Name of Student: Pushkar Prasad Sane		
Roll Number: 45		**Lab Assignment Number:** 1
Title of Lab Assignment: Assignment based on Collection.		
DOP: 23-08-2023		**DOS:** 06-09-2023
CO Mapped: **CO1, CO2**	**PO Mapped:** **PO1, PO2, PO3, PSO1**	**Signature:**

PRACTICAL 1

Aim:

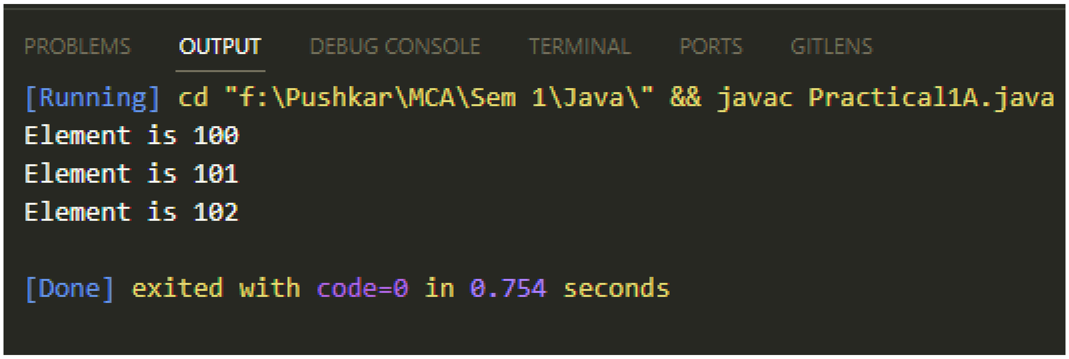
1) List Interface

A) Create an ArrayList of type Integer, add elements into it, traverse the arraylist and print the elements.

Code:

```
package demo;
import java.util.ArrayList;
import java.util.Iterator;
public class demo{
        public static void main(String args[]) {
                ArrayList<Integer> arr = new ArrayList <Integer>();
                arr.add(100);
                arr.add(101);
                arr.add(102);
                Iterator<Integer> itr = arr.iterator();
                while(itr.hasNext()) {
                        System.out.println("Element is "+ itr.next());
                }
        }
}
```

Output:



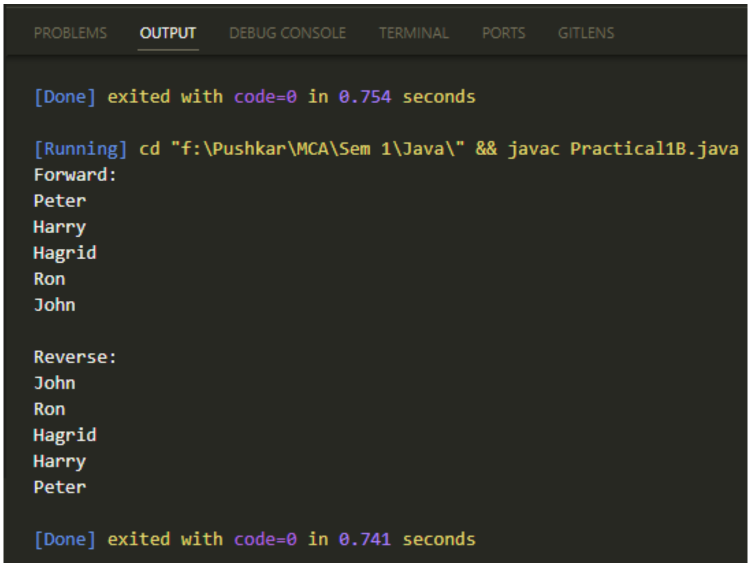
```
[Running] cd "f:\Pushkar\MCA\Sem 1\Java\" && javac Practical1A.java
Element is 100
Element is 101
Element is 102

[Done] exited with code=0 in 0.754 seconds
```

B) Create a LinkedList of type String, add 5 elements and traverse the list from both sides.

Code:

```
package demo;
import java.util.*;
public class demo{
        public static void main(String args[]) {
                LinkedList<String> al1 = new LinkedList<String>();
                al1.add("Peter");
                al1.add("Harry");
                al1.add("Hagrid");
                al1.add("Ron");
                al1.add("John");
                System.out.println("Forward:");
                ListIterator<String> itr = al1.listIterator();
                while(itr.hasNext()) {
                        System.out.println(itr.next());
                }
                System.out.println("\nReverse:");
                while(itr.hasPrevious()) {
                        while(itr.hasPrevious()) {
                                System.out.println(itr.previous());
                        }
                }
        }
}
```

Output:



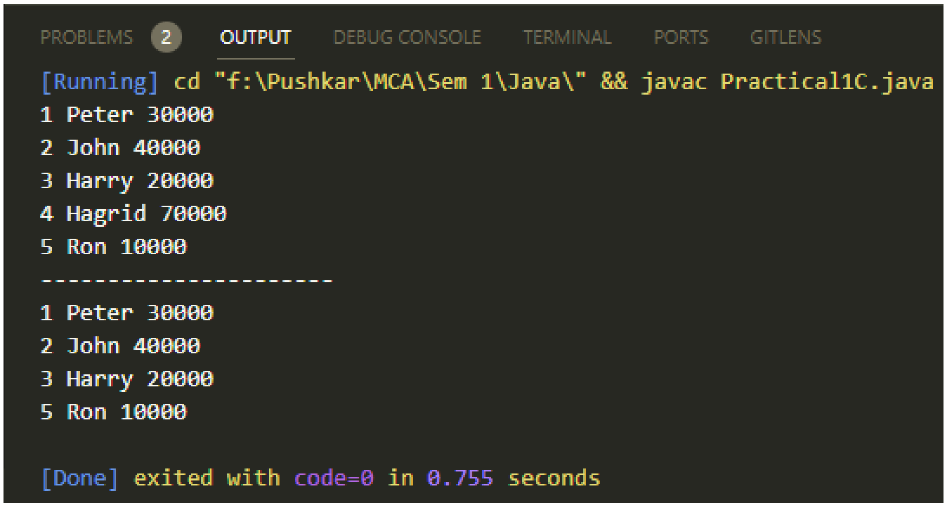
```
[Done] exited with code=0 in 0.754 seconds

[Running] cd "f:\Pushkar\MCA\Sem 1\Java\" && javac Practical1B.java
Forward:
Peter
Harry
Hagrid
Ron
John

Reverse:
John
Ron
Hagrid
Harry
Peter

[Done] exited with code=0 in 0.741 seconds
```

C) Create an employee class (id, name, salary) create an Arralist of type employee, add 5 employees, traverse the ArrayList and print the elements, Remove one element and print the list.

Code:

```
package demo;
import java.util.ArrayList;
import java.util.Iterator;
class employee{
        int id;
        String name;
        int salary;
        employee(int id, String name, int salary){
                this.id = id;
                this.name = name;
                this.salary = salary;
        }
}
public class demo{
        public static void main(String args[]) {
                employee e1 = new employee(1, "Peter", 30000);
                employee e2 = new employee(2, "John", 40000);
                employee e3 = new employee(3, "Harry", 20000);
                employee e4 = new employee(4, "Hagrid", 70000);
                employee e5 = new employee(5, "Ron", 10000);
                ArrayList<employee> al1 = new ArrayList<employee>();
                al1.add(e1);
                al1.add(e2);
                al1.add(e3);
                al1.add(e4);
                al1.add(e5);
                Iterator itr = al1.iterator();
                while(itr.hasNext()) {
                        employee emp = (employee)itr.next();
                        System.out.println(emp.id + emp.name + emp.salary);
                }
                al1.remove(e4);
                Iterator itr1 = al1.iterator();
                while(itr1.hasNext()) {
                        employee emp1 = (employee)itr1.next();
                        System.out.println(emp1.id + emp1.name + emp1.salary);
                }
         }
 }
```

Output:



```
[Running] cd "f:\Pushkar\MCA\Sem 1\Java\" && javac Practical1C.java
1 Peter 30000
2 John 40000
3 Harry 20000
4 Hagrid 70000
5 Ron 10000
----------------------
1 Peter 30000
2 John 40000
3 Harry 20000
5 Ron 10000

[Done] exited with code=0 in 0.755 seconds
```

2) Set Interface

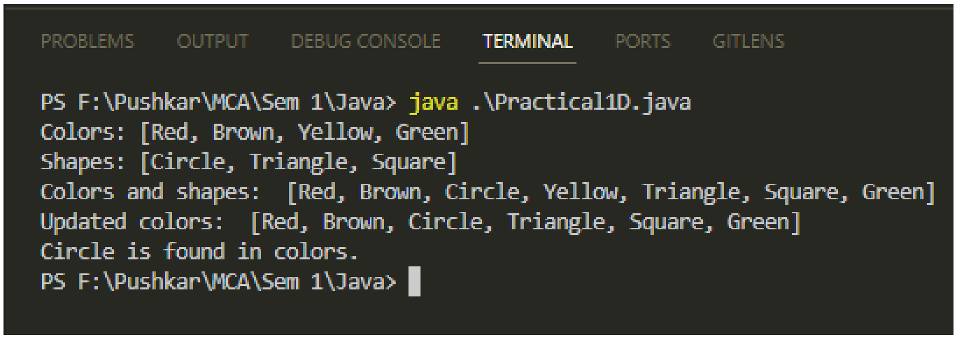
A. Write a Java program using Set interface containing list of items and perform the following operations:

- **a. Add items in the set.**
- **b. Insert items of one set into another set.**
- **c. Remove items from the set.**
- **d. Search the specified item in the set.**

Code:

```
package practicals;
import java.util.HashSet;
public class SetInterfaceExample {
    public static void main(String[] args) {
        HashSet<String> colors = new HashSet<>();
        HashSet<String> shapes = new HashSet<>();

        colors.add("Red");
        colors.add("Green");
        colors.add("Brown");
        colors.add("Yellow");

        shapes.add("Square");
        shapes.add("Triangle");
        shapes.add("Circle");

        System.out.println("Colors: " + colors);
        System.out.println("Shapes: " + shapes);

        colors.addAll(shapes);
        System.out.println("Colors and shapes:  " + colors);

        colors.remove("Yellow");
        System.out.println("Updated colors:  " + colors);

        String search = "Circle";
        if (colors.contains(search)) {
            System.out.println(search + " is found in colors.");
        } else {
            System.out.println(search + " is not found in colors.");
        }
    }
}
```

Output:



```
PS F:\Pushkar\MCA\Sem 1\Java> java .\Practical1D.java
Colors: [Red, Brown, Yellow, Green]
Shapes: [Circle, Triangle, Square]
Colors and shapes:  [Red, Brown, Circle, Yellow, Triangle, Square, Green]
Updated colors:  [Red, Brown, Circle, Triangle, Square, Green]
Circle is found in colors.
PS F:\Pushkar\MCA\Sem 1\Java>
```

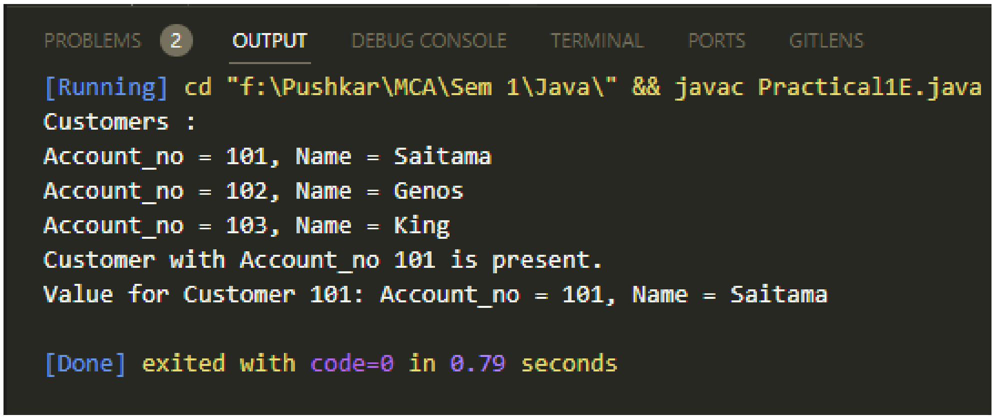
3) Map Interface

A. Create a class Customer(Account_no Integer, Name Sting), Create a HashMap of type Customer put elements, print elements, check if element with account number 101 is present or not? What is the value for Customer 101.

Code:

```
package practicals;
import java.util.HashMap;
import java.util.Iterator;
class Customer {
    private Integer Account_no;
    private String Name;
    public Customer(Integer accountNo, String name) {
        this.Account_no = accountNo;
        this.Name = name;
    }
    public Integer getAccountNo() {
        return Account_no;
    }
    public String getName() {
        return Name;
    }
    @Override
    public String toString() {
        return "Account_no = " + Account_no + ", Name = " + Name;
    }
}
public class MapInterfaceExample {
    public static void main(String[] args) {

        HashMap<Integer, Customer> cMap = new HashMap<>();

        // Adding customers
        cMap.put(101, new Customer(101, "Saitama"));
        cMap.put(102, new Customer(102, "Genos"));
        cMap.put(103, new Customer(103, "King"));

        // Print the elements in the HashMap
        System.out.println("Customers :");
        Iterator<Customer> customerIterator = cMap.values().iterator();
        while (customerIterator.hasNext()) {
            Customer customer = customerIterator.next();
            System.out.println(customer);
        }
        // Check if Account_no 101 is present
        int Check = 101;
        if (cMap.containsKey(Check)) {
            System.out.println("Customer with Account_no " + Check + " is present.");
        } else {
            System.out.println("Customer with Account_no " + Check + " is not present.");
        }

        // print the value of  Customer 101
        Customer customer101 = cMap.get(Check);
        if (customer101 != null) {
            System.out.println("Value for Customer 101: " + customer101);
        } else {
            System.out.println("Customer 101 not found in the HashMap.");
        }
    }
}
```

Output:



```
[Running] cd "f:\Pushkar\MCA\Sem 1\Java\" && javac Practical1E.java
Customers :
Account_no = 101, Name = Saitama
Account_no = 102, Name = Genos
Account_no = 103, Name = King
Customer with Account_no 101 is present.
Value for Customer 101: Account_no = 101, Name = Saitama

[Done] exited with code=0 in 0.79 seconds
```