

Lecture 30

CSE 331

Couple more definitions

$p(j)$ = largest $i < j$ s.t. i does not conflict with j

= 0 if no such i exists



$p(j) < j$

$OPT(j)$ = optimal value on instance $1, \dots, j$

Property of OPT

j in $\text{OPT}(j)$

j not in $\text{OPT}(j)$

$$\text{OPT}(j) = \max \{ v_j + \text{OPT}(p(j)), \text{OPT}(j-1) \}$$

Given $\text{OPT}(1), \dots, \text{OPT}(j-1)$,
how can one figure out if j
in optimal solution or not?

A recursive algorithm

Compute-Opt(j)

Correct for $j=0$

Proof of
correctness by
induction on j

If $j = 0$ then return 0

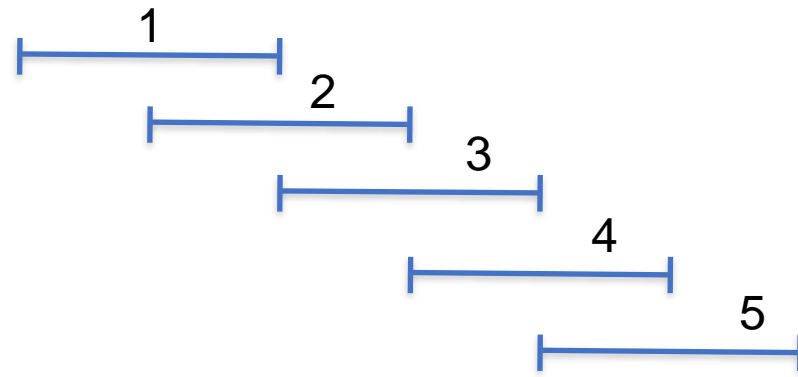
return max { $v_j + \text{Compute-Opt}(p(j))$, $\text{Compute-Opt}(j-1)$ }

= OPT($p(j)$)

= OPT($j-1$)

$$\text{OPT}(j) = \max \{ v_j + \text{OPT}(p(j)), \text{OPT}(j-1) \}$$

Exponential Running Time



$$p(j) = j - 2$$

Only 5 OPT values!

Formal proof: Ex.

