University of Washington
Department of Computer Science and Engineering
CSE 417, Winter 2020
Yiliang Wang

January 22, 2020

Homework 2 Problem 2

Problem 2 (10 points):
Prove that $2n^2 + 4n \log n + 6n + 20 \log^2 n + 11$ is $O(n^2)$.

Answer:
Since in text (2.5) Let k be a fixed constant, and let $f_1, f_2, ..., f_k$ and h be functions such that $f_i = O(h)$ for all i. Then $f_1 + f_2 + ... + f_k = O(h)$.

The Asymptotically upper bound of $f(x) = 2n^2 + 4n \log n + 6n + 20 \log^2 n + 11$ should decided by the part with highest asymptotic order of growth.
$2n^2 = O(n^2)$
$4n \log n = O(n \log n) = O(n^2)$
$6n + 20 = O(n) = O(n^2)$
$\log^2 n + 11 = O(n) = O(n^2)$

Therefore, $f(x) = O(n^2)$