Sebastian Braun
CS 313
Assignment A1
8 February, 2019

1. The provided code evaluates to the summation of i for n times because "x++" is executed i

times. Therefore, $\displaystyle\sum_{i=1}^{n} i \;=\; \dfrac{n(n+1)}{2} \;=\; \dfrac{n^2+n}{2} \;=\; \Theta(n^2).$

2.

$$T(n) \;=\; 5n^2 - 3n + 6 \;\leq\; Cn^2$$

$$C = 6$$

$$= \; 5 - \frac{3}{n} + \frac{6}{n^2} \;\leq\; 6$$

$$=-\frac{3}{n} + \frac{6}{n^2} \;\leq\; 1$$

$$= n^2\left(-\frac{3}{n} + \frac{6}{n^2}\right) \;\leq\; 1n^2$$

$$=- 3n + 6 \;\leq\; 1n^2$$

$$= 6 \;\leq\; n^2 + 3n$$

$$n = 2$$

$$= 6 \;\leq\; 4 + 6$$

3. *sorry about the format change. I continued to work from home and for some reason I don't have the same editing options on this laptop.

$$T(n) \;=\; 2^n$$

$$T(n)/64 \;=\; 2^n$$

$$T(n)/64 \;=\; 2^n$$

log both sides to remove n from the exponent and divide to simply for n.

$$n = log(T(n)/64)/ log2$$

4. See additional document labeled "CS313 Assignment A1 Question 4"

5.

A. $T(n) = T(n/2) + 3n$ a=1,b=2,c=3,d=1 therefore upperbound is O(n).

B. $T(n) = 2T(n/2) + 2$ a=2,b=2,c=2,d=0 therefore upperbound is O(n).