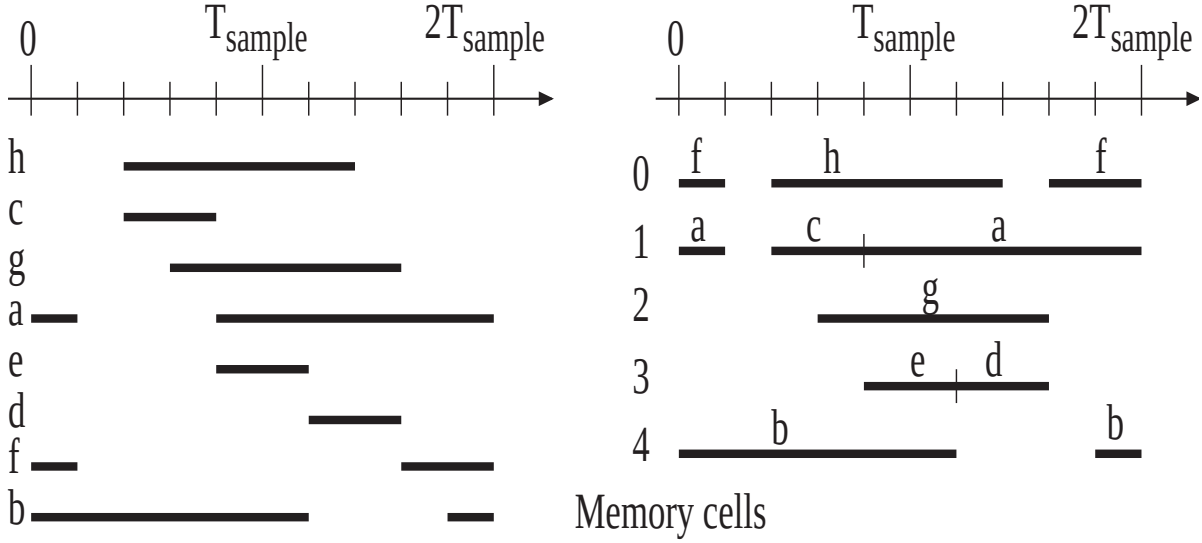
7.22 a) The upper bound of required number of memory cells is equal to the number of variables, i.e., 8.

The lower bound is equal to the total required lifetime divided by the available time, i.e., $\lceil 33/10 \rceil = 4$.

b) Sort the lifetime diagram according to the start time and lifetime and allocate the memories.



c) Each variable requires read and write within 2 sampling periods, i.e., total 16 memory accesses are needed. $T_{access} = \frac{2}{15 \times 10^6 \times 16} = 8.3$ ns.