my Textbook You're in line to meet a Problem fistulated cow, and whole you wait, you decide to solve some Dt (based on a true () problems. You're given two arrays of length n Problem[i] = happiness you get from solving preblem i Time [i] = time it takes to solve problem i If you choose to solve problem is then you will be unable to solve problems i+1.\_ Time[i] (i-c. next problem you can some is problem i+ Time (i) +1) Compute the maximum total hoppiness you can achieve from solving problems. Let maxtap(i) = the max happiness I can get form Problem Ci-n. MaxHapli) = 50 if in max 5 Maxtap(i+1),

Problem (i) + Maxtlep (i+time(i)+1) of it Timelizy 1D Array [1.- n+1]
Deveasing i max & Maxtle (i+1) } be have this for memoration... (n) i+Timeli] could be >>n, so without this case Return mex Hap (1) the array bounds could be very large

You've in charge of scheduling ads for the Superbowl. You've given two arrays of length n. Rev (t) = revenue gainel from mining ad i Time Ci ] = amount of time runny ad i takes. Compute the max possible revenue attainable such that the total time of the ads Let mex fer (i, t) = mex rev possible from Rev [i--n] with total time Et. Retur MaxRev (1,T) Max Rev (1-t) = mex Seev(:) + mexiku(i+1) if Time[i] < t

Max Rev (i+1, t) take Max Rev(i+1,-1) else 2D Array [1.-n+1,0--T]

Docreensy i, increasing t Runtine = O(nT)

| From DP Review   |
|--|
| 2.<br>bet Min Rt (i,l)= min cest of agentitue<br>A (i-n) into l'intervals.   |
| Intuition: Look at block starting with A[i], try every  jzi to end the block.  MinRt (i, l)=  as if i>n  Sum(i,n)  1 |
| (sum(in) if l=1 ad isn   |
| 2D Acrey [1-11, 1 k) Runtine: O(n3 k)  |
| i deercasy, l'inercasy.  |

Prefix Sum => O(n2k)

Let Cerryli) = max # of good districts that
can be made from tood Vote (i--n)
Intuition: Same as 2! Look at block starting with i and try
all ways to end that block

Georgia = 6 if i+k>N and i≤N

Georgia = 6 i>n

| Where Good=1 iff Vote (i-j] is good o else  Toy O(k) is= O(n) is= O(n) Votes in  Keep prefix conter: # good Notes in  | max {Good (ii) + Gerry (j+1)} else   |
|---|--|
| Keep prefix conter: # good Notes in Coodling? Can be computed wong Refixed? - Prefixed:  in OCI) time.  D (nk)  4 by Intuition: "building a tree" - balanced Borentleses make a tree!  For "bailding a tree" problems, surproblems usually look like this (eg. woodcutter)  Let Stupped (is; ) = max value adlaced from  purtues in ACI-j?  Stupid (ly) = likes (Stupid (is k) & Stupid (kHij))  I missed this  ATI if i= j  allows singless in left subree  I necessy 5-i  2D Array: [Implication] | Where Good=1 iff Vote Ci-j] is good  Tou O(k) is = O(n) is = O(n)Z)  |
| Coolly) can be computed wong Retrody - Professed in O(1) time.  D(nk)  Up, Intuition: "building a tree" - balanced Parentleses make a tree!  For "building a tree" problems, Surproblems usually look like this (eg. woodcutter)  Let Stypiol (i,j) = max value atlanced from purtices in A(i-j)  Stypid (lyj) = i i k < ( Stypid (i,k) P stypid(kt))  I wassed this  allows studious in left subtree  I nereasy 5-i  2D Array: [I. m] - 1  |  |
| Coolly) can be computed way (horizonds) - Arefacoods in O(1) time.  (a) Cool of time.  (b) Intuition: "building a tree" - balanced Parentleses make a tree!  For "building a tree" problems, Surproblems usually look like this (eg. woodcutter)  Let Stypiol (i,j) = max value attained for purtices in A(i-j)  Stypiol (Vj) = i i k < (stypiol (i, k) P stypiol(ki))  I wissed this  allows studious in left subtree  I nereasy 5-i  2D Arrey: [I. m] - 1   | keep prefix conter: # good "ofts in  |
| 4 by Intuition: "building a tree" - balanced Parentleses make a tree!  For "building a tree" problems, Surproblems usually look like this (eg. woodcutter)  Let Stypiol (i,j) = mcx value atlanced from  purticles in A[i-j]  Stypiol (i,j) = Suprod (i, k) & Stypiol (kthj)  I wassed this  A[i] if i= j  allows singletons in left subtree  I nereasy 5-i  2D Arrey: [I. m] - n   | Coedliss) can be computed voring RefixEd () - Prefix Good (  |
|   | For "building a tree" problems, Surproblems usually look like this leg. woodcutter)  Let Strippol (i,j) = mcx value atlaned from  purtness in ACI-j7  Strippol (i, k) & Strippol (kt)j)  I missed this  ACi) if i= j  allows singletons in left subtree  I nereasy 5-i  2D Arrey: [1n, 1n] |