1 /\*\*  
 2 \* @author Amar Bessedik   
 3 \* This class designs a disjoint set data structure using an array of ints.  
 4 \* The index represents the label of a set. The cell content hold vertices.  
 5 \*/  
 6 public class DisjointSet  
 7 {  
 8 private int[] set;//Holds graph's vertices represented by their labels.  
 9 private int N;//# of subsets where labels start from 1 up to N included.  
10   
11 /\*\*  
12 \* Constructor  
13 \* @param n # of vertices  
14 \*  
15 \*/  
16 public DisjointSet(int n)  
17 {  
18 this.N = n;  
19 initializeSubsets(N);  
20 }//end Constructor  
21   
22 private void initializeSubsets(int n)  
23 {   
24 this.set = new int[n + 1]; // There is no vertex called 0, therefore:  
25 // Start from 1 up to n included as vertices called 1, 2, . . ., n  
26 for (int x = 1; x <= n; x++)  
27 this.set[x] = x;  
28 }//end initializeSubsets()  
29   
30 /\*\*  
31 \* Finds the label of a vertex and does path compression along the way.  
32 \* @param x is a vertex  
33 \* @return the label of x.  
34 \*/  
35 public int find2(int x)  
36 {  
37 int r = x;  
38 while (r != set[r]) //If x is not its own representative (label)  
39 r = set[r];  
40   
41 int i = x;  
42 int j;  
43   
44 while (i != r) //Proceed to path compression only if x != set[x]  
45 {  
46 j = set[i];  
47 set[i] = r;  
48 i = j;  
49 }//All visited nodes would have been updated to point to same representative.  
50 return r;  
51 }//end find2()  
52   
53   
54 /\*\*  
55 \* merges two vertices in different disjoint sets into one disjoint set.  
56 \*  
57 \* @param a  
58 \* @param b  
59 \*/  
60 public void merge(int a, int b)  
61 {  
62 if (a < b)  
63 set[b] = a;  
64 else  
65 set[a] = b;   
66 }//end merge()  
67   
68 //Helps in debugging and to display the effect of path compression.  
69 private void showPathCompression(int[] d\_set)  
70 {  
71 for (int u : d\_set)  
72 System.out.printf("%3d", d\_set[u]);  
73 System.out.println();  
74 }//end showPathCompression()  
75 }//end class  
76