1.  Create a class illustrating all the three types of constructors

● No arguments constructor

● Default constructor

● Parameterised constructor (can create more than one with different type of parameters)

public class Product {

// Data members

private String name;

private double price;

private int quantity;

// 1. No arguments constructor (also the default constructor)

public Product() {

// Initialize data members with default values

this.name = "Unknown";

this.price = 0.0;

this.quantity = 0;

}

// 2. Parameterised constructor with name and price

public Product(String name, double price) {

this.name = name;

this.price = price;

this.quantity = 1; // Assume default quantity of 1

}

// 3. Parameterised constructor with all parameters

public Product(String name, double price, int quantity) {

this.name = name;

this.price = price;

this.quantity = quantity;

}

// Other methods (e.g., getters, setters, toString) can be added as needed

}

2.  Given a sorted integer array (in increasing order), remove duplicates in-place such that each unique element appears only once. The relative order of the elements should be kept the same. Then return the number of unique elements in the array.

**Input**

[22,22,77,77,88, 89,89]

**Output**

4

**Explanation :**After removing duplicates -> [22, 77, 88, 89, \_, \_, \_ ]

No. of unique elements = 4

public class RemoveDuplicates {

public static int removeDuplicates(int[] nums) {

int i = 0;

for (int j = 1; j < nums.length; j++) {

if (nums[i] != nums[j]) {

i++;

nums[i] = nums[j];

}

}

return i + 1;

}

public static void main(String[] args) {

int[] nums = {22, 22, 77, 77, 88, 89, 89};

int numUnique = removeDuplicates(nums);

System.out.println("Number of unique elements: " + numUnique);

System.out.println("Modified array: " + Arrays.toString(nums));

}

}

3 .  An array contains both positive and negative numbers in random order. Rearrange the array elements so that all negative numbers appear before all positive numbers. Don’t use .sort() method

**Input**[-12, 11, -13, -5, 6, -7, 5, -3, -6]

**Output**[-12, -13, -5, -7, -3, -6, 11, 6, 5]

import java.util.Arrays;

public class RearrangeArray {

public static void rearrange(int[] arr) {

int i = -1; // Index for negative numbers

for (int j = 0; j < arr.length; j++) {

if (arr[j] < 0) {

i++; // Increment index for negative numbers

int temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

}

}

}

public static void main(String[] args) {

int[] arr = {-12, 11, -13, -5, 6, -7, 5, -3, -6};

System.out.println("Original array: " + Arrays.toString(arr));

rearrange(arr);

System.out.println("Rearranged array: " + Arrays.toString(arr));

}

}