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BATCH-5(AI&ML)

EXPERIMENT NO – 9

TITLE: Collections

1. Write a program for the following:

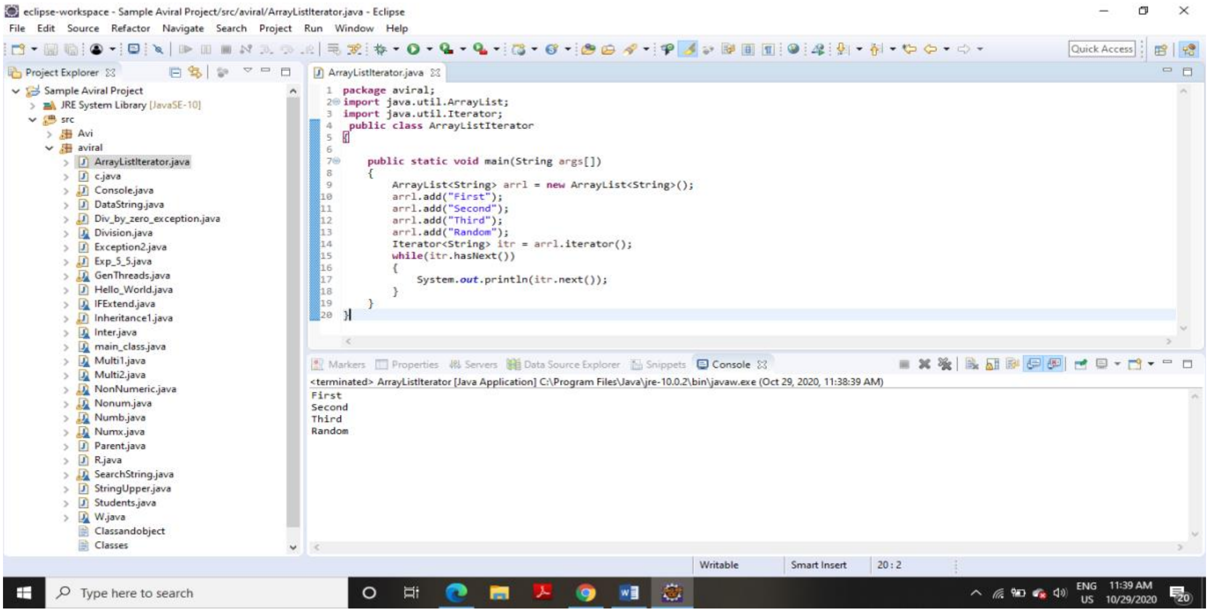
(i) Read all elements from ArrayList by using Iterator.

CODE

```
package rohan;
import java.util.ArrayList;
import java.util.Iterator;
 public class ArrayListIterator
{

    public static void main(String args[])
    {
        ArrayList<String> arrl = new ArrayList<String>();
        arrl.add("First");
        arrl.add("Second");
        arrl.add("Third");
        arrl.add("Random");
        Iterator<String> itr = arrl.iterator();
        while(itr.hasNext())
        {
            System.out.println(itr.next());
        }
    }
}
```

OUTPUT



```
package aviral;
import java.util.ArrayList;
import java.util.Iterator;
 public class ArrayListIterator
{

    public static void main(String args[])
    {
        ArrayList<String> arrl = new ArrayList<String>();
        arrl.add("First");
        arrl.add("Second");
        arrl.add("Third");
        arrl.add("Random");
        Iterator<String> itr = arrl.iterator();
        while(itr.hasNext())
        {
            System.out.println(itr.next());
        }
    }
}
```

```
<terminated> ArrayListIterator [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Oct 29, 2020, 11:38:39 AM)
First
Second
Third
Random
```

(ii) Create duplicate object of an ArrayList instance.

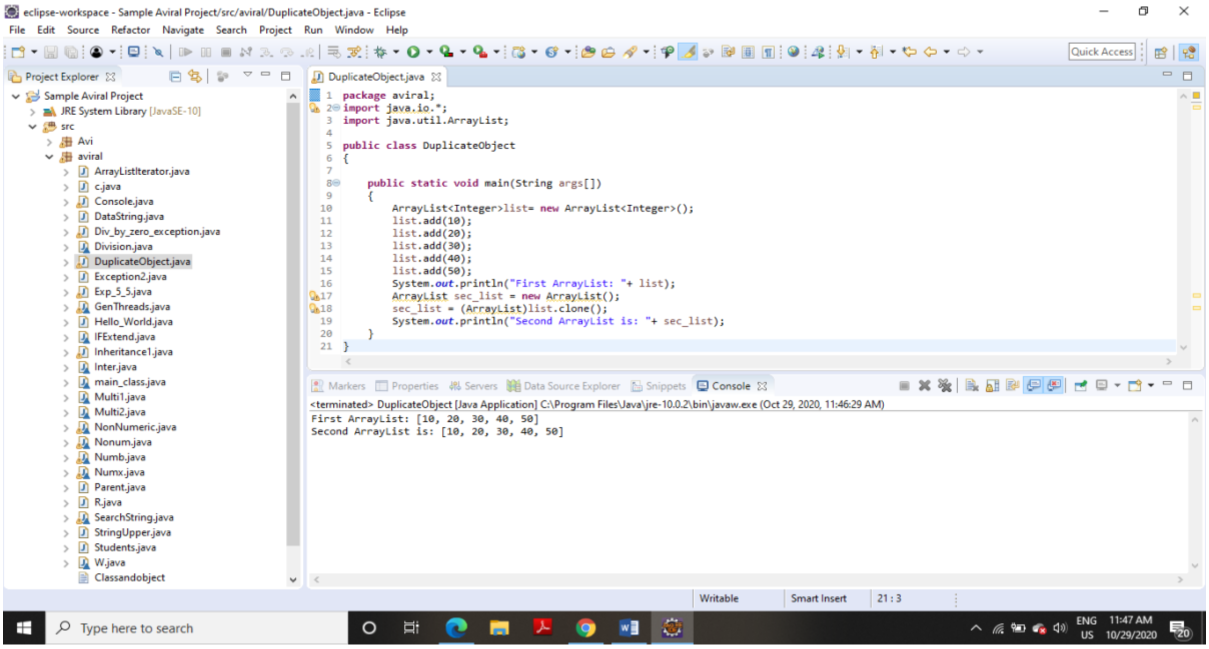
CODE

```
package rohan;
import java.io.*;
import java.util.ArrayList;

public class DuplicateObject
{

    public static void main(String args[])
    {
        ArrayList<Integer>list= new ArrayList<Integer>();
        list.add(10);
        list.add(20);
        list.add(30);
        list.add(40);
        list.add(50);
        System.out.println("First ArrayList: "+ list);
        ArrayList sec_list = new ArrayList();
        sec_list = (ArrayList)list.clone();
        System.out.println("Second ArrayList is: "+ sec_list);
    }
}
```

OUTPUT



```
package aviral;
import java.io.*;
import java.util.ArrayList;

public class DuplicateObject
{

    public static void main(String args[])
    {
        ArrayList<Integer>list= new ArrayList<Integer>();
        list.add(10);
        list.add(20);
        list.add(30);
        list.add(40);
        list.add(50);
        System.out.println("First ArrayList: "+ list);
        ArrayList sec_list = new ArrayList();
        sec_list = (ArrayList)list.clone();
        System.out.println("Second ArrayList is: "+ sec_list);
    }
}
```

```
<terminated> DuplicateObject [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Oct 29, 2020, 11:46:29 AM)
First ArrayList: [10, 20, 30, 40, 50]
Second ArrayList is: [10, 20, 30, 40, 50]
```

(iii) Reverse ArrayList content.

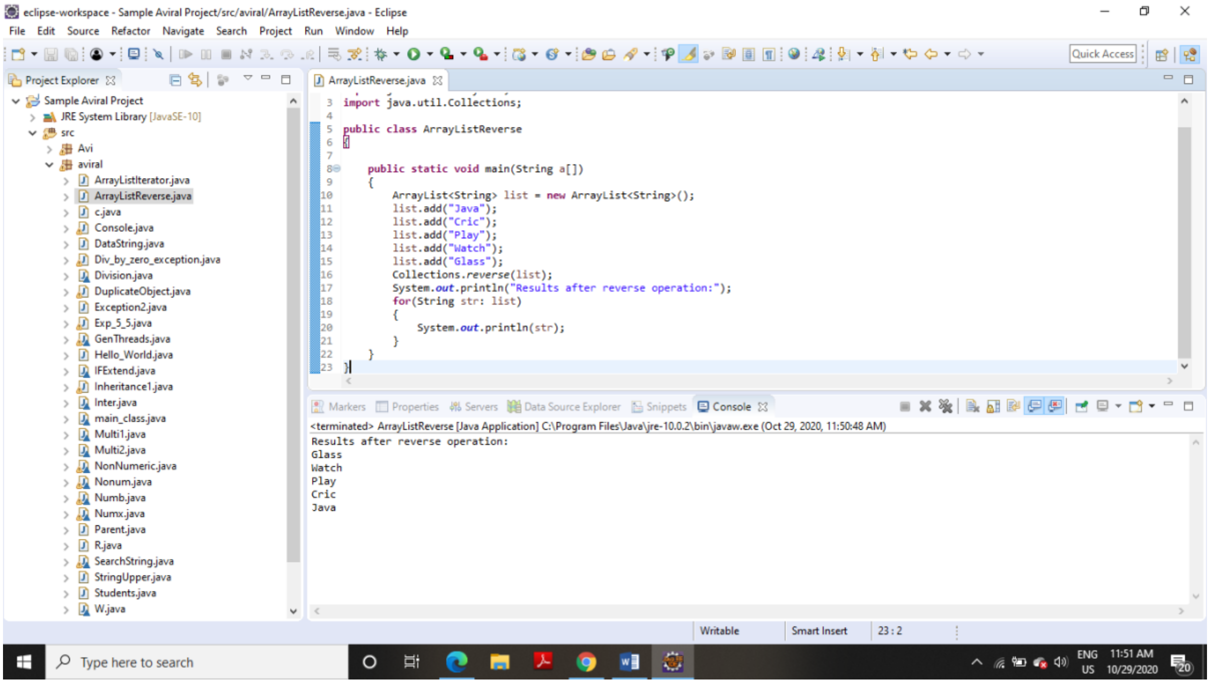
CODE

```
package rohan;
import java.util.ArrayList;
import java.util.Collections;

public class ArrayListReverse
{

   public static void main(String a[])
   {
      ArrayList<String> list = new ArrayList<String>();
      list.add("Java");
      list.add("Cric");
      list.add("Play");
      list.add("Watch");
      list.add("Glass");
      Collections.reverse(list);
      System.out.println("Results after reverse operation:");
      for(String str: list)
      {
         System.out.println(str);
      }
   }
}
```

OUTPUT



```
import java.util.Collections;

public class ArrayListReverse
{

    public static void main(String a[])
    {
        ArrayList<String> list = new ArrayList<String>();
        list.add("Java");
        list.add("Cric");
        list.add("Play");
        list.add("Watch");
        list.add("Glass");
        Collections.reverse(list);
        System.out.println("Results after reverse operation:");
        for(String str: list)
        {
            System.out.println(str);
        }
    }
}
```

```
<terminated> ArrayListReverse [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Oct 29, 2020, 11:50:48 AM)
Results after reverse operation:
Glass
Watch
Play
Cric
Java
```

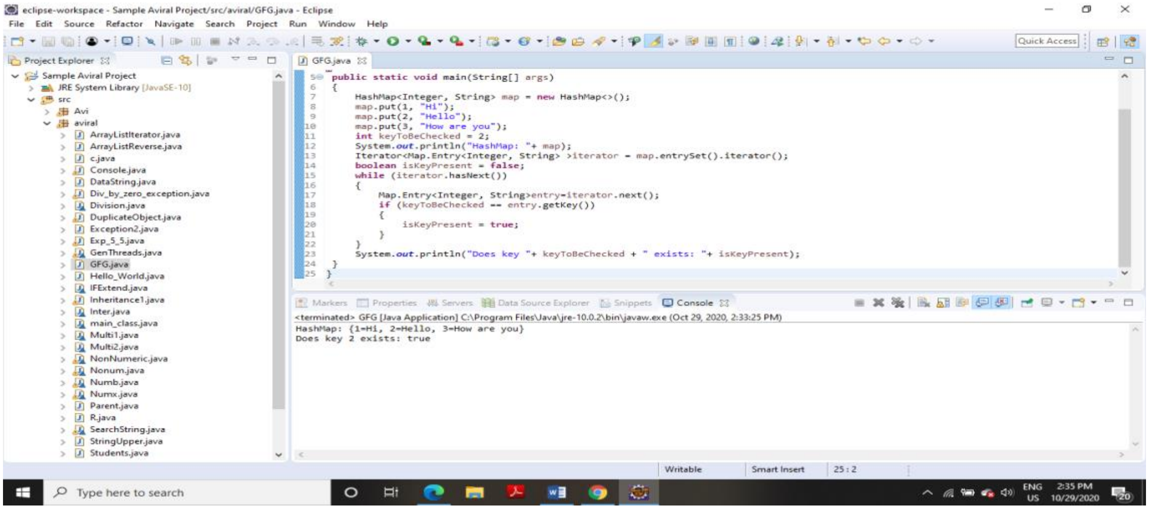
2. Write a program for the following HashMap:

(i) find whether specified key exists or not.

CODE

```
package rohan;
import java.util.*;
public class GFG
{
 public static void main(String[] args)
 {
    HashMap<Integer, String> map = new HashMap<>();
    map.put(1, "Hi");
    map.put(2, "Hello");
    map.put(3, "How are you");
    int keyToBeChecked = 2;
    System.out.println("HashMap: "+ map);
    Iterator<Map.Entry<Integer, String> >iterator = map.entrySet().iterator();
    boolean isKeyPresent = false;
    while (iterator.hasNext())
    {
       Map.Entry<Integer, String>entry=iterator.next();
       if (keyToBeChecked == entry.getKey())
       {
         isKeyPresent = true;
       }
    }
    System.out.println("Does key "+ keyToBeChecked + " exists: "+ isKeyPresent);
 }
}
```

OUTPUT



eclipse-workspace - Sample Aviral Project/src/aviral/GFG.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Project Explorer
GFG.java
Console

```
public static void main(String[] args)
{
     HashMap<Integer, String> map = new HashMap<>();
     map.put(1, "Hi");
     map.put(2, "Hello");
     map.put(3, "How are you");
     int keyToBeChecked = 2;
     System.out.println("HashMap: "+ map);
     Iterator<Map.Entry<Integer, String> >iterator = map.entrySet().iterator();
     boolean isKeyPresent = false;
     while (iterator.hasNext())
     {
         Map.Entry<Integer, String>entry=iterator.next();
         if (keyToBeChecked == entry.getKey())
         {
             isKeyPresent = true;
         }
     }
     System.out.println("Does key "+ keyToBeChecked + " exists: "+ isKeyPresent);
 }
}
```

```
<terminated> GFG [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Oct 29, 2020, 2:33:25 PM)
HashMap: {1=Hi, 2=Hello, 3=How are you}
Does key 2 exists: true
```

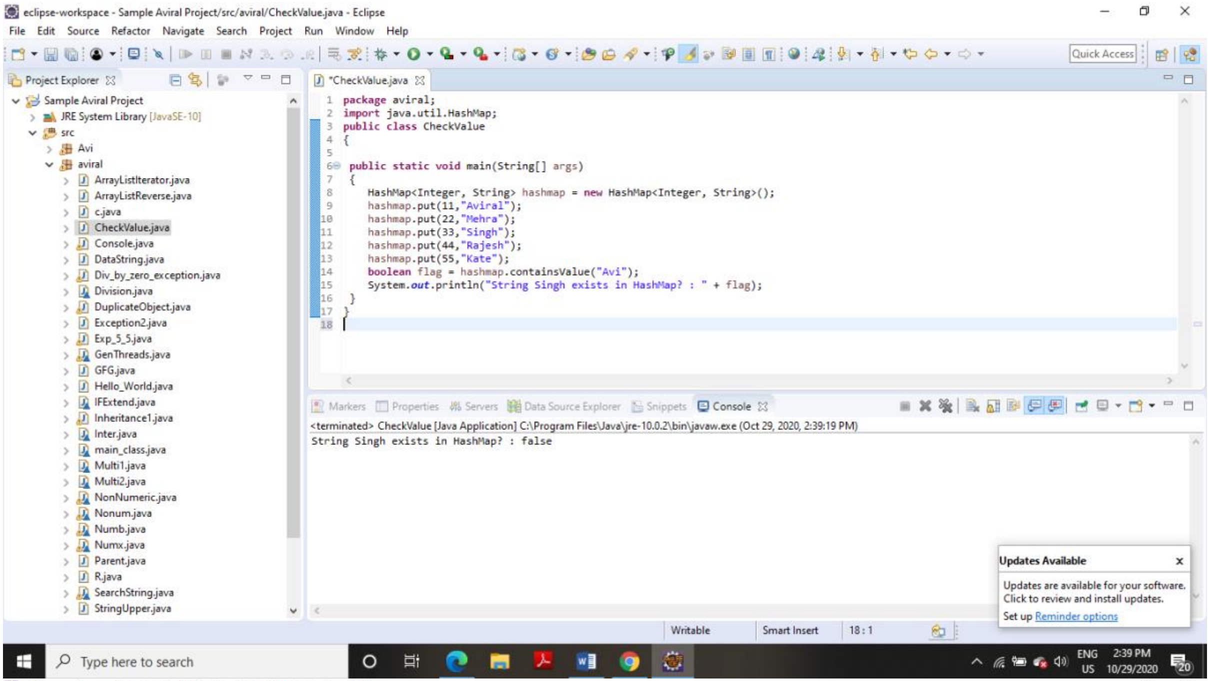
(ii) find whether specified value exists or not

CODE

```
package rohan;
import java.util.HashMap;
public class CheckValue
{

 public static void main(String[] args)
 {
        HashMap<Integer, String> hashmap = new HashMap<Integer, String>();
   hashmap.put(11,"Aviral");
   hashmap.put(22,"Mehra");
   hashmap.put(33,"Singh");
   hashmap.put(44,"Rajesh");
   hashmap.put(55,"Kate");
   boolean flag = hashmap.containsValue("Avi");
   System.out.println("String Singh exists in HashMap? : " + flag);
 }
}
```

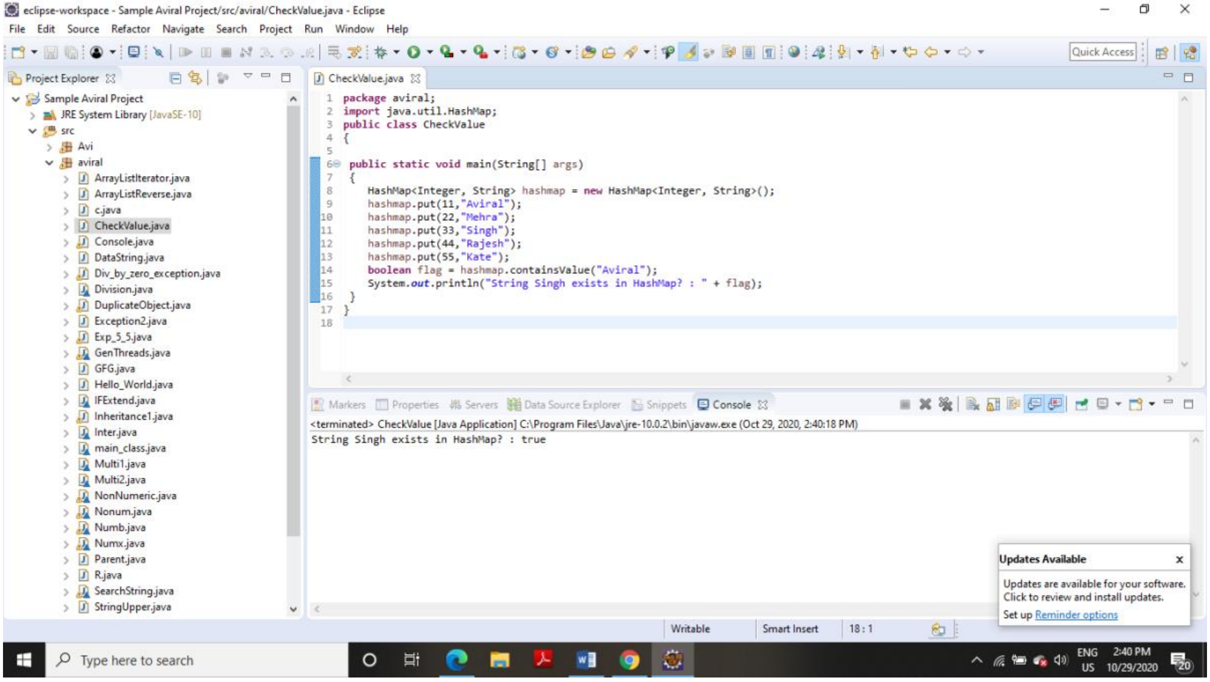
OUTPUT



```
package aviral;
import java.util.HashMap;
public class CheckValue
{

 public static void main(String[] args)
 {
    HashMap<Integer, String> hashmap = new HashMap<Integer, String>();
    hashmap.put(11,"Aviral");
    hashmap.put(22,"Mehra");
    hashmap.put(33,"Singh");
    hashmap.put(44,"Rajesh");
    hashmap.put(55,"Kate");
    boolean flag = hashmap.containsValue("Avi");
    System.out.println("String Singh exists in HashMap? : " + flag);
 }
}
```

```
<terminated> CheckValue [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Oct 29, 2020, 2:39:19 PM)
String Singh exists in HashMap? : false
```



```
package aviral;
import java.util.HashMap;
public class CheckValue
{

 public static void main(String[] args)
 {
    HashMap<Integer, String> hashmap = new HashMap<Integer, String>();
    hashmap.put(11,"Aviral");
    hashmap.put(22,"Mehra");
    hashmap.put(33,"Singh");
    hashmap.put(44,"Rajesh");
    hashmap.put(55,"Kate");
    boolean flag = hashmap.containsValue("Aviral");
    System.out.println("String Singh exists in HashMap? : " + flag);
 }
}
```

```
<terminated> CheckValue [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Oct 29, 2020, 2:40:18 PM)
String Singh exists in HashMap? : true
```

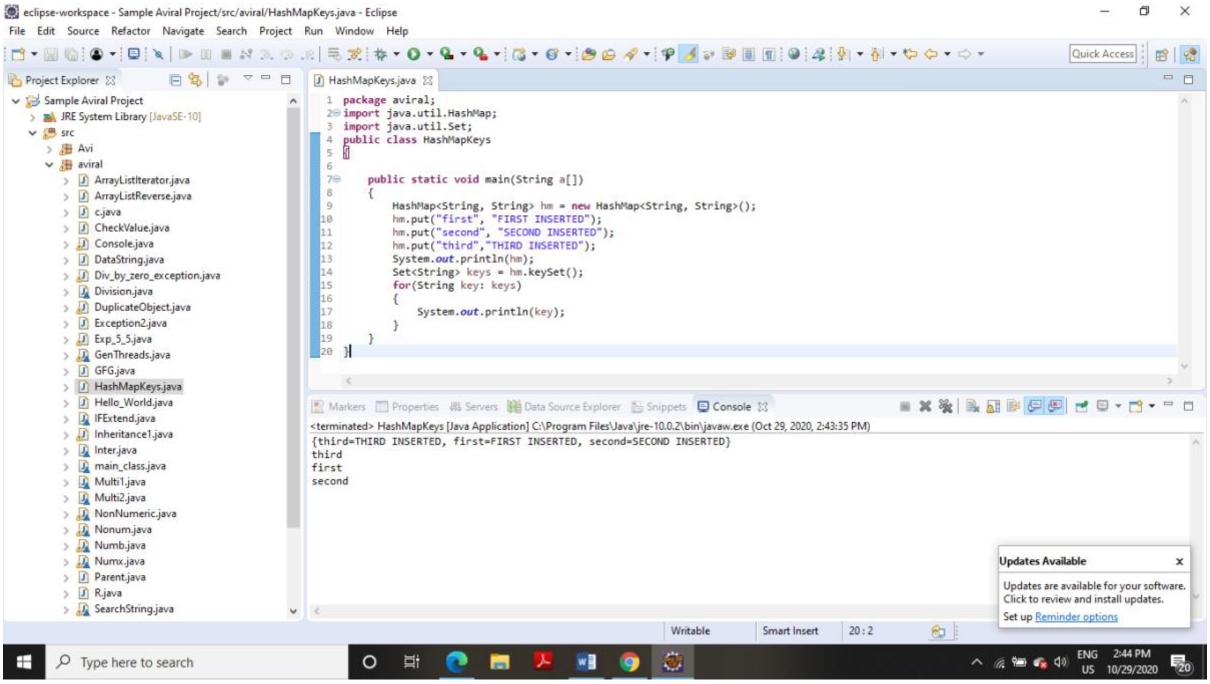
(iii) get all keys from the given HashMap

```
package rohan;
import java.util.HashMap;
import java.util.Set;
public class HashMapKeys
{

   public static void main(String a[])
   {
      HashMap<String, String> hm = new HashMap<String, String>();
```

```
        hm.put("first", "FIRST INSERTED");
        hm.put("second", "SECOND INSERTED");
        hm.put("third","THIRD INSERTED");
        System.out.println(hm);
        Set<String> keys = hm.keySet();
        for(String key: keys)
        {
            System.out.println(key);
        }
    }
}
```

OUTPUT



```
package aviral;
import java.util.HashMap;
import java.util.Set;
public class HashMapKeys
{

    public static void main(String a[])
    {
        HashMap<String, String> hm = new HashMap<String, String>();
        hm.put("first", "FIRST INSERTED");
        hm.put("second", "SECOND INSERTED");
        hm.put("third","THIRD INSERTED");
        System.out.println(hm);
        Set<String> keys = hm.keySet();
        for(String key: keys)
        {
            System.out.println(key);
        }
    }
}
```

```
<terminated> HashMapKeys [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Oct 29, 2020, 2:43:35 PM)
{third=THIRD INSERTED, first=FIRST INSERTED, second=SECOND INSERTED}
third
first
second
```

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Updates are available for your software. Click to review and install updates.

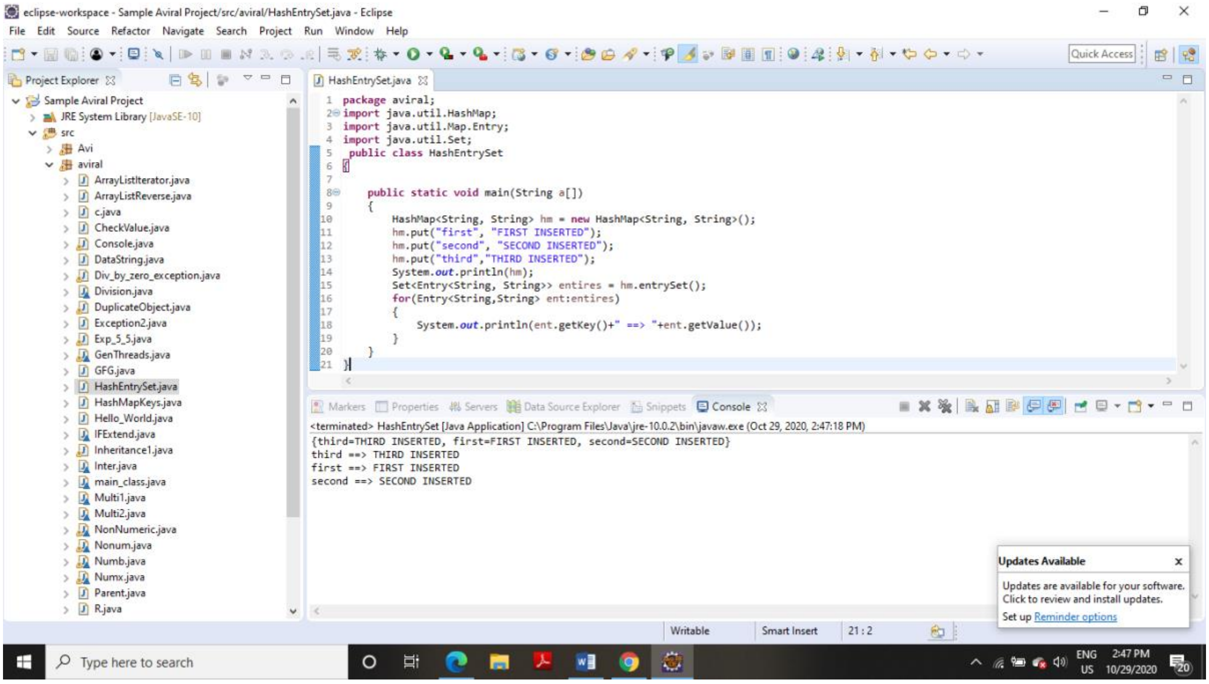
Set up Reminder options

(iv) get all key-value pair as Entry objects

CODE

```
package rohan;
import java.util.HashMap;
import java.util.Map.Entry;
import java.util.Set;
 public class HashEntrySet
{
    public static void main(String a[])
    {
        HashMap<String, String> hm = new HashMap<String, String>();
        hm.put("first", "FIRST INSERTED");
        hm.put("second", "SECOND INSERTED");
        hm.put("third","THIRD INSERTED");
        System.out.println(hm);
        Set<Entry<String, String>> entires = hm.entrySet();
        for(Entry<String,String> ent:entires)
        {
            System.out.println(ent.getKey()+" ==> "+ent.getValue());
        }
    }
}
```

OUTPUT



```
package aviral;
import java.util.HashMap;
import java.util.Map.Entry;
import java.util.Set;
 public class HashEntrySet
{

    public static void main(String a[])
    {
        HashMap<String, String> hm = new HashMap<String, String>();
        hm.put("first", "FIRST INSERTED");
        hm.put("second", "SECOND INSERTED");
        hm.put("third","THIRD INSERTED");
        System.out.println(hm);
        Set<Entry<String, String>> entires = hm.entrySet();
        for(Entry<String,String> ent:entires)
        {
            System.out.println(ent.getKey()+" ==> "+ent.getValue());
        }
    }
}
```

```
<terminated> HashEntrySet [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Oct 29, 2020, 2:47:18 PM)
{third=THIRD INSERTED, first=FIRST INSERTED, second=SECOND INSERTED}
third ==> THIRD INSERTED
first ==> FIRST INSERTED
second ==> SECOND INSERTED
```

eclipse-workspace - Sample Aviral Project/src/aviral/HashEntrySet.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Project Explorer
HashEntrySet.java
Markers Properties Servers Data Source Explorer Snippets Console
Updates Available
Updates are available for your software. Click to review and install updates.
Set up Reminder options
Writable Smart Insert 21 : 2
Type here to search
2:47 PM 10/29/2020

3. Write a program for the following:

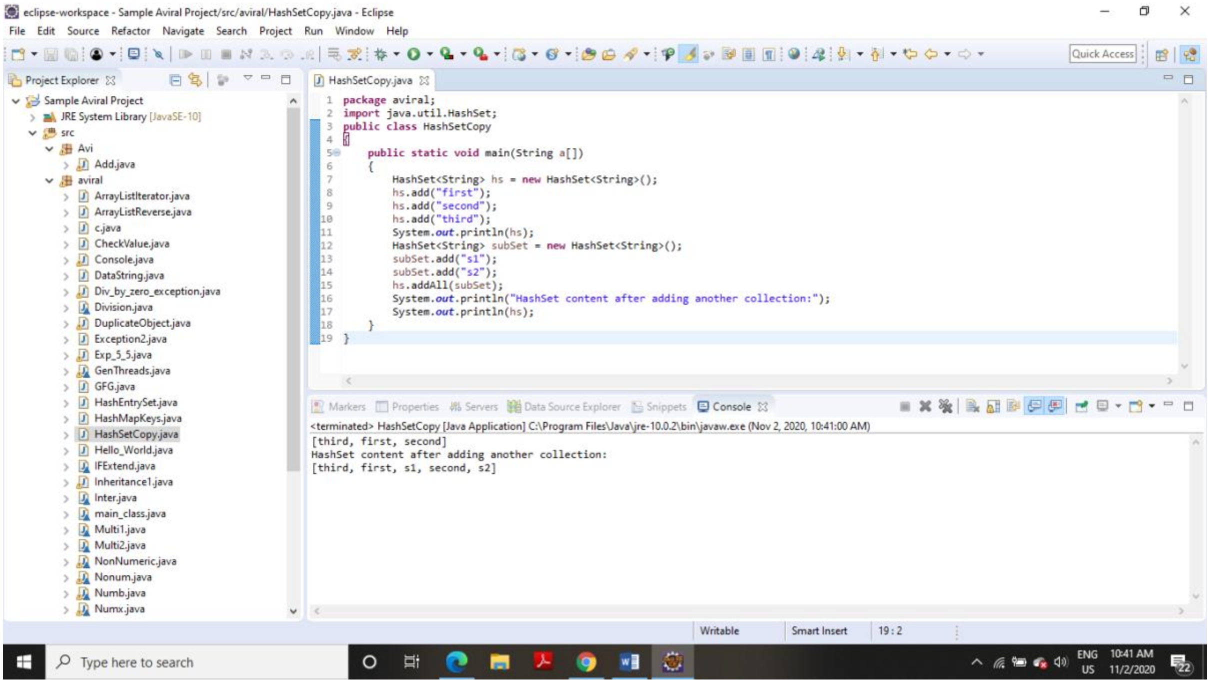
(i) HashSet copy another collection object to HashSet object.

CODE

```
package rohan;
import java.util.HashSet;
public class HashSetCopy
{
        public static void main(String a[])
```

```
    {
       HashSet<String> hs = new HashSet<String>();
       hs.add("first");
       hs.add("second");
       hs.add("third");
       System.out.println(hs);
       HashSet<String> subSet = new HashSet<String>();
       subSet.add("s1");
       subSet.add("s2");
       hs.addAll(subSet);
       System.out.println("HashSet content after adding another collection:");
       System.out.println(hs);
    }
}
```

OUTPUT



```
package aviral;
import java.util.HashSet;
public class HashSetCopy
{
    public static void main(String a[])
    {
        HashSet<String> hs = new HashSet<String>();
        hs.add("first");
        hs.add("second");
        hs.add("third");
        System.out.println(hs);
        HashSet<String> subSet = new HashSet<String>();
        subSet.add("s1");
        subSet.add("s2");
        hs.addAll(subSet);
        System.out.println("HashSet content after adding another collection:");
        System.out.println(hs);
    }
}
```

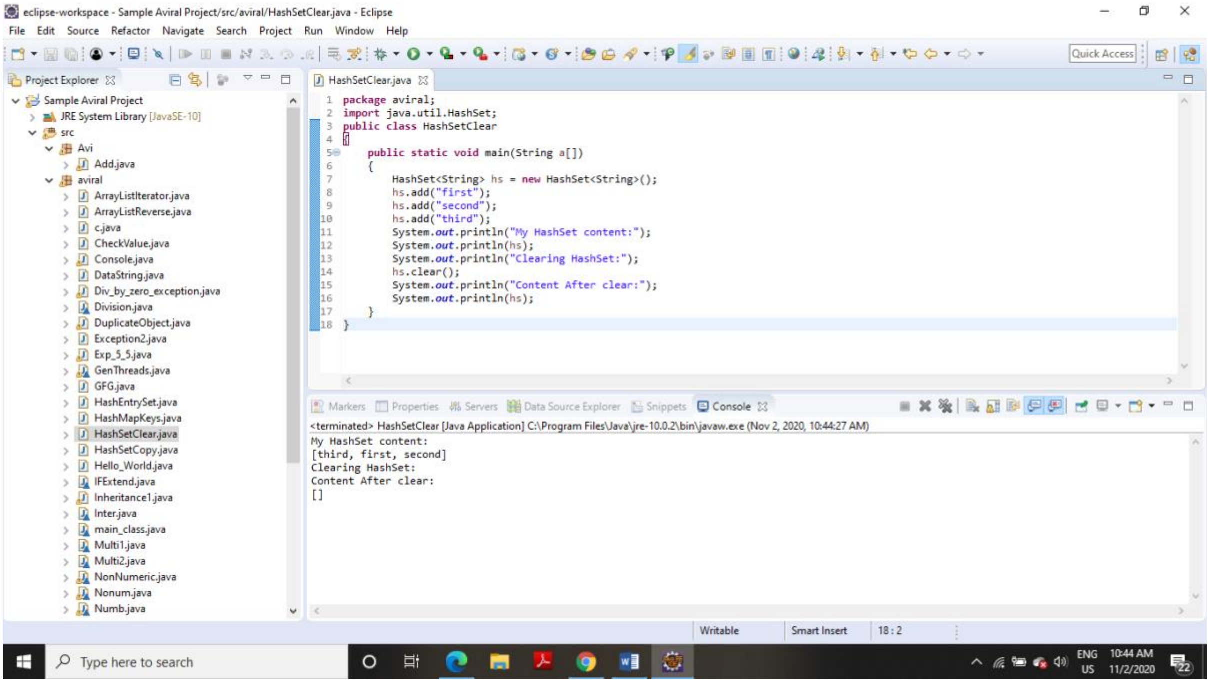
```
<terminated> HashSetCopy [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Nov 2, 2020, 10:41:00 AM)
[third, first, second]
HashSet content after adding another collection:
[third, first, s1, second, s2]
```

(ii) delete all entries at one call from HashSet

CODE

```
package rohan;
import java.util.HashSet;
public class HashSetClear
{
        public static void main(String a[])
    {
        HashSet<String> hs = new HashSet<String>();
        hs.add("first");
        hs.add("second");
        hs.add("third");
        System.out.println("My HashSet content:");
        System.out.println(hs);
        System.out.println("Clearing HashSet:");
        hs.clear();
        System.out.println("Content After clear:");
        System.out.println(hs);
    }
}
```

OUTPUT



eclipse-workspace - Sample Aviral Project/src/aviral/HashSetClear.java - Eclipse

```
package aviral;
import java.util.HashSet;
public class HashSetClear
{
    public static void main(String a[])
    {
        HashSet<String> hs = new HashSet<String>();
        hs.add("first");
        hs.add("second");
        hs.add("third");
        System.out.println("My HashSet content:");
        System.out.println(hs);
        System.out.println("Clearing HashSet:");
        hs.clear();
        System.out.println("Content After clear:");
        System.out.println(hs);
    }
}
```

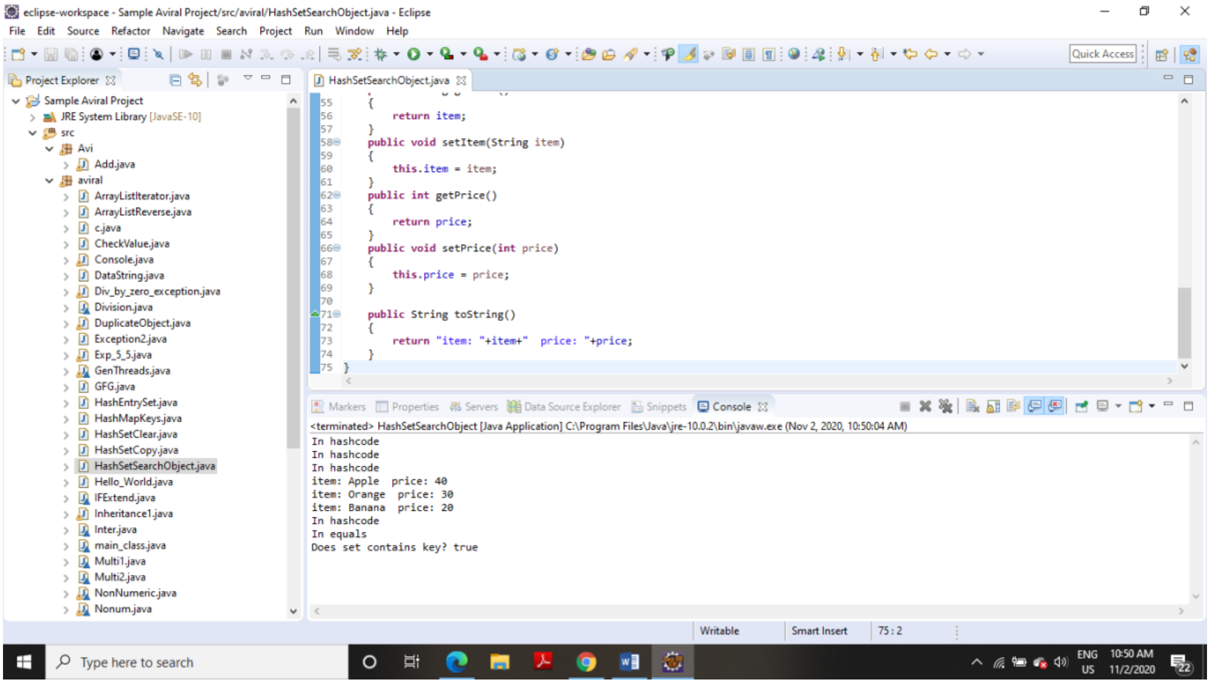
```
<terminated> HashSetClear [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Nov 2, 2020, 10:44:27 AM)
My HashSet content:
[third, first, second]
Clearing HashSet:
Content After clear:
[]
```

(iii) search user defined objects from HashSet

CODE

```
package rohan;
import java.util.HashSet;
public class HashSetSearchObject
{
        public static void main(String a[])
    {
        HashSet<Price> lhs = new HashSet<Price>();
        lhs.add(new Price("Banana", 20));
        lhs.add(new Price("Apple", 40));
        lhs.add(new Price("Orange", 30));
        for(Price pr:lhs)
        {
            System.out.println(pr);
        }
        Price key = new Price("Banana", 20);
        System.out.println("Does set contains key? "+lhs.contains(key));
    }
}

class Price
{

    private String item;
    private int price;

    public Price(String itm, int pr)
    {
        this.item = itm;
        this.price = pr;
    }

    public int hashCode()
    {
        System.out.println("In hashcode");
        int hashcode = 0;
        hashcode = price*20;
        hashcode += item.hashCode();
        return hashcode;
    }

    public boolean equals(Object obj)
    {
        System.out.println("In equals");
        if (obj instanceof Price)
        {
            Price pp = (Price) obj;
            return (pp.item.equals(this.item) && pp.price == this.price);
        } else
        {
            return false;
        }
    }

    public String getItem()
    {
        return item;
    }
    public void setItem(String item)
    {
        this.item = item;
    }
    public int getPrice()
    {
        return price;
    }
    public void setPrice(int price)
    {
        this.price = price;
    }

    public String toString()
    {
        return "item: "+item+"  price: "+price;
    }
}
```

OUTPUT



eclipse-workspace - Sample Aviral Project/src/aviral/HashSetSearchObject.java - Eclipse

```
    {
        return item;
    }
    public void setItem(String item)
    {
        this.item = item;
    }
    public int getPrice()
    {
        return price;
    }
    public void setPrice(int price)
    {
        this.price = price;
    }

    public String toString()
    {
        return "item: "+item+"  price: "+price;
    }
}
```

Markers Properties Servers Data Source Explorer Snippets Console

<terminated> HashSetSearchObject [Java Application] C:\Program Files\Java\jre-10.0.2\bin\javaw.exe (Nov 2, 2020, 10:50:04 AM)

```
In hashcode
In hashcode
In hashcode
item: Apple  price: 40
item: Orange  price: 30
item: Banana  price: 20
In hashcode
In equals
Does set contains key? true
```