Algorithm 2 VND Optimization Algorithm

Input: s ▷ Initial solution

$s* \leftarrow s$ ▷ Save the initial solution as the best solution
$k \leftarrow 0$ ▷ Initialize neighborhood counter
$improved \leftarrow True$
while $improved$ **or** $k \leq 5$ **do**
    $improved \leftarrow False$
    if $k = 0$ **then**
        Perform Change Vehicle Chain optimization
        if Solution improves **then**
            Update best solution and cost (s*)
            $k \leftarrow 0$ ▷ Reset neighborhood counter
            $improved \leftarrow True$
        else
            $k \leftarrow k + 1$ ▷ Explore the next neighborhood structure
        end if
    else if $k = 1$ **then**
        Perform Swap optimization
        if Solution improves **then**
            Update best solution and cost (s*)
            $k \leftarrow 0$
            $improved \leftarrow True$
        else
            $k \leftarrow k + 1$
        end if
    else if $k = 2$ **then**
        Perform Relocation optimization
        if Solution improves **then**
            Update best solution and cost (s*)
            $k \leftarrow 0$
            $improved \leftarrow True$
        else
            $k \leftarrow k + 1$
        end if
    else if $k = 3$ **then**
        Perform 2-opt local-search optimization
        if Solution improves **then**
            Update best solution and cost (s*)
            $k \leftarrow 0$
            $improved \leftarrow True$
        else
            $k \leftarrow k + 1$
        end if
    else if $k = 4$ **or** $k = 5$ **then**
        Perform Or-opt optimization
        if Solution improves **then**
            Update best solution and cost (s*)
            $k \leftarrow 0$
            $improved \leftarrow True$
        else
            $k \leftarrow k + 1$
        end if
    end if

Output: s* ▷ Optimized solution