Assignment: Asymptotic Analysis Of Algorithm 1) Compute Sums! a)  $\sum_{i=3}^{n+1} 1 = n+1-3+1 \cdots \sum_{i=e}^{u+1} 1 = u-l+1$ = N-2+1  $= N-1 \approx O(n)$ b)  $\Sigma_{i=3}^{i=3}$  i = A(1(n+1)(n+1+1) -3(n+1)(n+9)-6 % 0(n2) (.)  $\sum_{i=3}^{n+1} i \times (i+1) = \sum_{i=3}^{n+1} i^2 + \sum_{i=3}^{n+1} i$  $= 2 \left[ n + 1 \left( n + 2 \right) \left( \frac{2(n+1)+1}{6} \right) - \left( \frac{2}{6} \right) \left( \frac{2}{6} \right) \right] +$ (h+1)(n+2)-6  $= \left[ \frac{(n+1)(n+2)(2n+2+1)}{6} \right] - 5 +$ (h+1) (n+2) -6

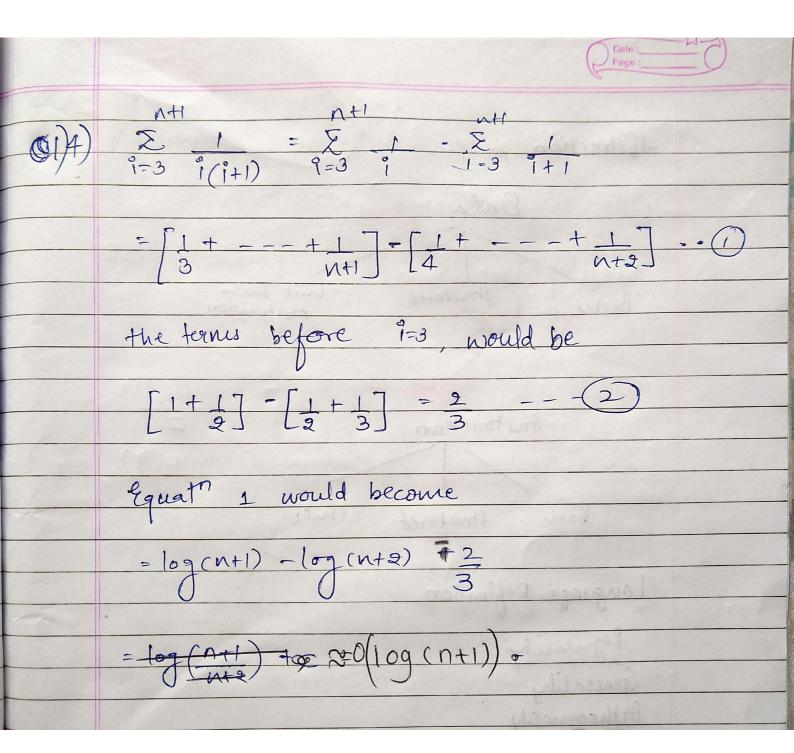
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$$= [(n+1)(n+2)(2n+3)-5] + 6$$

$$= [(n+1)(n+2)-6]$$

$$= [(n+1)(n+2)(0n+3)-30] + 6$$

$$= [(n+1)(n+2)-6] \neq O(n^3)$$



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(9) T(N) = T(NI-1) +5 for u>1, T(1)=0
 02)
  = T(N-2) +5.
          = T(N-2) +5 +5
           = T (N-2) + 2(5)
o: T(N-2)= T(N-2-1)+5
     = T (N-3) + 5
            = T(N-3) + 3(5)
            = T(N-K) +K(5)
   ; = N-1 = T(N-(N-1)) + (N-1)(5)
              FT(1) + (N-1)(5)
              = 0+ (N-1)(S)
              = O(N)
  b) T(N) = 3T(N-1)
                   for N71, T(1)=4
    T(N-1) = 3T (N-2)
         = 3 [3T(W-2)]
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$$T(N-3) = 3T(N-2-1)$$

$$= 3T(N-3)$$

$$T(N) = (3)^{2}T(3)^{2}t(N-3)$$

$$= (3)^{3}T(N-3)$$

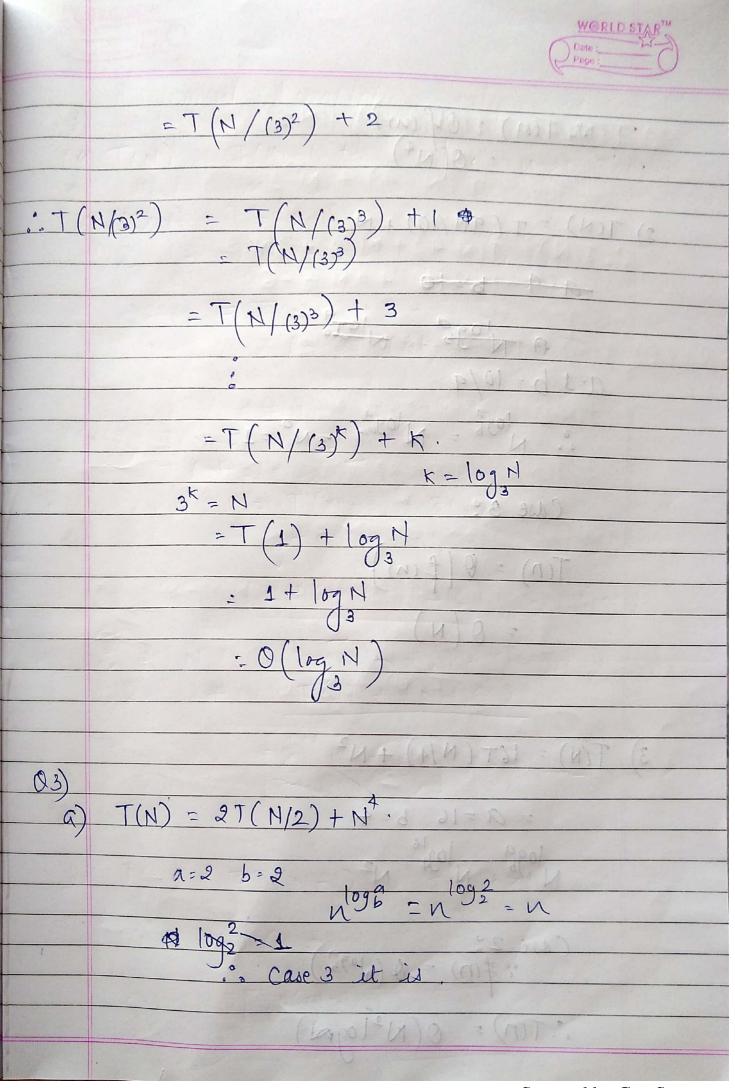
$$= (3)^{3}T(N-3)$$

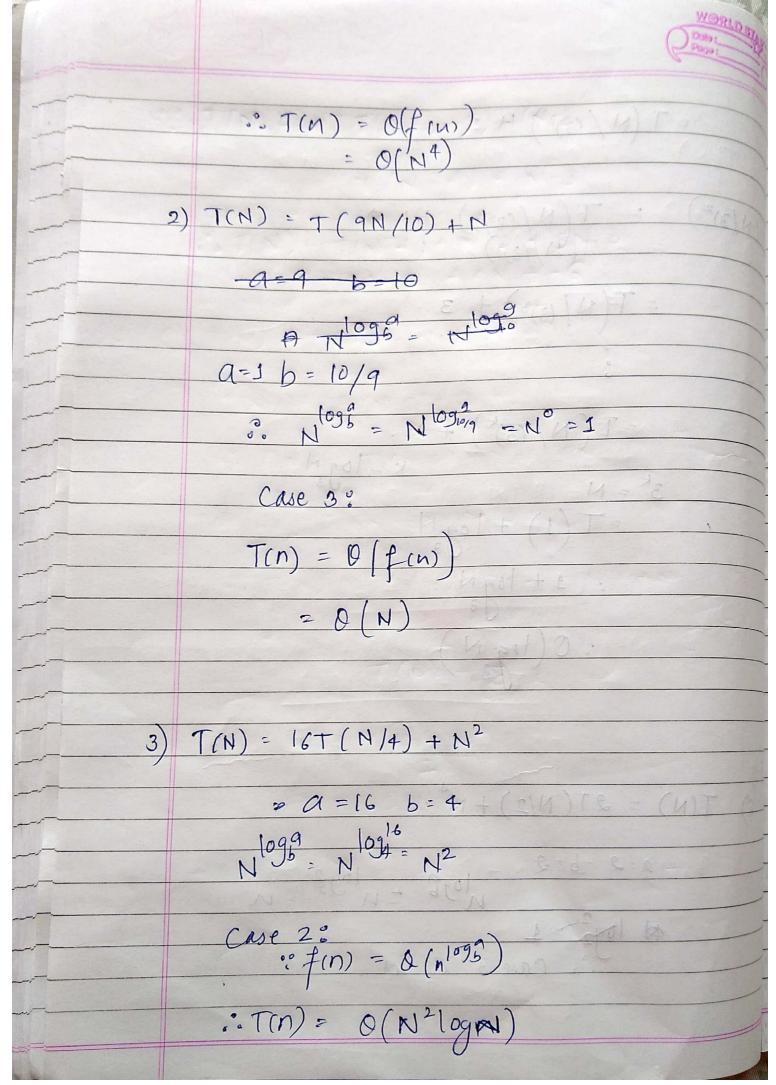
$$= (3)^{4}T(N-(k+1))$$

$$= (3)^{4}T(N-(k+1))$$

$$= (3)^{4}T(N-(N-1))$$

$$= (3)^{4$$





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4	) T(N) = 2T(N/4)/+ \N-8+1/) T = (81/1)
	$a = 2 b = 14 + (1 - 11) T^{2}$
7	
	0, NOS= NOS= NOS
	3- & NP+ (+-M) P.
	i. Case 26- $f(n) = O(N^{\log 5})$
	o. T(N) = O(N/2 log N)
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_03(e)	T(N) = T(N-1) + N
	T(N-1) = T(N-2) + N-11
	: T(N) = T (N-8) + N-1 + N
	T(N-2) = T(N-3) + N-2/1- (N-1)
	6. T(N) = T(N-3)+N-2+N-1+N
	=T(1) + (1) - (1) T
	1-457 (64) T.
	$=\frac{N(N+1)}{2}$
	=0(N <sup>2</sup> )(1-10-11) T · (0.11)
	su + (su) + (su)
	6-148+(E-14)+ 3

	Paga:
<del>f</del> )	T(N) = T(VN)+1 +1 (M)
	M-logN ". N = 2m
	$T(2^m) = T(2^{m/2}) + 1$
	$f(m) = T(2^m)$ $= f(m/2) + 1$
	a = 1 b = 2 f(N) = 1
	g(N) = Nlog2 = N = 1 P(N) = 9 (N)
	f(N) = g(N) $*.T(N) = T(2^m) = g(m)$
	$= O(\log m)$ $= O(\log (\log N))$