## Assignment 1 Post-Mortem

- Question 1 No common error for a, b.
  - For c:
    - Some students treat log as ln or  $log_{10}$ .
    - A few students reduce  $2^{2^{1/c}}$  to  $4^{1/c}$ .
  - For d, some student just stated such  $n_0$  exists, not explicitly stated the value.

## Question 2 • No common error for a, b, c.

- Some students use plot as a proof, which is not efficient.
- For d, some students were unable to show that  $\Omega$  applied and concluded that none of the symbols are applicable as the limit DNE. Several students who did prove  $\Omega$  applied did not show why one of the other symbols could not apply.
- Question 3 For a, some students proved the statement to be true.
  - For b, Providing counterexamples where f(n) / g(n) = 1/n, which in fact is O(1).
  - Nothing specific for c.

## Question 4 • nothing specific for a.

- For b, some students directly treat  $\log i = \log n$ , without explanation.
- For c, some student wrote *m* increasing linearly, which is incorrect.

## Question 5 • From $TA_1$ : In part (a), students provided examples that did not adhere to the upper bounds in the question, and at times, provided examples in which $T_2(n) > T_1(n)$ for $n \ge n_0$ .

- From  $TA_2$ : In part (a), Some students provided incorrect counterexamples, such as setting  $T_1(n) = n^3$ , which does not satisfy the given condition  $T_1(n) \in O(n^2 \log^5 n)$ .
- From  $TA_1$ : In part (b), students often forgot to include 2 separate constants (n1 and n2) while using the definitions of Big-theta for  $T_1(n)$  and  $T_2(n)$  at times, they forgot to write for all n  $n \ge n1$  eq1 and  $n \ge n2$  in eq2. In some situations, students started off with big-theta definitions but then resorted to using the limit rule.
- From  $TA_2$ : In part (b), many students, when determining  $n_0$ , neglected the  $n_1$  and  $n_2$  from the definitions of Big-Theta for  $T_1(n)$  and  $T_2(n)$ . Some did not use the definition at all in their proof.