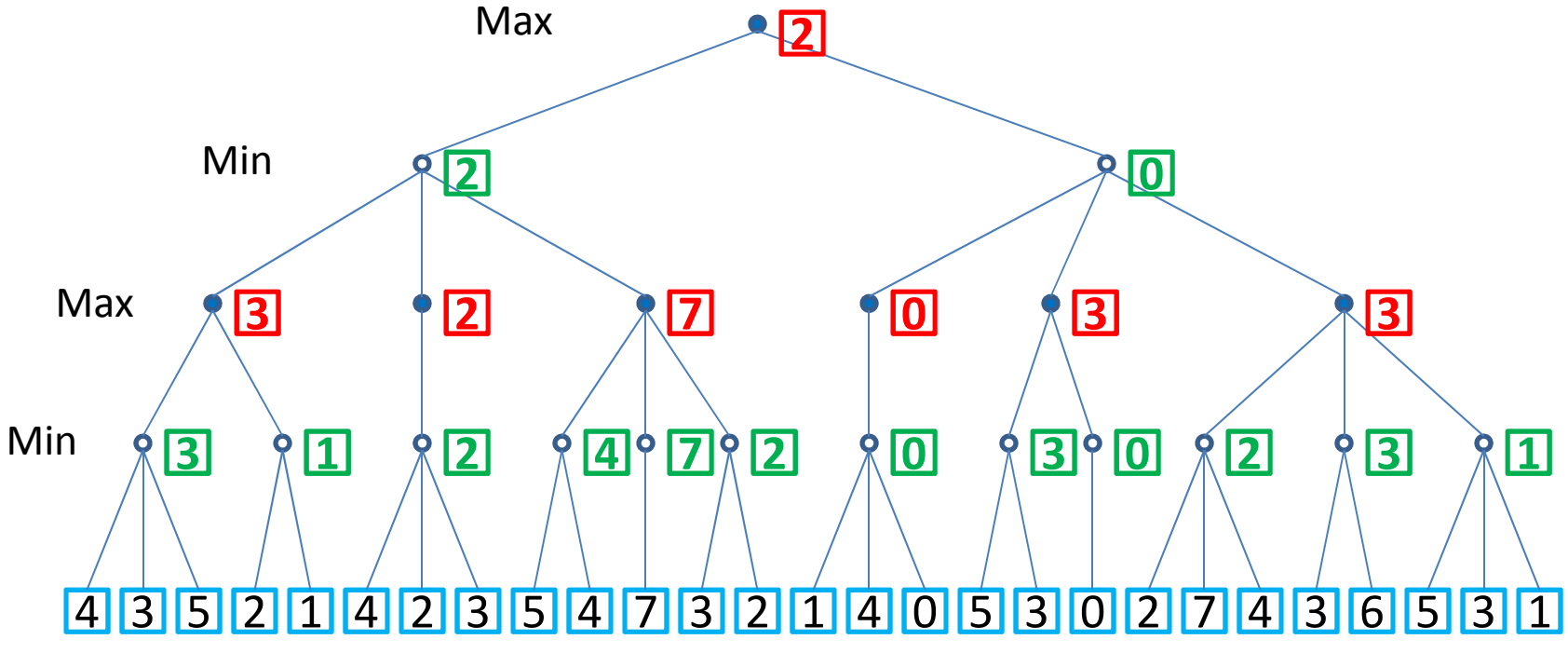
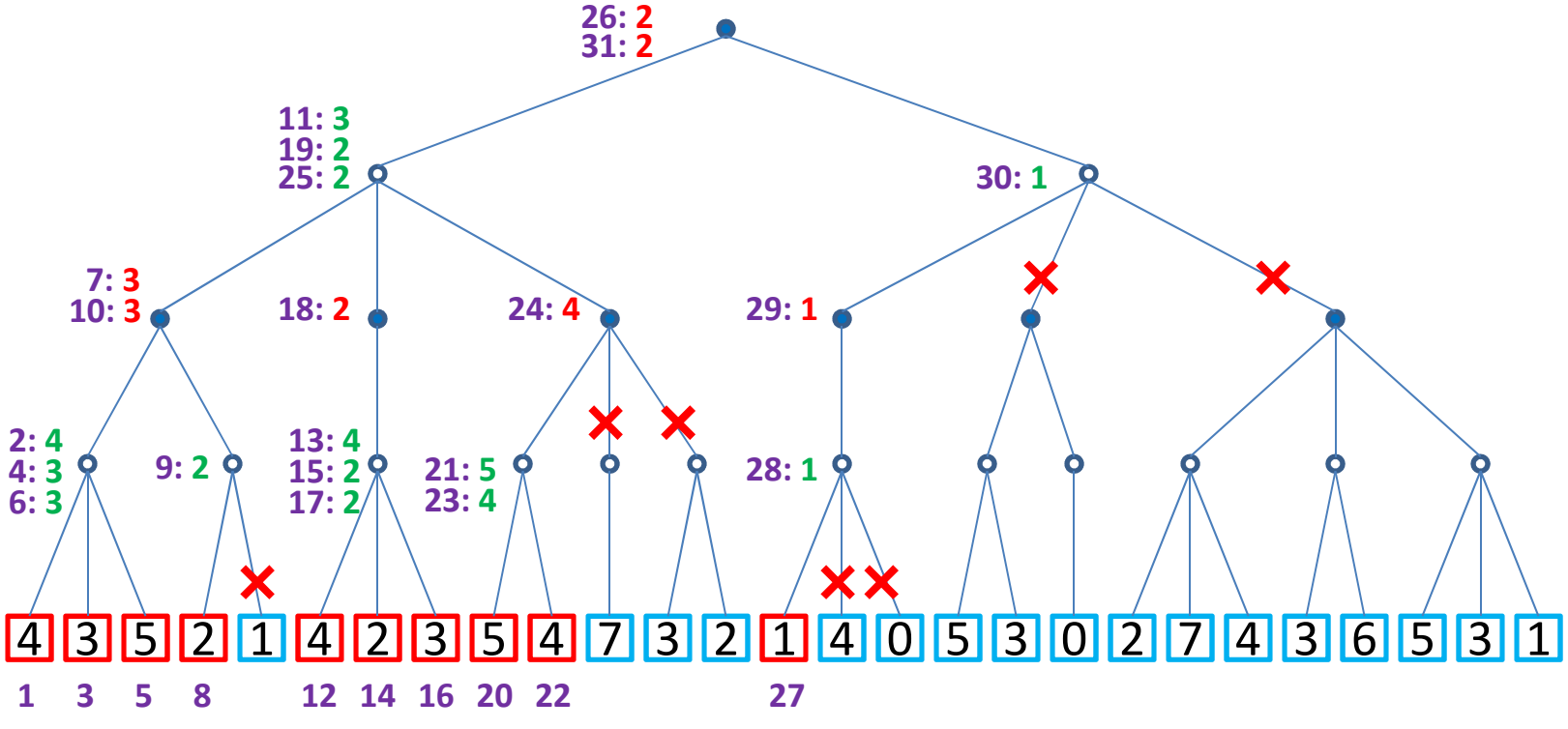
Exercises: Artificial Intelligence

MiniMax & Constraint Processing:
MiniMax Algorithm

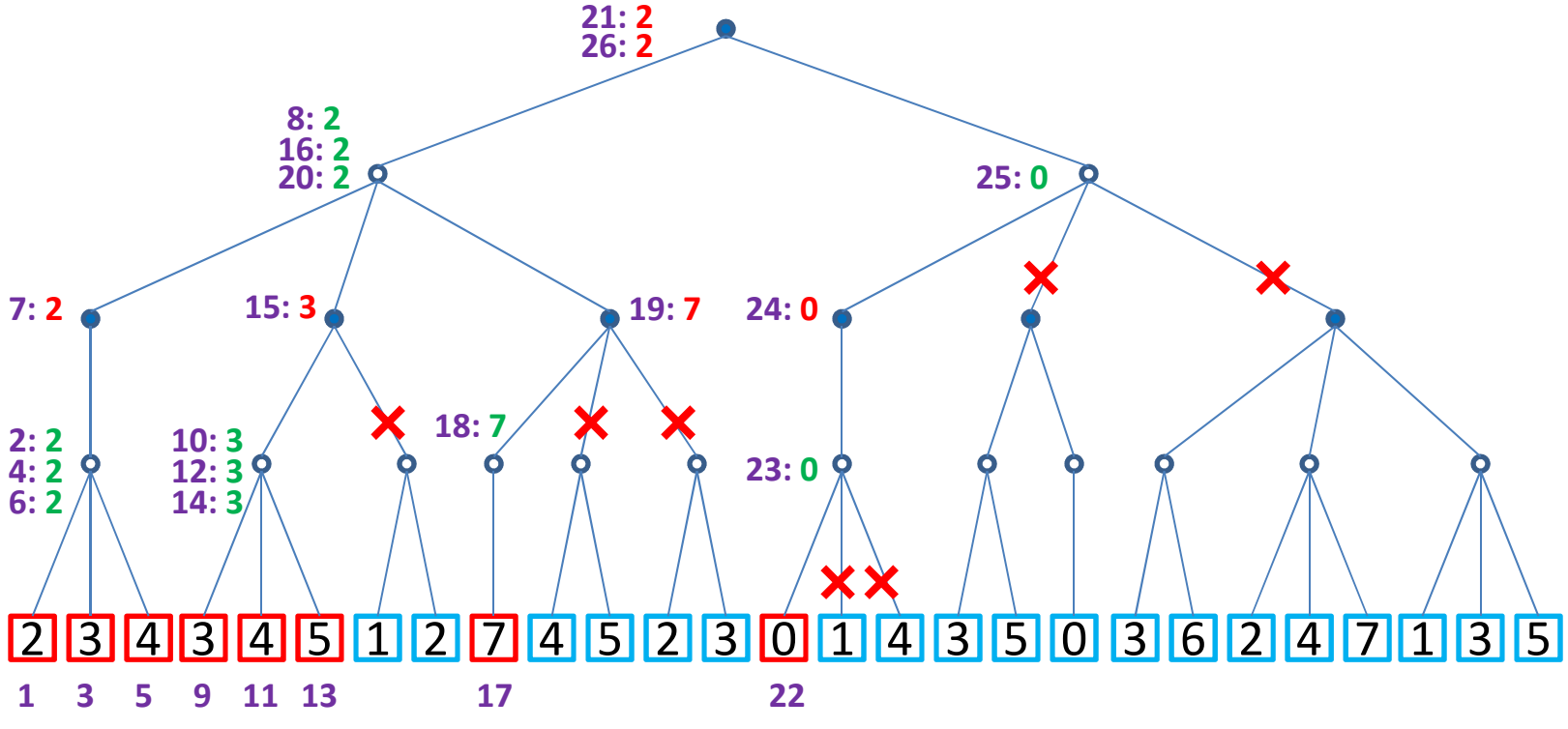
MiniMax without $\alpha\beta$-pruning



MiniMax with $\alpha\beta$-pruning



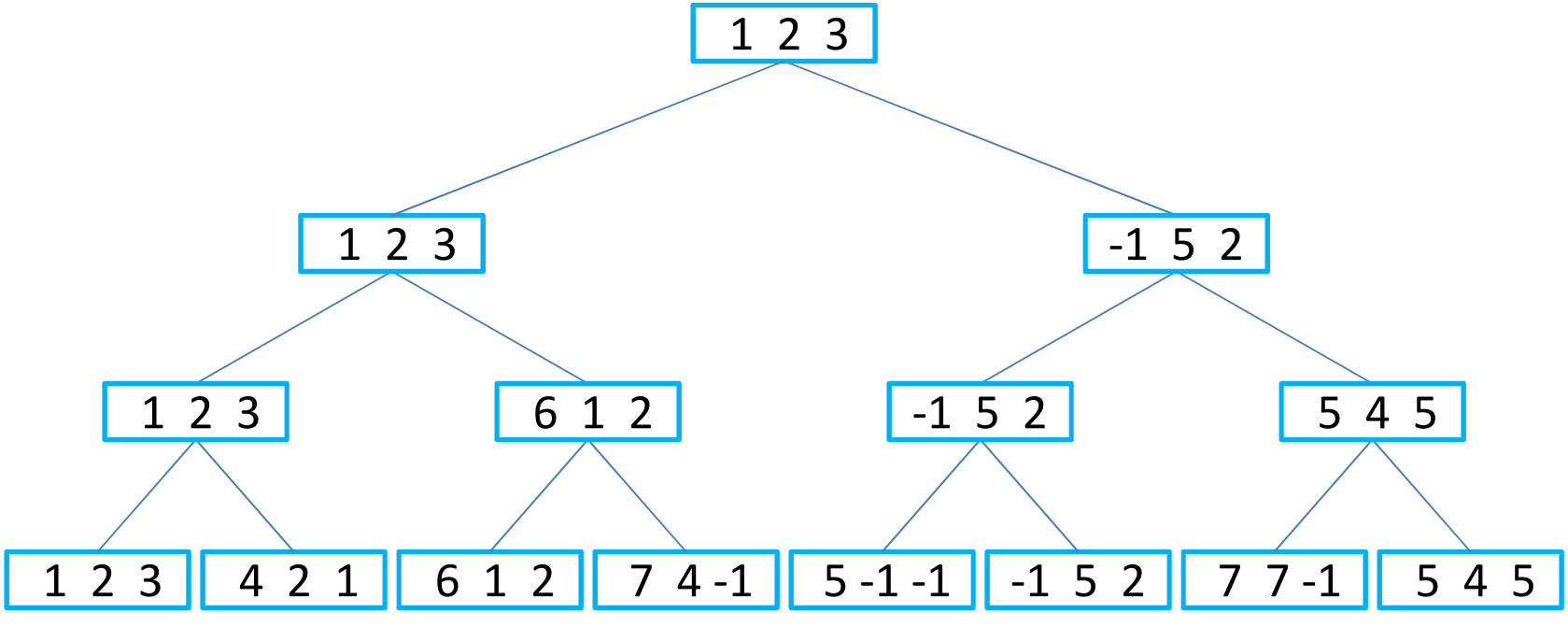
Reordering, MiniMax with $\alpha\beta$-Pruning



Exercises: Artificial Intelligence

MiniMax & Constraint Processing:
MiniMax Algorithm for 3 Players

MiniMax For 3 Players

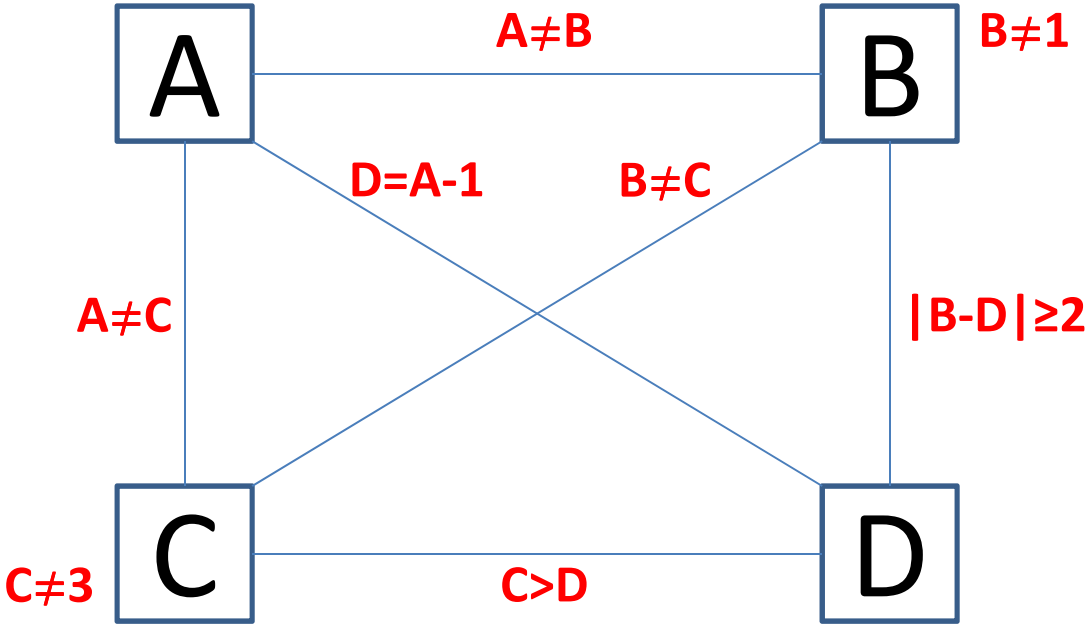


Exercises: Artificial Intelligence

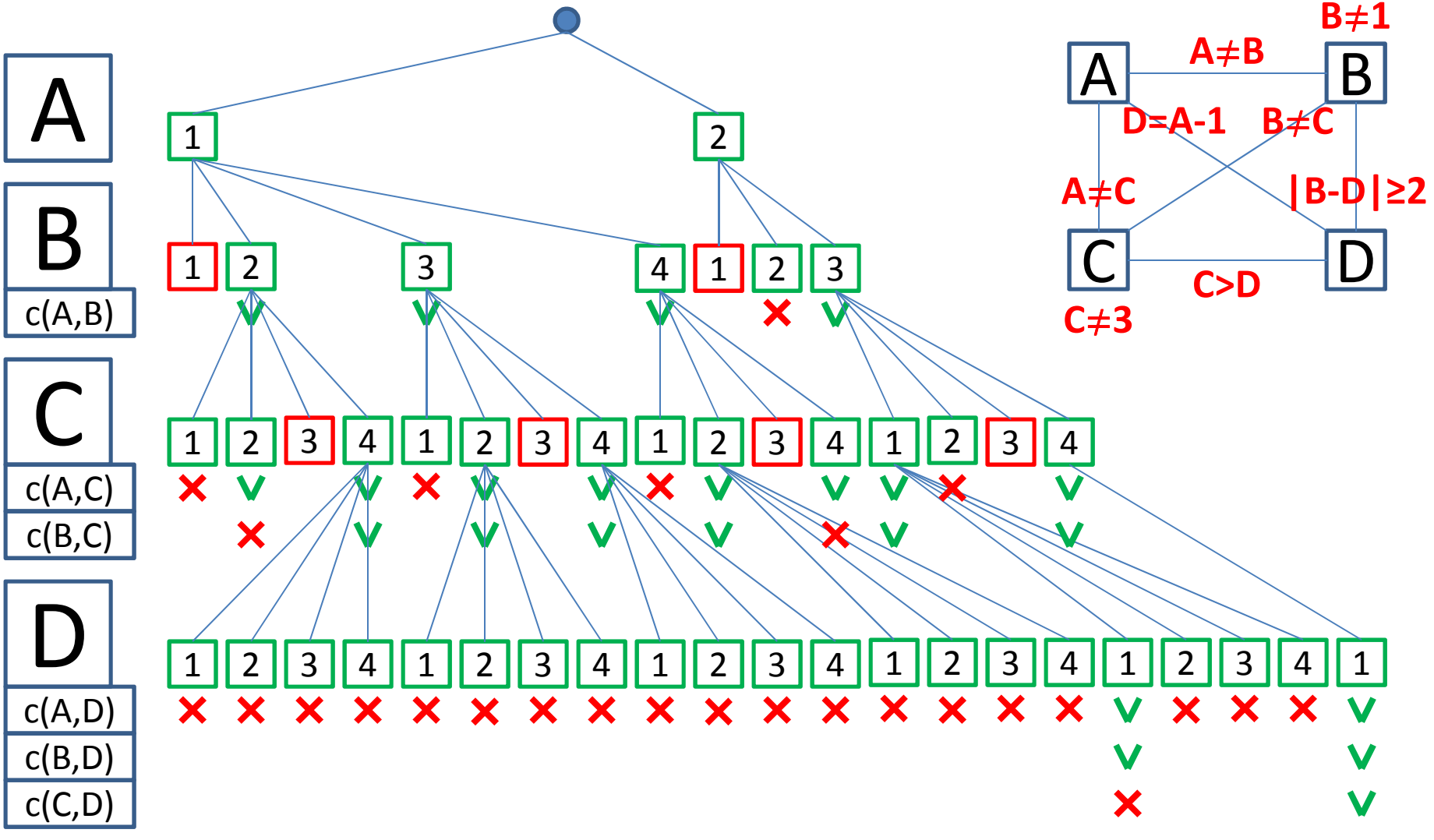
MiniMax & Constraint Processing:
The 4 Houses problem

Constraint Processing

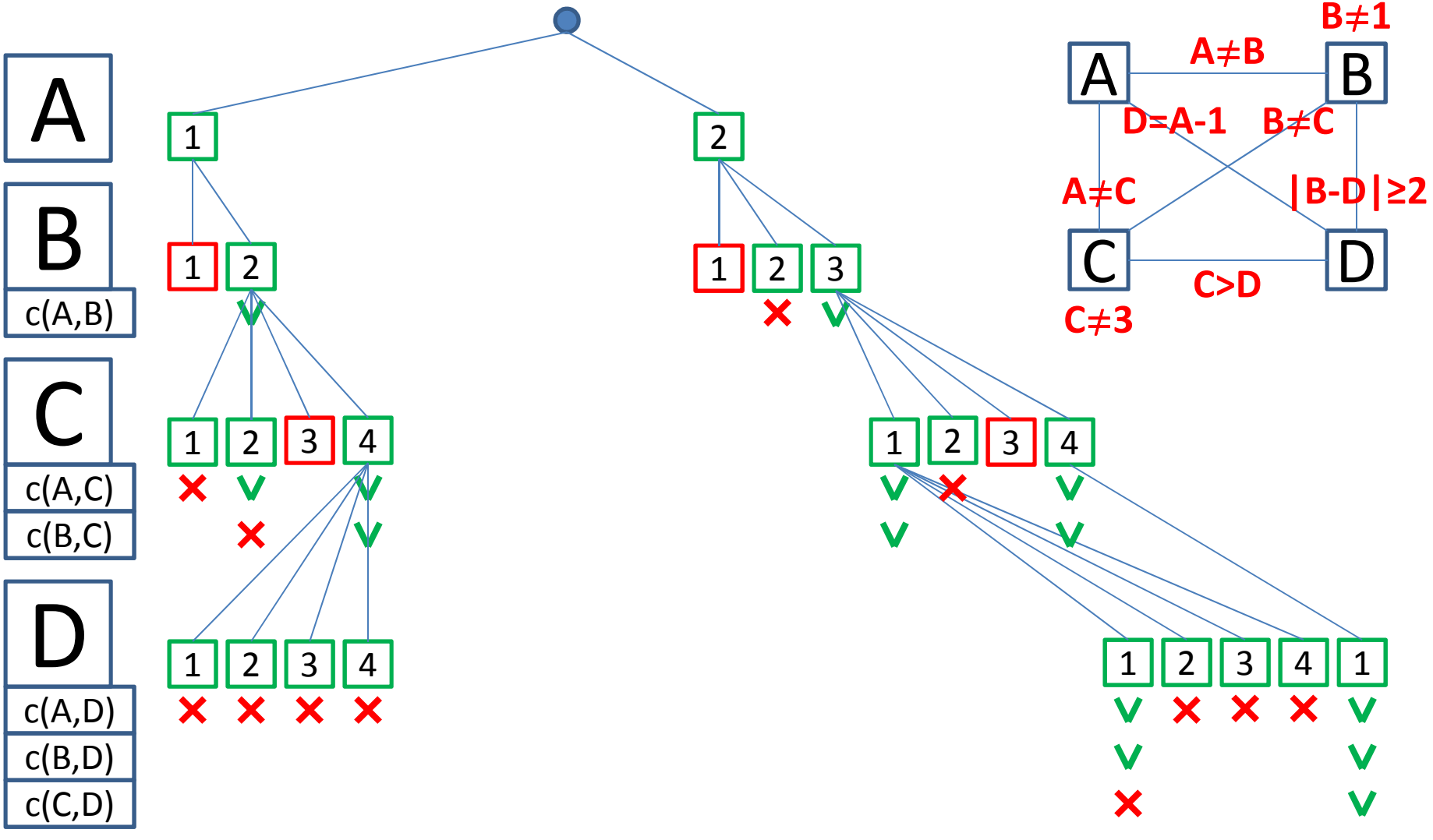
- Problem representation:



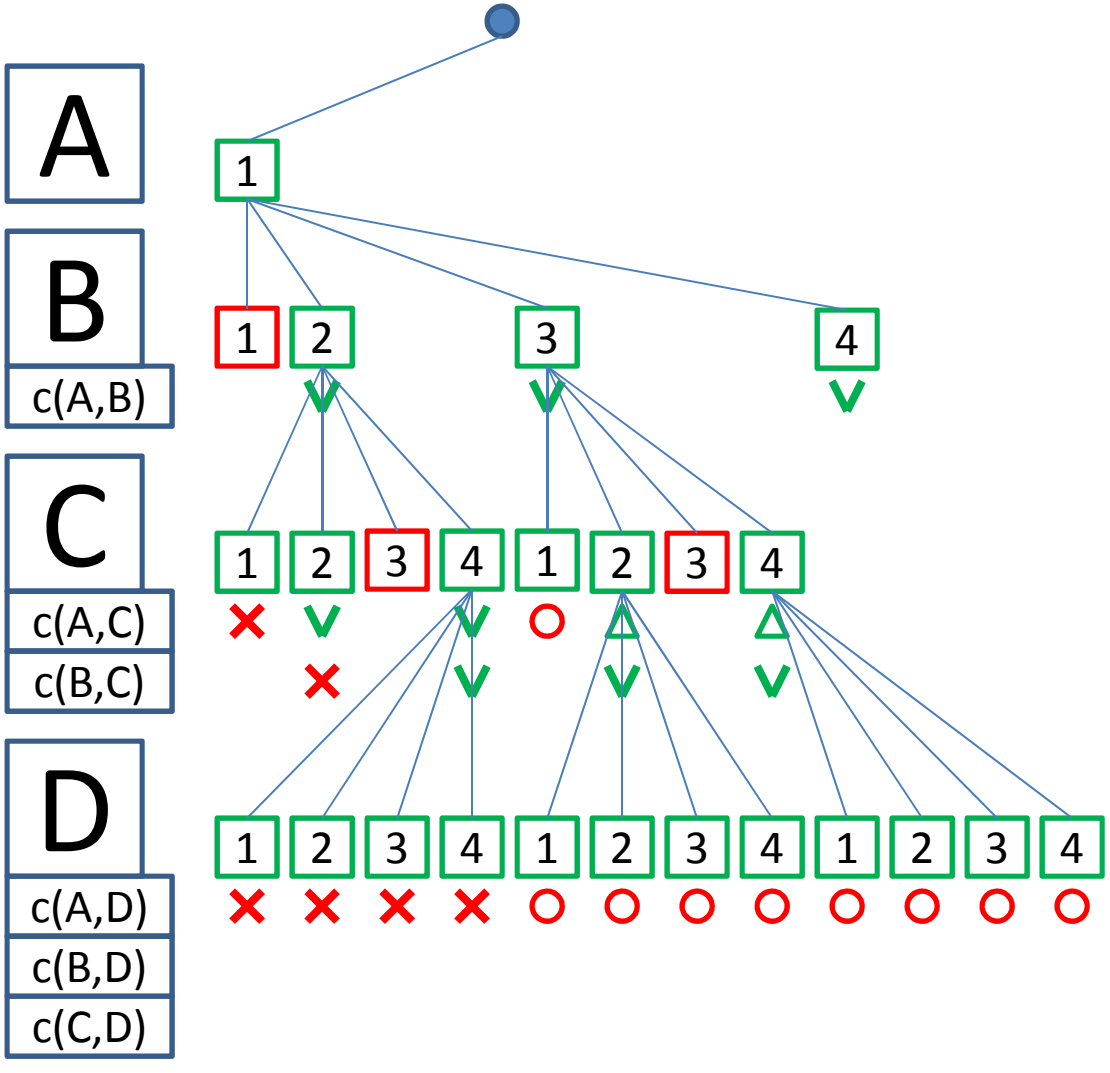
Constraint Processing: Backtracking



Constraint Processing: Backjumping

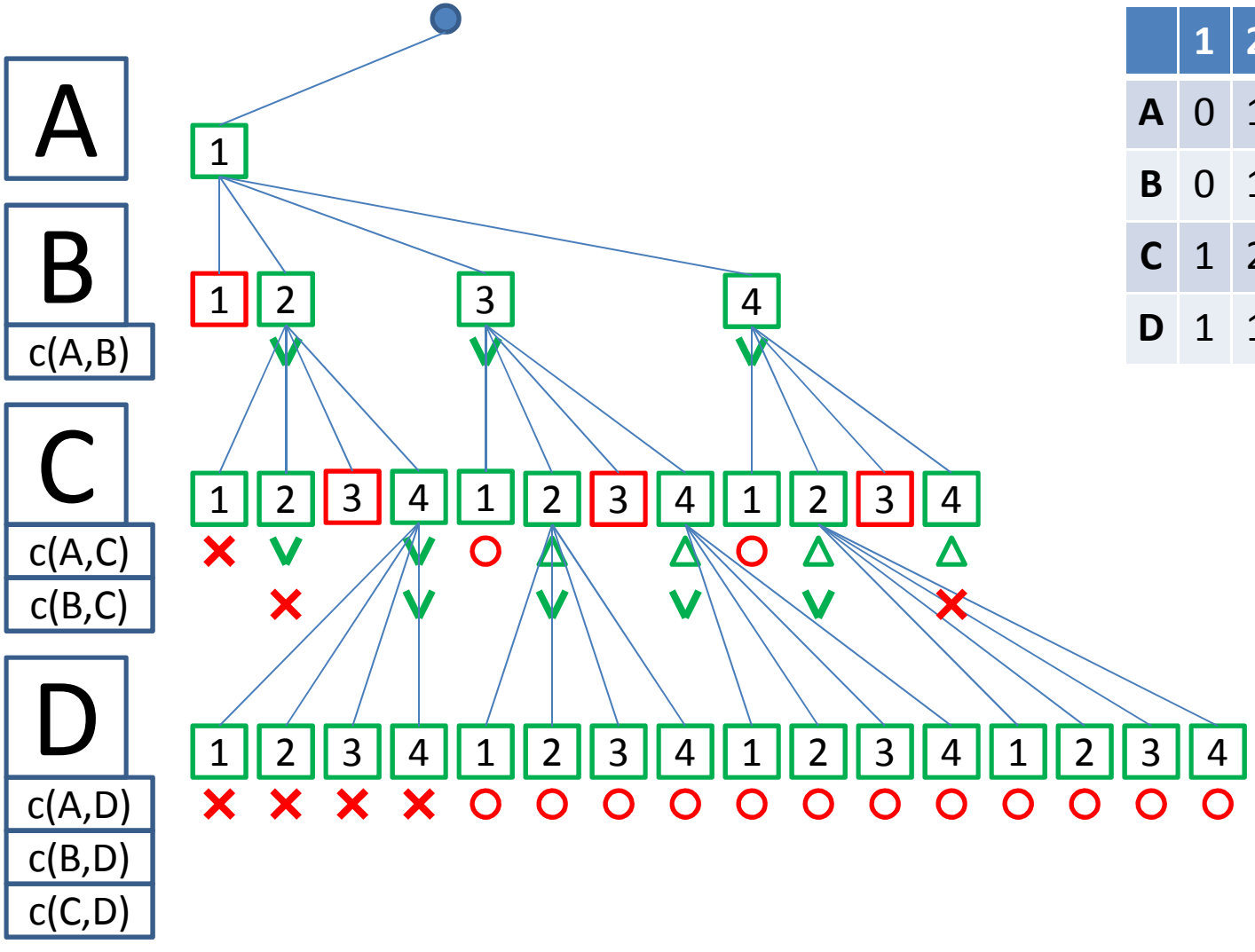


Constraint Processing: Backmarking



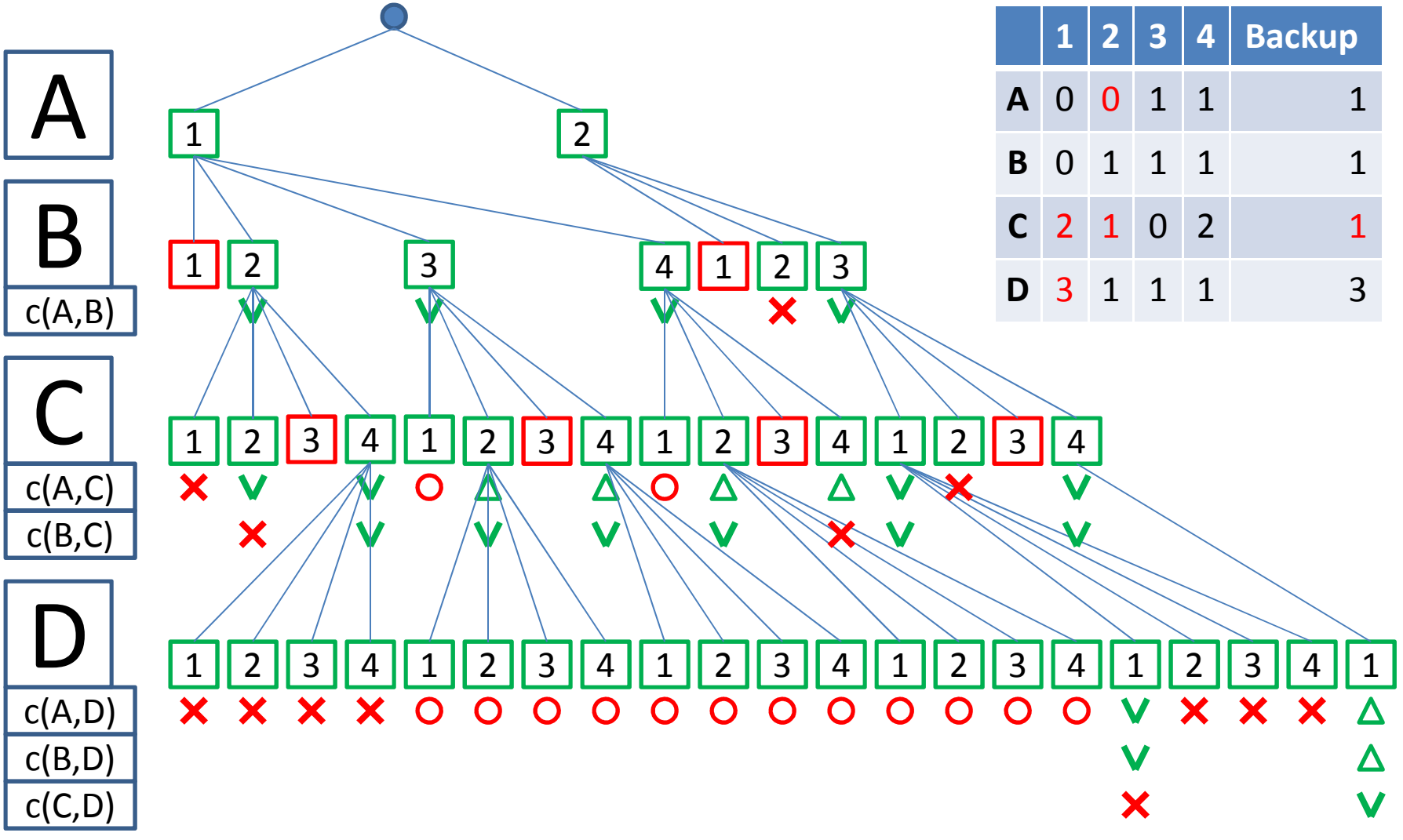
	1	2	3	4	Backup
A	0	1	1	1	1
B	0	1	1	1	1
C	1	2	0	2	2
D	1	1	1	1	2

Constraint Processing: Backmarking



	1	2	3	4	Backup
A	0	1	1	1	1
B	0	1	1	1	1
C	1	2	0	2	2
D	1	1	1	1	3

Constraint Processing: Backmarking

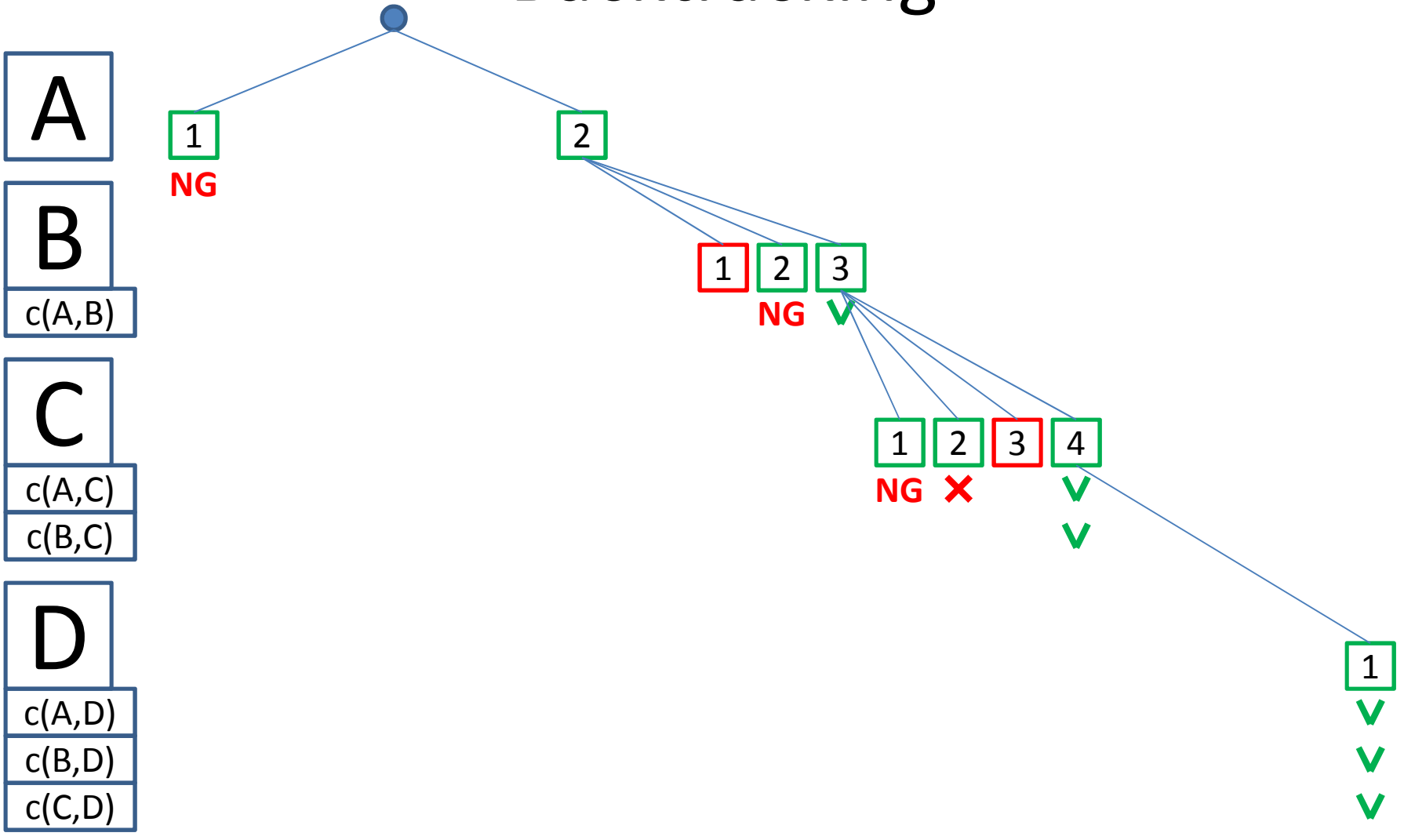


	1	2	3	4	Backup
A	0	0	1	1	1
B	0	1	1	1	1
C	2	1	0	2	1
D	3	1	1	1	3

Constraint Processing: No-goods

- {A=1}: No-good
  - No value for D such that A = D + 1
- {A=2,B=2}: No-good
  - A and B should have different houses
- {A=2,B=3}: Not a no-good: {A=2,B=3,C=4,D=1}
- {A=2,B=3,C=1}: No-good
  - A = D + 1, thus D = 1, but C = 1
- {A=2,B=4}: No-good
  - A = D + 1, thus D = 1, thus C = 3, but C cannot be 3

Constraint Processing: Intelligent Backtracking



Efficiency

All (One solution)	**Opened Nodes**	**Checks**
Standard Backtracking	28 (13)	142 (56)
Backjumping	21 (8)	93 (30)
Backmarking	28 (13)	79 (34)
Intelligent Backtracking	6 (4)	16 (9) + NG