

25. (a) The sample rate is limited by the critical path, that is, $f_s = 1/T_{crit} = 1/30$.
- (b) The fundamental limit is determined by the iteration bound, which in this case becomes $T_\infty = \max\{30/2, 25/1\} = 25$.
- (c) The retimed graph is shown in Figure 8.

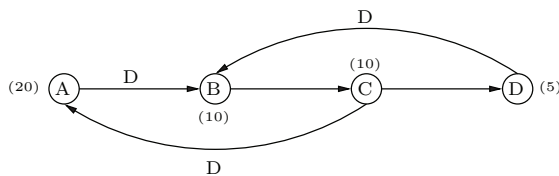


Figure 8: A DFG with node computation times.

26. (a) By inspection, the iteration bound is $7/4$ ns.
- (b) The critical path is simply 7 ns and runs along **M2-A1-A3-M3-A4**.
- (c) The modified filter is shown in Figure 9.

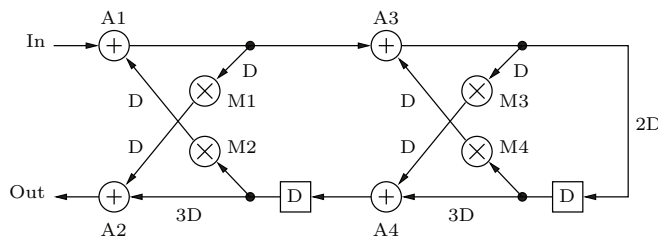


Figure 9: Retimed digital filter structure.

27. (a) Cutset retiming yields the system in Figure 10(a).
- (b) Using 2-D slow down and applying cutset retiming gives system shown in Figure 10(b). The hardware utilization efficiency of this system is now only 50%.

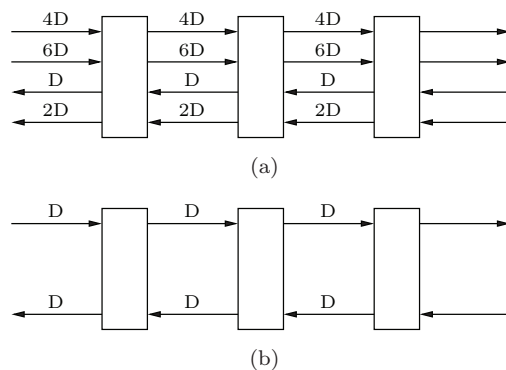


Figure 10: Two recursive DFGs.