Input: Two-dimensional flow direction ($\mathbb{F}$) and drainage density ($\mathbb{D}$)
Output: Two-dimensional upstream flow accumulation length ($\mathbb{L}$) for each grid cell

```
/* Count the number of upstream (donor) cells for each cell                    */
```
Let n be a two-dimensional array of the same size as $\mathbb{F}$, filled by zeros;
foreach grid cell (i, j) in the study area **do**
    Check the flow direction of (i, j), identify the downstream grid cell (i', j');
    $n(i', j') = n(i', j') + 1$;

```
/* Find the source cells                                                       */
```
Let S be a stack of grid cell indices;
foreach grid cell (i, j) in the study area **do**
    if $n(i, j) = 0$ **then**
        Push (i, j) to S;

```
/* Initialize 𝕃                                                                */
```
Let $\mathbb{L}$ be a two-dimensional array of the same size as $\mathbb{F}$;
foreach grid cell (i, j) in the study area **do**
    $\mathbb{L}(i, j) = \mathbb{D}(i, j) \times A(i, j)$, where $A(i, j)$ is the grid cell area;

```
/* Propagate length from sources downstream                                    */
```
while S *is not empty* **do**
    Pop (i, j) from S;
    while Check the flow direction $\mathbb{F}$, if (i, j) has a downstream cell (i', j') **do**
        $\mathbb{L}(i', j') = \mathbb{L}(i', j') + \mathbb{L}(i, j)$;
        if $n(i', j') >= 2$ **then**
            $n(i', j') = n(i', j') - 1$;
            Break;
        else
            Let $(i, j) \leftarrow (i', j')$;