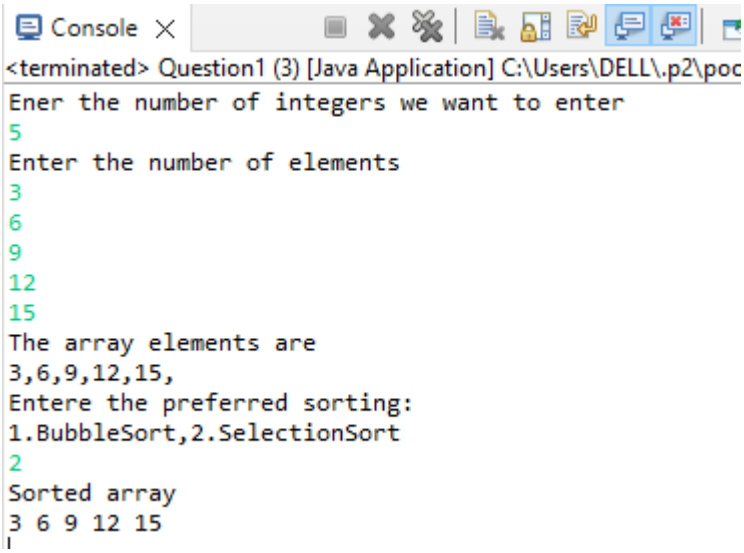
1.Write a program to take an integer array from the user and give the user a choice to sort using bubble sort (or) selection sort. Sort the array elements according to the selected algorithm of the user and display the sorted array.

Code:

```
package SBA4;

import java.util.Scanner;
public class Question1 {
	void bubbleSort(int arr[])
	{
		int n = arr.length; //n=6
		for (int i = 0; i < n-1; i++)
			for (int j = 0; j < n-i-1; j++)
			{
				if (arr[j] > arr[j+1])
				{
					// swap arr[j+1] and arr[j]
					int temp = arr[j];
					arr[j] = arr[j+1];
					arr[j+1] = temp;
				}
			}
	}
	void printArray(int arr[])
	{
		int n = arr.length;
		for (int i=0; i<n; ++i)
			System.out.print(arr[i] + " ");
		System.out.println();
	}
	void sort(int arr[])
	{		//1,2,3,4,6,9
		int n = arr.length; //6

		// One by one move boundary of unsorted subarray
		for (int i = 0; i < n-1; i++)
		{
			// Find the minimum element in unsorted array
			int min_idx = i;//
			for (int j = i+1; j < n; j++)
				{
					if (arr[min_idx] > arr[j])
					min_idx = j;//5
			}// Swap the found minimum element with the first
```

```
                int temp = arr[min_idx];
                arr[min_idx] = arr[i];
                arr[i] = temp;
                }
        }

        public static void main(String[] args) {
        System.out.println("Ener the number of integers we want
to enter ");
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int[] arr = new int[n];
        System.out.println("Enter the number of elements");
        for (int i = 0; i < n; i++) {
                arr[i] = sc.nextInt();
        }
        System.out.println("The array elements are");
        for (int i = 0; i < n; i++) {
                System.out.print(arr[i] + ",");
        }
        System.out.println(" ");
        System.out.println("Entere the preferred sorting:");
        System.out.println("1.BubbleSort,2.SelectionSort");
        int a=sc.nextInt();
        switch(a) {
        case 1:
                Q1 ob = new Q1();
                ob.bubbleSort(arr);
                System.out.println("Sorted array");
                ob.printArray(arr);
                break;
        case 2:
                Q1 obj = new Q1();

                obj.sort(arr);
                System.out.println("Sorted array");
                obj.printArray(arr);
                break;

        }
    }

}
```

Output:



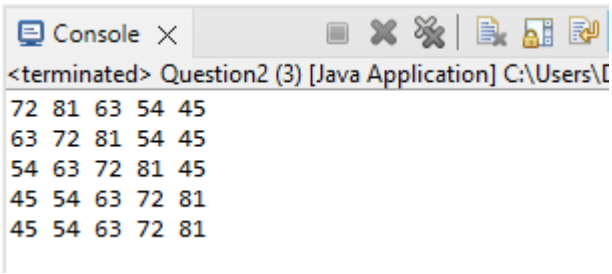
2.Write a program to implement insertion sort.

Code:

```
package SBA4;
public class Question2 {
public static void main(String[] args) {
            int a[]= {81,72,63,54,45};
            int temp,j;
            for(int i=1;i<a.length;i++)
            {
                  temp=a[i];
                  j=i;
                  while(j>0 && a[j-1]>temp)
                  {
                        a[j]=a[j-1];
                        j=j-1;
                  }
                  a[j]=temp;
                  for(int k=0;k<a.length;++k)
                  {
                        System.out.print(a[k]+" ");
                  }
                  System.out.println();
            }
            for(int i=0;i<a.length;i++)
            {
                  System.out.print(a[i]+" ");
            }
      }
```

}

Output:



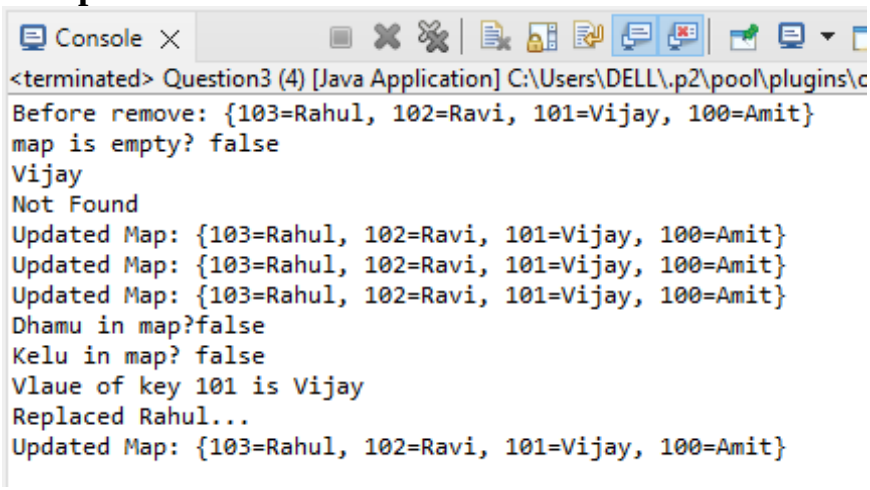
3.Write a program to implement Hashtable and add atleast 4 values into it, implement the putIfAbsent() method.

Code:

```
package SBA4;

import java.util.Hashtable;
public class Question3 {
      public static void main(String[] args) {
            Hashtable<Integer,String> map=new
Hashtable<Integer,String>();
           map.put(100,"Amit");
           map.put(102,"Ravi");
           map.put(101,"Vijay");
           map.put(103,"Rahul");
           System.out.println("Before remove: "+ map);
           // Remove value for key 102
           map.remove(102);
           System.out.println("After remove: "+ map);
           //checking empty or not
           System.out.println("map is empty? "+map.isEmpty());
           //Here, we specify the if and else statement as arguments
of the method
           System.out.println(map.getOrDefault(101, "Not Found"));
           System.out.println(map.getOrDefault(105, "Not Found"));
           //Inserts, as the specified pair is unique
           map.putIfAbsent(102,"Gaurav");
           System.out.println("Updated Map: "+map);
```

```
            //Returns the current value, as the specified pair already
exist
            map.putIfAbsent(101,"Dhamu");
            System.out.println("Updated Map: "+map);
            //Replace the value at key 100
            map.replace(100,"Kelu");
            System.out.println("Updated Map: "+map);
            //Checking values in map
            System.out.println("Dhamu in map?
"+map.contains("Dhamu"));
            System.out.println("Kelu in map? "+map.contains("Kelu"));
            //Checking key in map and getting the value
            if(map.containsKey(101)==true)  {
              System.out.println("Vlaue of key 101 is "+map.get(101));
            }
            //printing all values in map
            System.out.println(map.values());
            if(map.replace(103,"rahul","Raju")==true) {
              System.out.println("Replaced Rahul...");
              System.out.println("Updated Map: "+map);
            }

      }

}
```

Output:



4.Create a class of Books with attributes:

a)id

b)name

c)author

d)publisher

e)quantity sold.

Implement a Hashtable to implement the objects of Books type. Print all the details of books by traversing through the Hashtable.

Code:

```
package SBA4;

import java.util.Hashtable;
import java.util.Map;

      class Book {
            int id;
            String name,author,publisher;
            int quantity;
            public Book(int id, String name, String author, String
publisher, int quantity) {
                this.id = id;
                this.name = name;
                this.author = author;
                this.publisher = publisher;
                this.quantity = quantity;
            }
            }

            public class Question4 {
                  public static void main(String[] args) {
                      //Creating map of Books
                      Hashtable<Integer,Book> map=new
Hashtable<Integer,Book>();
                      //Creating Books
                      Book b1=new Book(101,"Let us C","Yashwant
Kanetkar","BPB",8);
                      Book b2=new Book(102,"Data Communications &
Networking","Forouzan","Mc Graw Hill",4);
                      Book b3=new Book(103,"Operating
System","Galvin","Wiley",6);
                      //Adding Books to map
                      map.put(1,b1);
                      map.put(2,b2);
                      map.put(3,b3);
                      //Traversing map
                      for(Map.Entry<Integer, Book> z:map.entrySet()){
                          int key=z.getKey(); //key=3
```

```
                        Book b=z.getValue(); //b=b3
                        System.out.println(key+" Details:");
                        System.out.println(b.id+" "+b.name+"
"+b.author+" "+b.publisher+" "+b.quantity);
                    }
                }
            }
```

Output: