1. Find the Majority Element in an Array
2. package Assignment6;
3. import java.util.\*;
4. public class MajorityElement {
5. public static int findMajorityElement(int[] arr) {
6. HashMap<Integer, Integer> map = new HashMap<>();
7. int n = arr.length;
8. for (int i=0;i<n;i++) {
9. map.put(arr[i], map.getOrDefault(arr[i], 0) + 1);
10. if (map.get(arr[i]) > n / 2) {
11. return arr[i];
12. }
13. }
14. return -1;
15. }
16. public static void main(String[] args) {
17. int[] arr = {3,3,4,2,3,3,3};
18. System.***out***.println("Majority Element: " + *findMajorityElement*(arr));
19. }
20. }

2. Solve the Maximum Subarray Sum Problem (Kadane Algorithm)

package Assignment6;

import java.util.\*;

public class MaximumSubArray {

public static int maxSubArray(int[] arr) {

int maxSum = arr[0];

int currentSum = arr[0];

for (int i = 1; i < arr.length; i++) {

currentSum = Math.*max*(arr[i], currentSum + arr[i]);

maxSum = Math.*max*(maxSum, currentSum);

}

return maxSum;

}

public static void main(String[] args) {

int[] arr = {-2,1,-3,4,-1,2,1,-5,4};

System.***out***.println("Maximum Subarray Sum: " + *maxSubArray*(arr));

}

}

3. Find the First Non-Repeating Character in a String

package Assignment6;

import java.util.\*;

public class NonRepeating {

public static int firstUniqChar(String s) {

HashMap<Character, Integer> map = new HashMap<>();

for (char c : s.toCharArray()) {

map.put(c, map.getOrDefault(c, 0) + 1);

}

for (int i = 0; i < s.length(); i++) {

if (map.get(s.charAt(i)) == 1) {

return i;

}

}

return -1;

}

public static void main(String[] args) {

String s = "aabb";

System.***out***.println("First non-repeating character index: " + *firstUniqChar*(s));

}

}

}

4. Given two strings s1 and s2, check if s2 is a rotation of s1 using only one call to a

substring-checking method (or equivalent logic). A rotation means that the characters

are shifted in a circular manner.

package Assignment6;

import java.util.\*;

public class RotationString {

public static boolean isRotation(String s1, String s2) {

if (s1.length() != s2.length()) return false;

String combined = s1 + s1;

return combined.contains(s2);

}

public static void main(String[] args) {

String s1 = "waterbottle";

String s2 = "erbottlewat";

if (*isRotation*(s1, s2)) {

System.***out***.println("True");

} else {

System.***out***.println("False");

}

}

}