

Multiplication

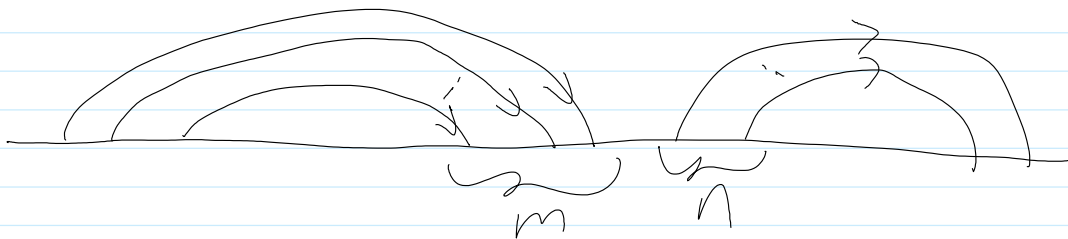
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How many such shapes are there?

$$S(m, n+1) = \sum_{j=0}^m S(m-j, n) \cdot \binom{m+1}{j+1}$$

Why is this symmetric?

It is enough to compute the "model product"



$S(m, n)$ counts pairs (α, β) :

$$\alpha: [m] \longrightarrow [n] \cup \infty$$

$$\beta: [n] \longrightarrow [m] \cup \infty$$

$$\text{s.t. } \forall i \quad \alpha(i) = \infty \text{ or } \beta(\alpha(i)) > i$$

$$\forall j, \beta(j) = \infty \text{ or } \langle \beta(j) \rangle > j$$

Some ~~A~~ facts

