Exercises.

1.0 Study Lecture 1 in the book

1.1 Consider the set

$$L := \{\#b_k(0)\#b_k(1)\#b_k(2)\#\ldots\#b_k(2^k-1)\# \mid k \geqslant 0\} .$$

Show that L is not regular.

1.2 a) Define what is to be understood by a *time-bounded* Turing machine.

b) Give a one-tape deterministic $O(n \log n)$-time-bounded Turing machine accepting a nonregular set.

c) Show that any set accepted by a one-tape deterministic TM in time $o(n \log n)$ is regular.