**Quick find:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| input | id[0] | id[1] | id[2] | id[3] | id[4] | id[5] | id[6] | id[7] | id[8] | id[9] |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 9-0 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 0 |
| 3-4 | 0 | 1 | 2 | 4 | 4 | 5 | 6 | 7 | 8 | 0 |
| 5-8 | 0 | 1 | 2 | 4 | 4 | 8 | 6 | 7 | 8 | 0 |
| 7-2 | 0 | 1 | 2 | 4 | 4 | 8 | 6 | 2 | 8 | 0 |
| 2-1 | 0 | 1 | 1 | 4 | 4 | 8 | 6 | 1 | 8 | 0 |
| 5-7 | 0 | 1 | 1 | 4 | 4 | 1 | 6 | 1 | 1 | 0 |
| 0-3 | 4 | 1 | 1 | 4 | 4 | 1 | 6 | 1 | 1 | 4 |
| 4-2 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 1 | 1 | 1 |
|  |  |  |  |  |  |  |  |  |  |  |

**Quick union:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| input | id[0] | id[1] | id[2] | id[3] | id[4] | id[5] | id[6] | id[7] | id[8] | id[9] |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 9-0 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 0 |
| 3-4 | 0 | 1 | 2 | 4 | 4 | 5 | 6 | 7 | 8 | 0 |
| 5-8 | 0 | 1 | 2 | 4 | 4 | 8 | 6 | 7 | 8 | 0 |
| 7-2 | 0 | 1 | 2 | 4 | 4 | 8 | 6 | 2 | 8 | 0 |
| 2-1 | 0 | 1 | 1 | 4 | 4 | 8 | 6 | 2 | 8 | 0 |
| 5-7 | 0 | 1 | 1 | 4 | 4 | 8 | 6 | 2 | 1 | 0 |
| 0-3 | 4 | 1 | 1 | 4 | 4 | 8 | 6 | 2 | 1 | 0 |
| 4-2 | 4 | 1 | 1 | 4 | 1 | 8 | 6 | 2 | 1 | 0 |
|  |  |  |  |  |  |  |  |  |  |  |

**Weighted Quick union:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| input | id[0] | id[1] | id[2] | id[3] | id[4] | id[5] | id[6] | id[7] | id[8] | id[9] |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 9-0 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3-4 | 9 | 1 | 2 | 3 | 3 | 5 | 6 | 7 | 5 | 9 |
| 5-8 | 9 | 1 | 2 | 3 | 3 | 5 | 6 | 7 | 5 | 9 |
| 7-2 | 9 | 1 | 7 | 3 | 3 | 5 | 6 | 7 | 5 | 9 |
| 2-1 | 9 | 7 | 7 | 3 | 3 | 5 | 6 | 7 | 5 | 9 |
| 5-7 | 9 | 7 | 7 | 3 | 3 | 7 | 6 | 7 | 5 | 9 |
| 0-3 | 9 | 7 | 7 | 9 | 3 | 7 | 6 | 7 | 5 | 9 |
| 4-2 | 9 | 7 | 7 | 9 | 3 | 7 | 6 | 7 | 5 | 9 |