(day-16 assignment, below 3 questions)

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.

```java
package SBA_4;

import java.util.Scanner;

public class Q1 {
    //*****BUBBLE SORT************
    void bubbleSort(int arr[])
    {
        int n = arr.length;
        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;
                }
                //for debugging every move made by the
algorithm
                /*for (int k=0; k<n; ++k)
                {
                    System.out.print(arr[k]+",");
                }
                System.out.println("");*/
            }//inner for closes
    }

    /* Prints the array */
    void printArray(int arr[])
    {
```

```java
        int n = arr.length;
        for (int i=0; i<n; ++i)
                System.out.print(arr[i] + " ");
        System.out.println();
    }


    //********SELECTION SORT*************
    void Selectionsort(int arr[])
    {
        int n = arr.length; //6
        for (int i = 0; i < n-1; i++)
        {
                int min_idx = i;//
                for (int j = i+1; j < n; j++)
                    {
                                if (arr[min_idx] > arr[j])
                                min_idx = j;//5
                }
                int temp = arr[min_idx];
                arr[min_idx] = arr[i];
                arr[i] = temp;
                /*for (int k=0; k<n; ++k)
                {
                        System.out.print(arr[k]+" ");
                }
                System.out.println();  */
        }
    }
    // Prints the array
    void printArray2(int arr[])
    {
        int n = arr.length;
        for (int i=0; i<n; ++i)
                System.out.print(arr[i]+" ");
        System.out.println();
    }
//****MAIN CLASS*********
    public static void main(String[] args) {
        //int arr[] = {64, 34, 25, 12, 22, 11, 90};
        int[] arr=new int[5];
```

```java
System.out.println("Enter 5 integer values");
Scanner sc=new Scanner(System.in);
for(int i=0;i<5;i++)
{
        arr[i]=sc.nextInt();
}

System.out.print("Unsorted Array is : [");
for(int i=0;i<5;i++)
{
        System.out.print(arr[i]+",");
}
System.out.println("]");
Q1 ob = new Q1();
System.out.println("Enter 1:Bubble Sort 2:Selection Sort");
int n=sc.nextInt();
switch(n)
{
case 1:{

        ob.bubbleSort(arr);
        System.out.println("Sorted array");
        ob.printArray(arr);
        break;
}
case 2:{
        ob.Selectionsort(arr);
        System.out.println("Sorted array");
        ob.printArray2(arr);
        break;
}
}

        }
}
```

```
Enter 5 integer values
67
55
47
89
65
Unsorted Array is : [67,55,47,89,65,]
Enter 1:Bubble Sort 2:Selection Sort
1
Sorted array
47 55 65 67 89
```

```
Enter 5 integer values
78
98
56
77
44
Unsorted Array is : [78,98,56,77,44,]
Enter 1:Bubble Sort 2:Selection Sort
2
Sorted array
44 56 77 78 98
```

2. Write a program to implement insertion sort.

```java
//Write a program to implement insertion sort.
package SBA_4;

public class Q2 {
    void sort(int arr[])
    {
        int n = arr.length;
        for (int i = 1; i < n; ++i) {
            int key = arr[i];
            int j = i - 1;

            /* Move elements of arr[0..i-1], that are
               greater than key, to one position ahead
               of their current position */
            while (j >= 0 && arr[j] > key) {
                arr[j + 1] = arr[j];
                j = j - 1;
            }
            arr[j + 1] = key;
        }
    }
```

```java
/* A utility function to print array of size n*/
static void printArray(int arr[])
{
    int n = arr.length;
    for (int i = 0; i < n; ++i)
        System.out.print(arr[i] + " ");

    System.out.println();
}

// Driver method
public static void main(String args[])
{
    int arr[] = { 12, 11, 13, 5, 6 };

    Q2 ob = new Q2();
    ob.sort(arr);

    printArray(arr);
}
}
```

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

```java
//Write a program to implement Hashtable and add atleast 4 values into it,
implement the putIfAbsent() method.
package SBA_4;

import java.util.*;
class Q3{
 public static void main(String args[]){
```
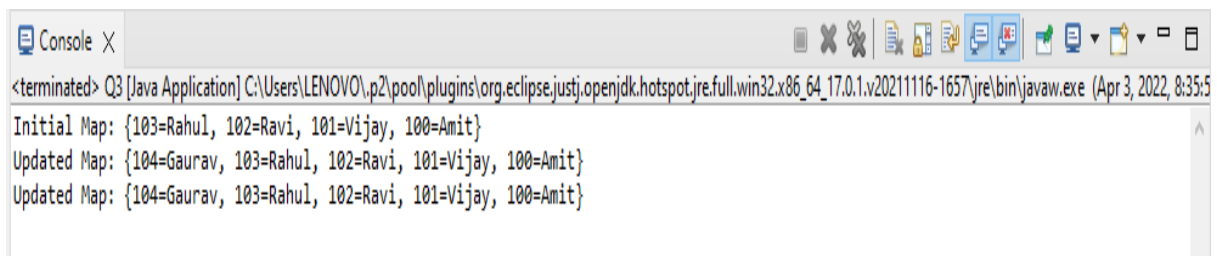
```java
Hashtable<Integer,String> map=new Hashtable<Integer,String>();
map.put(100,"Amit");
map.put(102,"Ravi");
map.put(101,"Vijay");
map.put(103,"Rahul");
System.out.println("Initial Map: "+map);
//Inserts, as the specified pair is unique
map.putIfAbsent(104,"Gaurav");
System.out.println("Updated Map: "+map);
//Returns the current value, as the specified pair already exist
map.putIfAbsent(101,"Vijay");
System.out.println("Updated Map: "+map);
  }
}
```



```
Console X
<terminated> Q3 [Java Application] C:\Users\LENOVO\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.1.v20211116-1657\jre\bin\javaw.exe (Apr 3, 2022, 8:35:5
Initial Map: {103=Rahul, 102=Ravi, 101=Vijay, 100=Amit}
Updated Map: {104=Gaurav, 103=Rahul, 102=Ravi, 101=Vijay, 100=Amit}
Updated Map: {104=Gaurav, 103=Rahul, 102=Ravi, 101=Vijay, 100=Amit}
```

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.

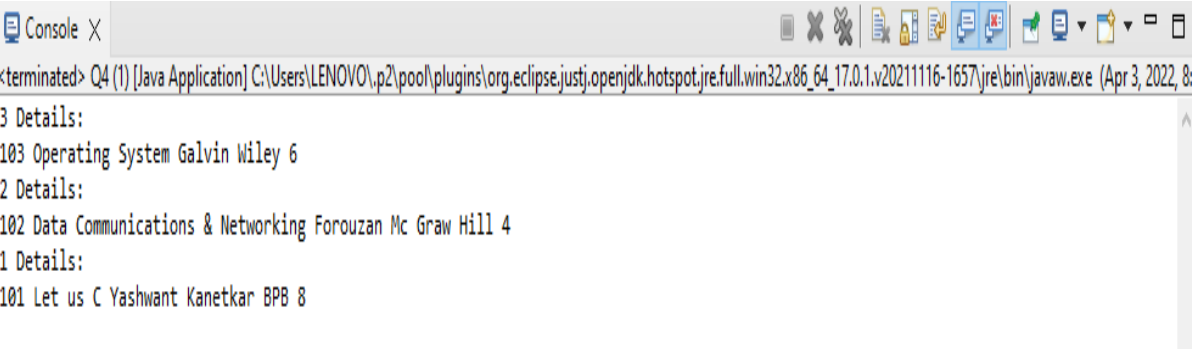package SBA_4;

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

class Book {
int id;
String name,author,publisher;
int quantity;

```java
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 Q4 {
    public static void main(String[] args) {
        //Creating map of Books
        Map<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> entry:map.entrySet()){
            int key=entry.getKey();
            Book b=entry.getValue();
            System.out.println(key+" Details:");
            System.out.println(b.id+" "+b.name+" "+b.author+" "+b.publisher+"
"+b.quantity);
        }
    }
}
```

Console X

&lt;terminated&gt; Q4 (1) [Java Application] C:\Users\LENOVO\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.1.v20211116-1657\jre\bin\javaw.exe (Apr 3, 2022, 8:3

```
3 Details:
103 Operating System Galvin Wiley 6
2 Details:
102 Data Communications & Networking Forouzan Mc Graw Hill 4
1 Details:
101 Let us C Yashwant Kanetkar BPB 8
```