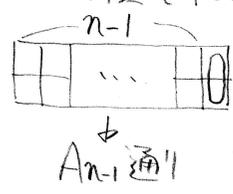
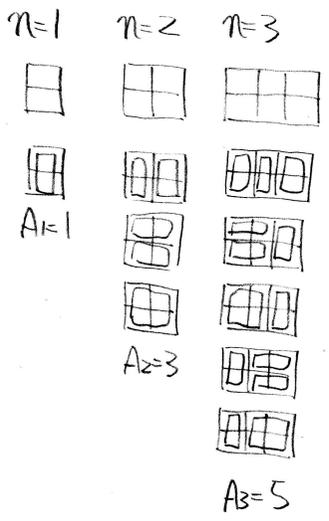
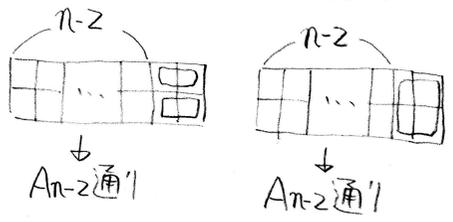


(1) (i) 縦2横n-1の部屋に、縦2横1の部屋を右側に追加する場合



(ii) 縦2横n-2の部屋に、縦2横2の部屋を右側に追加する場合



(i)(ii)より $A_n = A_{n-1} + 2A_{n-2}$

$x^2 = x + 2, x^2 - x - 2 = 0$
 $(x-2)(x+1) = 0, x = -1, 2$

(2) $n \geq 3$ のとき

$A_n + A_{n-1} = 2(A_{n-1} + A_{n-2}) = 2^2(A_{n-2} + A_{n-3}) = \dots = 2^{n-2}(A_2 + A_1) = 2^{n-2} \cdot 4 = 2^n$ — (1)

$A_n - 2A_{n-1} = -(A_{n-1} - 2A_{n-2}) = (-1)^2(A_{n-2} - 2A_{n-3}) = \dots = (-1)^{n-2}(A_2 - 2A_1) = (-1)^{n-2}$ — (2)

(1)(2)より

$2A_n + 2A_{n-1} = 2^{n+1}$
 $+ \quad A_n - 2A_{n-1} = (-1)^{n-2}$

 $3A_n = 2^{n+1} + (-1)^{n-2}$

$\therefore \frac{1}{3} \{ 2^{n+1} + (-1)^{n-2} \} = \frac{1}{3} (4-1) = 1$ — (4)

$\frac{1}{3} \{ 2^{2+1} + (-1)^{2-2} \} = \frac{1}{3} (8+1) = 3$ — (5)

$A_n = \frac{1}{3} \{ 2^{n+1} + (-1)^{n-2} \}$ — (3)

(3)(4)(5)より $A_n = \frac{1}{3} \{ 2^{n+1} + (-1)^{n-2} \}$