

Problem 4

a.) The inner for loop is $\sum_{i=0}^{i=n} 1$ } $\sum_{i=n}^n \sum_{l=0}^{l=n} 1 = \sum_{i=0}^n i \cdot n = n \sum_{i=0}^n i = n^3$
 outer for loop is $\sum_{i=n}^n \sum_{l=0}^{l=n} 1$ } $\boxed{\Theta(n^3)}$

b. The if statement $\rightarrow \text{if}(A[i] == i);$ will run 'n' times
 b/c

if { $A[1] = 1$ $A[1] = 2$
 $A[2] = 1$ $A[2] \neq 2$ b/c
 $A[3] = 1$
 $A[4] = 1$

$1 \times 2 \times 2 \times 2 \dots n$ inner for
 $i = \frac{n}{2 \times 2 \times 2 \dots} \log_2 n$ loop considered logn since variables
 multiplied by constant amount $\rightarrow m = m + m$
 but it'll run once so not considered. $m = 2m$
 if statement runs n times so the 2 outer for
 loops generate $\boxed{\Theta(n^2)}$

c.) $\begin{matrix} & n & \\ & n-2 & n-2 \\ & / & / \\ n-4 & n-4 & n-4 & n-4 \end{matrix}$ Given the 2 recursive calls there
 will be $n/2$ steps/levels from
 when n is called until it reaches

$\sum_{i=1}^{n/2} 2^i = \boxed{\Theta(2^{n/2})}$

d.)

$$\text{size} = 10$$

$$\text{size} = 10 \left(\frac{3}{2}\right)$$

$$\text{size} = 10 \left(\frac{3}{2}\right) \left(\frac{3}{2}\right)$$

$$\text{size} = 10 \left(\frac{3}{2}\right)^n$$

there are
 $\log_{\frac{3}{2}} n$
levels.

$$\sum_{i=1}^{\log_{\frac{3}{2}} n} 10 \times \left(\frac{3}{2}\right)^n$$

$$10 \sum_{i=1}^{\log_{\frac{3}{2}} n} \left(\frac{3}{2}\right)^n$$

$$= O(n)$$