBook.PhbBInsert("Sami", "9997778989");  
avlTreePhBook.PhbBInsert("Cari", "3567892341");
```

Output:

Printing AVL Tree after inserting using AVLTreeName:

Name: Alie, Phone Number: 2134567890  
Name: Cari, Phone Number: 3567892341  
Name: Dave, Phone Number: 8608302732  
Name: Isha, Phone Number: 4356789234  
Name: Jane, Phone Number: 6437890667  
Name: Rosy, Phone Number: 1111113467  
Name: Sami, Phone Number: 9997778989  
Name: Tina, Phone Number: 0000000030  
Name: Zain, Phone Number: 7324456889

### 3. Testing the Search method by PhoneNumber & Name

Input:

```
String searchPhoneNumber = "4356789234";
```

```
String searchedName = "Zain";
```

Output:

```
=====
Person name and phone number with searched phone number 4356789234 -> Name: Isha, Phone Number: 4356789234
Person name and phone number with searched name Zain -> Name: Zain, Phone Number: 7324456889
=====
```

---

Input:

*Searching a number that does not exist in the AVL Tree*

```
String searchPhoneNumber = "9999999999";
```

Output:

```
-----
The 9999999999 doesnt exist in the AVL Double Tree book
```

#### 4. PHBDelete Method

Input:

```
avlTreePhBook.PhbBDelete("Jane", "6437890667");
```

Output:

```

=====
Delete testing:(Jane, 6437890667)
Printing AVL Tree after deleting using AVLTreePhoneNo:

Name: Tina, Phone Number: 0000000030
Name: Rosy, Phone Number: 1111113467
Name: Alie, Phone Number: 2134567890
Name: Cari, Phone Number: 3567892341
Name: Isha, Phone Number: 4356789234
Name: Zain, Phone Number: 7324456889
Name: Dave, Phone Number: 8608302732
Name: Sami, Phone Number: 9997778989

Printing AVL Tree after deleting using AVLTree Name:

Name: Alie, Phone Number: 2134567890
Name: Cari, Phone Number: 3567892341
Name: Dave, Phone Number: 8608302732
Name: Isha, Phone Number: 4356789234
Name: Rosy, Phone Number: 1111113467
Name: Sami, Phone Number: 9997778989
Name: Tina, Phone Number: 0000000030
Name: Zain, Phone Number: 7324456889
=====

```

As seen in the output below, the new phonebook doesn't have Jane since I used the PhBDelete method to delete them.

- Then I tested a person Isha and a phone number that was already in phonebook and tried deleting it. Since, this isn't possible the method returned false as shown in the output below.

Input:

```
boolean testInsert = avlTreePhBook.PhbBInsert("Isha", "4356789234");
```

Output:

```
Testing can the method insert a person if the person exists in the AVL Tree?(True if it can & False if not:) false
```

Then I tested a person John and a phone number that was not in the phonebook and tried deleting it. Since, this isn't possible the method returned false as shown in the output below.

Input:

```
boolean testDelete = avlTreePhBook.PhbBDelete("John", "111111111");
```

Output:

```
Testing can the method delete a person if the person doesn't exist in the AVL Tree?(True if it can & False if not:) false
```

- **Person Class** - It implements Comparable Interface of type Person.
- **PhoneBook Interface** : A phonebook Interface of type Person created for abstraction and it has 4 methods: boolean PhbBInsert(String name, String

phoneNumber), boolean PhbBDelete(String name, String phoneNumber), Person PhbBPhoneSeach(String phoneNumber), Person PhbNameSeach(String name).

- **AVLTreeNode Class**: It is a helper Treenode class of type Person and used in both AVLs(AVLTreeName&AVLPhoneNo). It has 8 private fields - root, data , key, leftChild, rightChild,parent,balance, height
  - and it's getter and setter methods in order to have a more proper way of information hiding and encapsulation.
- **AVLTree class** is the parent class that is extended by AVLTreeName and AVLTreePhoneNo child classes
- **The AVLTreePhBook** class implements the **Phonebook interface**