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(MTH 354	10-17-17-
\$7.2 #19) Find	a closes form	$\alpha_{N} = \alpha_{N-1} + 1 + 2 \qquad \alpha_{0} = 0$
50/1 an	$= Q_{N-1} + 1 + 2^{N-1}$	0 _{N-1} =0 _{N-2} +1+2
	=(a _{n-1} +1+2)+	\ +1 n-3
	= 0, x 11 + 21 + 2"-	$\alpha_{N-1} = \alpha_{N-3} + 1 + 2$
	$=(\alpha_{N-3}+1+2)$	4-2 1-1 + A+2 +2
	$= 0_{N-3} + 3 + 2^{N-3}$	3 n-1 n-1 +2 +2
	•	n-10 n-9 n-1 2 +2 ++2
	- ~ N-1D+ 10+	∠ + 2 + + 2
	: = 0 + h + 1	+2+2++2
	N-N	7 2 - 1
	- 0/ 1/2 N	$+2+2++2$ $=\frac{1}{2-1}$
0	- W - W - W	
RR R	= N+2 ^h -1	Clased form
Q = Q	+2=2	a = 0+2-1=0
0(2=01+	1+2 = 5	$Q_1 = 1 + 2^{-1} = 2$ $Q_2 = 2 + 2^{-1} = 5$ $Q_3 = 3 + 2^{-1} = 10$
03=02+ 04=03+	1 +Z = 10 1	$A_3 = 3 + 2 = 10$ $A_4 = 4 + 2 = 19$
44= 43=	21+2 ()	
2017 2:00p		10/17/17, 7:02 AM, 9

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#19) Find a closed form an = an - (+1+2 a = 0 50/3 $a_N = a_{N-1} + 1 + 2$ $Q_{N-1} = Q_{N-2} + 1 + 2$ $= \frac{(\alpha_{N-2}+1+2)}{(\alpha_{N-2}+1+2)} + \frac{(\alpha_{N-2}+1+2)}{(\alpha_{N-2}+1+2)} + \frac{(\alpha_{N-2}+1+2)}{(\alpha_{N-2}+1+2)} = \frac{(\alpha_{N-3}+1+2)}{(\alpha_{N-3}+1+2)} + \frac{(\alpha_{N-3}+1+2)}{(\alpha_{N-3}+1+2)} + \frac{(\alpha_{N-3}+1+2)}{(\alpha_{N-3}+1+2)} = \frac{$ $= Q_{N-10} + 10 + 2 + 2 + ... + 2$ $= Q_{N-N} + N + Q + Q + Q + 2 + \dots + Q = \frac{N+1}{N-1}$ $= \frac{2^{-1}}{2^{-1}}$

 $\frac{RR}{\alpha_{\circ} = 0}$ $\alpha_{\circ} = \alpha_{\circ} + 1 + 2 = 2$ $Q_{3} = Q_{1} + 1 + 2 = 5$ $Q_{3} = Q_{2} + 1 + 2 = 10$ a4= a3+1+23=19

 $\frac{\text{Closed form}}{Q_{1} = 0 + 2 - 1} = 0$ $Q_{1} = 1 + 2 - 1 = 2$ $Q_{2} = 2 + 2 - 1 = 5$ $Q_{3} = 3 + 2 - 1 = 10$ $Q_{4} = 4 + 2 - 1 = 19$

Selection Jort
Goul: Find a D notation for the time required for
Goul: Find a D notation for the time required for the code to run. Debine by:= The number of comparisons at line 6 to sor in items.
Initial and ton n=1 b=0
For an arbitrary seguence of length bygger want
Initial condition. n=1. b=0. For an arbitrary Sequence of length bigger than I count the number of comparisons at each line a add them to find the total number of comparisons by
add were to find the total number of comparisons to
lines 1-5 has D comparisons. line 6 has n= comparisons (line 5 causes line times
1:40 (has a . Compacisons (line 5 Causes line
= 6 to execute N-1
times
lives 7 and 8 have o compar, sons.
line 9 has by comparisons (kydebinition)
recursive
" Yearsive (all
Hence $b_N = (N-1) + b_{N-1}$, $b_1 = 0$
50 We Than.
by= by-1+(y)-1
$= (b_{N-2} + (N-2)) + (N-1) + (N-1) - (N-1) - (N-1) - (N-1) - (N-1) + (N-1) - (N-1) + (N-1) - (N-1) + (N-1) - (N-1) + (N-1) $
$= b_{N-3} + (N-3) + (N-2) + (N-1) + D_{N-2} = D_{N-3} + (N-2) - 1$
= bn-10)+ (n-10)+ (n-4)++(n-1)
$\frac{1}{2} = \frac{1}{2} + \frac{1}$
$\frac{1}{N} = \frac{1}{N} = \frac{1}$
- 177 +>+···+ (M-1)2 -2 (M-11)

 (v^2)

Example of binary search
Import: $S_1 = 'C'$, $S_2 = 'G'$, $S_3 = 'J'$, $S_4 = 'M'$, key = 'J' (=1, J=4)

At line 2 (>) is false, go to line 4, where k=2At line 5, Since key ('j') $\neq S_2$ ('G'), proceed to line 7

At line 7, key (S_2 ('J'X'G'), is false, so set

('=3 at line 10.

call the algorithm with i=3, j=4

At line 2. i > j 15 false, goto line 4 where k:=3

At line 7, Since bey ('j') = 5, ('j'), return 3.