

AND/OR Graph Search

- Problem Reduction
- Hanoi Tower
- Monkey and Banana
- AND/OR Graph Search

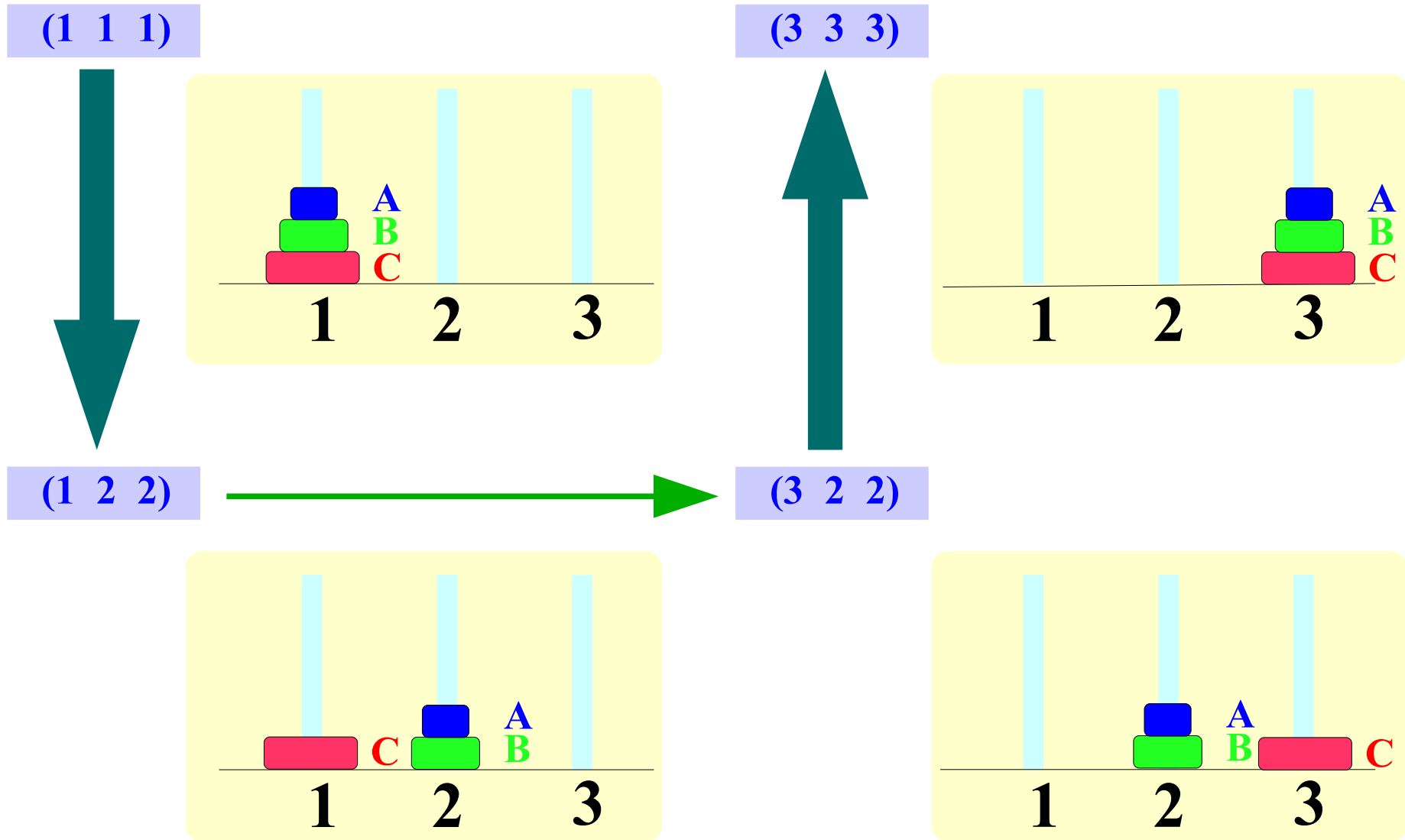
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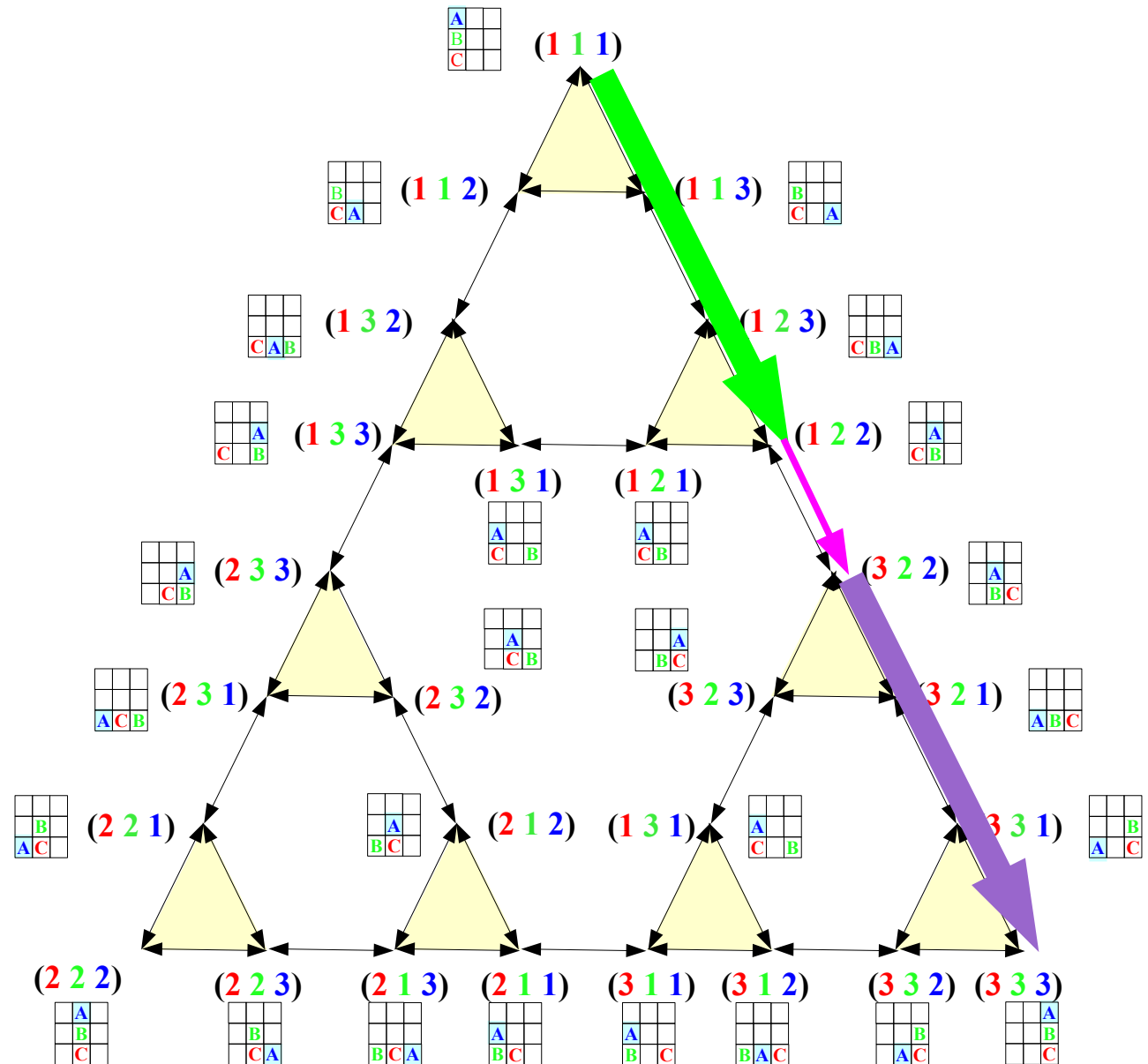
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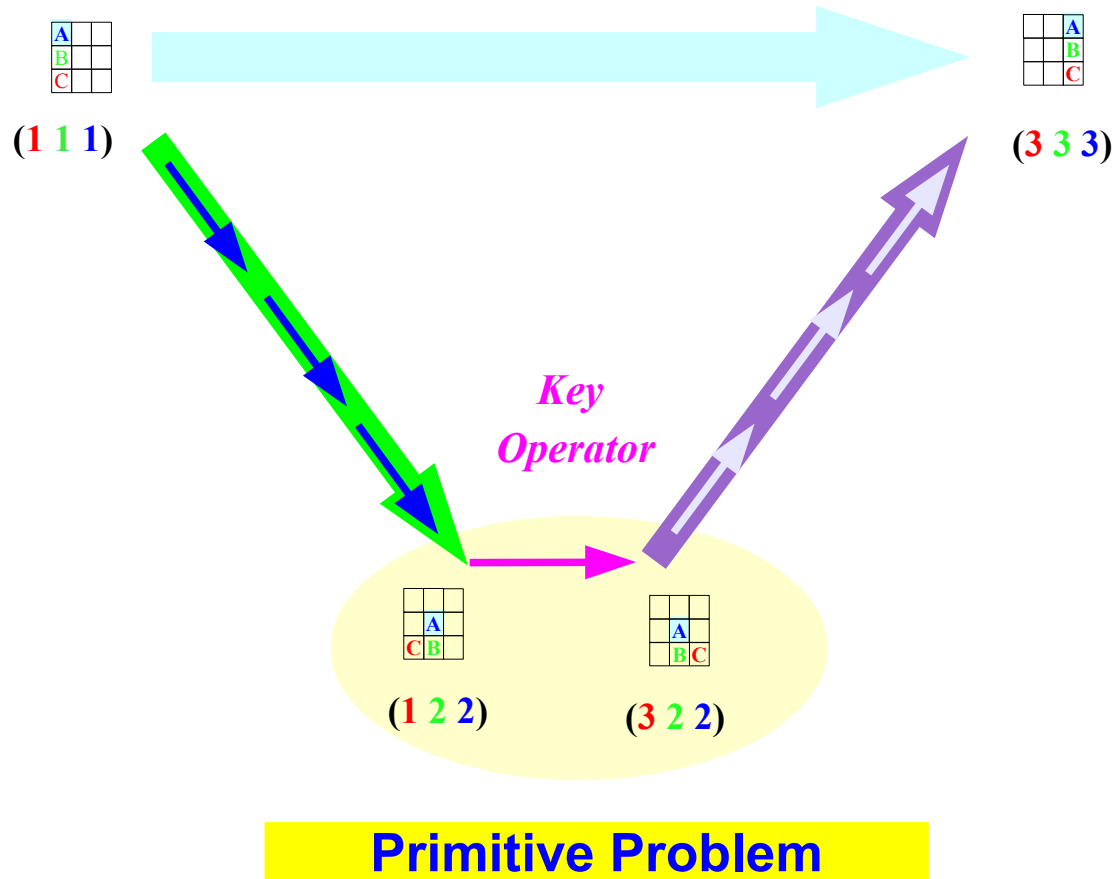
Hanoi Tower – Problem Reduction



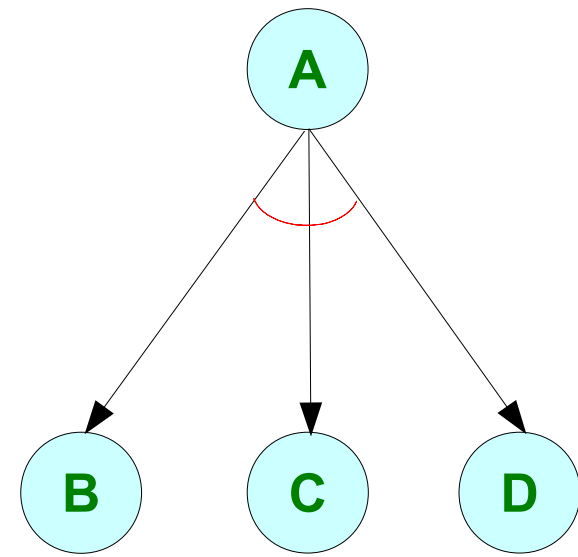
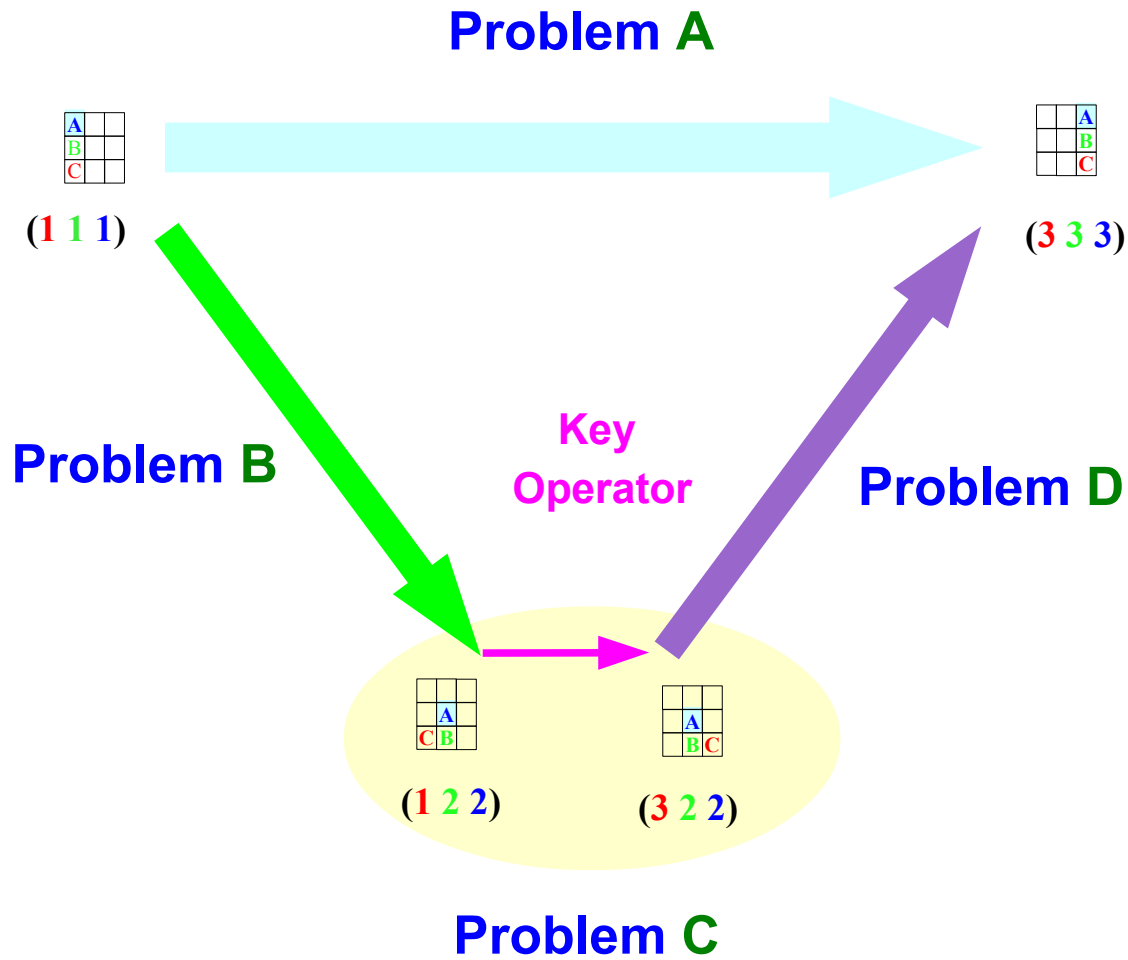
Hanoi Tower – State Space



Key Operator

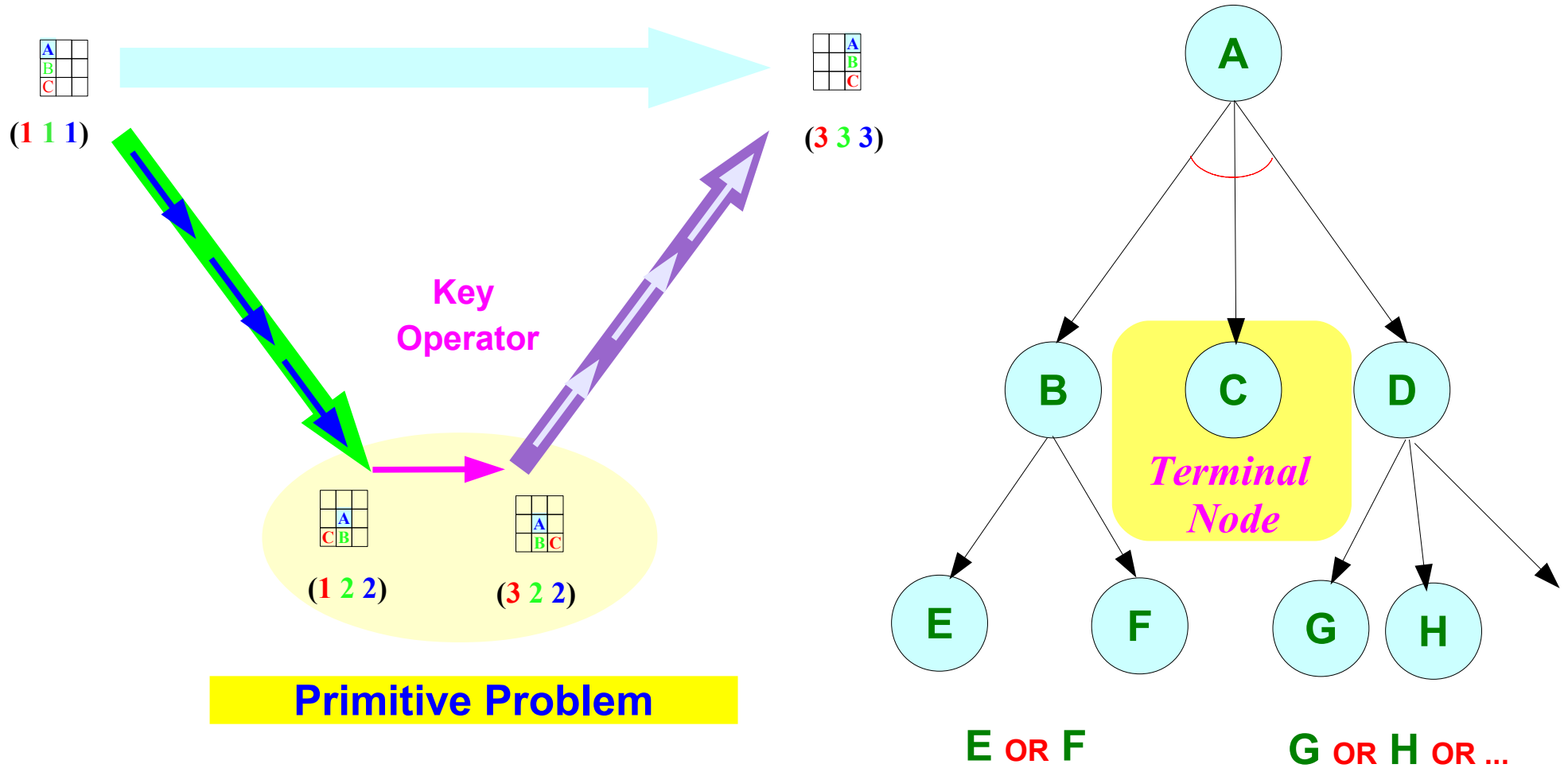


AND/OR Graph

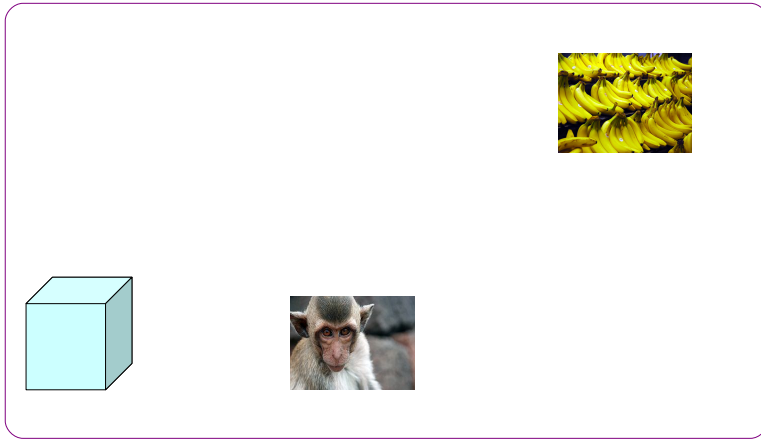


B AND C AND D

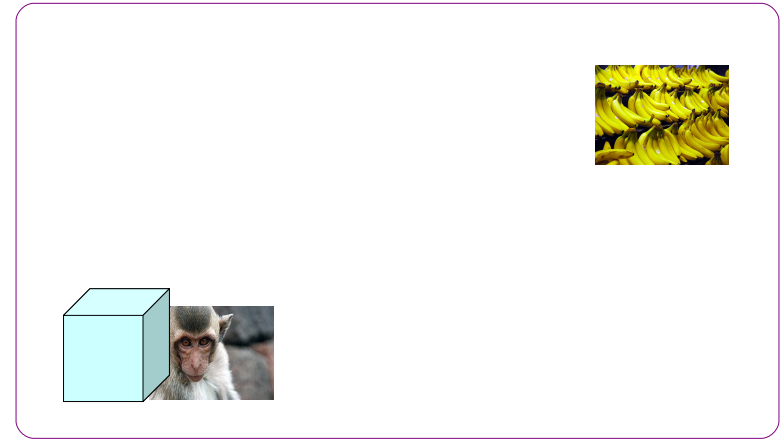
AND/OR Graph – Terminal Node



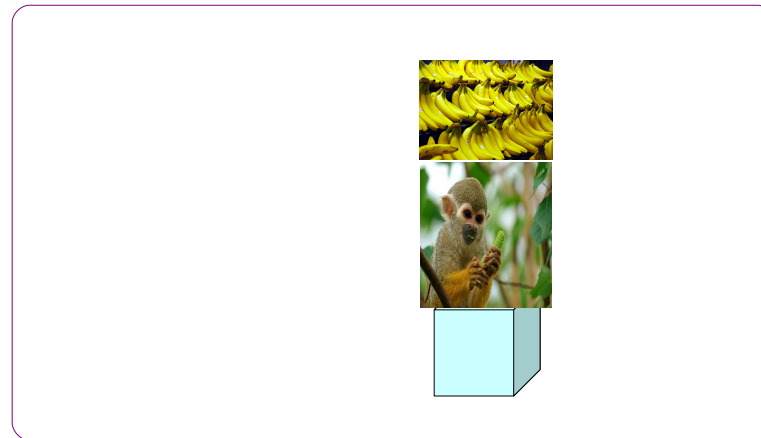
Monkey and Banana



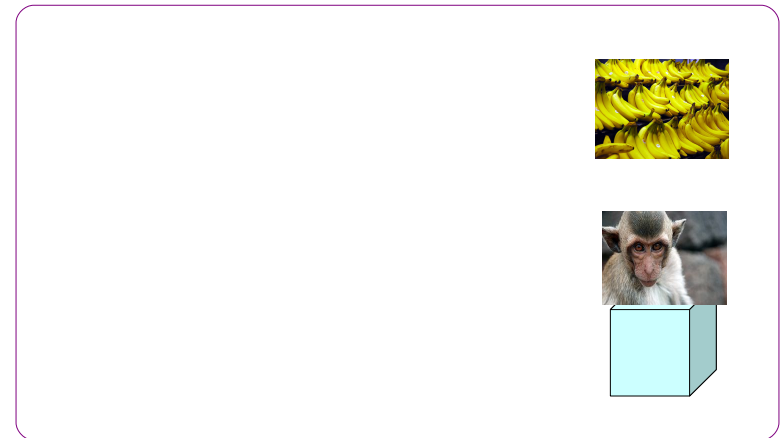
goto



**pushbox
climbbox**



grasp



Monkey and Banana - State

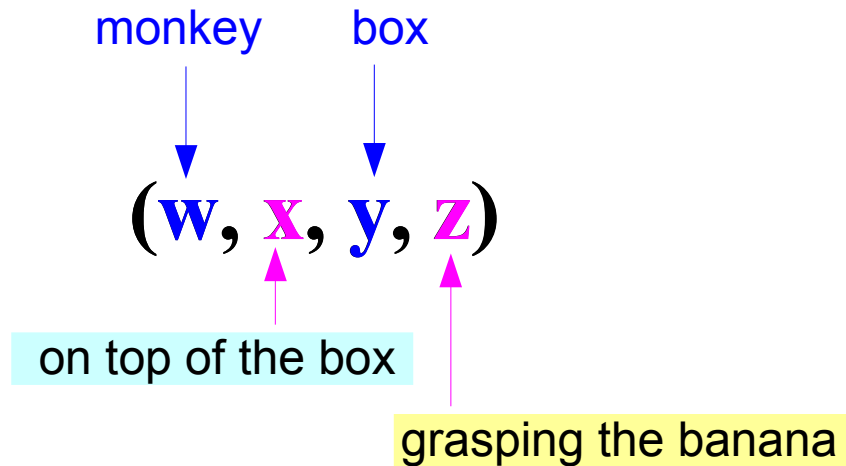
(w, x, y, z)

w: the position of the monkey (horizontal, vertical)

x: monkey on top of the box (1 or 0)

y: the position of the box (horizontal, vertical)

z: monkey grasping the banana (1 or 0)



Operator Difference (1)

precondition:

$x = 0$

$(w, 0, y, z)$

$goto(u)$

$(u, 0, y, z)$

difference: The monkey is not at the location u .

precondition:

$w = y, x = 0$

$(w, 0, w, z)$

$pushbox(v)$

$(v, 0, v, z)$

difference: The box is not at the location v .

Operator Difference (2)

precondition:
 $w = y, x = 0$

$(w, 0, w, z)$

climbbox

$(w, 1, w, z)$

difference: The monkey is not on the box.

precondition:
 $x = y = C,$
 $x = 1, z = 0$

$(c, 1, c, 0)$

grasp

$(c, 1, c, 1)$

difference: The monkey does not have bananas.

Finding Key Operator (1)

$(A, 0, B, 0)$ \longrightarrow $(C, 1, C, 1)$

difference: The monkey does not have bananas.

$(A, 0, B, 0)$ \longrightarrow $(C, 1, C, 0)$ $\xrightarrow{\text{grasp}}$ $(C, 1, C, 1)$

P_1 P_2

pushbox(C)
goto(C)
climbbox

difference:

- 1. The box is not at the location C.*
- 2. The monkey is not at the location C.*
- 3. The monkey is not on the box.*

Finding Key Operator (2)

$(A, 0, B, 0) \xrightarrow{\quad} (C, 1, C, 0) \xrightarrow{\quad} (C, 1, C, 1)$

difference:

pushbox(C)

goto(C)

climbbox

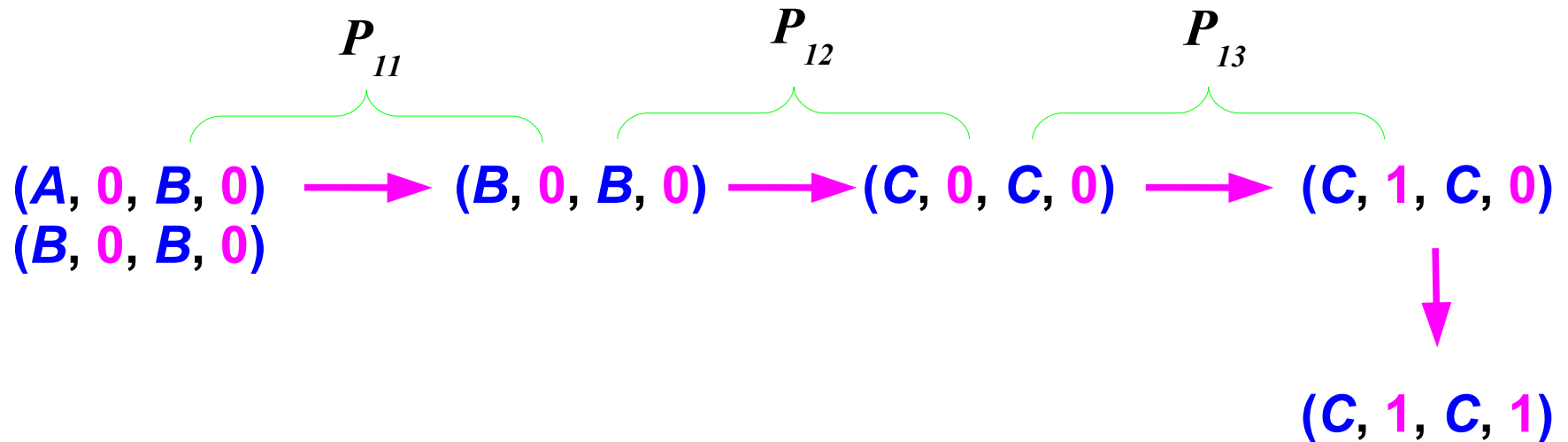
1. The box is not at the location C.

2. The monkey is not at the location C.

3. The monkey is not on the box.

precondition:

$w = y, x = 0$



References

[1] <http://en.wikipedia.org/>

[2] 인공지능개론, 이광형, 조충호, 홍릉과학출판사, 2000