Worksheet 14 Solution

March 25, 2020

Question 1

a. **Inner Loop:** n

Outer Loop: $n - 5$

Theta Expressions: $\Theta(n^2)$

Correct Solution:

Inner Loop: n

Outer Loop: $n \cdot \frac{n}{5}$

Theta Expressions: $\Theta(n^2)$

b. **Inner Loop:** $\frac{n}{3} + (n - 2)$

Outer Loop: $n - 4$

Theta Expressions: $\Theta(n^2)$

c. **Inner Loop #2:** $\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$

Inner Loop #1: $n \cdot \frac{n(n+1)}{2} = \frac{n^3 + n^2}{2}$

Outer Loop: $\frac{n^3 + n^2}{2} \cdot (n - 4) = \frac{n^4 - 3n^3 + 4n^2}{2}$

Theta Expressions: $\Theta(n^4)$

d. **Inner Loop:** 2^n

Outer Loop: $\sum_{i=0}^{\frac{n}{2}-1} 2^i = 2^{\frac{n}{2}-1}$

Theta Expressions: $\Theta(2^n)$

Question 2