

## COMBINATION FORMULA

$${}^nC_r = \frac{n!}{r!(n-r)!}$$

$$\begin{aligned} fac\_n &= fac(n) \\ fac\_r &= fac(r) \\ fac\_nr &= fac(n-r) \end{aligned} \quad (3) \quad \underline{fac}$$

Input -  $n, r$

Combination( $n, r$ );

→ return value

long ~~int~~ <sup>unsigned int</sup>  $t_1, t_2, t_3;$

$O(n)$

$O(n)$

$O(n)$

$t_1 = fac(n);$

$t_2 = fac(n-r);$

$t_3 = fac(r);$

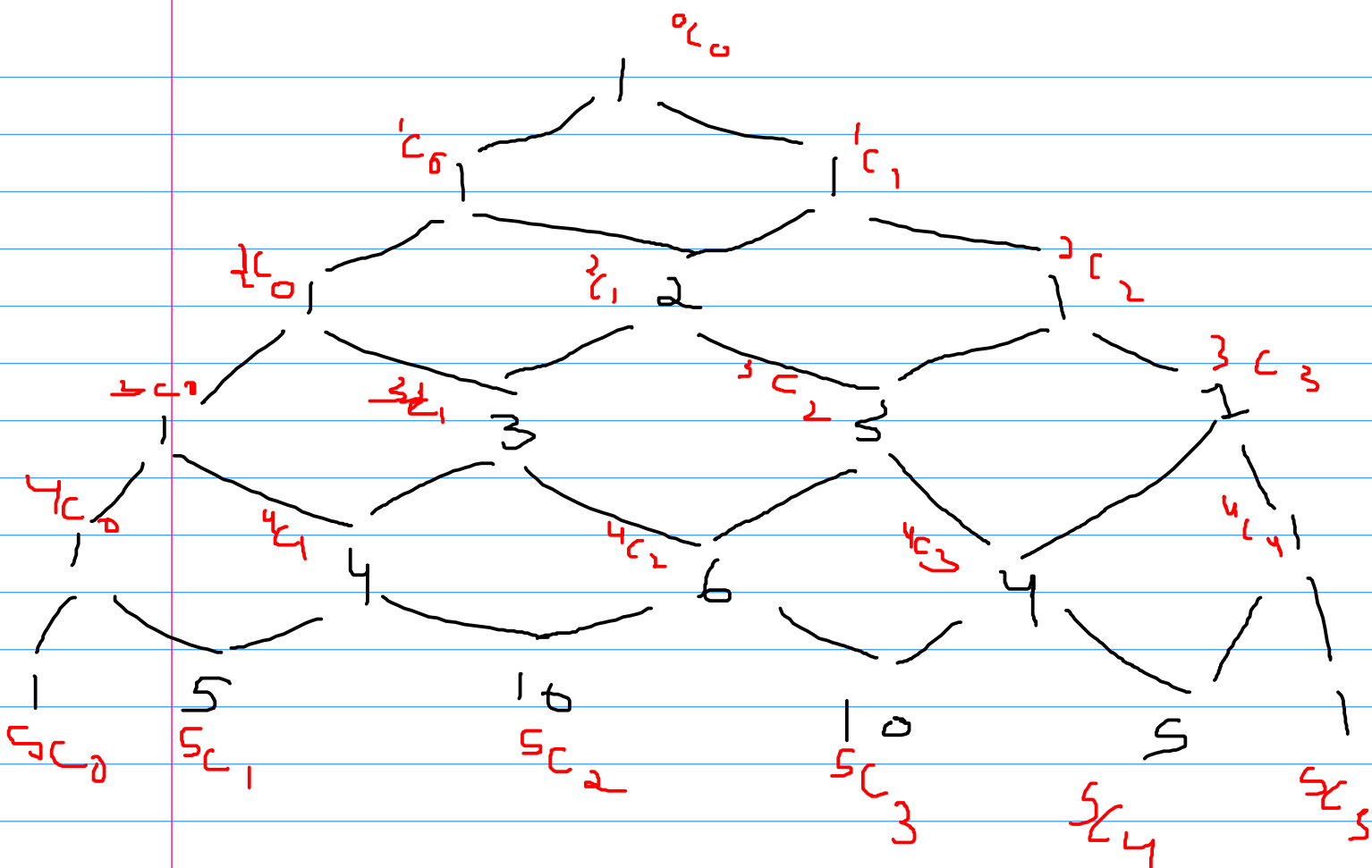
→ fac

return  $(t_1)/(t_2)(t_3);$

↳

total time  $\rightarrow \underline{O(n) = O(n)}$

# Pascal Triangle



$${}^4C_3 = {}^3C_2 + {}^3C_3$$

$${}^5C_2 = {}^4C_1 + {}^4C_2$$

$${}^3C_0 + {}^3C_1$$

$${}^3C_1 + {}^3C_2$$

$${}^2C_0 + {}^2C_1$$

$${}^1C_0$$

$${}^1C_0$$

$${}^1C_1$$

$$r=0, c=0$$

$$r=1, c=1$$

$$1$$

$$1$$

$$1$$

Combination (n, r)

{ if (r == 0 || r == n)  
return 1;

int t1, t2;

t1 = Comb(n-1, r-1);

t2 = Comb(n-1, r);

return t1 + t2;

}