GIT Department of Computer Engineering
CSE 222/505
Spring 2014

Homework 02
Due date: March 11th 2014 16:00

1- Prove that if *f1(n) = Θ(g1(n))* and *f2(n) = Θ(g2(n))* then *f1(n) * f2(n) = Θ(g1(n) * g2(n))*

2- Show formally if the following is true or not: if $f(n)=O(g(n))$ then $f(n)^k=O(g(n)^k)$

3- Compare the following pairs of functions f,g. In each case, say whether f =o(g) or g=o(f) or f=Θ(g) and prove your results.

$$f(n) = 100n + \log n,\ g(n) = n + (\log n)^2.$$

$$f(n) = \log n,\ g(n) = \log\log(n^2).$$

$$f(n) = n^2/\log n,\ g(n) = n(\log n)^2.$$

$$f(n) = (\log n)^{10^6},\ g(n) = n^{10^{-6}}.$$

$$f(n) = n\log n,\ g(n) = (\log n)^{\log n}.$$

$$f(n) = n2^n,\ g(n) = 3^n.$$

Notes

- Your submissions will be handwritten.
- Always provide your formal proofs using the definitions of asymthotic notations.
- Do not email your homework.
- You should handover the submissions to the TA before 16:00 on due date.