

Exercises

CSC 486
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(1) Use Tarski-Kuratowski to classify

(a) $A = \{i \mid L(M_i) \text{ contains an infinite number of strings that when viewed as Turing machine indices are machines that accept infinite languages}\}$.

~~(b)~~ (b) $B = \{i \# j \# k \# l \mid L(M_i) \neq L(M_j) \text{ and } k = l\}$.

(c) $C = \{i \# j \mid L(M_i) - L(M_j) = L(M_j) - L(M_i)\}$.

(d) $D = \{i \mid i \text{ is a prime number}\}$.

(e) $E = \{x \# i \mid x \in L(M_i)\}$.

(f) $F = \{i \mid L(M_i) = HP\}$.

(g) $G = \{i \mid L(M_i) = \overline{HP}\}$.

(2) (a) Prove $E \leq_m F$.

(b) Prove $\overline{HP} \leq_m F$.

(c) Prove $HP \leq F$.