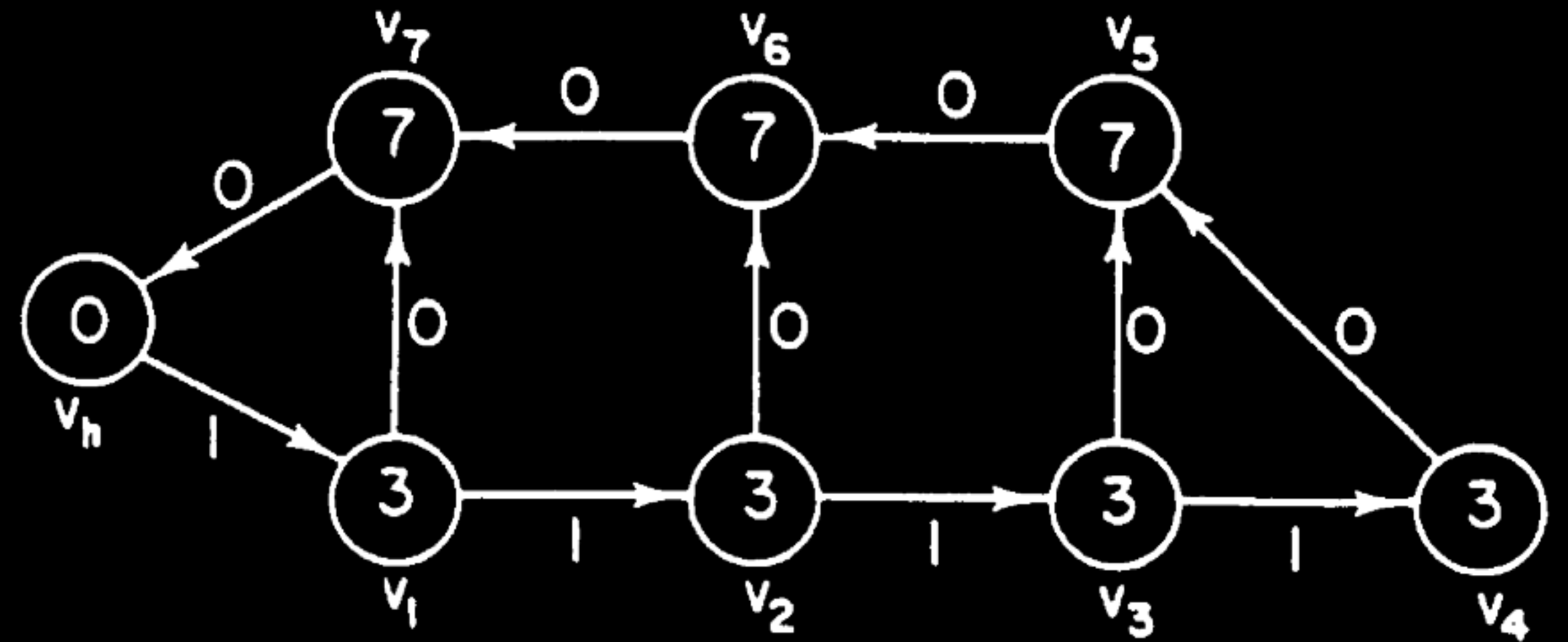


# The problem

A *retiming* of a circuit  $G = \langle V, E, d, w \rangle$  is a function  $r : V \mapsto \mathbb{Z}$  that transforms  $G$  into  $G_r = \langle V, E, d, w_r \rangle$ , where

$$w_r(e) = w(e) + r(v) - r(u).$$



# Algorithm CP

Compute the clock period  $\Phi(G)$  for a synchronous circuit  $G$ .

1. Let  $G_0$  be the (acyclic) subgraph of  $G$  that contains precisely those edges  $e : w(e) = 0$ .
2. Perform a topological sort on  $G_0$ .
3. Go through the vertices in the topological order. For each vertex  $v$ 
  - A. if there is no incoming edge to  $v$ , set  $\Delta(v) \leftarrow d(v)$ ;
  - B. otherwise, set  $\Delta(v) \leftarrow d(v) + \max\{\Delta(u) : u \xrightarrow{e} v \text{ and } w(e) = 0\}$ .
4.  $\Phi(G) = \max\{\Delta(v)\}$ .