Conquer How many ways    RECURRENCE

$$T(1) = 1$$
$$T(2) = 1$$
$$T(n) = \sum_{i=1}^{n-1} T(i) + T(n-i)$$

$$2\sum_{i=1}^{n-1} T(i) + (n-1)$$

$$-\quad T(n-1) = 2\sum_{i=1}^{n-2} T(i) + n-2$$

$$\overline{T(n) - T(n-1) = 2T(n-1) + 1}$$

$$T(n) - 3T(n-1) = 1$$
$$(r-3)(r-1) \quad\quad root\ 3, 1$$

$$T(n) = C_1 3^n + C_2 \quad\quad\quad T(1) = 0 \quad T(n) = \frac{1}{9} 3^n - 1$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad T(2) = 0$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad \Theta(3^n)$$

WORSE THAN EXPONENTIAL

# Dynamic How Many Ways

$$T(1) = 1$$

$$T(2) = 1$$

$$T(n) = \sum_{i=3}^{n} \sum_{j=1}^{i-1}$$

$$T(n) = \sum_{i=3}^{n} (i-1)$$

$$T(n) = \frac{n(n+1)}{2} - 2 - (n-2)$$

$$O(n^2)$$