演算法 Homework 20190919
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Mini HW #1

截止時間 星期四，14:20 **總分** 1 **繳交** 線上輸入或者檔案上傳
檔案類型 pdf **接受繳交時間** 9月19日 14:20 - 9月26日 14:20 7 天

Let $f(n) = g(n) - h(n)$.

Given $g(n) = \Theta(F(n))$ and $h(n) = o(F(n))$.

Prove or disprove $f(n) = \Omega(F(n))$ using the definitions of Θ, o, Ω given in the textbook.

Note that the definition of o is different from O. As for the definition of o, please refer to section 3.1 of the textbook.

Proof

The definitions of Θ, o and Ω is below.

Θ (g(n))={f(n): there exist positive constant c and n_0 such that 0 ≤ f(n) ≤ cg(n) for all n ≥ n_0

o(g(n))={f(n): for any positive constant c> 0, there exists a constant n_0 > 0 such that 0 ≤ f(n) < cg(n) for all n ≥ n_0

Ω(g(n))={f(n):for any positive constant c and n_0 such that 0 ≤ cg(n) ≤ f(n) for all n ≥ n_0

At first, a function g(n) belongs to the set Θ(F(n)) if there exist positive constants c_1 and c_2. g(n) is in the range between c_1g(n) and c_2g(n).
Secondly, if there exist positive constants c_3, the value of function h(n) is below c_3h(n) and also c_3h(n) can not be equal h(n).
Thirdly, if there exist positive constants c_4, the value of function f(n) is always above c_4f(n) and also c_4f(n) includes the value of f(n).
In addition to them, according to the definitions, every formulas given is positive funtions.
As a result, this equation, f(n) = Ω(F(n)), holds in the given condition.