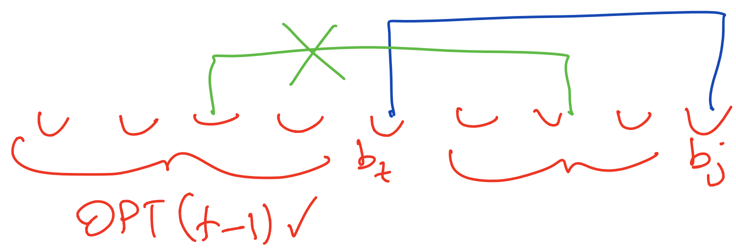
Assum $b_1 - - b_n$

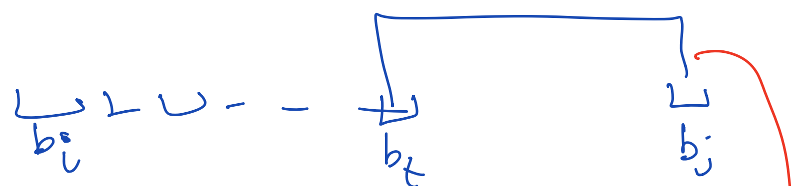
$OPT(j)$ = maxim number of matches for seq $b_1 - b_j$.

→ b_j is not matched $OPT(j-1)$

→ b_j is matched



$OPT(i,j)$ = maximum number of matches for seq $b_i - b_j$.



→ b_j not matched $OPT(i, j-1)$

→ b_j is matched b_t $OPT(i, t-1) + OPT(t+1, j-1) + 1$

try all possible t's and take the max

We will talk about ALG for matching two weeks
& you cannot use DP for matching.
In this problem we could find max matching B/C
of no crossing condition!

Formal Induction

$P(d)$ = My ALG works for all i,j s.t. $|i-j| = d$.

IH. $P(0) \dots P(d)$.

IS. Prove $P(d+1)$. Given i,j s.t. $|i-j| = d+1$, need to say ALG works.

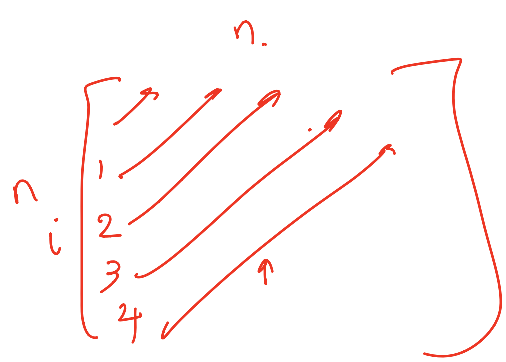
$OPT(i, j-1)$ $\quad |i-(j-1)| = d$

$OPT(i, t-1) + OPT(t+1, j-1) + 1$

$|i-(t-1)| < d$ B/C $t < j$.

$|j-1-(t+1)| \leq d$ B/C $t \geq i$

Bottom/UP DP?



$n \times n$ many entries

take $O(n)$ to fill out entry

guess for t.

$x_1 - - x_m$

$y_1 - - y_n$

$OPT(i,j)$ = The minim cost for matchn $x_1 \dots x_i$

$y_1 - - y_j$

if $x_i = y_j$ $\quad OPT(i-1, j-1)$

$\to 1 + OPT(i-1, j-1)$

$\to x_i$ is matched with gap

$1 + OPT(i-1, j)$

$\to y_j$ is matched with gap

$1 + OPT(i, j-1)$.

$x_1 - - \quad x_i$

$y_1 - - \quad y_{j-1} \; y_j$

$x_1 - \quad x_{i-1} \; x_i$

$y_1 - - \quad y_j \; \sqcup$

$\mathbb{I}[x_i \neq y_j] + OPT(i-1, j-1)$ $\quad x_i$ $\quad y_j$ $\quad 1 \quad 0$

$1 + OPT(i-1, j)$ $\quad x_i$ $\quad \sqcup$

$1 + OPT(i, j-1)$ $\quad \sqcup$ $\quad y_j$

min

h e l l o

h e l l o

a

l