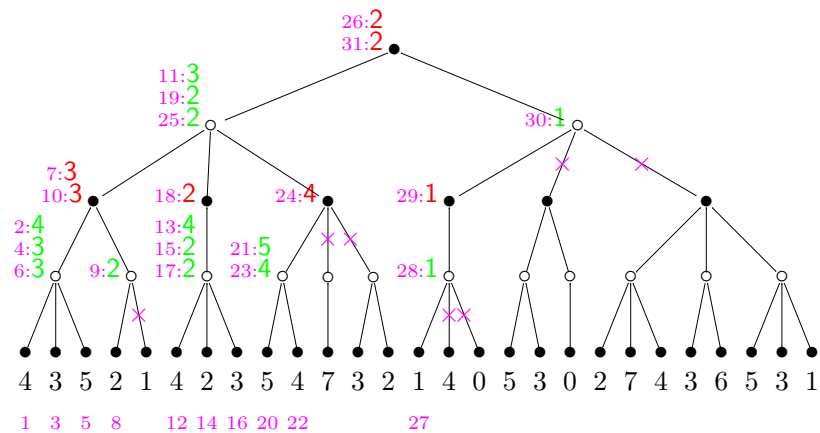
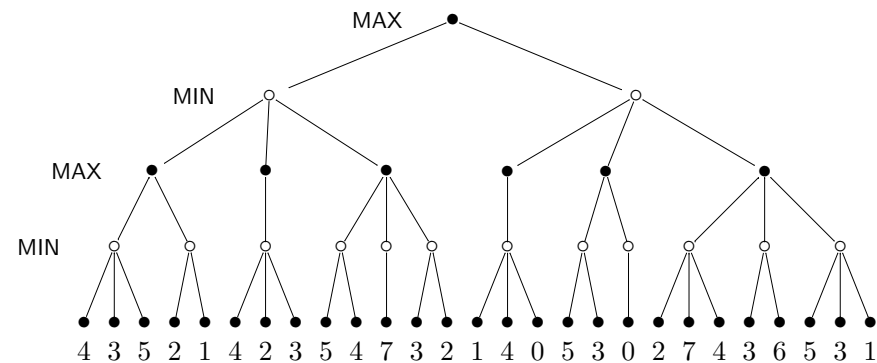


Minimax



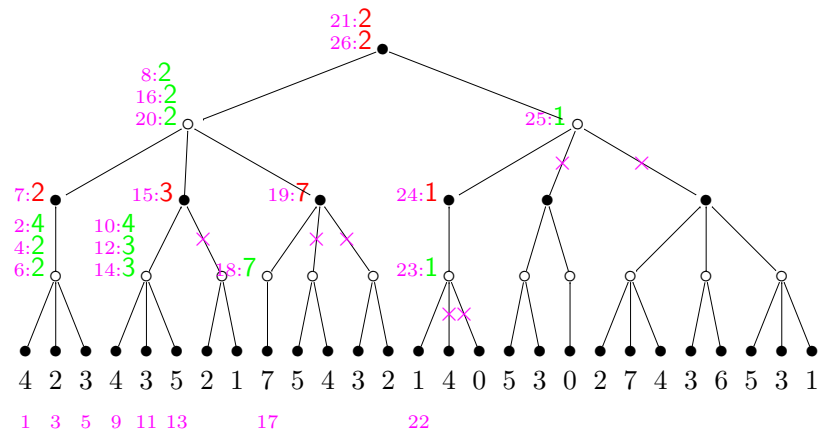
3

Minimax



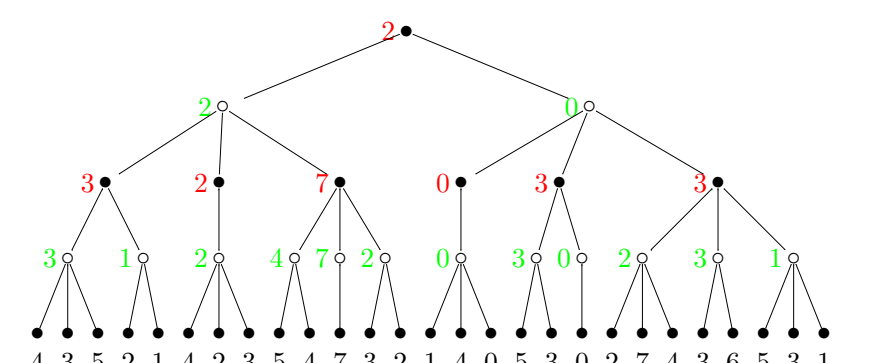
1

Minimax

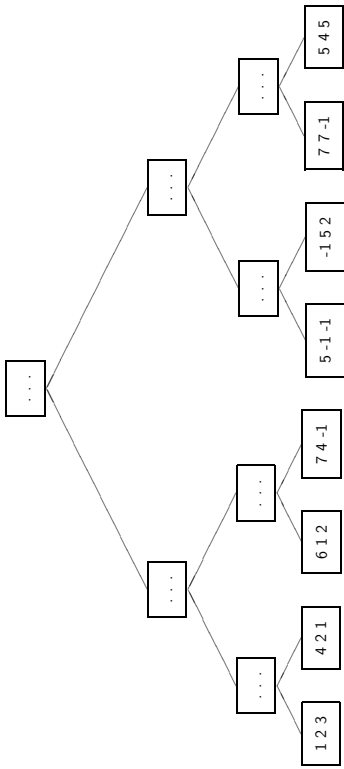


4

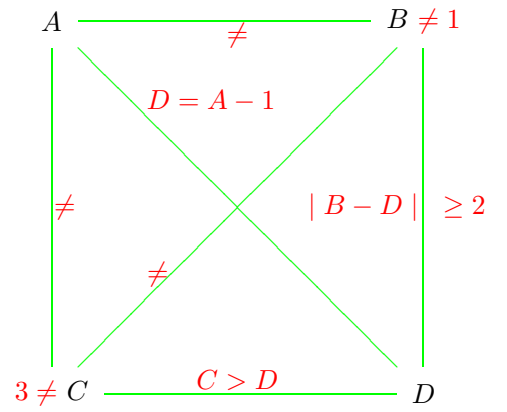
Minimax



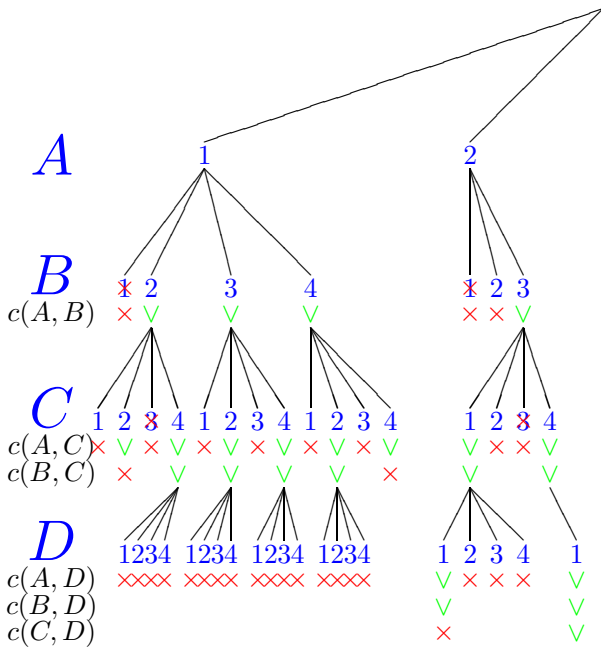
2



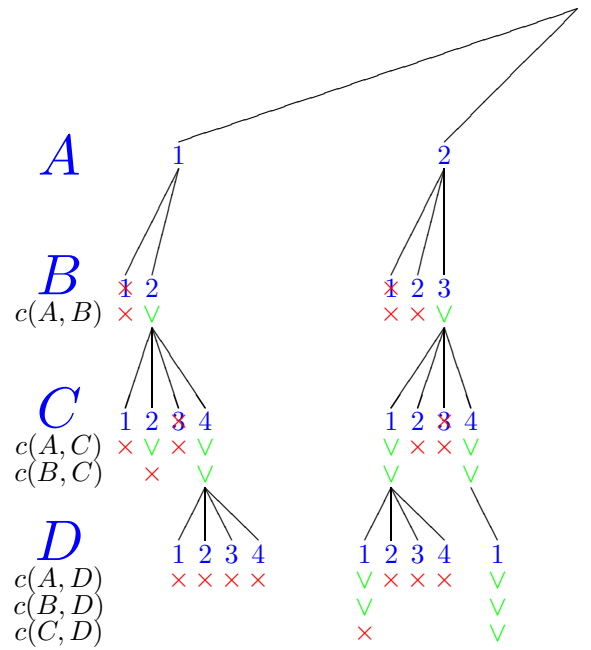
4 houses — constraints



4 houses — backtracking



4 houses — backjumping



4 houses — backmarking

A	1	1	1	1	1
B	1	1	1	1	1
C	1	1	1	1	1
D	1	1	1	1	1

A

B
c(A, B)

C
c(A, C)
c(B, C)

D
c(A, D)
c(B, D)
c(C, D)

× = failed check
○ = failed lookup
✓ = succeeded check
◇ = succeeded lookup

4 houses — backmarking

A	0 ✗	1	1	1	1
B	1	1	1	1	1
C	1 2 ✗	1 2 ✗	2 ✗		
D	1	1	1	1	2 ✗

A
1

B
c(A, B)
✗ 2 ✓ 3 ✓

C
c(A, C)
✗ 1 ✓ 2 ✗ 3 ✓ 4 ✓
c(B, C)
✗ 1 ✓ 2 ✓ 3 ✓ 4 ✓

D
c(A, D)
c(B, D)
c(C, D)
✗ ✗ ✗ ✗

Step 1

4 houses — backmarking

A	0 ✗	1	1	1	1
B	1	1	1	1	1
C	1 2 ✗	1 2 ✗	2 ✗		
D	1	1	1	1	2 ✗

A
1

B
c(A, B)
✗ 2 ✓ 3 ✓ 4 ✓

C
c(A, C)
✗ 1 ✓ 2 ✗ 3 ✓ 4 ✓ ○ ○ ◇
c(B, C)
✗ 1 ✓ 2 ✓ 3 ✓ 4 ✓

D
c(A, D)
c(B, D)
c(C, D)
✗ ✗ ✗ ✗ ○ ○ ○ ○ ○ ○ ○ ○

Step 1

4 houses — backmarking

A	0 ✗	1	1	1	1
B	1	1	1	1	1
C	1 2 ✗	1 2 ✗	2 ✗	1	2 ✗
D	1	1	1	1	2 ✗

A
1

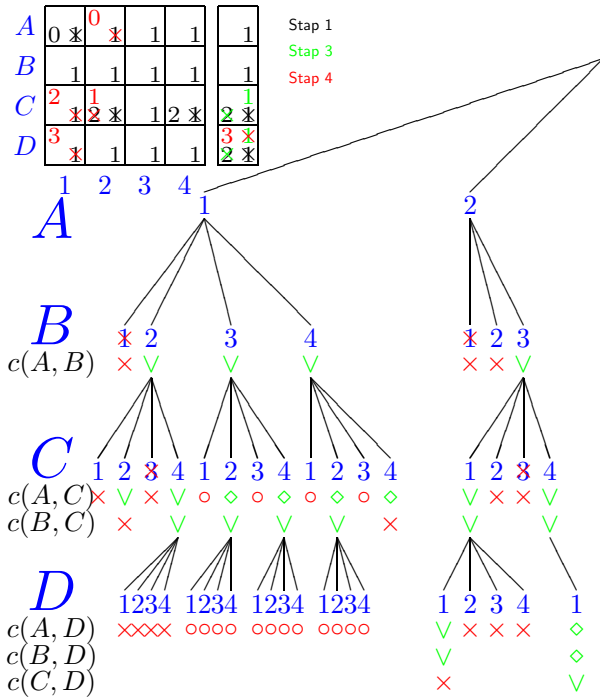
B
c(A, B)
✗ 2 ✓ 3 ✓ 4 ✓

C
c(A, C)
✗ 1 ✓ 2 ✗ 3 ✓ 4 ✓ ○ ○ ◇ ○ ○ ◇ ○ ○ ◇
c(B, C)
✗ 1 ✓ 2 ✓ 3 ✓ 4 ✓ ✗

D
c(A, D)
c(B, D)
c(C, D)
✗ ✗ ✗ ✗ ○ ○ ○ ○ ○ ○ ○ ○

Step 1
Step 3

4 houses — backmarking



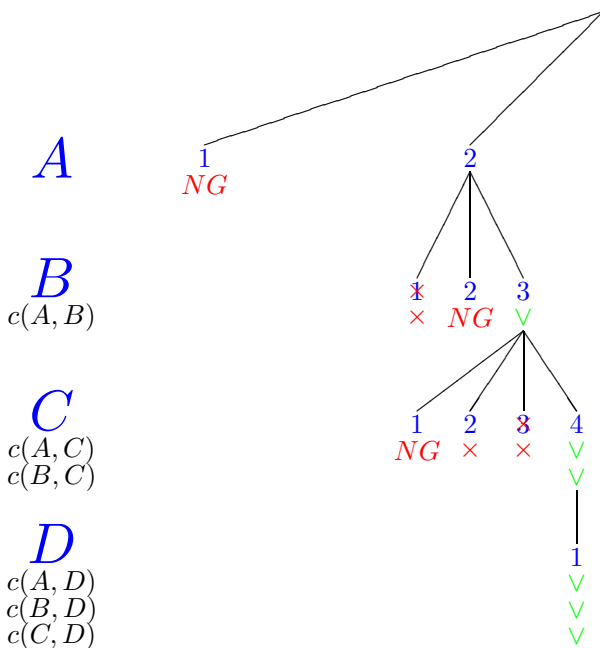
13

4 houses — no-goods

- $\{A=1\}$ no-good
There is no value for D such that $A = D + 1$.
- $\{A=2, B=2\}$ no-good
All families should be assigned to different houses.
- $\{A=2, B=3\}$ not a no-good
 $\{A = 2, B = 3, C = 4, D = 1\}$ is a solution.
- $\{A=2, B=3, C=1\}$ no-good
Conflicts with $C > D$.
- $\{A=2, B=4\}$ no-good
In this case we would have $D = 1$, but C can't be 3.

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4 houses — no-goods



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4 houses — efficiency

	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) ^(+no-good checks)
All (One)		

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