

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;

}

}

}

```

```

SBA - SBA/src/SBA_4/q1.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console X
<terminated> q1 (3) [Java Application] C:\Users\MY BOOK\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.1.v20211116-1657\jre\bin\javaw.exe (01-Apr-2022, 10:25:13 pm - 10:25:24 pm)
Enter the number of elements you want to enter into the array :
5
Enter the array elements :
45
23
89
120
56
The entered array elements are :
45 23 89 120 56

Enter your choice to sort the array- 1:Bubble Sort 2:Selection Sort

2
-----Array sorting using selection sort-----
The sorted array is :
23 45 56 89 120

```

## 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] + " ");

}
}

```

SBA - SBA/src/SBA\_4/q2.java - Eclipse IDE

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<terminated> q2 (3) [Java Application] C:\Users\MY BOOK\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86\_64\_17.0.1.v20211116-1657\jre\bin\javaw.exe (01-Apr-2022, 10:26:25 pm - 10:26:36 pm)

```

Enter the number of elements you want to enter into the array :
5
Enter the array elements :
410
150
126
895
123
The entered array elements are :
410 150 126 895 123

The sorted array is :
123 126 150 410 895

```

### 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");
}
}

```

```
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<terminated> q3 (3) [Java Application] C:\Users\MY BOOK\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_17.0.1.v20211116-1657\jre\bin\javaw.exe (01-Apr-2022, 10:27:39 pm - 10:28:13 pm)
Enter hash table size: 6
Enter your values :
45
12
32
15
19
45
10
18
57
49
94
87
The original hash table is : {10=18, 32=15, 19=45, 94=87, 57=49, 45=12}

-----remove method-----
Enter a value to remove :
94
After remove method: {10=18, 32=15, 19=45, 57=49, 45=12}

Initial table: {10=18, 32=15, 19=45, 57=49, 45=12}

-----putif method-----
Enter a value for putif method :
100
102
Updated table: {10=18, 32=15, 19=45, 57=49, 100=102, 45=12}
```

#### 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);
}
}
}
}

```



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<terminated> q4 (3) [Java Application] C:\Users\MY BOOK\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86\_64\_17.0.1.v20211116-1657\jre\bin\javaw.exe (01-Apr-2022, 10:29:16 pm - 10:29:16 pm)

```

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

```