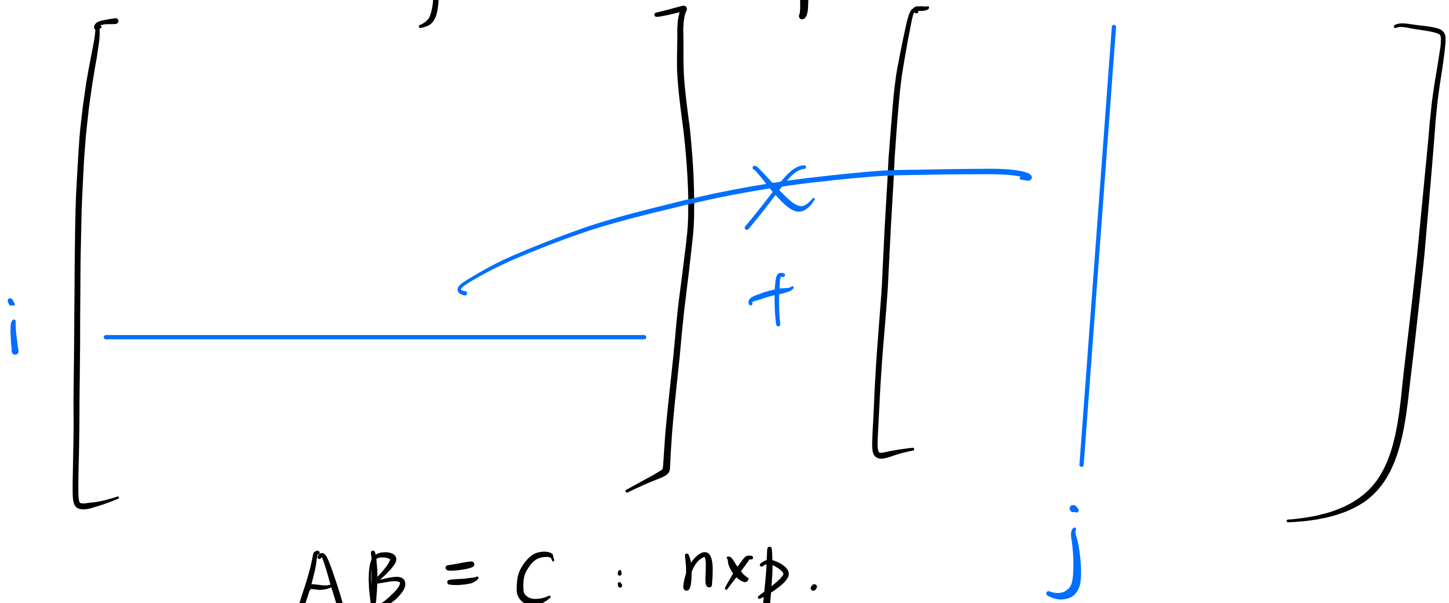
$A_{i,j}: \underline{n\times m}$ A列 = B行. $B_{i,j}: \underline{m}\times p$.



$AB = C: n\times p$.

✓ $$C_{i,j} = \sum_{k=1}^{m} A_{ik}\cdot B_{kj}$$

$$f_n = f_{n-1} + f_{n-2}.$$ $O(n)$.

都是 $n\times n$.

$$(A\times B)\times C = A\times(B\times C).$$

$$A^k = \left(A^{k/2}\right)^2.$$ (偶).

奇: $\left(A^{\lfloor k/2 \rfloor}\right)^2 \cdot A$

$O(n^3 \log k)$.

$$\begin{bmatrix} f_n \\ f_{n-1} \end{bmatrix} = \underbrace{\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}}_{A} \times \begin{bmatrix} f_{n-1} \\ f_{n-2} \end{bmatrix}$$

$f_0 = f_1 = 1$.

$$\begin{bmatrix} f_2 \\ f_1 \end{bmatrix} = A \cdot \begin{bmatrix} f_1 \\ f_0 \end{bmatrix}$$

$$\begin{bmatrix} f_3 \\ f_2 \end{bmatrix} = A \cdot \begin{bmatrix} f_2 \\ f_1 \end{bmatrix} = A^2 \cdot \begin{bmatrix} f_1 \\ f_0 \end{bmatrix}$$

$$\begin{bmatrix} f_{n+1} \\ f_n \end{bmatrix} = A^n \times \begin{bmatrix} f_1 \\ f_0 \end{bmatrix}$$

$f_{i,0/1/2}$ ：i结尾有0/1/2个A的方案数.

$$f_{i,0} = f_{i-1,0} + f_{i-1,1} + f_{i-1,2}.$$

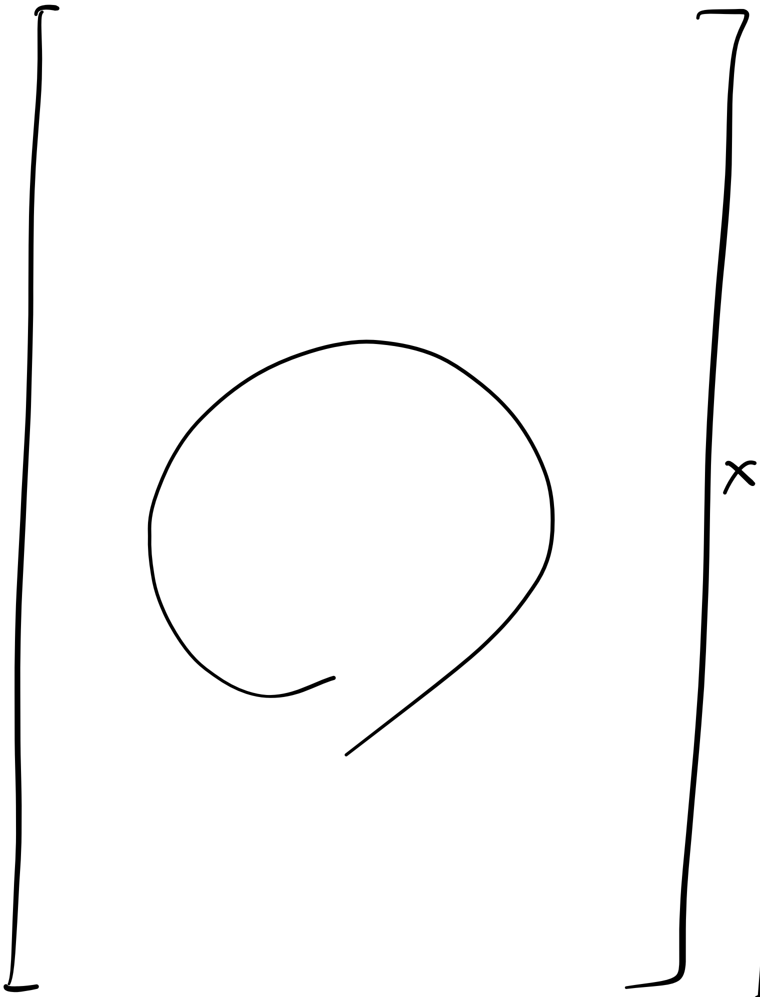
$$f_{i,1} = f_{i-1,0}$$

$$f_{i,2} = f_{i-1,1}$$

A.

$$\begin{bmatrix} f_{i,0} \\ f_{i,1} \\ f_{i,2} \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} \times \begin{bmatrix} f_{i-1,0} \\ f_{i-1,1} \\ f_{i-1,2} \end{bmatrix}$$

$$\begin{bmatrix} a_{k+2} \\ b_{k+2} \\ c_{k+2} \\ a_{k+1} \\ b_{k+1} \\ c_{k+1} \\ (k+1)^2 \\ k+1 \\ w^{k+1} \\ z^{k+1} \\ 1 \end{bmatrix} =$$



$$\times \begin{bmatrix} a_{k+1} \\ b_{k+1} \\ c_{k+1} \\ a_k \\ b_k \\ c_k \\ k^2 \\ k \\ w^k \\ z^k \\ 1 \end{bmatrix}$$

$f_{i,j}$：到第 i 行、第 j 列的方案数.

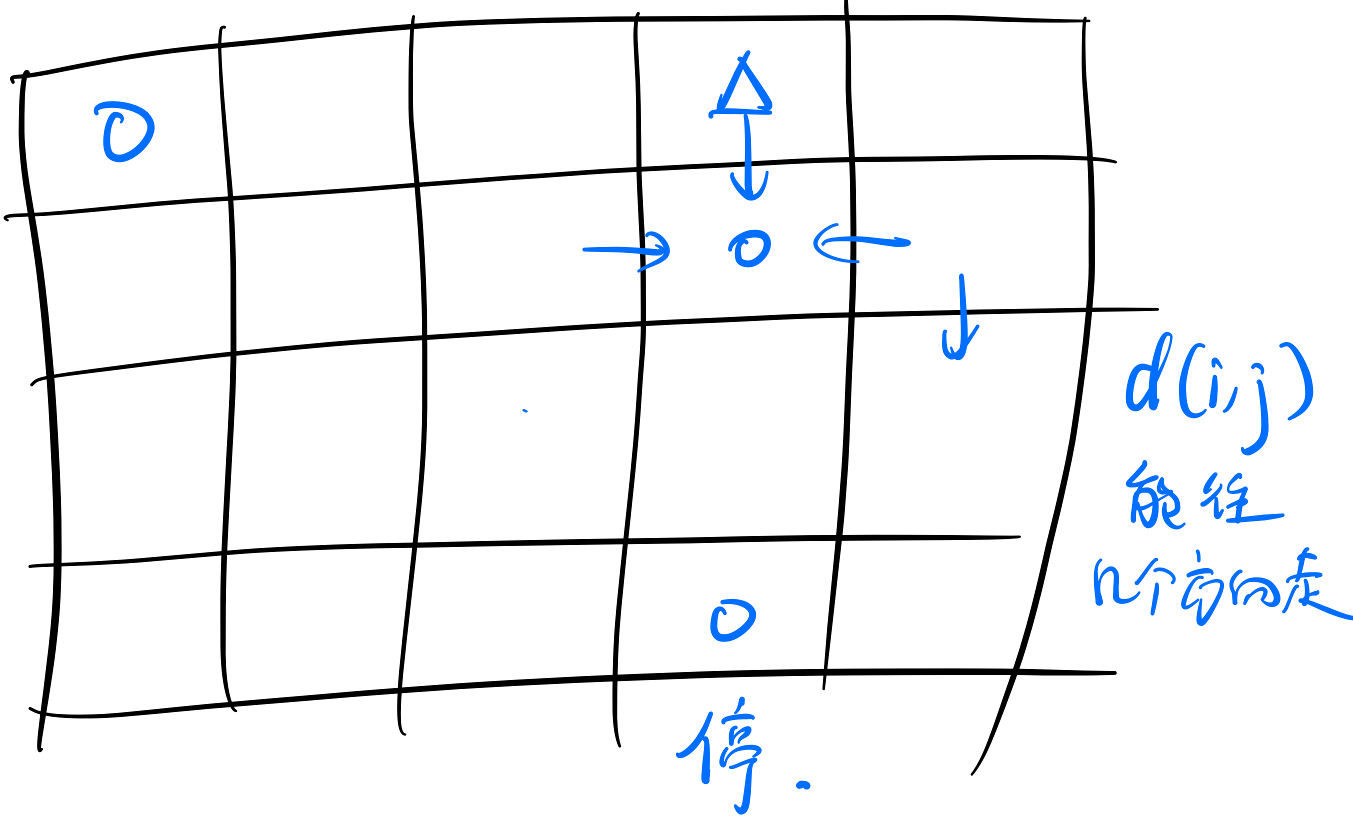
$$f_{i,j} = f_{i-1,j-1} + f_{i-1,j-3} + f_{i-1,j-5} + \cdots$$
$$+ f_{i,j-1} + f_{i,j-3} + f_{i,j-5} + \cdots$$
$$+ f_{i+1,j-1} + f_{i+1,j-3} + f_{i+1,j-5} + \cdots$$

$$= f_{i,j-2}$$

$$f_{i,j} = f_{i-1,j-1} + f_{i,j-1} + f_{i+1,j-1} + f_{i,j-2}.$$

$$\begin{array}{c} \begin{bmatrix} f_{1,j} \\ \vdots \\ f_{n,j} \\ f_{1,j-1} \\ \vdots \\ f_{n,j-2} \end{bmatrix} \\ j\text{列} \end{array} = \begin{bmatrix} & & \\ & A & \\ & & \end{bmatrix} \times \begin{array}{c} \begin{bmatrix} f_{1,j-1} \\ \vdots \\ f_{n,j-1} \\ f_{1,j-2} \\ \vdots \\ f_{n,j-2} \end{bmatrix} \\ j-1\text{列} \end{array}$$

n行. m列 ≤50.



p_j = 最后停在最后一行第 j 列的概率.

求 $p_1 \cdots p_m$

若到达最后一行，下一步、下下一步……不能移动.

$f_{i,j}^{(k)}$：第 k 步在 (i,j) 的概率.

$$f_{i,j}^{(k)} = \frac{f_{i-1,j}^{(k-1)}}{d_{i-1,j}} + \frac{f_{i,j-1}^{(k-1)}}{d_{i,j-1}} + \frac{f_{i,j+1}^{(k-1)}}{d_{i,j+1}}$$

$$f_{n,j}^{(k)} = \frac{f_{n-1,j}^{(k-1)}}{d_{n-1,j}} + f_{n,j}^{(k-1)}$$

(double)、

$$\begin{bmatrix} f_{1,1}^{(k)} \\ \vdots \\ f_{n,m}^{(k)} \end{bmatrix} = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix} \times \begin{bmatrix} f_{1,1}^{(k-1)} \\ \vdots \\ f_{n,m}^{(k-1)} \end{bmatrix}$$

$n \times m$'j

让 $k = 10^{100}$