

LAB-9

OOPS

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Question1:

Develop a class "Contacts" with attributes first name, last name, organization, mobile number. Develop another class "ContactList" to hold all contacts of a user in the form of Contacts class objects and as an Array List. Now the user wants to display all the contacts in ascending order of first name or descending order of last name. Develop a suitable logic using Comparator interface to display contacts in requested order.

Code:

```
import java.io.*;
import java.lang.*;
import java.util.*;
class Contacts
{
    String firstname;
    String lastname;
    String organization;
    String mobno;
}
class ContactList
{
    ArrayList<Contacts>list=new ArrayList<>();
    public void addContact()
    {
        System.out.println();
        Contacts c=new Contacts();
        System.out.println("Enter first name:");
        c.firstname=line();
        System.out.println("Enter last name:");
```

```

c.lastname=line();
System.out.println("Enter Organization:");
c.organization=line();
System.out.println("Enter Mobile Number:");
c.mobno=line();
this.list.add(c);
System.out.println();
}
static String line()
{
Scanner sc=new Scanner(System.in);
String s=sc.nextLine();
return s;
}
public void displayAsc()
{
    System.out.println();
for(int i=0;i<this.list.size();i++)
{
System.out.println("Information of contact "+(i+1));
System.out.println("First name: "+this.list.get(i).firstname);
System.out.println("Last name: "+this.list.get(i).lastname);
System.out.println("Organization: "+this.list.get(i).organization);
System.out.println("Mobile Number: "+this.list.get(i).mobno);
System.out.println();
}
}
public void displayDesc()
{
    System.out.println();
for(int i=this.list.size()-1;i>=0;i--)
{

```

```

System.out.println("Information of contact "+(this.list.size()-i));
System.out.println("First name: "+this.list.get(i).firstname);
System.out.println("Last name: "+this.list.get(i).lastname);
System.out.println("Organization: "+this.list.get(i).organization);
System.out.println("Mobile Number: "+this.list.get(i).mobno);
System.out.println();
}
}
}
public class ContactOrder
{
public static void main(String args[])
{
int b=0;
ContactList cl=new ContactList();
while(b==0)
{
System.out.println();
System.out.println("Enter your choice of number to the following
action:");
System.out.println("1 to add a contact");
System.out.println("2 to display all contacts in ascending order of
first name and exit");
System.out.println("3 to display all contacts in descending order of
last name and exit");
int k=integer();
if(k==1)
{
cl.addContact();
}
else if(k==2)
{
Collections.sort(cl.list, new sortByFirstname());
}
}
}
}

```

```

cl.displayAsc();
b=1;
}
else if(k==3)
{
Collections.sort(cl.list, new sortByLastname());
cl.displayDesc();
b=1;
}
}
}
static int integer()
{
Scanner sc=new Scanner(System.in);
int a=sc.nextInt();
return a;
}
}
class sortByFirstname implements Comparator<Contacts>
{
public int compare(Contacts c1,Contacts c2)
{
return c1.firstname.compareTo(c2.firstname);
}
}
class sortByLastname implements Comparator<Contacts>
{
public int compare(Contacts c1,Contacts c2)
{
return c1.lastname.compareTo(c2.lastname);
}
}

```

Output :

```
C:\Users\MAJJIGA JASWANTH\Desktop\java>javac ContactOrder.java

C:\Users\MAJJIGA JASWANTH\Desktop\java>java ContactOrder

Enter your choice of number to the following action:
1 to add a contact
2 to display all contacts in ascending order of first name and exit
3 to display all contacts in descending order of last name and exit
1

Enter first name:
Majjiga
Enter last name:
Jaswanth
Enter Organization:
Vitap
Enter Mobile Number:
9959860037

Enter your choice of number to the following action:
1 to add a contact
2 to display all contacts in ascending order of first name and exit
3 to display all contacts in descending order of last name and exit
1

Enter first name:
Leon
Enter last name:
Chrono
Enter Organization:
FF
Enter Mobile Number:
7842251005
```

```
Enter your choice of number to the following action:
1 to add a contact
2 to display all contacts in ascending order of first name and exit
3 to display all contacts in descending order of last name and exit
1

Enter first name:
K
Enter last name:
SHMR
Enter Organization:
Ind
Enter Mobile Number:
9703464471

Enter your choice of number to the following action:
1 to add a contact
2 to display all contacts in ascending order of first name and exit
3 to display all contacts in descending order of last name and exit
1

Enter first name:
Mohammad
Enter last name:
Umair
Enter Organization:
Narayana
Enter Mobile Number:
8528528521
```

```
Enter your choice of number to the following action:
1 to add a contact
2 to display all contacts in ascending order of first name and exit
3 to display all contacts in descending order of last name and exit
2

Information of contact 1
First name: K
Last name: SHMR
Organization: Ind
Mobile Number: 9703464471

Information of contact 2
First name: Leon
Last name: Chrono
Organization: FF
Mobile Number: 7842251005

Information of contact 3
First name: Majjiga
Last name: Jaswanth
Organization: Vitap
Mobile Number: 9959860037

Information of contact 4
First name: Mohammad
Last name: Umair
Organization: Narayana
Mobile Number: 8528528521

C:\Users\MAJJIGA JASWANTH\Desktop\java>
```

Question2:

Develop a class "Product" with attributes product id, product name, product price. Develop another class "ProductList" to hold all products of a shopping mall as Product objects and as a Linked List. Now the store manager wants to display the products either in ascending order of product names or descending order of product price. Develop a suitable logic using Comparator interface to display products in requested order.

Code:

```
import java.io.*;
import java.lang.*;
import java.util.*;

class Product
{
    int id;
    String name;
    double price;
    public double getPrice()
    {
        return this.price;
    }
}
```

```

}
}
class ProductList
{
    ArrayList<Product>list=new ArrayList<>();
    public void addProduct()
    {
        System.out.println();
        Product p=new Product();
        System.out.println("Enter product id:");
        p.id=integer();
        System.out.println("Enter product name:");
        p.name=line();
        System.out.println("Enter product price:");
        p.price=dbl();
        this.list.add(p);
        System.out.println();
    }
    static String line()
    {
        Scanner sc=new Scanner(System.in);
        String s=sc.nextLine();
        return s;
    }
    static int integer()
    {
        Scanner sc=new Scanner(System.in);
        int a=sc.nextInt();
        return a;
    }
    static double dbl()
    {

```

```
Scanner sc=new Scanner(System.in);
double d=sc.nextDouble();
return d;
}
public void displayAsc()
{
    System.out.println();
    for(int i=0;i<this.list.size();i++)
    {
        System.out.println("Information of product "+(i+1));
        System.out.println("Product ID: "+this.list.get(i).id);
        System.out.println("Product name: "+this.list.get(i).name);
        System.out.println("Product price: "+this.list.get(i).price);
        System.out.println();
    }
}
public void displayDesc()
{
    System.out.println();
    for(int i=this.list.size()-1;i>=0;i--)
    {
        System.out.println("Information of product "+(this.list.size()-i));
        System.out.println("Product ID: "+this.list.get(i).id);
        System.out.println("Product name: "+this.list.get(i).name);
        System.out.println("Product price: "+this.list.get(i).price);
        System.out.println();
    }
}
public class ProductOrder
{
    public static void main(String args[])
```



```
{
int b=0;
ProductList PL=new ProductList();
while(b==0)
{
System.out.println();
System.out.println("Enter your choice of number to the following
action:");
System.out.println("1 to add a product");
System.out.println("2 to display all products in ascending order of
product names and exit");
System.out.println("3 to display all contacts in descending order of
product prices and exit");
int k=integer();
if(k==1)
{
PL.addProduct();
}
else if(k==2)
{
Collections.sort(PL.list, new sortByName());
PL.displayAsc();
b=1;
}
else if(k==3)
{
Collections.sort(PL.list,Comparator.comparingDouble(Product::getPrice)
);
PL.displayDesc();
b=1;
}
}
```

```

}

static int integer()
{
Scanner sc=new Scanner(System.in);
int a=sc.nextInt();
return a;
}
}

class sortByName implements Comparator<Product>
{
public int compare(Product p1,Product p2)
{
return p1.name.compareTo(p2.name);
}
}
}

```

Output:

```

C:\Users\MAJJIGA JASWANTH\Desktop\java>javac ProductOrder.java
C:\Users\MAJJIGA JASWANTH\Desktop\java>java ProductOrder

Enter your choice of number to the following action:
1 to add a product
2 to display all products in ascending order of product names and exit
3 to display all contacts in descending order of product prices and exit
1

Enter product id:
85285
Enter product name:
Jaggery
Enter product price:
25

Enter your choice of number to the following action:
1 to add a product
2 to display all products in ascending order of product names and exit
3 to display all contacts in descending order of product prices and exit
1

Enter product id:
957468
Enter product name:
Lays
Enter product price:
20

Enter your choice of number to the following action:
1 to add a product
2 to display all products in ascending order of product names and exit
3 to display all contacts in descending order of product prices and exit
1

Enter product id:
45682
Enter product name:
KurKure
Enter product price:
30

```

```

Enter your choice of number to the following action:
1 to add a product
2 to display all products in ascending order of product names and exit
3 to display all contacts in descending order of product prices and exit
1

Enter product id:
74158
Enter product name:
Oreo
Enter product price:
40

Enter your choice of number to the following action:
1 to add a product
2 to display all products in ascending order of product names and exit
3 to display all contacts in descending order of product prices and exit
2

Information of product 1
Product ID: 85285
Product name: Jaggery
Product price: 25.0

Information of product 2
Product ID: 45682
Product name: KurKure
Product price: 30.0

Information of product 3
Product ID: 957468
Product name: Lays
Product price: 20.0

Information of product 4
Product ID: 74158
Product name: Oreo
Product price: 40.0

C:\Users\MAJJIGA JASWANTH\Desktop\java>_

```

Question3:

A mobile user can store the contacts with relevant information such as name, mobile number, mail id, organization. The user can add a new contact, remove a contact, display all contacts, and also can search for a contact. Develop a class to store the contacts and to perform the mentioned operations using HashMap key-value model.

Code:

```

import java.util.*;
import java.util.Map.Entry;

class Contacts
{
    String name;
    String mailId;
    String organization;
    String mobno;
    public String toString()

```

```

{
return "Name:"+name+" "+"Mail Id:"+mailId+"
"+"Organization:"+organization+" "+"Mobile Number:"+mobno+" ";
}
}
class ContactList
{
HashMap<Integer,Contacts>hp=new HashMap<>();
public void addContact()
{
    System.out.println();
    Contacts c=new Contacts();
    System.out.println("Enter name:");
    c.name=line();
    System.out.println("Enter mailId:");
    c.mailId=line();
    System.out.println("Enter Organization:");
    c.organization=line();
    System.out.println("Enter Mobile Number:");
    c.mobno=line();
    System.out.println("Enter a key for this contact: ");
    int k=integer();
    this.hp.put(k,c);
    System.out.println();
}
public void DeleteContact(int n)
{
    System.out.println();
    this.hp.remove(n);
    System.out.println();
}
public void displayContacts()

```

```

{
    System.out.println();
    for (Map.Entry<Integer,Contacts> e : this.hp.entrySet())
    {
        System.out.println(e.getValue()+"with key "+e.getKey());
    }
}

public void Search(int m)
{
    System.out.println();
    if(this.hp.containsKey(m))
    {
        System.out.println("Found");
        System.out.println(this.hp.get(m));
    }
    else
    {
        System.out.println("Not Found");
    }
    System.out.println();
}

static int integer()
{
    Scanner sc=new Scanner(System.in);
    int a=sc.nextInt();
    return a;
}

static String line()
{
    Scanner sc=new Scanner(System.in);
    String s=sc.nextLine();
    return s;
}

```

```

}
}
public class ContactsHashMap
{
public static void main(String args[])
{
int b=0;
ContactList CL=new ContactList();
while(b==0)
{
System.out.println("Enter your choice of number to the following
action:");
System.out.println("1 to add a contact");
System.out.println("2 to delete a contact");
System.out.println("3 to search for a contact");
System.out.println("4 to display all contacts and exit");
int k=integer();
if(k==1)
{
CL.addContact();
}
else if(k==2)
{
System.out.println("Enter the key of the contact to be
deleted.");
int key=integer();
CL.DeleteContact(key);
}
else if(k==3)
{
System.out.println("Enter the key of contact to be searched.");
int srch=integer();

```

```
CL.Search(srch);  
}  
else if(k==4)  
{  
CL.displayContacts();  
b=1;  
}  
}  
}  
static int integer()  
{  
Scanner sc=new Scanner(System.in);  
int a=sc.nextInt();  
return a;  
}  
static String line()  
{  
Scanner sc=new Scanner(System.in);  
String s=sc.nextLine();  
return s;  
}  
}
```

Output:

```
C:\Users\MAJJIGA JASWANTH\Desktop\java>javac ContactsHashMap.java
```

```
C:\Users\MAJJIGA JASWANTH\Desktop\java>java ContactsHashMap
```

```
Enter your choice of number to the following action:
```

- 1 to add a contact
- 2 to delete a contact
- 3 to search for a contact
- 4 to display all contacts and exit

```
1
```

```
Enter name:
```

```
leon
```

```
Enter mailId:
```

```
leon12@gmail.com
```

```
Enter Organization:
```

```
FF
```

```
Enter Mobile Number:
```

```
8888888888
```

```
Enter a key for this contact:
```

```
7
```

```
Enter your choice of number to the following action:
```

- 1 to add a contact
- 2 to delete a contact
- 3 to search for a contact
- 4 to display all contacts and exit

```
1
```

```
Enter name:
```

```
chrono
```

```
Enter mailId:
```

```
chronocr7@gmail.com
```

```
Enter Organization:
```

```
FFcr7
```

```
Enter Mobile Number:
```

```
7777777777
```

```
Enter a key for this contact:
```

```
2
```



```
Enter your choice of number to the following action:
1 to add a contact
2 to delete a contact
3 to search for a contact
4 to display all contacts and exit
1
```

```
Enter name:
ProMunna\
Enter mailId:
Munna@pro.proton.com
Enter Organization:
FFMunna
Enter Mobile Number:
7857458745
Enter a key for this contact:
3
```

```
Enter your choice of number to the following action:
1 to add a contact
2 to delete a contact
3 to search for a contact
4 to display all contacts and exit
1
```

```
Enter name:
Hisoka
Enter mailId:
Hisoka@gmail.com
Enter Organization:
FFHisoka
Enter Mobile Number:
8745874587
Enter a key for this contact:
4
```

```
Enter your choice of number to the following action:
1 to add a contact
2 to delete a contact
3 to search for a contact
4 to display all contacts and exit
2
Enter the key of the contact to be deleted.
3
```

```
Enter your choice of number to the following action:
1 to add a contact
2 to delete a contact
3 to search for a contact
4 to display all contacts and exit
3
Enter the key of contact to be searched.
4
```

```
Found
Name:Hisoka Mail Id:Hisoka@gmail.com Organization:FFHisoka Mobile Number:8745874587
```

```
Enter your choice of number to the following action:
1 to add a contact
2 to delete a contact
3 to search for a contact
4 to display all contacts and exit
4
```

```
Name:chrono Mail Id:chronocr7@gmail.com Organization:FFcr7 Mobile Number:7777777777 with key 2
Name:Hisoka Mail Id:Hisoka@gmail.com Organization:FFHisoka Mobile Number:8745874587 with key 4
Name:leon Mail Id:leon12@gmail.com Organization:FF Mobile Number:8888888888 with key 7
```

```
C:\Users\MAJJIGA JASWANTH\Desktop\java>
```

Question4:

In a super market, usually products are categorized into fancy, grocery, plastic, steel, etc. Each product falls under a single category. Each product is depicted by product id, product name, and product price. Develop "ProductList" class to hold all product objects of same category as a single "ProductList" object. Also develop a Key-Value model to represent product category and its relevant ProductList object using HashMap and display all products in the following format with suitable iterator:

Code:

```
import java.util.*;

class Product
{
    int id;
    String name;
    double price;
    public double getPrice()
    {
        return this.price;
    }
    public String toString()
    {
        return "Product Id:"+id+" | "+"Product name:"+name+" | "+"Product price:"+price;
    }
}

class ProductList
{
    ArrayList<Product>list=new ArrayList<>();
    public void addProduct()
    {
        System.out.println();
        Product p=new Product();
        System.out.println("Enter product id:");
        p.id=integer();
```

```
System.out.println("Enter product name:");
p.name=line();
System.out.println("Enter product price:");
p.price=dbl();
this.list.add(p);
System.out.println();
}
static String line()
{
Scanner sc=new Scanner(System.in);
String s=sc.nextLine();
return s;
}
static int integer()
{
Scanner sc=new Scanner(System.in);
int a=sc.nextInt();
return a;
}
static double dbl()
{
Scanner sc=new Scanner(System.in);
double d=sc.nextDouble();
return d;
}
public void displayProducts(int k)
{
String category;
if(k==1)
{
category="Fancy";
}
```

```

else if(k==2)
{
category="Grocery";
}
else if(k==3)
{
category="Plastic";
}
else if(k==4)
{
category="Steel";
}
else
{
category="Other";
}
for(int i=0;i<this.list.size();i++)
{
System.out.println(category+" | "+this.list.get(i));
}
}
}

public class ProductCategory
{
public static void main(String args[])
{
HashMap<Integer,ProductList>hm=new HashMap<>();
ProductList fancy=new ProductList();
ProductList grocery=new ProductList();
ProductList plastic=new ProductList();
ProductList steel=new ProductList();
ProductList other=new ProductList();

```

```
hm.put(1,fancy);
hm.put(2,grocery);
hm.put(3,plastic);
hm.put(4,steel);
hm.put(5,other);
int b=0;
while(b==0)
{
System.out.println();
System.out.println("Enter your choice of number to the following
action:");
System.out.println("1 to add a product");
System.out.println("2 to display all products of same category");
System.out.println("3 to exit");
int k=integer();
if(k==1)
{
System.out.println("Enter the category of the product.(1 for fancy,2
for grocery,3 for plastic,4 for steel,5 for other");
int cat=integer();
if(cat==1)
{
fancy.addProduct();
}
else if(cat==2)
{
grocery.addProduct();
}
else if(cat==3)
{
plastic.addProduct();
}
else if(cat==4)
```

```

{
steel.addProduct();
}
else if(cat==5)
{
other.addProduct();
}
}
else if(k==2)
{
System.out.println("Enter the category of the products to display.(1
for fancy,2 for grocery,3 for plastic,4 for steel,5 for other");
int ctgry=integer();
System.out.println();
if(hm.containsKey(ctgry))
{
hm.get(ctgry).displayProducts(ctgry);
}
else
{
System.out.println("No products category exist for the key given.");
}
}
else if(k==3)
{
System.out.println("Exited from the process.");
b=1;
}
}
}
static int integer()
{

```

```
Scanner sc=new Scanner(System.in);  
int a=sc.nextInt();  
return a;  
}  
}
```

Output:

```
C:\Users\MAJJIGA JASWANTH\Desktop\java>javac ProductCategory.java  
C:\Users\MAJJIGA JASWANTH\Desktop\java>java ProductCategory  
Enter your choice of number to the following action:  
1 to add a product  
2 to display all products of same category  
3 to exit  
1  
Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other  
1  
Enter product id:  
854712  
Enter product name:  
SunGlasses  
Enter product price:  
2000  
Enter your choice of number to the following action:  
1 to add a product  
2 to display all products of same category  
3 to exit  
1  
Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other  
1  
Enter product id:  
54871  
Enter product name:  
Watch  
Enter product price:  
12000  
Enter your choice of number to the following action:  
1 to add a product  
2 to display all products of same category  
3 to exit  
1  
Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other  
2
```

Enter product id:

5647

Enter product name:

VegetableOil

Enter product price:

99

Enter your choice of number to the following action:

1 to add a product

2 to display all products of same category

3 to exit

1

Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other

2

Enter product id:

823147

Enter product name:

Cheese

Enter product price:

120

Enter your choice of number to the following action:

1 to add a product

2 to display all products of same category

3 to exit

1

Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other

3

Enter product id:

5554478

Enter product name:

WaterBottle

Enter product price:

150

Enter your choice of number to the following action:

- 1 to add a product
- 2 to display all products of same category
- 3 to exit

1

Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
3

Enter product id:

95846

Enter product name:

Bucket

Enter product price:

964

Enter your choice of number to the following action:

- 1 to add a product
- 2 to display all products of same category
- 3 to exit

1

Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
4

Enter product id:

54218

Enter product name:

StainLessSteelGlass

Enter product price:

2000

Enter your choice of number to the following action:

- 1 to add a product
- 2 to display all products of same category
- 3 to exit

1

Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
4

Enter product id:

78547

Enter product name:

NonStickPan

Enter product price:

1000

Enter your choice of number to the following action:

- 1 to add a product
- 2 to display all products of same category
- 3 to exit

1

Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
5

Enter product id:

7852369

Enter product name:

FlowerPots

Enter product price:

1521

Enter your choice of number to the following action:

- 1 to add a product
- 2 to display all products of same category
- 3 to exit

1

Enter the category of the product.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
4

Enter product id:

563214

Enter product name:

Aquarium

Enter product price:

78541

Enter your choice of number to the following action:

- 1 to add a product
- 2 to display all products of same category
- 3 to exit

2

Enter the category of the products to display.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
1

Fancy | Product Id:854712 | Product name:SunGlasses | Product price:2000.0

Fancy | Product Id:54871 | Product name:Watch | Product price:12000.0

```
Enter your choice of number to the following action:
1 to add a product
2 to display all products of same category
3 to exit
2
Enter the category of the products to display.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
2
Grocery | Product Id:5647 | Product name:VegetableOil | Product price:99.0
Grocery | Product Id:823147 | Product name:Cheese | Product price:120.0

Enter your choice of number to the following action:
1 to add a product
2 to display all products of same category
3 to exit
2
Enter the category of the products to display.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
3
Plastic | Product Id:5554478 | Product name:WaterBottle | Product price:150.0
Plastic | Product Id:95846 | Product name:Bucket | Product price:964.0

Enter your choice of number to the following action:
1 to add a product
2 to display all products of same category
3 to exit
2
Enter the category of the products to display.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
4
Steel | Product Id:54218 | Product name:StainLessSteelGlass | Product price:2000.0
Steel | Product Id:78547 | Product name:NonStickPan | Product price:1000.0
Steel | Product Id:563214 | Product name:Aquarium | Product price:78541.0

Enter your choice of number to the following action:
1 to add a product
2 to display all products of same category
3 to exit
2

Enter the category of the products to display.(1 for fancy,2 for grocery,3 for plastic,4 for steel,5 for other
5
Other | Product Id:7852369 | Product name:FlowerPots | Product price:1521.0

Enter your choice of number to the following action:
1 to add a product
2 to display all products of same category
3 to exit
3
Exited from the process.

C:\Users\MAJJIGA JASWANTH\Desktop\java>
```