Problem Set 1

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Problem 1-1.

(a) $f_1 = \log n^n = n \log n \in O(f_2)$, $f_3 = \log n^{6006} = 6006 \log n \in \Theta(\log n)$. So that $f_3 \in O(f_1)$. Meanwhile $f_4 \in O(f_2)$, and $f_5 \in O(f_3)$, the answer is $(f_5, f_3, f_1, f_4, f_2)$.

(b) Since $n \in O(2^n)$, $f_1 \in O(f_3)$. Also $n \in O(n^2), n^2 \in O(2^n)$, $f_1 = 2^n \in \Theta(6006^n) = \Theta(f_2)$ and $f_3 = 2^{6006^n} \in \Theta(6006^{2^n}) = \Theta(f_4)$, the answer is $(\{f_1, f_2\}, f_5, \{f_3, f_4\})$.

(c)

(d)

Problem 1-2.

(a)

(b)

Problem 1-3.

Problem 1-4.

(a)

(b)

(c)

(d) Submit your implementation to `alg.mit.edu`.