Question:

b) Find the particular solution for the following recurrence with the given initial values!
Also give the asymptotic upper bound $(O())$. **Show all your work!**

$$t(n)=t(n-2)+n, \quad t(0)=t(1)=0;$$

Answer:

$T(n)=T(n-2)+n$

Assumnig n is even and Substituting recursively the value of T(n) we get, (Assumption does not affects the asymptotic running time)

$T(n)=T(n-4)+ n-2 +n$

$T(n)=T(n-6)+ n-4 +n-2 +n$

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$T(n)= 0+2+4..........+n-4 +n-2 +n$

This is an AP having last term n and difference 2, so total number of terms = n/2 +1

the sum of this AP is $O(n^2)$

Thus $T(n)=O(n^2)$