The Kleene Hierarchy

\[ \exists \forall \prod \Sigma_1 \Pi_1 \Delta_2 \Sigma_2 \Pi_2 \Delta_3 \Sigma_3 \Pi_3 \ldots \ldots \ldots \ldots \]

restrictive

r.e.

co-r.e.
HP = \{M\#x \mid M \text{ halts on } x\}

MP = \{M\#x \mid M \text{ accepts } x\}

NUL = \{M \mid L(M) = \emptyset\}

FIN = \{M \mid L(M) \text{ is finite}\}

INF = \{M \mid L(M) \text{ is infinite}\}

ALL = \{M \mid L(M) = \Sigma^*\}

REC = \{M \mid L(M) \text{ is recursive}\}

CFL = \{M \mid L(M) \text{ is context free}\}

REG = \{M \mid L(M) \text{ is regular}\}

COF = \{M \mid \sim L(M) \text{ is finite}\}