



OBST



Introduction



- Dictionary
- Problem Description



Algorithm

for $i = 0$ to n do

$C(i, i) \leftarrow 0$

$W(i, i) \leftarrow q(i)$

for $m = 0$ to n do

for $i = 0$ to $(n - m)$ do

$J \leftarrow i + m$

$W(i, j) \leftarrow W(i, j - 1) + p(j) + q(j)$

*find $C(i, j)$ and $R(i, j)$

end



$$w_{i, i+1} = q_i + q(i+1) + p(i+1)$$

$$r_{i, i+1} = i+1$$

$$c_{i, i+1} = q_i + q(i+1) + p(i+1)$$

$$w_{i, j} = w_{i, j-1} + p_j + q_j$$

$$r_{i, j} = k$$

$$c_{i, j} = \min_{i < k < j} \{ c_{i, k-1} + r_{k, j} \} + w_{i, j}$$

we will construct tables for values of w , c & r .

Let $i=0$

$$w_{00} = q_{00} = 2$$

when $i=1$

$$w_{11} = 3$$

when $i=2$

$$w_{22} = 1$$

when $i=3$

$$w_{33}$$



- $P_i = \{3, 3, 1, 1\}$
- $q_i = \{2, 3, 1, 1, 1\}$
- $Keys = \{do, if, int, while\}$



$j \rightarrow$	0	1	2	3	4
$j-i=0$	$w_{00}=2$ $C_{00}=0$ $T_{00}=0$	$w_{11}=3$ $C_{11}=0$ $T_{11}=0$	$w_{22}=1$ $C_{22}=0$ $T_{22}=0$	$w_{33}=1$ $C_{33}=0$ $T_{33}=0$	$w_{44}=1$ $C_{44}=0$ $T_{44}=0$
$j-i=1$	$w_{01}=8$ $C_{01}=8$ $T_{01}=1$	$w_{12}=7$ $C_{12}=7$ $T_{12}=2$	$w_{23}=3$ $C_{23}=3$ $T_{23}=3$	$w_{34}=3$ $C_{34}=3$ $T_{34}=4$	
$j-i=2$	$w_{02}=12$ $C_{02}=19$ $T_{02}=1$	$w_{13}=9$ $C_{13}=12$ $T_{13}=2$	$w_{24}=5$ $C_{24}=8$ $T_{24}=3$		
$j-i=3$	$w_{03}=14$ $C_{03}=25$ $T_{03}=2$	$w_{14}=11$ $C_{14}=19$ $T_{14}=2$			
$j-i=4$	$w_{04}=16$ $C_{04}=32$ $T_{04}=2$				

$32 / 16 = 2$

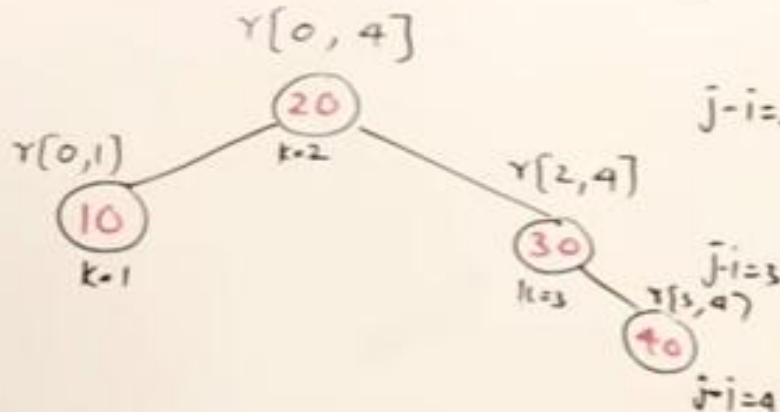


Optimal Binary Search Tree

$keys = \{ 0 \ 1 \ 2 \ 3 \ 4 \}$
 $\{ 10, 20, 30, 40 \}$

$P_i = \{ 3, 3, 1, 1 \}$

$q_i = \{ 2, 3, 1, 1, 1 \}$



$j \rightarrow$	0	1	2	3	4
$j-i=0$	$w_{00}=2$ $C_{00}=0$ $r_{00}=0$	$w_{11}=3$ $C_{11}=0$ $r_{11}=0$	$w_{22}=1$ $C_{22}=0$ $r_{22}=0$	$w_{33}=1$ $C_{33}=0$ $r_{33}=0$	$w_{44}=1$ $C_{44}=0$ $r_{44}=0$
$j-i=1$	$w_{01}=8$ $C_{01}=8$ $r_{01}=1$	$w_{12}=7$ $C_{12}=7$ $r_{12}=2$	$w_{23}=3$ $C_{23}=3$ $r_{23}=3$	$w_{34}=3$ $C_{34}=3$ $r_{34}=4$	
$j-i=2$	$w_{02}=12$ $C_{02}=19$ $r_{02}=1$	$w_{13}=9$ $C_{13}=12$ $r_{13}=2$	$w_{24}=5$ $C_{24}=8$ $r_{24}=3$		
$j-i=3$	$w_{03}=14$ $C_{03}=25$ $r_{03}=2$	$w_{14}=11$ $C_{14}=19$ $r_{14}=2$			
$j-i=4$	$w_{04}=16$ $C_{04}=32$ $r_{04}=2$				

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