ENERO 31

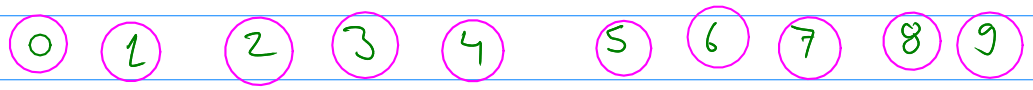
UNION FIND

¿Qué es?

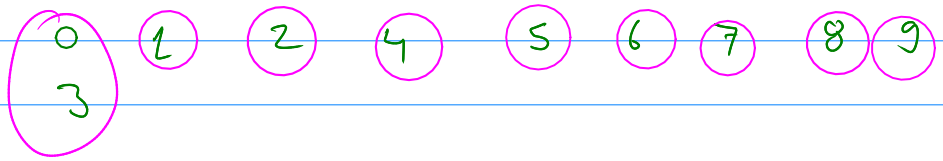
Es una estructura de datos que nos permite **unir** conjuntos disjuntos y **saber** si dos elementos pertenecen al mismo conjunto.
↳ find

Idea (10 conjuntos disjuntos)

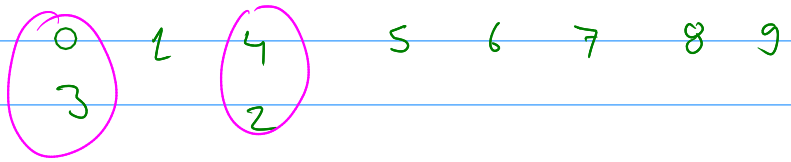
init



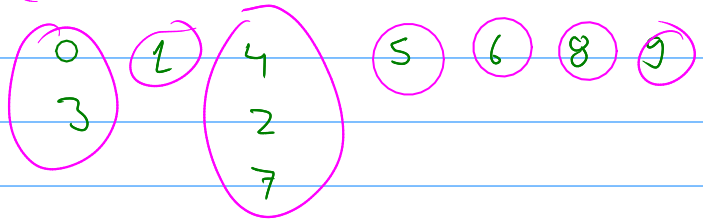
unir (0,3)



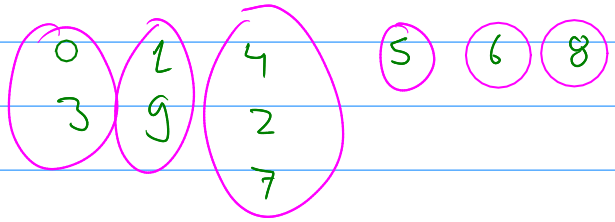
unir (4,2)



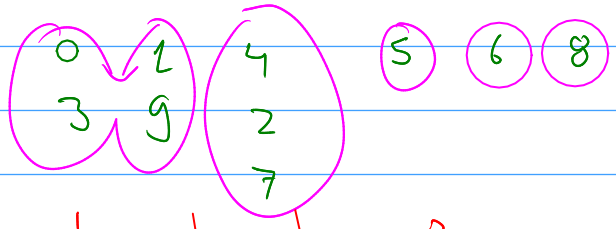
unir (2,7)



unir (1,9)

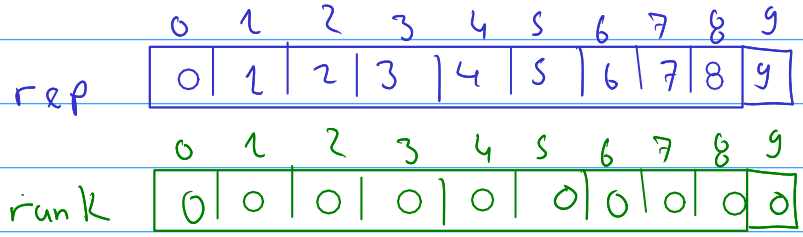


Unir (3, 9)



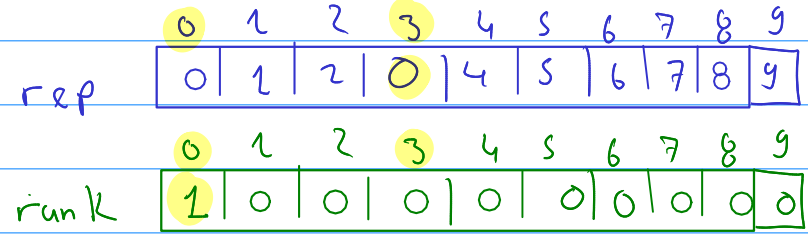
¿Cómo lo implementamos?

① init



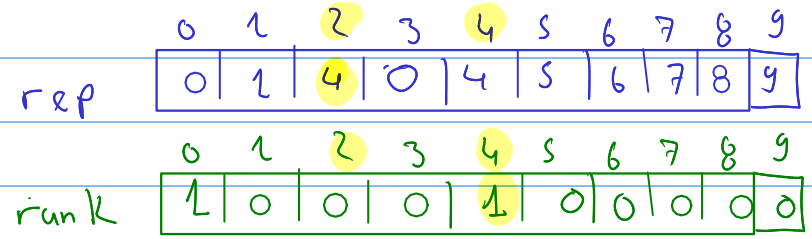
0 1 2 3 4 5 6 7 8 9

② unir(0,3)



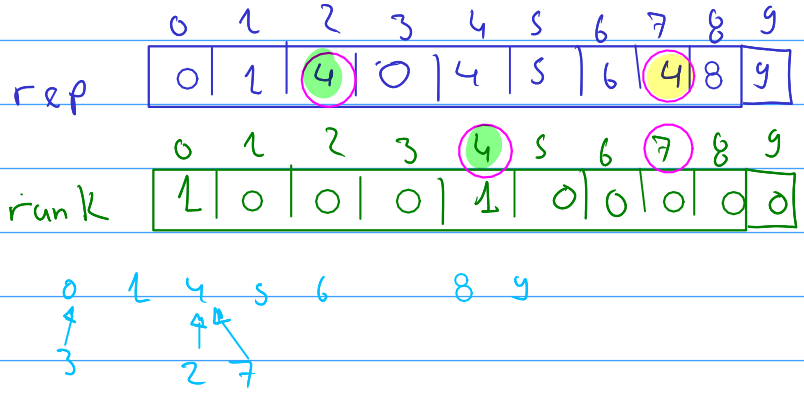
0 1 2 4 5 6 7 8 9
↑
3

unir (4,2)

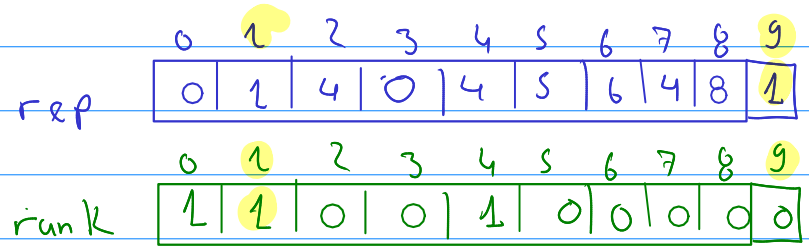


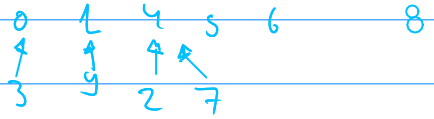
0 1 4 5 6 7 8 9
↑ ↑
3 2

unir (2,7)

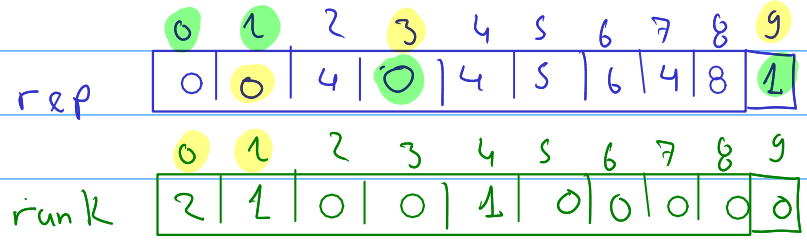


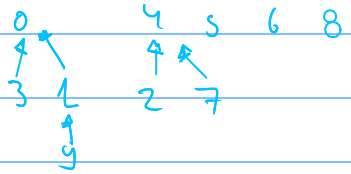
unir (1,9)



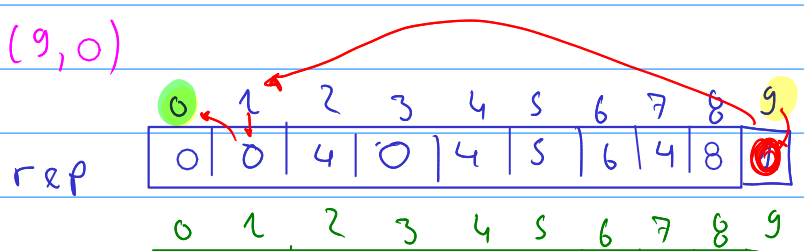


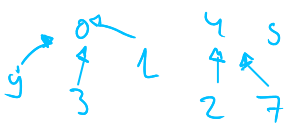
unir (3,9)





unir (9,0)





Pseudocódigo

```
init (N)
    for(i = 0; i < N; i++)
        rep[i] = i
        rank[i] = 0
```

```
find (x)        O(log N)
    if (rep[x] == x)
        return x
    return rep[x] = find(rep[x])
```

```
union(x, y)     O(log N)
    x = find(x), y = find(y)
    if (x != y)
        if(rank[x] >= rank[y])      x ← y
            rep[y] = x
            if(rank[x] == rank[y])
                rank[x]++;
        else
            rep[x] = y              y ← x
```