

496√ (grow slow) Suppose *alloc* allocates 1 unit of memory space and takes time 1 to do so. Then the following computation slowly allocates memory.

$GrowSlow \Leftarrow \mathbf{if } t=2 \times x \mathbf{ then } alloc \parallel x:=t \mathbf{ else } t:=t+1 \mathbf{ fi. } GrowSlow$

If the time is equal to  $2 \times x$ , then one space is allocated, and concurrently  $x$  becomes the time stamp of the allocation; otherwise the clock ticks. The process is repeated forever. Prove that if the space is initially less than the logarithm of the time, and  $x$  is suitably initialized, then at all times the space is less than the logarithm of the time.

§ see book Subsection 9.0.1