```
function REACH($bddfsm, init$)
    $reach \leftarrow init$
    $new \leftarrow$ POST($bddfsm, reach$)
    while $new \neq$ INTERSECTION($reach, new$) do
        $reach \leftarrow$ UNION(DIFF($new, reach$), $reach$)
        $new \leftarrow$ POST($bddfsm, reach$)
    end while
    return $reach$
end function

function BACKWARD_IMAGE_COMP($bddfsm, counter\_examples, init$)
    $images \leftarrow []$
    $counter\_example \leftarrow$ PICK_ONE_STATE_RANDOM($counter\_examples$)
    $pre\_counter\_example \leftarrow counter\_example$
    $counter\_example\_original \leftarrow counter\_example$
    APPEND($images, counter\_example$)
    while INTERSECTION($init, pre\_counter_example$) $\neq \emptyset$ do
        $counter\_example \leftarrow pre\_counter\_example$
        $pre\_counter\_example \leftarrow$ PRE($bddfsm, counter\_example$)
        INSERT($images, pre\_counter\_example$)
    end while
    return $images, counter\_example\_original$
end function

function FIND_TRACE($bddfsm, init, images, counter\_example\_original$)
    $trace \leftarrow []$
    $start \leftarrow init$
    for $i \leftarrow 1$ to $n$ do                                  ▷ LENGTH(images - 1)
        $start \leftarrow$ INTERSECTION($start, images[i]$)
        $next\_state \leftarrow$ PICK_ONE_STATE($start$)
        APPEND($trace, next\_state$)
        $post \leftarrow$ INTERSECTION(POST($start$), $images[i+1]$)
        $inputs \leftarrow$ GET_INPUTS_BETWEEN_STATES($start, post$)
        APPEND($trace$, PICK_ONE_INPUTS($inputs$))
        $start \leftarrow post$
    end for
    APPEND($trace, counter\_example\_original$)
    return $trace$
end function
```

```
function CHECK_EXPLAIN_INV_SPEC($(bddfsm, spec)$)
    $nspec \leftarrow \neg(spec)$
    $bddspec \leftarrow$ SPEC_TO_BDD($bddfsm, nspec$)
    $reach \leftarrow$ REACH($bddfsm, init$)
    if INTERSECTION($bddspec, reach$) $= \emptyset$ then
        return $(True, None)$
    else
        $counter\_examples \leftarrow$ INTERSECTION($bddspec, reach$)
        $images, counter\_example\_original \leftarrow$
              BACKWARD_IMAGE_COMP($bddfsm, counter\_examples, init$)
        $trace \leftarrow$
              FIND_TRACE($bddfsm, init, images, counter\_example\_original$)
        return $(False, trace)$
    end if
end function
```