## Activity 7 - Learning by doing 1

**Quick Find** - Replace with All the occurences of first element with the second.

**Quick Union** - Replace only one element, takes value as index of other, and so on and then swaps/replace.

**Weighted Quick Union** - Merges two paths, smaller to larger path.Right, if large and left on small.

**Weighted Quick Union Path Compression** - Takes root as parent and shifts up decreasing the height of tree.

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### Quick Find

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| **Quick-Find** | **Array id[]** |
| Initial Array for Quick Find | [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] |

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### Quick Union

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| **Quick-Union** | **Array id[]** |
| Initial value of the array | [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

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| **Weighted Quick-Union** | **Array id[]** |
| Initial value of the array | [0, 1, 2, 3, 4, 5, 6, 7, 8, 9] |
| union(9,0) | [9, 1, 2, 3, 4, 5, 6, 7, 8, 9] |
| union(3,4) | [9, 1, 2, 3, 3, 5, 6, 7, 8, 9] |
| union(5,8) | [9, 1, 2, 3, 3, 5, 6, 7, 5, 9] |
| union(7,2) | [9, 1, 7, 3, 3, 5, 6, 7, 5, 9] |
| union(2,1) | [9, 7, 7, 3, 3, 5, 6, 7, 5, 9] |
| union(5,7) | [9, 7, 7, 3, 3, 7, 6, 7, 5, 9] |
| union(0,3) | [9, 7, 7, 9, 3, 7, 6, 7, 5, 9] |
| union(4,2) | [9, 7, 7, 9, 3, 7, 6, 7, 5, 7] |

### Weighted Quick Union Path Compression

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| **Weighted Quick-Union path compression** | **Array id[]** |
| Initial value of the array | [0, 1, 2, 3, 4, 5, 6, 7, 8, 9] |
| union(9,0) | [9, 1, 2, 3, 4, 5, 6, 7, 8, 9] |
| union(3,4) | [9, 1, 2, 3, 3, 5, 6, 7, 8, 9] |
| union(5,8) | [9, 1, 2, 3, 3, 5, 6, 7, 5, 9] |
| union(7,2) | [9, 1, 7, 3, 3, 5, 6, 7, 5, 9] |
| union(2,1) | [9, 7, 7, 3, 3, 5, 6, 7, 5, 9] |
| union(5,7) | [9, 7, 7, 3, 3, 7, 6, 7, 5, 9] |
| union(0,3) | [9, 7, 7, 9, 3, 7, 6, 7, 5, 9] |
| union(4,2) | [9, 7, 7, 9, 3, 7, 6, 7, 5, 7] |