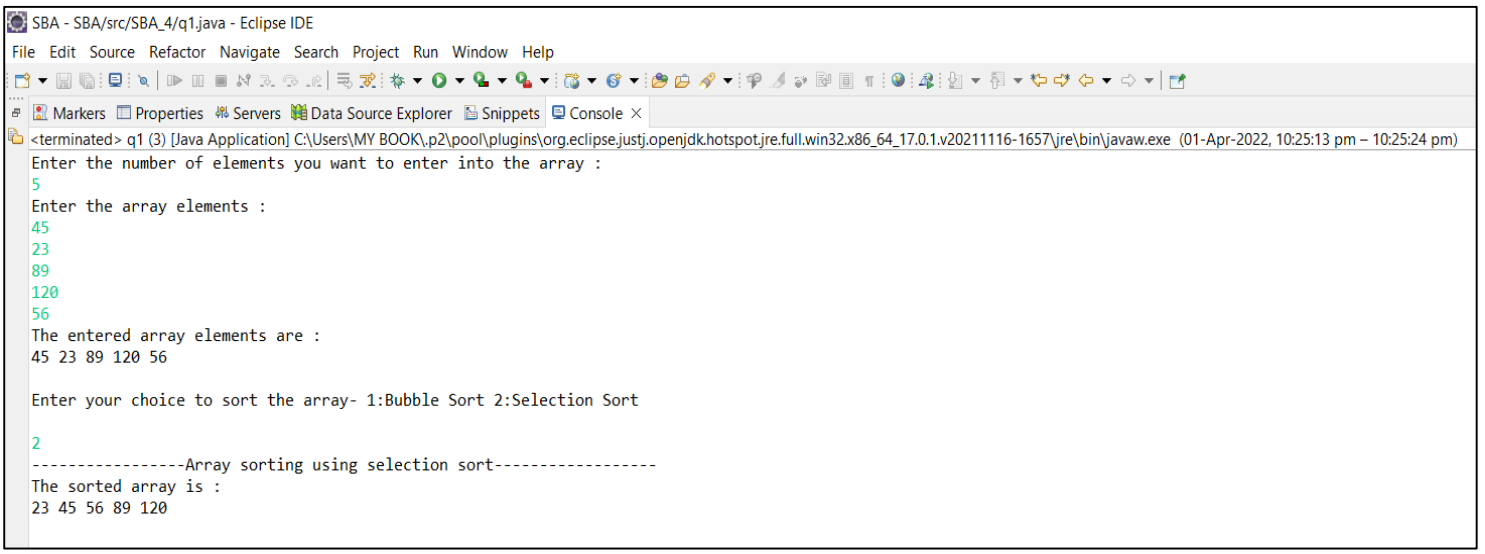
1. **Write a program to take an integer array from the user and give the user a choice to sort using bubble sort (or) selection sort. Sort the array elements according to the selected algorithm of the user and display the sorted array.**

```
package SBA_4;

import java.util.Scanner;

public class q1 {

int i,j,n;

void bubblesort(int arr[])

{

//sorting of array elements using bubble sort

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;

}

}

}

void printArray1(int arr[])

{

int n = arr.length;

for (int i=0; i<n; ++i)

System.out.print(arr[i] + " ");

System.out.println();

}


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;
}
}
void printArray2(int arr[])
{
int n = arr.length;
for (int i=0; i<n; ++i)
System.out.print(arr[i]+" ");
System.out.println();
}

public static void main(String[] args) {
Scanner sc=new Scanner(System.in);
q1 obj=new q1();
System.out.println("Enter the number of elements you want to enter into the array : ");
int n=sc.nextInt();
int[] arr=new int[n];
System.out.println("Enter the array elements : ");
for(int i=0;i<n;i++)
{
arr[i]=sc.nextInt();
}
System.out.println("The entered array elements are : ");
for(int i=0;i<n;i++)
{
System.out.print(arr[i]+" ");
}
System.out.println("\n");
System.out.println("Enter your choice to sort the array- 1:Bubble Sort 2:Selection Sort");
int choice=sc.nextInt();
switch(choice)
{
case 1:
```

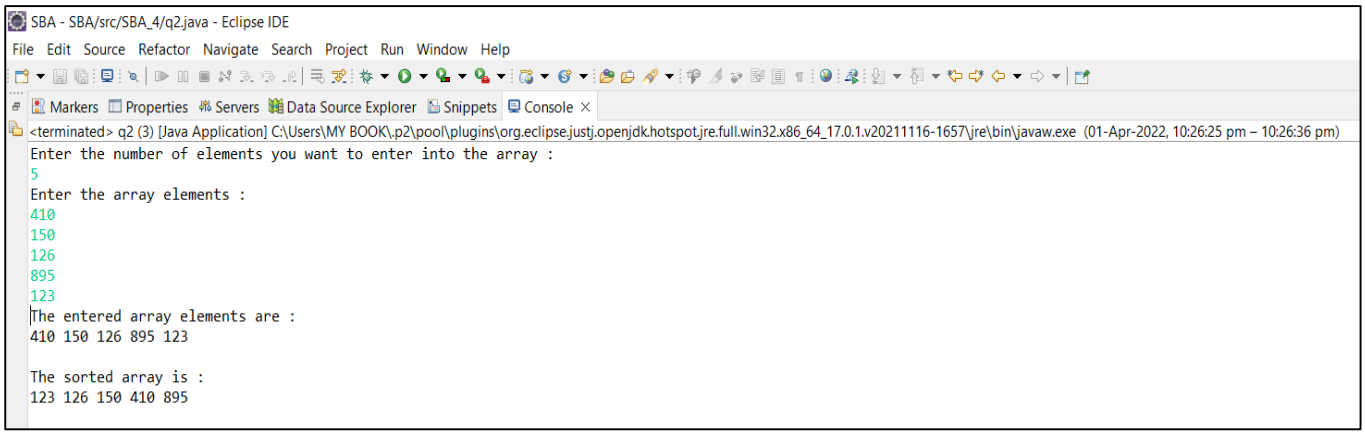
```
System.out.println("------------------------Array sorting using bubble sort-------------------
----");
System.out.println("The sorted array is : ");
obj.bubblesort(arr);
obj.printArray1(arr);
break;
case 2:
System.out.println("-----------------Array sorting using selection sort-----------------");
System.out.println("The sorted array is : ");
obj.selectionsort(arr);
obj.printArray2(arr);
break;
default:
System.out.println("You entered an invalid option !");
break;
}

}
}
```



2. Write a program to implement insertion sort.

```
package SBA_4;

import java.util.Scanner;

public class q2 {
public static void main(String[] args) {
Scanner sc=new Scanner(System.in);
System.out.println("Enter the number of elements you want to enter into the array : ");
int n=sc.nextInt();
int[] arr=new int[n];
```

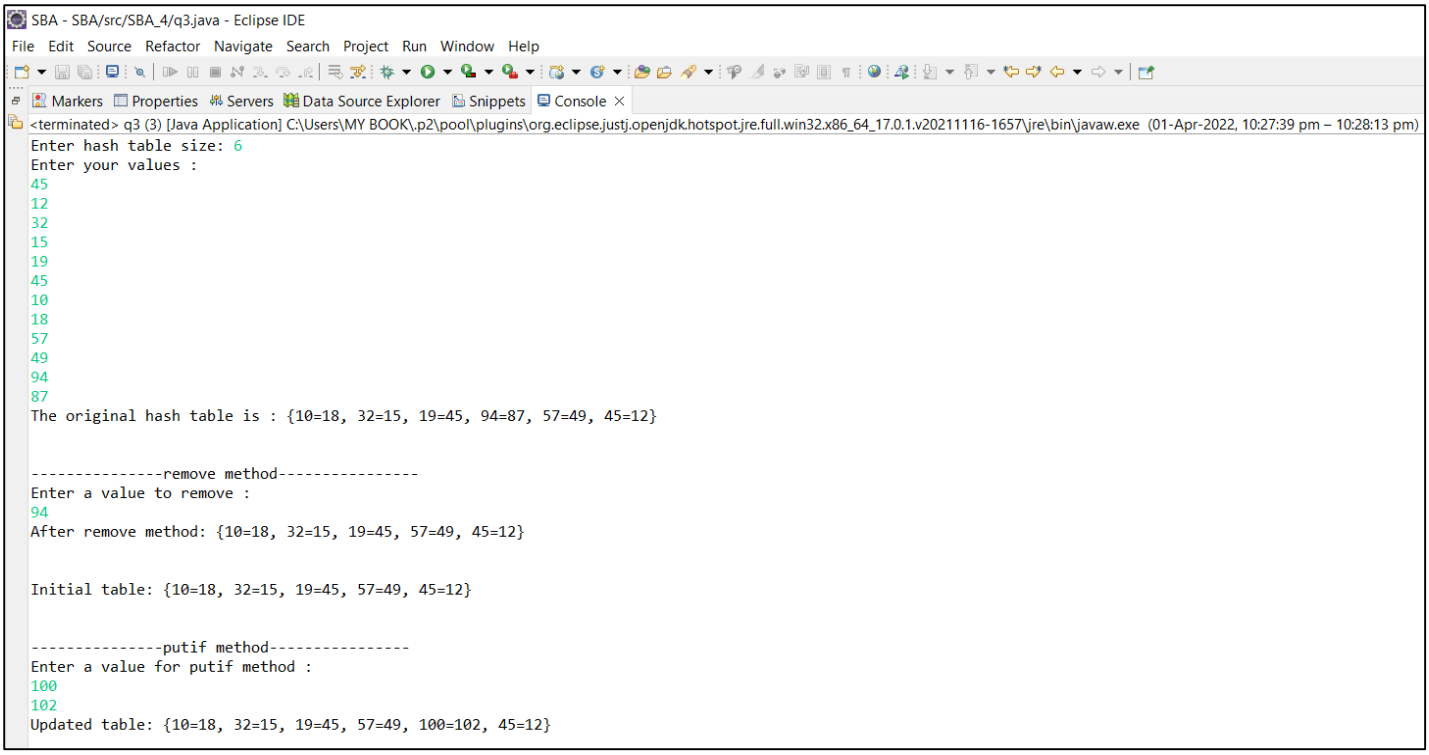
```
System.out.println("Enter the array elements : ");
for(int i=0;i<n;i++)
{
arr[i]=sc.nextInt();
}
System.out.println("The entered array elements are : ");
for(int i=0;i<n;i++)
{
System.out.print(arr[i]+" ");
}
System.out.println("\n");
//sorting of array elements using insertion sort
for (int i = 1; i < n; ++i)
{
int key = arr[i];
int j = i - 1;
while (j >= 0 && arr[j] > key)
{
arr[j + 1] = arr[j];
j = j - 1;
}
arr[j + 1] = key;
}
System.out.println("The sorted array is : ");
for (int i = 0; i < n; ++i)
System.out.print(arr[i] + " ");

}
	}
```



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

```
package SBA_4;

import java.util.Hashtable;

import java.util.Scanner;

public class q3 {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

System.out.print("Enter hash table size: ");

int number = sc.nextInt();

int[] array = new int[number];
```

```
Hashtable<Integer,String> hm=new Hashtable<Integer,String>();
System.out.println("Enter your values : ");
for(int i = 0; i < array.length; i++)
{

int value = sc.nextInt();
String val=sc.next();
hm.put(value, val);      }
System.out.println("The original hash table is : "+hm);
System.out.println("\n");
System.out.println("---------------remove method----------------");
System.out.println("Enter a value to remove : ");
int rem=sc.nextInt();
hm.remove(rem);
System.out.println("After remove method: "+ hm);
//updates the table
System.out.println("\n");
System.out.println("Initial table: "+hm);
System.out.println("\n");
System.out.println("---------------putif method----------------");
System.out.println("Enter a value for putif method : ");
int p1=sc.nextInt();
String p2=sc.next();
hm.putIfAbsent(p1, p2);
System.out.println("Updated table: "+hm);
System.out.println("\n");
}
}
```



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.*;

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 q4 {
```

```
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);
}
}
}
```