

Assignment 1

Exercise

Consider the following three program fragments (a), (b), and (c).

- (a) `sum = 0;`
 `for (int i = 0; i < n ; i++) {`
 `sum++;`
 `}`
- (b) `sum = 0;`
 `for (int i = 0; i < 2*n ; i++) {`
 `sum++;`
 `}`
- (c) `sum = 0; i=n*n;`
 `while (i > 1) {`
 `sum++;`
 `i= i/2;`
 `}`

We denote by $T_a(n)$, $T_b(n)$, $T_c(n)$ the running time of the three fragments.

1. Give Θ evaluations for $T_a(n)$, $T_b(n)$, $T_c(n)$.
 $T_a(n) = \Theta(n)$
2. Is $T_b(n) = O(T_a(n))$? Answer YES or NO and justify your answer.
3. Is $T_c(n) = \Theta(T_a(n))$? Answer YES or NO and justify your answer.