

Module 1 - Activity 7

Question:

Show the contents of the `id[]` array and the number of times the array is accessed for each input pair when you use quick-find, quick-union, weighted quick-union, weighted quick-union path compression, for the sequence of inputs 9-0 3-4 5-8 7-2 2-1 5-7 0-3 4-2.

Solution:

Quick Find :

Indexes :	0	1	2	3	4	5	6	7	8	9
	0	1	2	3	4	5	6	7	8	9
union(9,0)	0	1	2	3	4	5	6	7	8	0
union(3,4)	0	1	2	4	4	5	6	7	8	0
union(5,8)	0	1	2	4	4	8	6	7	8	0
union(7,2)	0	1	2	4	4	8	6	2	8	0
union(2,1)	0	1	1	4	4	8	6	1	8	0
union(5,7)	0	1	1	4	4	1	6	1	1	0
union(0,3)	4	1	1	4	4	1	6	1	1	4
union(4,2)	1	1	1	1	1	1	6	1	1	1

Quick Union :

Indexes :	0	1	2	3	4	5	6	7	8	9
	0	1	2	3	4	5	6	7	8	9
union(9,0)	0	1	2	3	4	5	6	7	8	0
union(3,4)	0	1	2	4	4	5	6	7	8	0
union(5,8)	0	1	2	4	4	8	6	7	8	0
union(7,2)	0	1	2	4	4	8	6	2	8	0

union(2,1)	0	1	1	4	4	8	6	2	8	0
union(5,7)	0	1	1	4	4	8	6	2	1	0
union(0,3)	4	1	1	4	4	8	6	2	1	0
union(4,2)	4	1	1	4	1	8	6	2	1	0

Weighted Quick Union :

Indexes :	0	1	2	3	4	5	6	7	8	9
	0	1	2	3	4	5	6	7	8	9
weights:	1	1	1	1	1	1	1	1	1	1
union(9,0)	9	1	2	3	4	5	6	7	8	9
weights:	1	1	1	1	1	1	1	1	1	2
union(3,4)	9	1	2	3	3	5	6	7	8	9
weights:	1	1	1	2	1	1	1	1	1	2
union(5,8)	9	1	2	3	3	5	6	7	5	9
weights:	1	1	1	2	1	2	1	1	1	2
union(7,2)	9	1	7	3	3	5	6	7	5	9
weights:	1	1	1	2	1	2	1	2	1	2
union(2,1)	9	7	7	3	3	5	6	7	5	9
weights:	1	1	2	2	1	2	1	2	1	2
union(5,7)	9	7	7	3	3	5	6	5	5	9
weights:	1	1	2	2	1	4	1	2	1	2
union(0,3)	9	7	7	3	3	5	6	5	5	3
weights:	1	1	2	3	1	4	1	2	1	2
union(4,2)	9	7	7	5	3	5	6	5	5	3
weights:	1	1	3	3	1	4	1	2	1	2

Weighted Quick Union - Path Compression:

Indexes :	0	1	2	3	4	5	6	7	8	9
	0	1	2	3	4	5	6	7	8	9
weights:	1	1	1	1	1	1	1	1	1	1
union(9,0)	9	1	2	3	4	5	6	7	8	9
weights:	1	1	1	1	1	1	1	1	1	2
union(3,4)	9	1	2	3	3	5	6	7	8	9
weights:	1	1	1	2	1	1	1	1	1	2
union(5,8)	9	1	2	3	3	5	6	7	5	9
weights:	1	1	1	2	1	2	1	1	1	2
union(7,2)	9	1	7	3	3	5	6	7	5	9
weights:	1	1	1	2	1	2	1	2	1	2
union(2,1)	9	7	7	3	3	5	6	7	5	9
weights:	1	1	2	2	1	2	1	2	1	2
union(5,7)	9	7	7	3	3	5	6	5	5	9
weights:	1	1	2	2	1	4	1	2	1	2
union(0,3)	9	7	7	3	3	5	6	5	5	9
weights:	1	1	2	3	1	4	1	2	1	2
union(4,2)	9	7	7	5	3	5	6	5	5	3
weights:	1	1	3	3	1	4	1	2	1	2