**Assignment 02- Collection Framework**

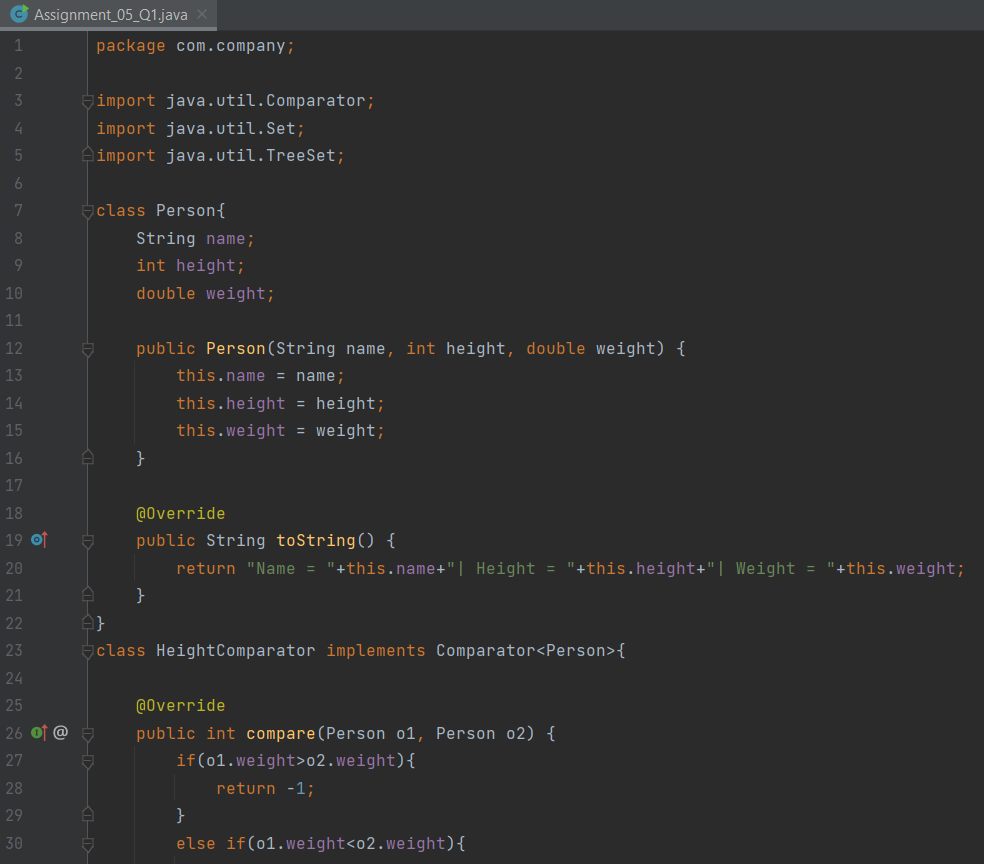
[**Q1**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2148)**. Write a class Person having weight, height & name. Create multiple person objects & print them in the sorted order. In the sorting order first sort based upon their weight & it two persons have same weight them sort them based upon their height. Use Tree Set.**

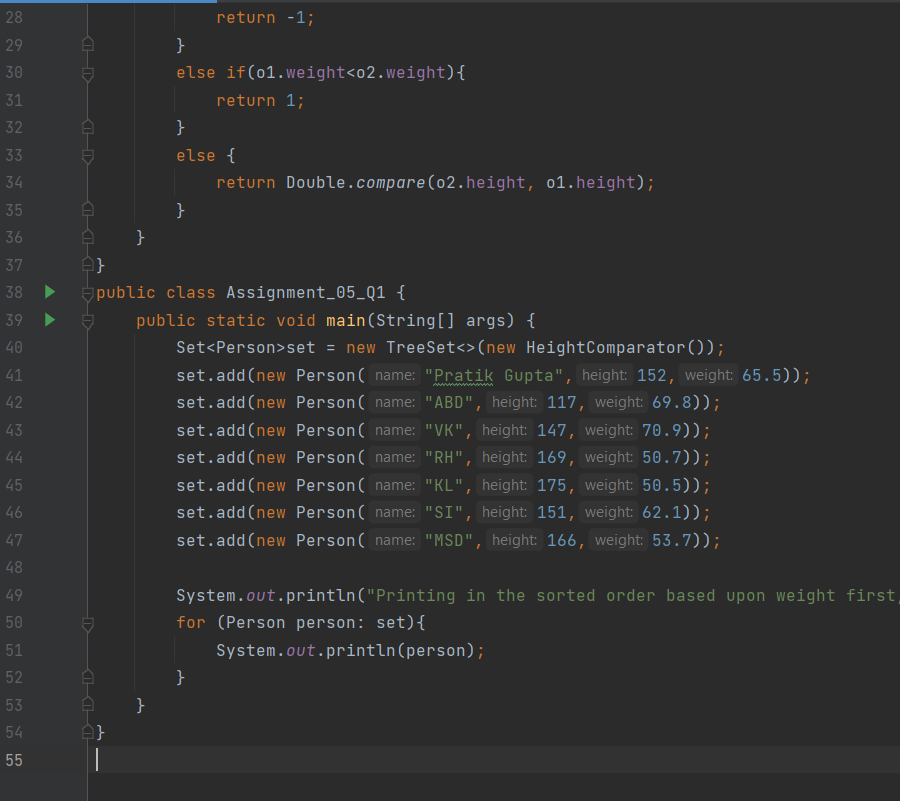
**Description:-**

Create Person class with variables weight and height. Create multiple person objects & print them in the sorted order based upon weight first if the weights are equal then based upon height. Use Tree Set.

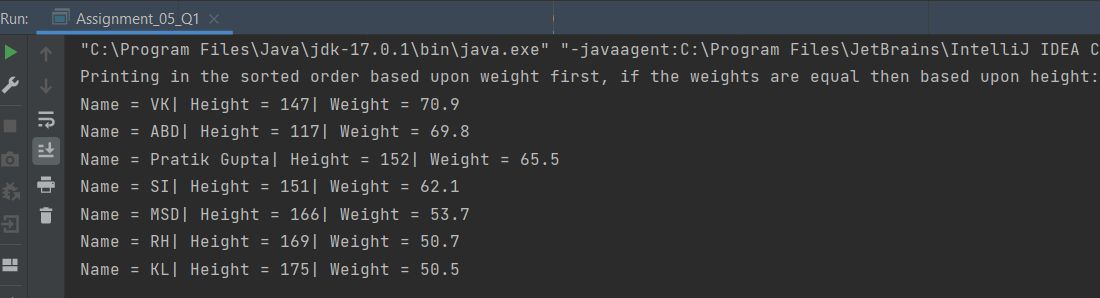
**Specifications:**

class Person{  
    private String name;  
    private int height;  
    private double weight;  
}  
  
public class Assignment3Q1 {  
    public static void main(String[] args) {}  
}





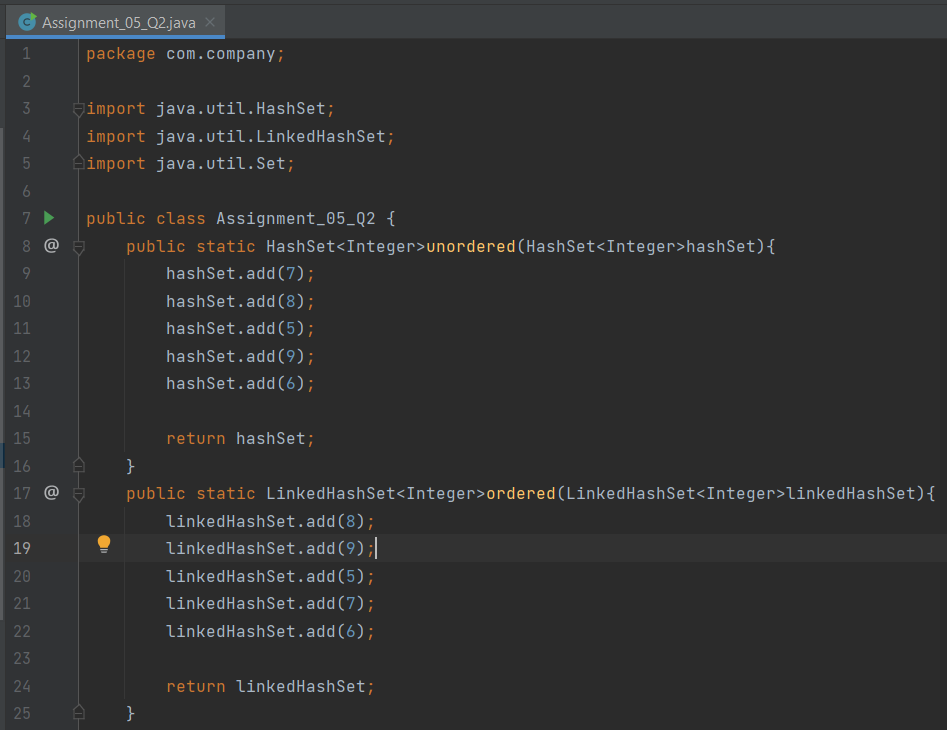
**OUTPUT :-**

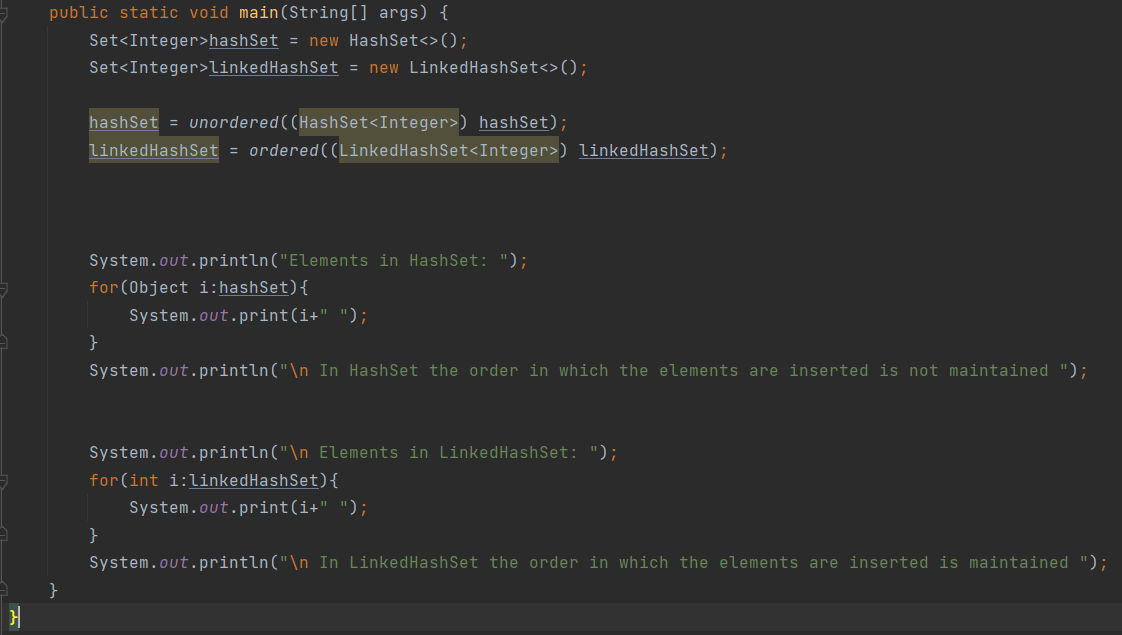
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[**Q2**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2156)**.  Prove that Hash Set is unordered & Linked Hash Set is ordered.**

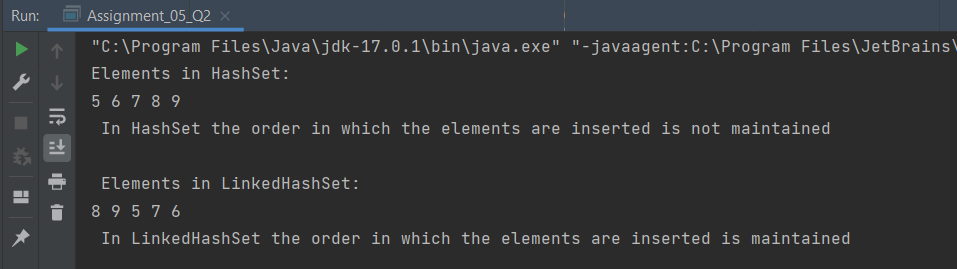
**Specifications:**

public class Assignment3Q2 {  
    public static void main(String[] args) { }  
    public static LinkedHashSet ordered(LinkedHashSet linkedHashSet){ }  
    public static HashSet unordered(HashSet hashSet){}  
}





**OUTPUT :-**



[**Q3**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2261)**. Create a ArrayList with few elements & print it in backward direction. Use ListIterator.**

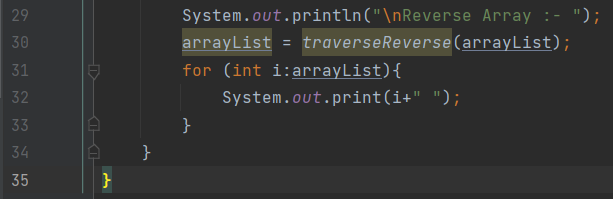
**Description:**

Write a program which consists of ArrayList which has some elements and print them in reverse direction.

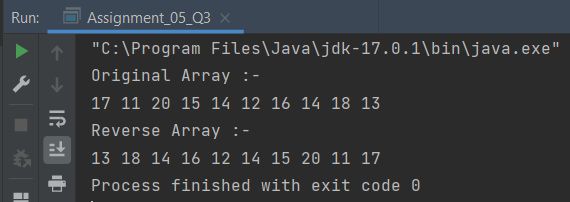
**Specifications:**

public class Assignment3Q3 {  
    public static List traverseReverse(ArrayList aList){}  
    public static void main(String[] args) {}  
}





**OUTPUT :-**



[**Q4**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2262)**. Write a program using Hashtable or HashMap where Date of birth is a key & Employee name as value. Design the class Date is such a way where the get method fails if two employees have same day & month of birth but birth year is different**.

**Description:-**

Using hash table or hash map write a program where key is date of birth and employee name is value and also the condition in the question should be satisfied.

**Specifications:**

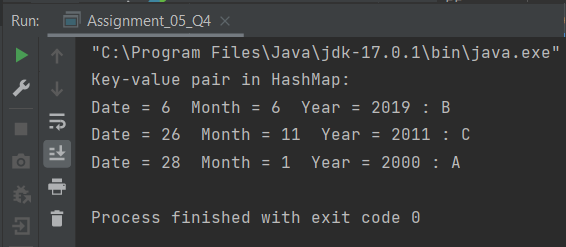
class DateClass {  
    private int date;  
    private int month;  
    private int year;  
}  
  
public class Assignment3Q4 {  
  
    public String getEmployee(HashMap<DateClass, String> dob,String employeeName){}  
    public static void main(String[] args) {}  
}







**OUTPUT :-**



[**Q5**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2153)**. Write a user defined class say Employee that overrides equals() & hashCode() methods. Equals() always returns true & hashCode() always returns a fixed number. Make such a class as key of you Hashtable. Observe the behavior while calling put & get methods.**

**Description:-**

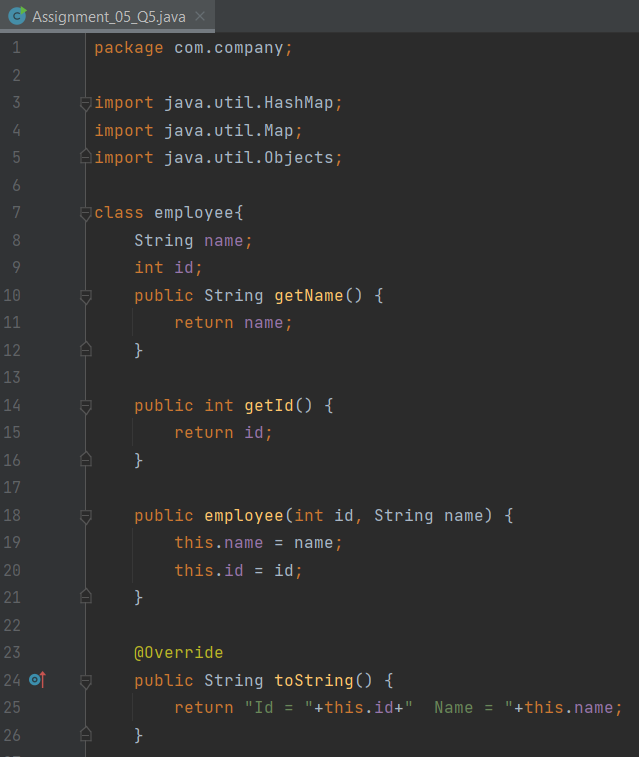
HashMap and HashSet use the hashcode value of an object to find out how the object would be stored in the collection, and subsequently hashcode is used to help locate the object in the collection. Hashing retrieval involves:

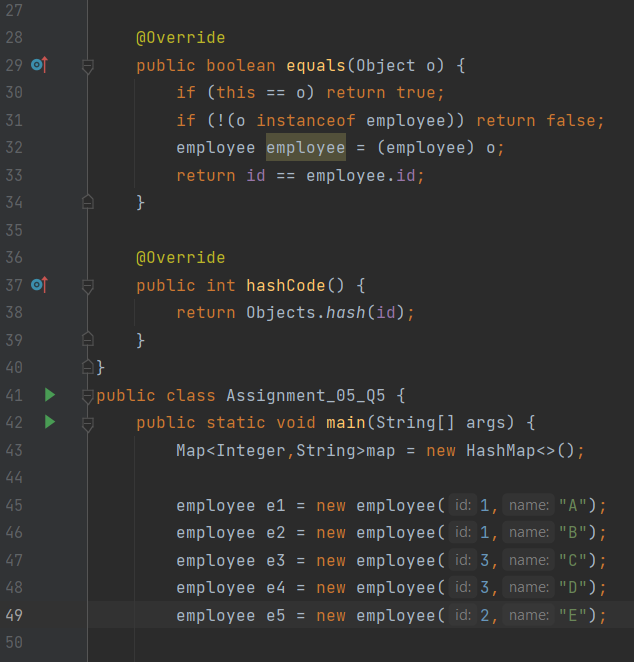
First, find out the right bucket using hashCode().

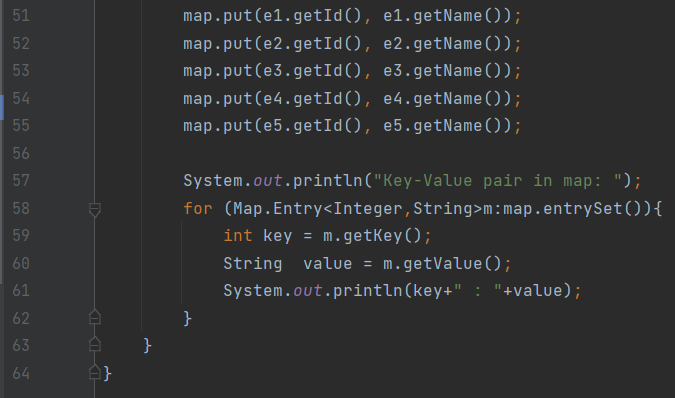
Secondly, search the bucket for the right element using equals().

**Specifications:**

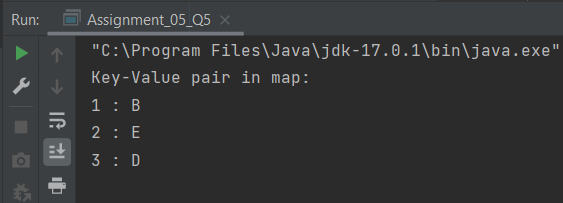
class Employee {  
    private String name;  
    private int id;  
}  
  
public class Assignment3Q5 {  
    public static void main(String[] args) {}  
}







**OUTPUT :-**

****

[**Q6**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2145)**. Implement the console based chatting using collections. Here are the options to be placed for to the user:**

**>java ChatApplication**

**Options:**

**A) Create a chatroom**

**B) Add the user**

**C) User login**

**D) Send a message**

**E) Display the messages from a specific chatroom**

**F) List down all users belonging to the specified chat room.**

**G) Logout**

**H) Delete an user**

**I) Delete the chat room.**

**Please enter your option:**

**Specifications:**

class Chatroom{  
    private String name;  
    private Set<String> username;  
    private List<String> messages;  
  
    {  
        name = "";  
        username = new HashSet<String>();  
        messages = new ArrayList<String>();  
    }  
    public boolean removeUser(String username) {  
    }  
}  
  
class User{  
  
    private String username;  
    private String password;  
    private String firstName;  
    private String lastName;  
}  
  
  
class ChatApplication{  
  
    private Map<String, Chatroom> chatrooms = new HashMap<String, Chatroom>();  
    private Map<String, User> users = new HashMap<String, User>();  
    private Set<String> loggedInUsers = new HashSet<String>();  
  
    public boolean isChatroomNameValid(String name) {}  
  
    public boolean isUsernameExists(String username) {}  
  
    public boolean authenticateUser(String username, String password) {}  
  
    //UI Methods Below  
    public void createChatroom() {}  
  
    public void addNewUser() {}  
  
    public boolean login() {}  
  
    public void sendMessage() {}  
    public void printMessages() {}  
  
    public void listUsersFromChatroom() {}  
  
    public void logout(){}  
  
    public void deleteUser(){}  
  
  
    public void menu() {}  
}  
  
public class Assignment3Q6{  
    public static void main(String[] args){}  
}

[**Q7**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2169)**. There is parking slot available in R-Mall with 3 floors; each floor has 4 sections and each section can maximum park 20 cars. You need to design one application which will maintain all car details in such way when a car owner arrives to collect his care your application should provide details including where it is located.**

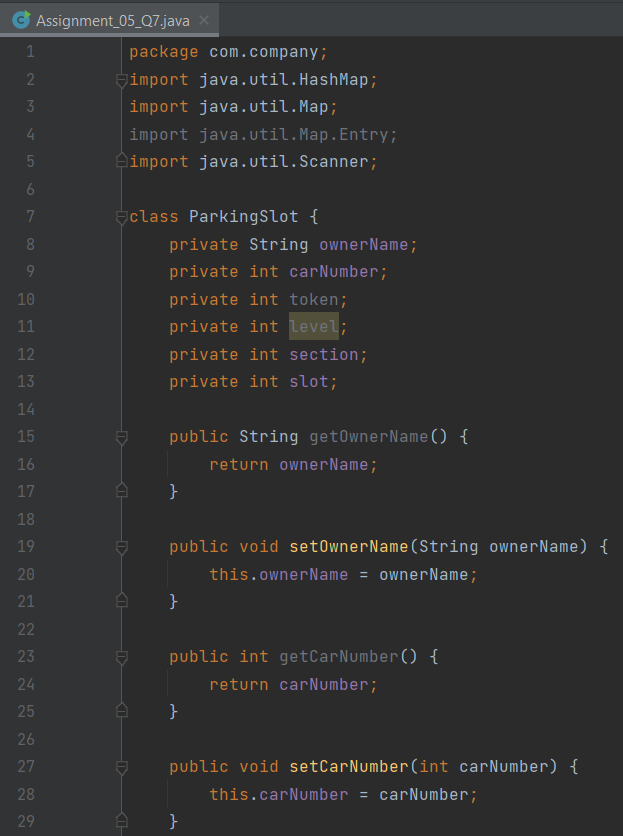
**a. Create class Parked\_CarOwner\_Details which will have field’s owerName, carModel, carNO, owerMobileNo, owerAddress with setter and getter methods.**

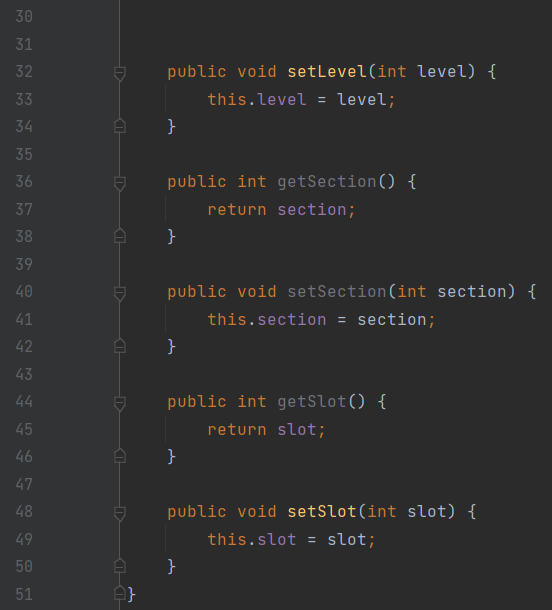
**b. Create class Parked\_CarOwenerList which will have method’s int add\_new\_car(Parked\_CarOwner\_Details obj), remove\_car(), get\_parked\_car\_location(token).**

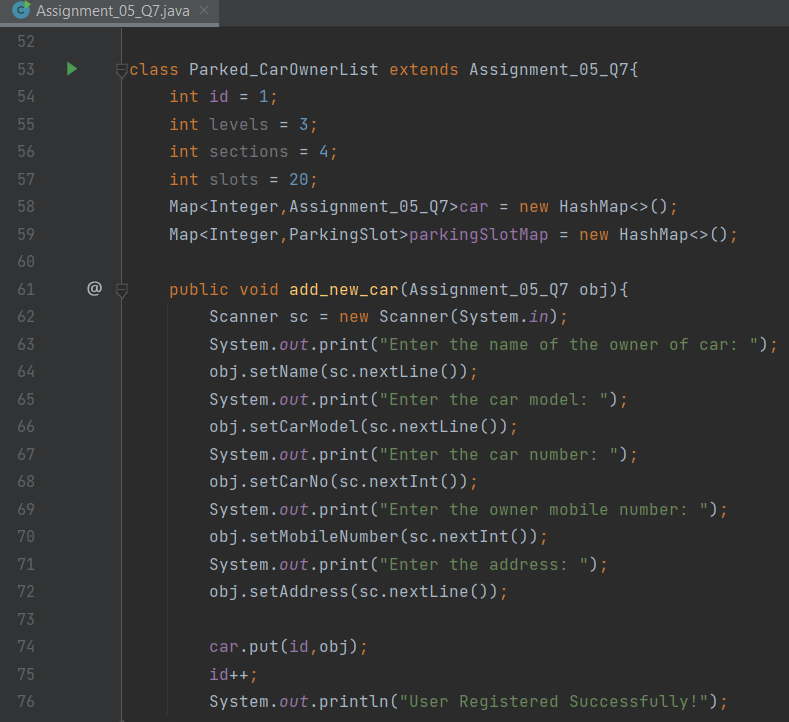
**Specifications:**

class ParkingSlot {  
    private String ownerName;  
    private int carNumber;  
    private int token;  
    private int level;  
    private int section;  
    private int slot;  
}  
  
class Parked\_CarOwenerList {  
    int levels = 3;  
    int sections = 4;  
    int slots = 20;  
    public void add\_new\_car(Assignment3Q7 obj){}  
    public void remove\_car(String name,int carNo){}  
    public String get\_parked\_car\_location(int token){}  
}  
  
public class Assignment3Q7 {  
    private String name;  
    private String carModel;  
    private int carNo;  
    private int mobileNumber;  
    private String address;

    public static void main(String[] args) {}  
}



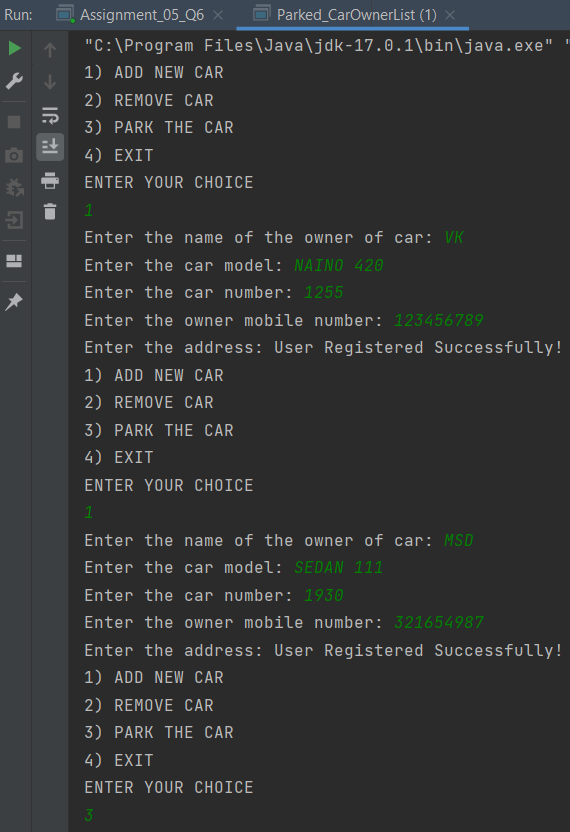


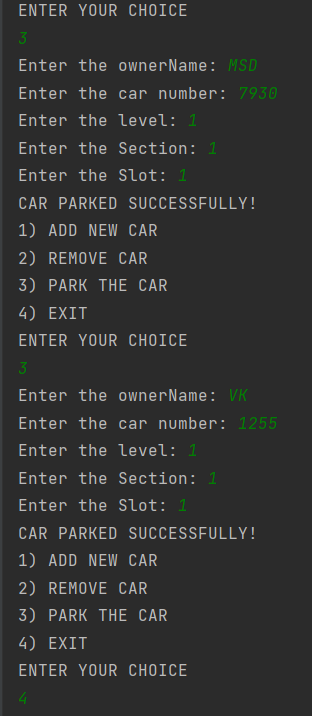




System.*out*.print("Enter the Slot: ");  
 parkingSlot.setSlot(sc.nextInt());  
  
 parkingSlotMap.put(token,parkingSlot);  
 return "CAR PARKED SUCCESSFULLY!";  
 }  
}  
  
public class Assignment\_05\_Q7 {  
 String name;  
 String carModel;  
 int carNo;  
 int mobileNumber;  
 String address;  
  
 public String getName() {  
 return name;  
 }  
  
 public void setName(String name) {  
 this.name = name;  
 }  
  
  
 public void setCarModel(String carModel) {  
 this.carModel = carModel;  
 }  
  
 public int getCarNo() {  
 return carNo;  
 }  
  
 public void setCarNo(int carNo) {  
 this.carNo = carNo;  
 }  
  
 public void setMobileNumber(int mobileNumber) {  
 this.mobileNumber = mobileNumber;  
 }  
  
 public void setAddress(String address) {  
 this.address = address;  
 }  
  
 public void menu(){  
 Parked\_CarOwnerList parked\_carOwenerList = new Parked\_CarOwnerList();  
 Scanner sc = new Scanner(System.*in*);  
 int choice;  
 do{  
 System.*out*.println("1) ADD NEW CAR");  
 System.*out*.println("2) REMOVE CAR");  
 System.*out*.println("3) PARK THE CAR");  
 System.*out*.println("4) EXIT");  
 System.*out*.println("ENTER YOUR CHOICE");  
 choice = sc.nextInt();  
 switch (choice){  
 case 1: parked\_carOwenerList.add\_new\_car(new Assignment\_05\_Q7());  
 break;  
 case 2: String name;  
 int number;  
 System.*out*.print("Enter the owner name: ");  
 name = sc.nextLine();  
 System.*out*.print("Enter the car number: ");  
 number = sc.nextInt();  
  
 parked\_carOwenerList.remove\_car(name,number);  
 break;  
 case 3:  
 System.*out*.println(parked\_carOwenerList.get\_parked\_car\_location(101));  
 break;  
 case 4:  
 System.*exit*(0);  
  
 default:  
 System.*out*.println("PLEASE ENTER THE CORRECT CHOICE!!");  
 }  
 }while (choice!=4);  
 }  
 public static void main(String[] args) {  
 Assignment\_05\_Q7 obj = new Assignment\_05\_Q7();  
 obj.menu();  
 }  
}

OUTPUT :-





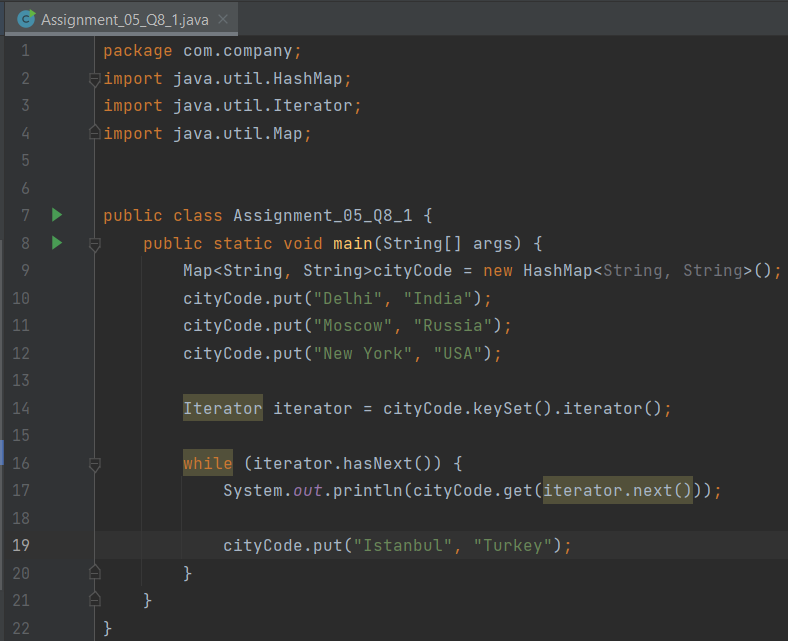
[**Q8**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2147)**.1.  Test fail-fast iterators within multithreaded environment. Note example of fail fast iterator is Vector, ArrayList, HashSet etc. And fail-safe is ConcurrentHashMap, CopyOnWriteArrayList etc.**

**Fail Fast:**

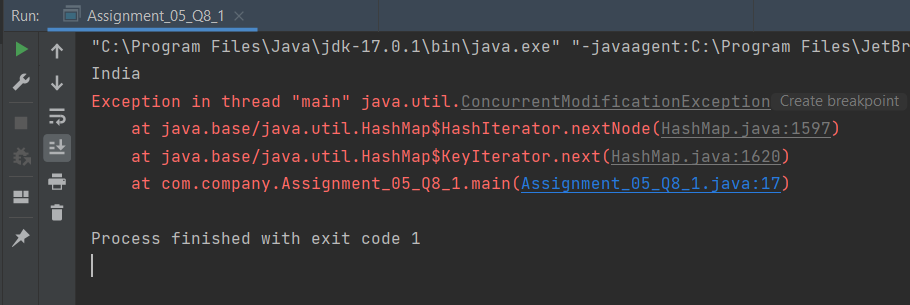
Iterators in java are used to iterate over the Collection objects.Fail-Fast iterators immediately throw ConcurrentModificationException if there is structural modification of the collection. Structural modification means adding, removing or updating any element from collection while a thread is iterating over that collection. Iterator on ArrayList, HashMap classes are some examples of fail-fast Iterator.

**Specifications:**

public class Assignment3Q8a {  
    public static void failFast(Map<String, String> cityCode){}  
    public static void main(String[] args) {}  
}



OUTPUT :-



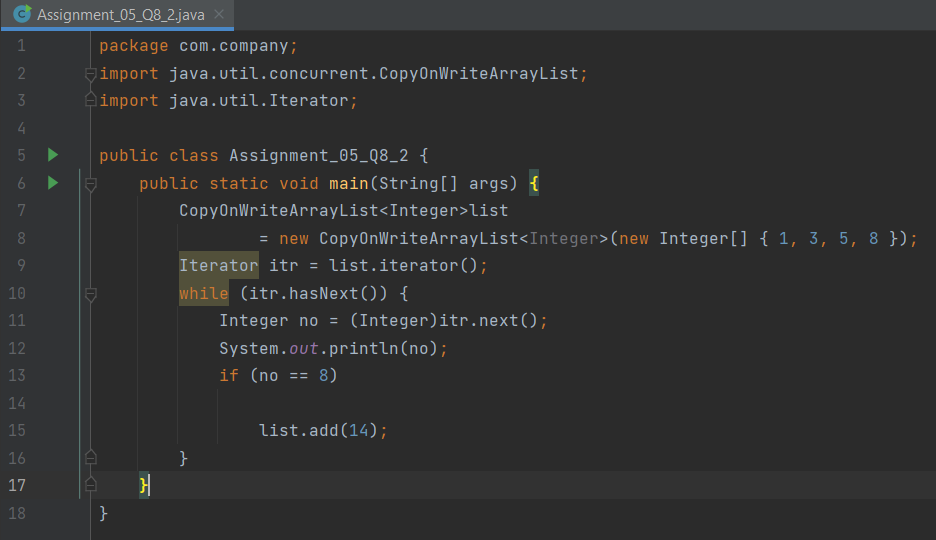
[**Q8**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2147)**.2. Test fail-safe iterators within multithreaded environment. Note example of fail fast iterator is Vector, ArrayList, HashSet etc. And fail-safe is ConcurrentHashMap, CopyOnWriteArrayList etc.**

**Fail Safe:**

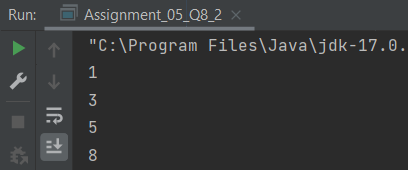
Fail-Safe iterators don’t throw any exceptions if a collection is structurally modified while iterating over it. This is because, they operate on the clone of the collection, not on the original collection and that’s why they are called fail-safe iterators. Iterator on CopyOnWriteArrayList, ConcurrentHashMap classes are examples of fail-safe Iterator.

**Specifications:**

public class Assignment3Q8b {  
    public static CopyOnWriteArrayList<Integer> failFast(CopyOnWriteArrayList<Integer> list){  
    }  
    public static void main(String args[]) {}  
}



OUTPUT :-



[**Q9**](https://adapt.in.capgemini.com/mod/vpl/view.php?id=2150)**. Create a Class SavingAccount with field’s acc\_balance, acc\_ID, accountHoldername, isSalaryAccount. Also add setter and getter methods with business method like withdraw and deposit.**

**a. Create class BankAccountList which will maintain SavingAccount objects. Ensure that this class should not allow duplicates as well as data should be displayed in sorted order. (as per acc\_ID)**

**Specifications:**

class SavingAccount {  
  
    private double acc\_balance;  
    private int acc\_ID;  
    private String accountHolderName;  
    private boolean isSalaryAccount;  
}  
  
class BankAccountList{  
  
    private TreeSet<SavingAccount> savingAccounts = new TreeSet<>();  
  
    public boolean addSavingAccount(SavingAccount savingAccount) {}  
  
    public List<Integer> displaySavingAccountIds() {}  
}  
  
public class Assignment3Q9 {  
    public static void main(String[] args) {}  
}

package com.company;  
import java.util.\*;  
  
class savingaccount {  
  
 private double acc\_balance;  
 private int acc\_ID;  
 private String accountHolderName;  
 private boolean isSalaryAccount;  
  
 public double getAcc\_balance() {  
 return acc\_balance;  
 }  
  
 public void setAcc\_balance(double acc\_balance) {  
 this.acc\_balance = acc\_balance;  
 }  
  
 public int getAcc\_ID() {  
 return acc\_ID;  
 }  
  
 public void setAcc\_ID(int acc\_ID) {  
 this.acc\_ID = acc\_ID;  
 }  
  
 public String getAccountHolderName() {  
 return accountHolderName;  
 }  
  
 public void setAccountHolderName(String accountHolderName) {  
 this.accountHolderName = accountHolderName;  
 }  
  
 public boolean isSalaryAccount() {  
 return isSalaryAccount;  
 }  
  
 public void setSalaryAccount(boolean salaryAccount) {  
 isSalaryAccount = salaryAccount;  
 }  
  
 public void withDraw(double amount){  
 if(this.acc\_balance<amount){  
 System.*out*.println("YOUR ACCOUNT HAS INSUFFICIENT BALANCE");  
 }  
 else{  
 this.acc\_balance-=amount;  
 System.*out*.println("MONEY WITHDRAWN SUCCESSFULLY");  
 System.*out*.println("ACCOUNT BALANCE = "+this.acc\_balance);  
 }  
 }  
 public void Deposit(double amount){  
 this.acc\_balance += amount;  
 System.*out*.println("MONEY ADDED SUCCESSFULLY");  
 System.*out*.println("ACCOUNT BALANCE = "+this.acc\_balance);  
 }  
}  
class accountComparator implements Comparator<savingaccount>{  
  
 @Override  
 public int compare(savingaccount o1, savingaccount o2) {  
 if(o1.getAcc\_ID()>o2.getAcc\_ID()){  
 return -1;  
 }  
 else if(o1.getAcc\_ID()<o2.getAcc\_ID()){  
 return 1;  
 }  
 else {  
 return 0;  
 }  
 }  
}  
  
  
class BankAccountList{  
  
 TreeSet<savingaccount>savingAccounts = new TreeSet<>(new accountComparator());  
  
 public boolean addSavingAccount(savingaccount savingAccount) {  
 Scanner sc = new Scanner(System.*in*);  
  
 System.*out*.println("Enter the Account Id: ");  
 savingAccount.setAcc\_ID(sc.nextInt());  
  
 System.*out*.println("Enter the Account holder name: ");  
 savingAccount.setAccountHolderName(sc.next());  
  
 System.*out*.println("Enter the Account Balance: ");  
 savingAccount.setAcc\_balance(sc.nextDouble());  
  
 System.*out*.println("Is Saving Account (Yes/No): ");  
 String accountType = sc.next();  
 if(accountType.toUpperCase().equals("YES")){  
 savingAccount.setSalaryAccount(true);  
 }  
 else{  
 savingAccount.setSalaryAccount(false);  
 }  
  
 savingAccounts.add(savingAccount);  
 System.*out*.println("ACCOUNT REGISTERED SUCCESSFULLY");  
 return true;  
 }  
  
 public List<Integer>displaySavingAccountIds() {  
 List<Integer>id = new ArrayList<>();  
  
 for(savingaccount savingaccount: savingAccounts){  
 id.add(savingaccount.getAcc\_ID());  
 }  
 return id;  
 }  
}  
  
  
public class Assignment\_05\_Q9 {  
 public static void main(String[] args) {  
 BankAccountList bankAccountList = new BankAccountList();  
 savingaccount savingaccount = new savingaccount();  
 Scanner sc = new Scanner(System.*in*);  
 int choice;  
 do{  
 System.*out*.println("1. ADD THE SAVING ACCOUNT");  
 System.*out*.println("2. DEPOSIT MONEY");  
 System.*out*.println("3. WITHDRAW MONEY");  
 System.*out*.println("4. DISPLAY THE SAVING ACCOUNT IDs");  
 System.*out*.println("ENTER YOUR CHOICE");  
 choice = sc.nextInt();  
 switch (choice){  
 case 1: bankAccountList.addSavingAccount(savingaccount);  
 break;  
  
 case 2:double amount;  
 System.*out*.println("Enter the amount to be deposit: ");  
 amount = sc.nextDouble();  
 savingaccount.Deposit(amount);  
 break;  
 case 3:  
 double amount1;  
 System.*out*.println("Enter the amount to be withdraw: ");  
 amount1 = sc.nextDouble();  
 savingaccount.withDraw(amount1);  
 break;  
 case 4: List<Integer>id = new ArrayList<>();  
 id = bankAccountList.displaySavingAccountIds();  
 System.*out*.println("Account Id: ");  
 for(Integer i: id){  
 System.*out*.println(i);  
 }  
 break;  
 case 5: System.*exit*(0);  
 default:  
 System.*out*.println("PLEASE ENTER THE VALID OPTION!");  
  
 }  
 }while (choice!=5);  
 }  
}

OUTPUT :-

