Algorithm 4 Downsampling

function DOWNSAMPLE(B, s)
Input: Binary matrix B, downsampling scaling factor s
Output: Scaled down binary matrix B'
    $m, n \leftarrow$ Size of matrix B ▷ $B \in \{0,1\}^{m \times n}$
    for $i = 1$ **to** $\lfloor \frac{m}{s} \rfloor$ **do**
        for $j = 1$ **to** $\lfloor \frac{n}{s} \rfloor$ **do**
            $v \leftarrow \frac{1}{s^2} \sum_{x=0}^{s-1} \sum_{y=0}^{s-1} B_{i+x,j+y}$
            if $v \geq \frac{1}{2}$ **then**
                $B'_{i,j} \leftarrow 1$
            else
                $B'_{i,j} \leftarrow 0$
            end if
        end for
    end for
    return B'
end function