

Constructing a contingency table from 2-bit encoded genotypes

$contin \leftarrow \{0, 0, 0, 0, 0, 0, 0, 0, 0, 0\}$

for $i = 0 \rightarrow N$ **do**

▷ N is the number of blocks per bit vector

$M1[0] \leftarrow A[i]$

▷ Read bit blocks for Marker 1

$M1[1] \leftarrow B[i]$

$M2[0] \leftarrow C[i]$

▷ Read bit blocks for Marker 2

$M2[1] \leftarrow D[i]$

$M1[2] \leftarrow M1[0] \wedge M1[1]$

$M2[2] \leftarrow M2[0] \wedge M2[1]$

for $j = 0 \rightarrow 2$ **do**

$M1[j] \leftarrow M1[j] \oplus M1[2]$

$M2[j] \leftarrow M2[j] \oplus M2[2]$

end for

for $j = 0 \rightarrow 3$ **do**

for $k = 0 \rightarrow 3$ **do**

$contin[j * 3 + k] \leftarrow contin[j * 3 + k] + \text{popcount}(M1[j] \wedge M2[k])$

end for

end for

end for
