Mahiem Agrowal 0 Assignment 4 idios front carri vot sucos telos seil Problem 4. 1 and 10 the 2 show that they will have completely of black to & Implementation inside the file "Mergesort cpp" according to the Quostion. p) Graph implemented for various values of kfrom 0 till the size worker about on 18the noting of it so only insaffon () The Best-case. For the different values of k, we can see that the bost case requires less time. This is because the time complainty of best case in inspition soit is just O(n) wand when k becomes lorse only insertion sort is applied hence the complexity O(n) but for Average - case The average case for merse sort is $\Theta(n\log n)$ and insortion sortis (n2) therefore 2 our algorithm's complexity is & Chlosn, the and thu is the for all various values OF K.

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a woist-case. The worst case to insortion soit is $O(n^2)$ not more soit is just & (nlosn). Initially they will have comploxity of o(n/ocn, + 62) nowever as for k gets lower just insortion sort is applied so the complexty of becomes O(n2). 4) This would append on the type of airay I how. If the array is already corted I would have a large value of k so only insertion sort is applied. If the array is unsorted, I would chose the value of k to be I as this way pejust the messe the complexits would be just a chlosh. Problem 4.2 T(n) = 36T(n/6) + 2nusing mostor method. T(N) = 9&T(n) + f(n) a=36 6=6 f(n) = 2n

2			
3		$n^{\log_{100}} = n^{\log_{100}} = n^2$	
3			
7		$f(n) = O(n^{2-E})$ for $E = 1$	
3		with the court of the court of the	
7		$T(n) = G(n^2).$	
3		Sidesta Somos PAR stoops Nos	
2	C1-1	紹 T(N)= 5T(n/3)+17n1.2	
2 2	(a)		
3		b=3 (4,00 1)0=(10)T	
72 72			
2 2	0		
2 12		$n^{10Spa} = n^{1.46}.$	
72 72		trought transfer to the major transfer to	-AA
		f(n)= O(n:46-E) for E=0.26)	13.40
72 72			
72 72		:.T(n) = 6 (n 1.46).	
70 1	(-)	$T(n) = 12(n/2) + n^2 lgn$	
	(c)	((n) = 120112)	
		12.12.12.12.12.12.12.12.12.12.12.12.12.1	
		a=12	
		0=2	
		$f(n) = n^2 gn $	
		STORE TOWER STORES	
		Νοω	
		100 ba = 105 = 12	
		$\int_{0}^{\infty} \int_{0}^{\infty} \int_{0$	
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-		Nou	

Now we can use case (III) (I) n3.5a > n2 ign will be grouter for some value and we con easily fing some constant & $T(n) = \Theta(n \log_b \alpha)$ $= \Theta(n^{3.59})$