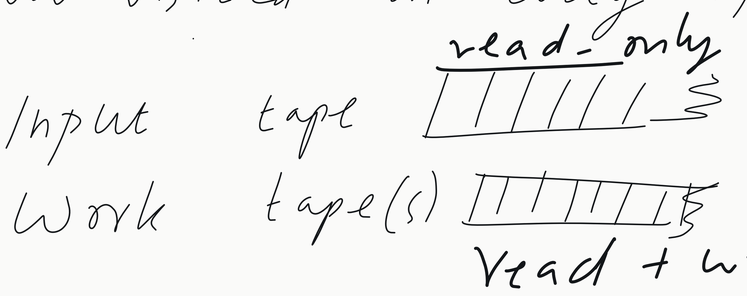
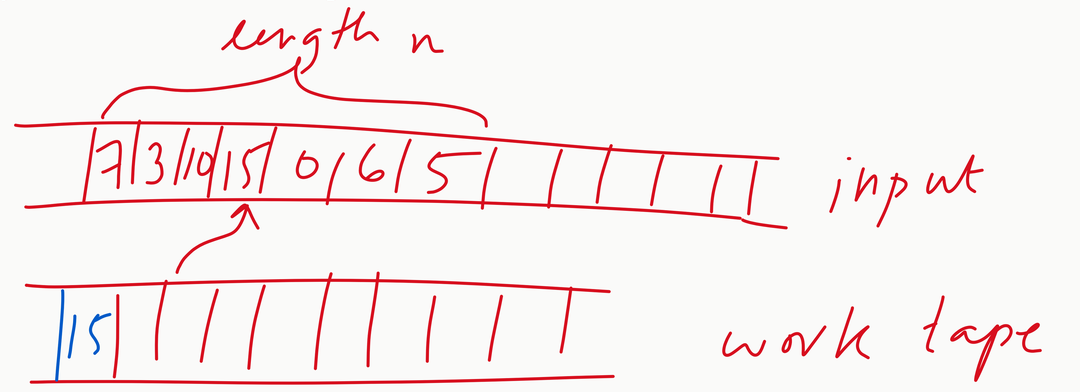
Space Bounded computation

Let $S : \mathbb{N} \to \mathbb{N}$ and $L \subseteq \{0,1\}^*$. We say that $L \in SPACE(S(n))$ if there is a constant c and a TM M deciding L such that at most $c \cdot S(n)$ locations on M's work tapes (excl. the input tape) are ever visited on every input of length n.

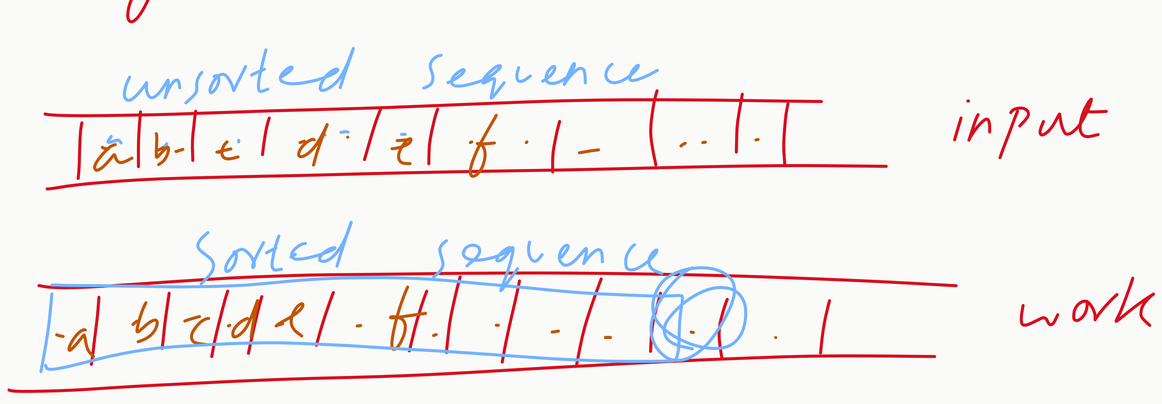


→ finding the largest number in a sequence



$SPACE(\log n)$ ← smallest function to consider

→ sorting a sequence of numbers



$SPACE(n)$

perform binary search on a sequence.

- index of start, end
- ~~value~~ index at mid
- ~~value~~ index we are looking for on input

$SPACE(\log n)$?

1 if first no. is larger.