Algorithm 1: Indexing barcode diversity by decomposition

Input: vector of strings V ;   ▷ `trimmed sequences`
$\qquad\quad$ $b, k \in \mathbb{N}$;   ▷ `barcode start and length`
$\qquad\quad$ $q \neq 1$
Output: ^{T}D

1 $n \leftarrow |V|, m \leftarrow |v| - k + 1$;

2 $A \leftarrow O^{m \times n}$;   ▷ `empty matrix of strings`

3 **for** $i \leftarrow 1$ **to** n **do**

4 $\quad$ **for** $j \leftarrow 1$ **to** m **do**

5 $\quad\quad$ $A_{i,j} \leftarrow v_i[j : j + k - 1]$;   ▷ `end index included`

6 $W \leftarrow 0_m$

7 **for** $j \leftarrow 1$ **to** m **do**

8 $\quad$ $W_j \leftarrow \left(\sum [P(X \in A_j)]^q \right)^{1/1-q}$

9 $^{S}D \leftarrow W_b$

10 $N \leftarrow \frac{1}{m-k-1} \sum_{j \notin [b, b+k]} W_j$

11 $^{T}D \leftarrow {}^{S}D/N$

12 **return** ^{T}D