18wh1a05a3 - Amulya Chandhana
Date : 11/06/2021

Additional Problems On Arrays

Problem-1:

```
package AdditionalProblems6;
import java.io.*;
import java.util.*;
import java.lang.*;
public class Problem_1 {
	static Scanner sc = new Scanner(System.in);
	public static void main(String[] args) {
		System.out.print("Enter the no.of elements in the array:");
		int t = sc.nextInt();
		System.out.print("Enter the elements of the array:");
		int arr[] = new int[t];
		for(int i=0;i<t;i++) {
			arr[i]=sc.nextInt();
		}
		ReArranging(arr,t);
		System.out.print("Final Array:");
		for(int i=0;i<t;i++) {
			System.out.print(arr[i]+" ");
		}

	}

	//Time Complexity : O(n)
	//Auxiliary space : O(n)
	//Approch-1 Using extra array
	private static void Arrange(int[] arr, int t) {
		int temp[] = new int[t];
		int j=0;
		for(int i=0;i<t;i++) {
			if(arr[i]<0) {
				temp[j++] =arr[i];
			}
		}
		if(j==0||j==t) {
			return;
		}
		for(int i=0;i<t;i++) {
			if(arr[i]>=0) {
				temp[j++] =arr[i];
			}
		}
		for(int i=0;i<t;i++) {
			arr[i]=temp[i];
		}
```

```
	}

//Time Complexity : O(n^2)
//Auxiliary space : O(1)
//Approch-2 // usinf modified Insertion Sort
	private static void ReArranging(int[] arr, int t) {
		int key,j;
		for(int i=1;i<t;i++) {
			key=arr[i];
			if(key>0) {
				continue;
			}
			j = i-1;
			while(j>=0 && arr[j]>=0) {
				arr[j+1] = arr[j];
				j=j-1;
			}
			arr[j+1]=key;
		}
	}

}
```

OutPut 1:-

```
Enter the no.of elements in the array:5
Enter the elements of the array:2 -4 7 -3 4
Final Array:-4 -3 2 7 4
```

OutPut 2:-

```
Enter the no.of elements in the array:10
Enter the elements of the array:12 34 56 -34 -67 -90 -2 8 120 -17
Final Array:-34 -67 -90 -2 -17 12 34 56 8 120
```

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Problem-2:

```
package AdditionalProblems6;
import java.util.*;
public class Problem_2 {
	static Scanner sc = new Scanner(System.in);
	public static void main(String[] args) {
		int n;
		System.out.println("Enter the no. of elements : ");
		n = sc.nextInt();
		int[] arr = new int[n];
		System.out.println("Enter the elements : ");
		for(int i = 0;i<n;i++) {
			arr[i] = sc.nextInt();
		}
		ReArranging(arr,n);
		int neg=0;
		for(int i = 0;i<n;i++) {
			if(arr[i]<0) {
				neg++;
			}
		}
		int pov = n-neg;
		ArrayList<Integer> list = new ArrayList<>();
		int x=0,y=0;
		for(int i=0;i<n;i++) {
			if(i%2==0) {
				list.add(arr[x]);
				x++;
			}
			else {
				list.add(arr[pov+y]);
				y++;
			}
		}
		System.out.println("Final Array : ");
		for(int i=0;i<n;i++) {
			System.out.print(list.get(i)+" ");
		}

	}
```

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```
	private static void ReArranging(int[] arr, int t) {
		int temp[] = new int[t];
		int j=0;
		for(int i=0;i<t;i++) {
			if(arr[i]>=0) {
				temp[j++] =arr[i];
			}
		}
		if(j==0||j==t) {
			return;
		}
		for(int i=0;i<t;i++) {
			if(arr[i]<0) {
				temp[j++] =arr[i];
			}
		}
		for(int i=0;i<t;i++) {
			arr[i]=temp[i];
		}
	}
}
```

OutPut 1:-

```
Enter the no. of elements :
9
Enter the elements :
9 4 -2 -1 5 0 -5 -3 2
Final Array :
9 -2 4 -1 5 -5 0 -3 2
```

OutPut 2:-

```
Enter the no. of elements :
5
Enter the elements :
5 12 -4 -7 68
Final Array :
5 -4 12 -7 68
```

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Problem-3:

```
package AdditionalProblems6;
import java.util.*;
public class Problem_3 {
	static Scanner sc = new Scanner(System.in);
	public static void main(String[] args) {
		System.out.println("Enter the size of the array: ");
		int n = sc.nextInt();
		int[] arr = new int[n];
		System.out.println("Enter the elements of the array: ");
		for(int i = 0;i<n;i++) {
			arr[i] = sc.nextInt();
		}
		HashMap<Integer,Integer> map = new HashMap<>();
		for(int i:arr) {
			if(map.containsKey(i)) {
				int val = map.get(i)+1;
				map.put(i, val);
			}
			else {
				map.put(i,1);
			}
		}
		int max = 0;
		boolean flag = false;
		for (Map.Entry<Integer, Integer> e : map.entrySet()){
			if(e.getValue() > n/2 ){
				max = e.getKey();
				flag = true;
			}
		}
		if(flag == false) {
			System.out.print("No majority element");
		}
		else {
			System.out.print("Majority ele: "+max);
		}
	}
}
```

OutPut:-

```
Enter the size of the array:
9
Enter the elements of the array:
11 11 11 11 23 11 24 13 35
Majority ele: 11
```

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Problem-4:

```
package AdditionalProblems6;
import java.util.*;
public class Problem_4 {
static Scanner sc = new Scanner(System.in);
	public static void main(String[] args) {
		System.out.println("Enter the Number of bulbs:");
		int n = sc.nextInt();
		System.out.println("Enter the Status of each bulb:");
		int B[] = new int[n];
		for(int i=0;i<n;i++) {
			B[i] = sc.nextInt();
		}
		int count=0;
		for(int i=0;i<n-1;i++) {
			if(B[i]!=B[i+1]) {
				count++;
			}
		}
		System.out.println("Minimun number of switchs:"+count);

	}

}
```

OutPut 1:-

```
Enter the Number of bulbs:
6
Enter the Status of each bulb:
1 0 1 1 0 0
Minimun number of switchs:3
```

OutPut 2:-

```
Enter the Number of bulbs:
14
Enter the Status of each bulb:
1 0 1 1 1 0 1 1 1 1 0 0 1 0
Minimun number of switchs:7
```

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Problem-5:

```
package AdditionalProblems6;
import java.util.*;
public class Problem_5 {
static Scanner sc = new Scanner(System.in);
	public static void main(String[] args) {
		System.out.println("Enter the number of holes: ");
		int h = sc.nextInt();
		System.out.println("Enter the diameter of each hole: ");
		int DH[] = new int[h];
		int capacity[] = new int[h];
		for(int i=0;i<h;i++) {
			capacity[i] = i+1;}
		for(int i=0;i<h;i++){
			DH[i] = sc.nextInt();}
		System.out.println("Enter the number of balls: ");
		int b = sc.nextInt();
		System.out.println("Enter the diameter of each ball: ");
		int DB[] = new int[b];
		for(int i=0;i<b;i++) {
			DB[i] = sc.nextInt();
		}
		System.out.println("Positions of each ball: ");
	   boolean flag;
		for(int i=0;i<b;i++) {
			flag=false;
			for(int j=h-1;j>=0;j--) {
				if(DB[i]<=DH[j] && capacity[j]>0) {
					capacity[j] -= 1;
					flag = true;
					System.out.print((j+1)+" ");
					break;
				}
			}
			if(flag == false) {
				System.out.print(0+" ");
			}
		}
	}
}
```

OutPut:-

```
Enter the number of holes:
3
Enter the diameter of each hole:
21 3 6
Enter the number of balls:
11
Enter the diameter of each ball:
20 15 5 7 10 4 2 1 3 6 8
Positions of each ball:
1 0 3 0 0 3 3 2 2 0 0
```

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Problem-6:

```
package AdditionalProblems6;
import java.util.*;
public class Problem_6 {
	static Scanner sc = new Scanner(System.in);
	public static void main(String[] args) {
		System.out.println("Enter the number of balloons: ");
		int n = sc.nextInt();
		System.out.println("Enter the radius of each balloons: ");
		int B[] = new int[n];
		for(int i=0;i<n;i++) {
			B[i] = sc.nextInt();
		}
		System.out.println("Enter the persentage reduce: ");
		int p = sc.nextInt();
		Arrays.sort(B);
		double TotalVolume=0.0;
		float vol;
		for(int i=0;i<n;i++) {
			vol =0;
			vol = (float) ((4*3.14*Math.pow(B[i], 3))/3);
			int x = n-i-1;
			while(x-->0) {
				vol -= (p*vol)/100;
			}
			TotalVolume +=vol;
		}
		System.out.printf("Total Volume: %.2f ",TotalVolume);

	}

}
```

OutPut:-

```
Enter the number of balloons:
5
Enter the radius of each balloons:
8 4 6 10 3
Enter the persentage reduce:
10
Total Volume: 7117.88
```