El problema de las 8 damas

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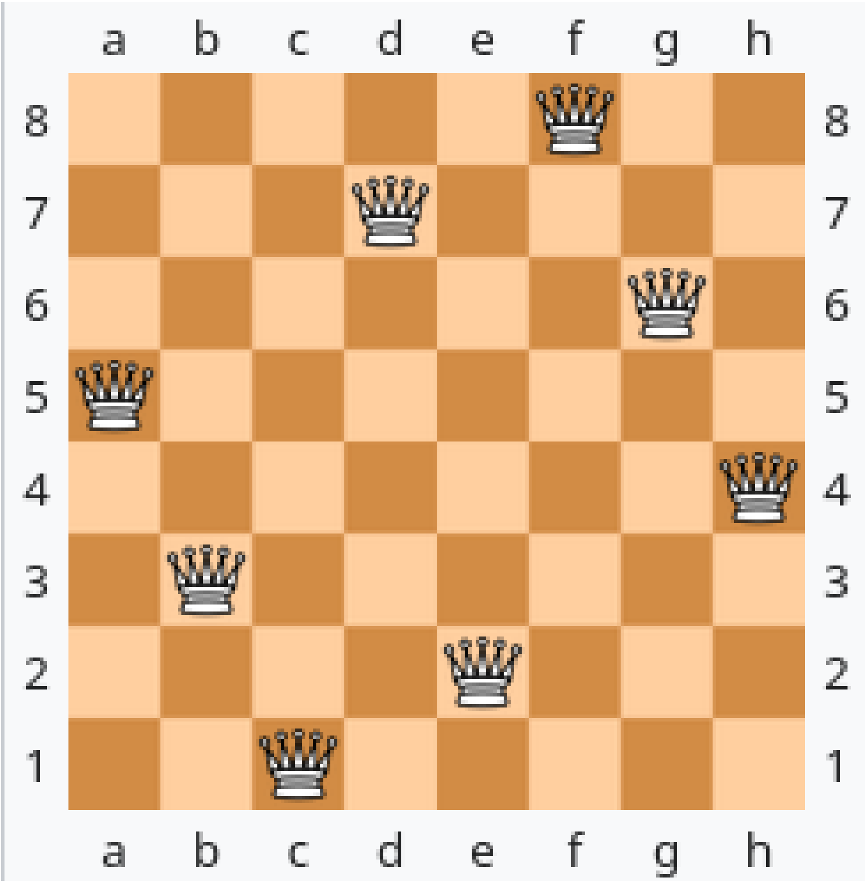
El problema de las 8 damas se trata de ubicar 8 damas en un tablero de ajedrez **sin que se ataquen mutuamente**. [1]

Ejemplo:



Existen 92 soluciones!!

[1] https://en.wikipedia.org/wiki/Eight_queens_puzzle

Historia

HISTORIA MATHEMATICA 4 (1977), 397-404

GAUSS AND THE EIGHT
QUEENS PROBLEM: A STUDY IN
MINIATURE OF THE PROPAGATION OF HISTORICAL ERROR

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Gauss wrote to Schumacher on September 1, proposing the problem to the latter and mentioning the *Illustrirte Zeitung* as his source. Gauss also remarked that the proposer had declared that there were 60 solutions, but that Gauss himself found 76.

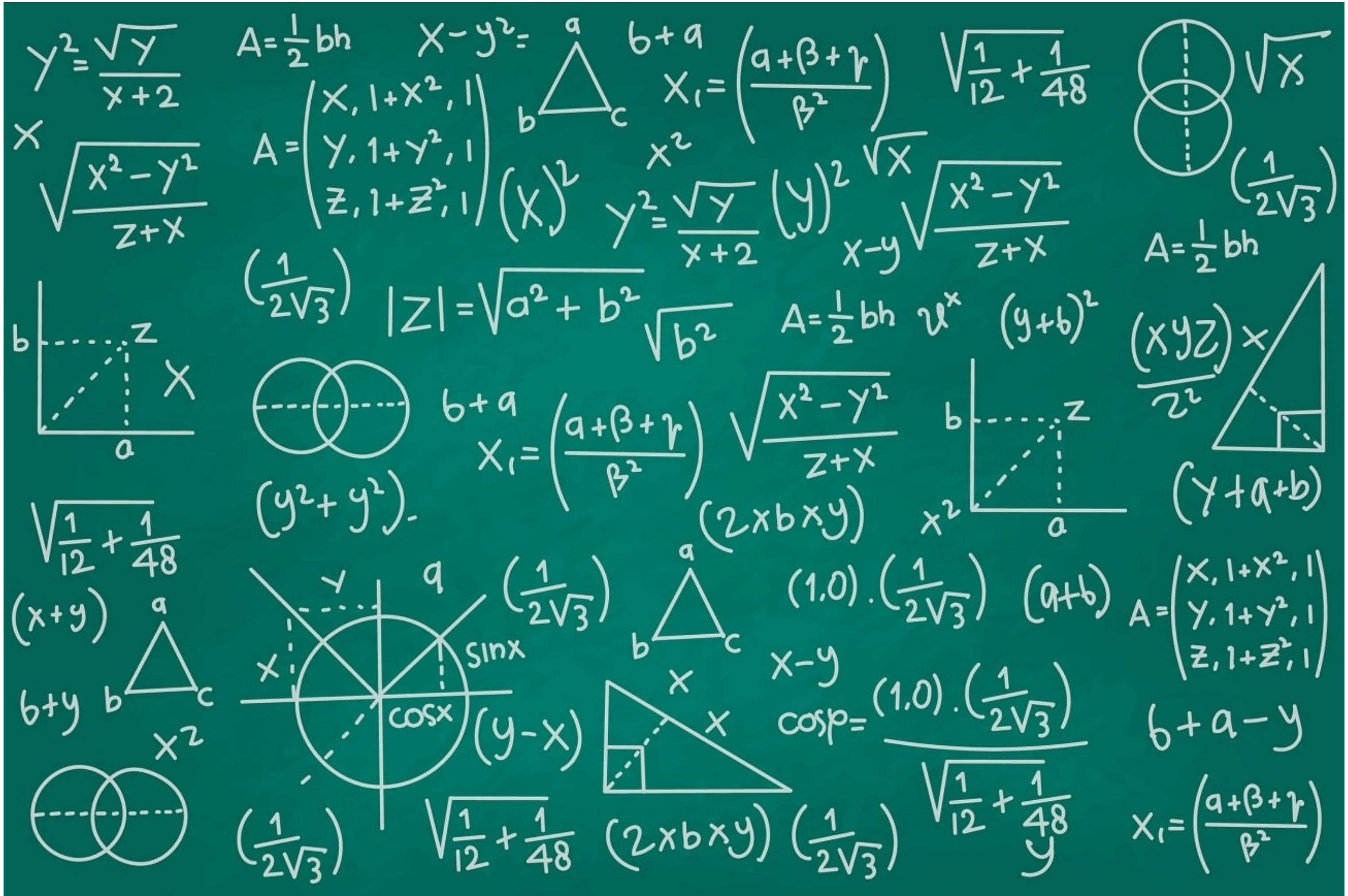
it. He continued on in the letter to reformulate the problem as an arithmetic one, and to relate it to the representation of complex numbers.

Jaenisch [1862], Lange [1865], and Natani [1867] and contributed his own method of solution via determinants, which he carried out only for the 4x4 and 5x5 boards.

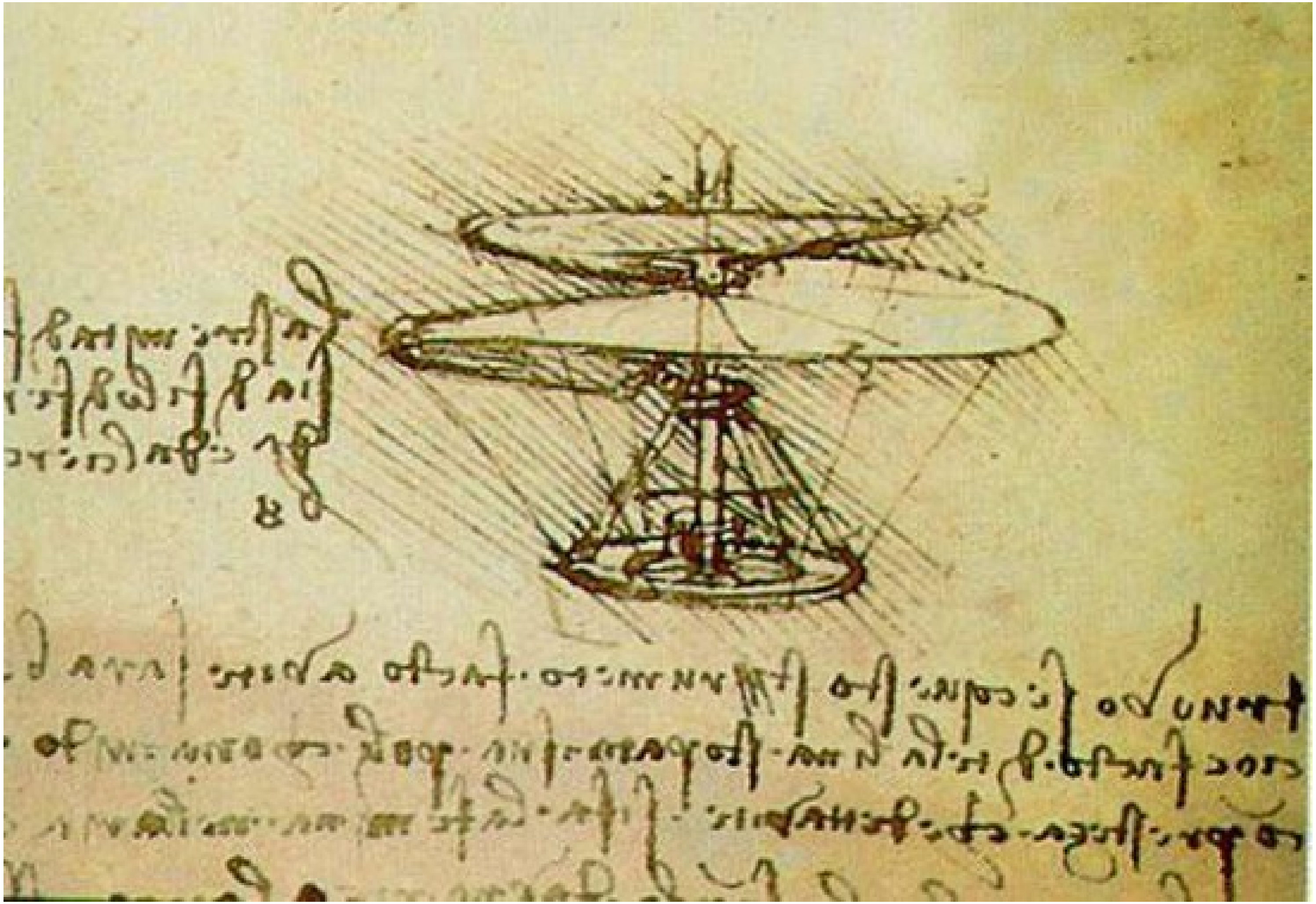
Carl Friedrich Gauss (1777-1855)

El principe de los matematicos

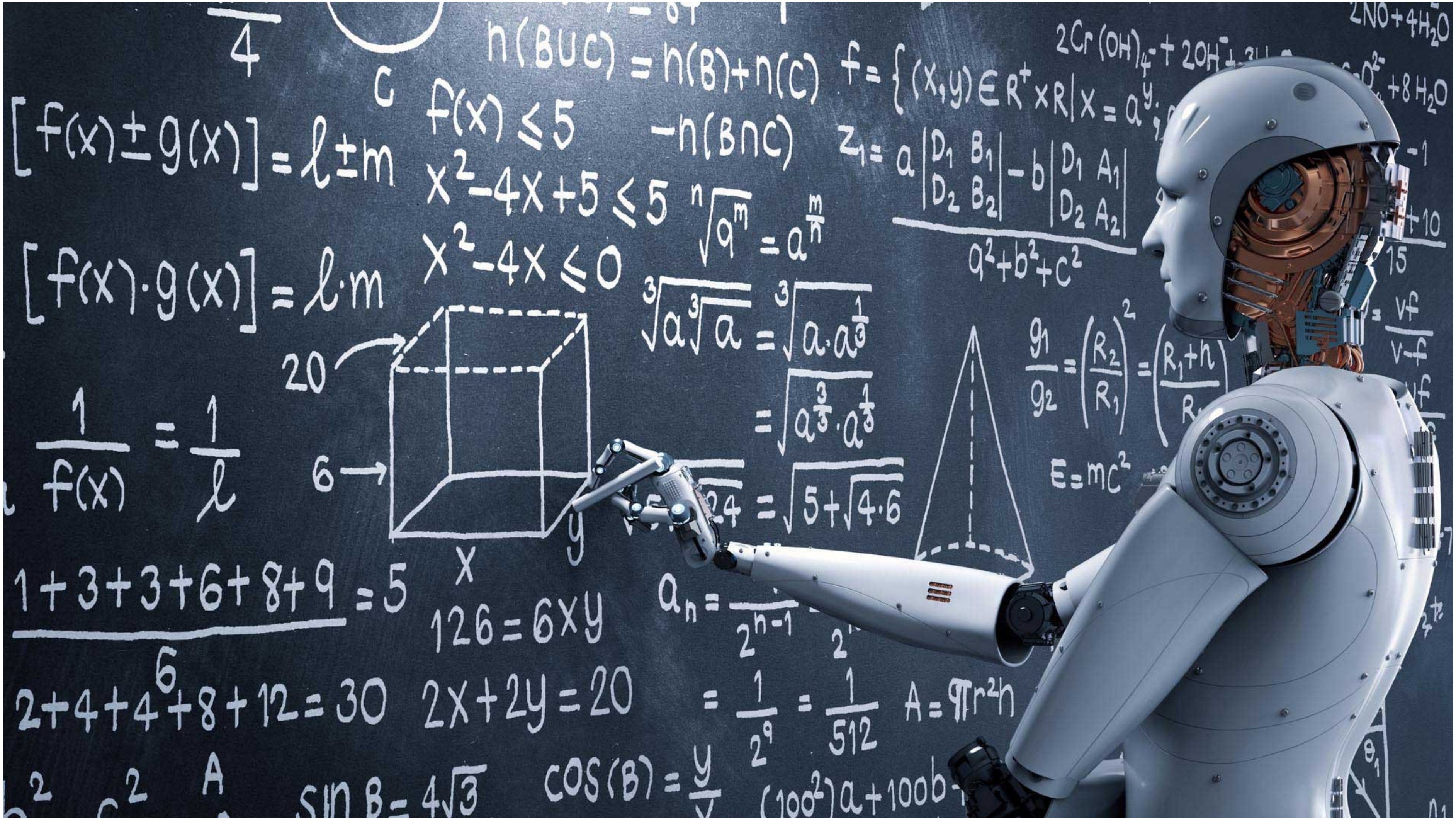
La idea de Gauss era de que deberia de haber una forma de resolverlo usando matematicas…



Pero a veces existen desafios que deben de esperar muchos años para que llegue la herramienta adecuada..

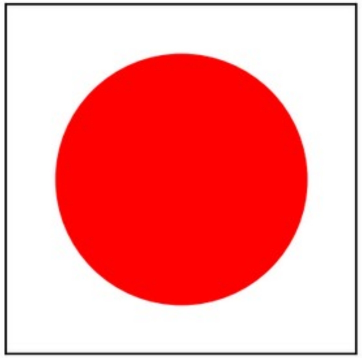


En este caso, no fue sino hasta 1972 en que las computadoras existieron, se desarrollaron tecnicas de programacion que pudieron resolver este problema usando un algoritmo.

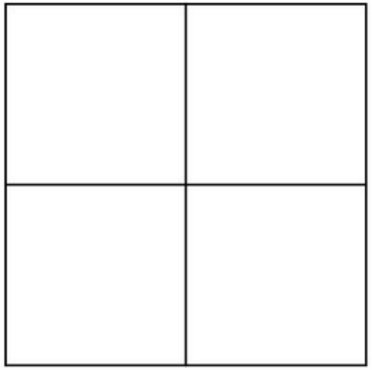


Es muy interesante el reto de encontrar un algoritmo para resolver este problema.

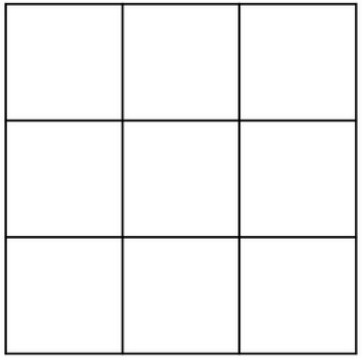
Una estrategia es considerar el problema de las 8 damas, como un caso particular, digamos el caso para n=8. Para entender como se resuelve el algoritmo para n=8, podemos intentar resolver para n<8.



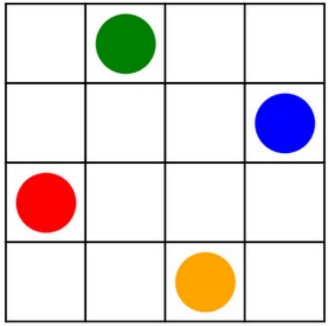
n=1



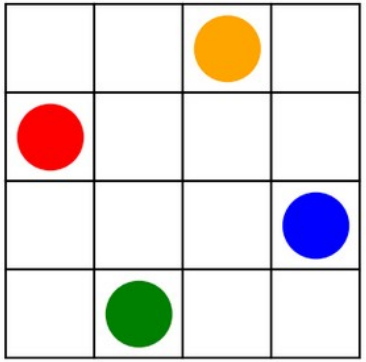
n=2



n=3



n=4



n=4

J Sign Process Syst
DOI 10.1007/s11265-016-1176-8

Putting Queens in Carry Chains, №27

Thomas B. Preußer[1] · Matthias R. Engelhardt[2]

Abstract The *N*-Queens Puzzle is a fascinating combinatorial problem. Up to now, the number of distinct valid placements of *N* non-attacking queens on a generalized $N \times N$ chessboard cannot be computed by a formula. The computation of these numbers is instead based on an exhaustive search whose complexity grows dramatically with the problem size *N*. Solutions counts are currently known for all *N* up to 26. The parallelization of the search for solutions

https://oeis.org/A000170

Table 1 Currently known solution counts of *N*-queens puzzles [20].

N	Total	D_4 Orbits
1	1	1
2	0	0
3	0	0
4	2	1
5	10	2
6	4	1
7	40	6
8	92	12
9	352	46
10	724	92
11	2680	341
12	14200	1787
13	73712	9233
14	365596	45752
15	2279184	285053
16	14772512	1846955
17	95815104	11977939
18	666090624	83263591
19	4968057848	621012754
20	39029188884	4878666808
21	314666222712	39333324973
22	2691008701644	336376244042
23	24233937684440	3029242658210
24	227514171973736	28439272956934
25	2207893435808352	275986683743434
26	22317699616364044	2789712466510289

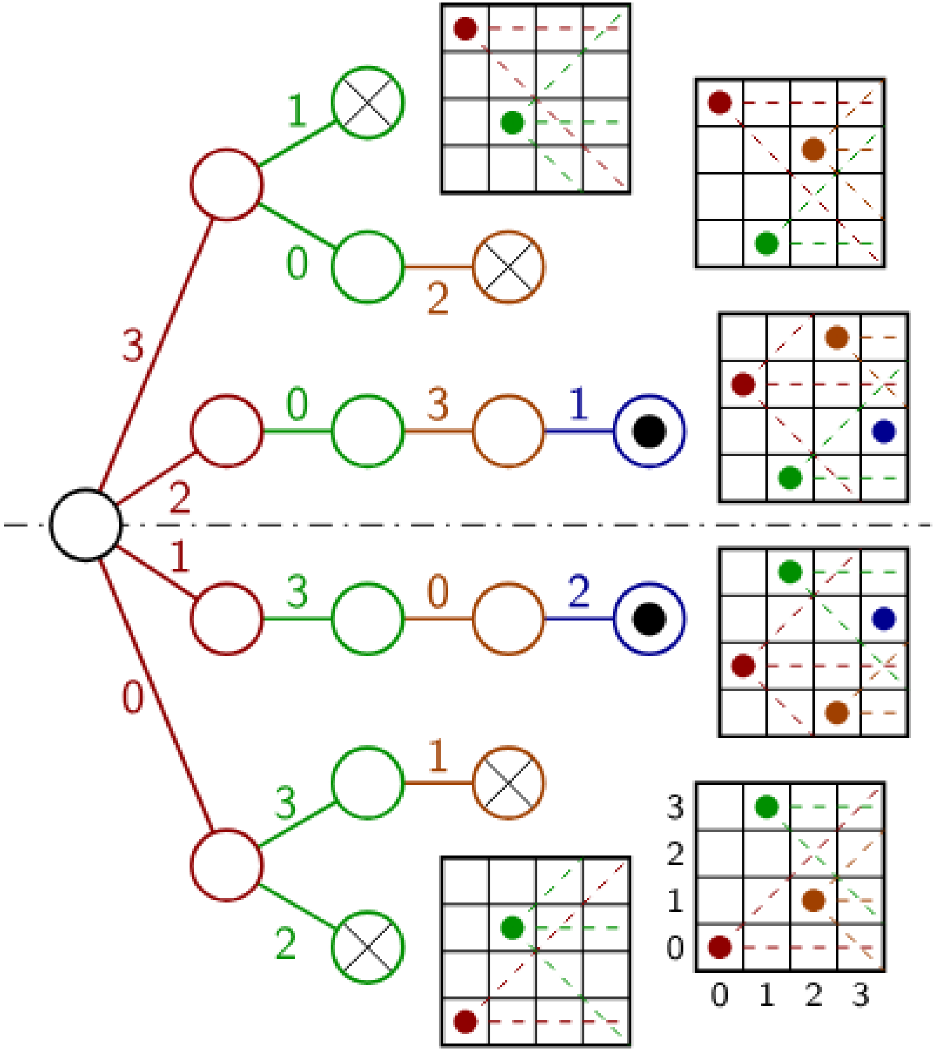
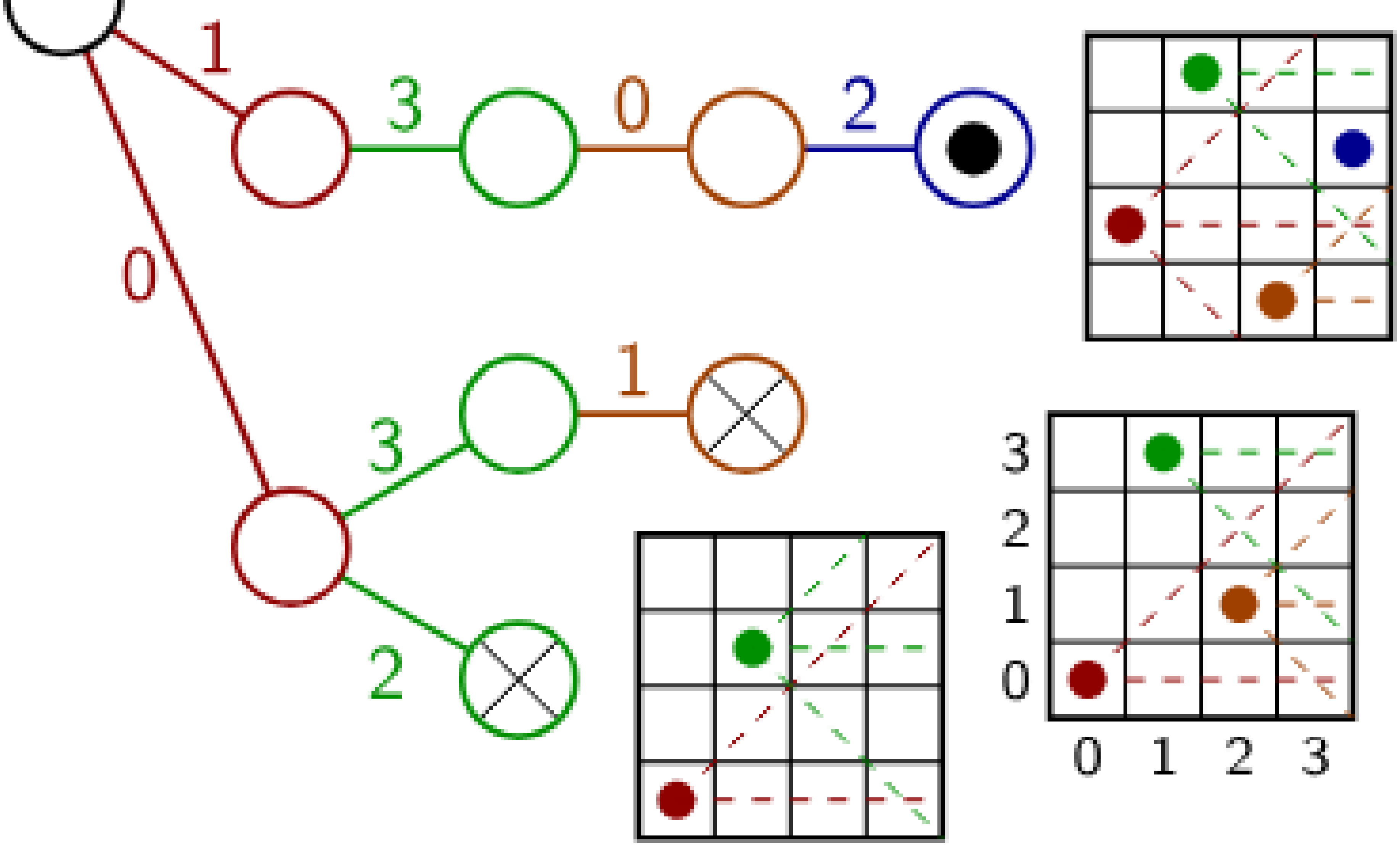
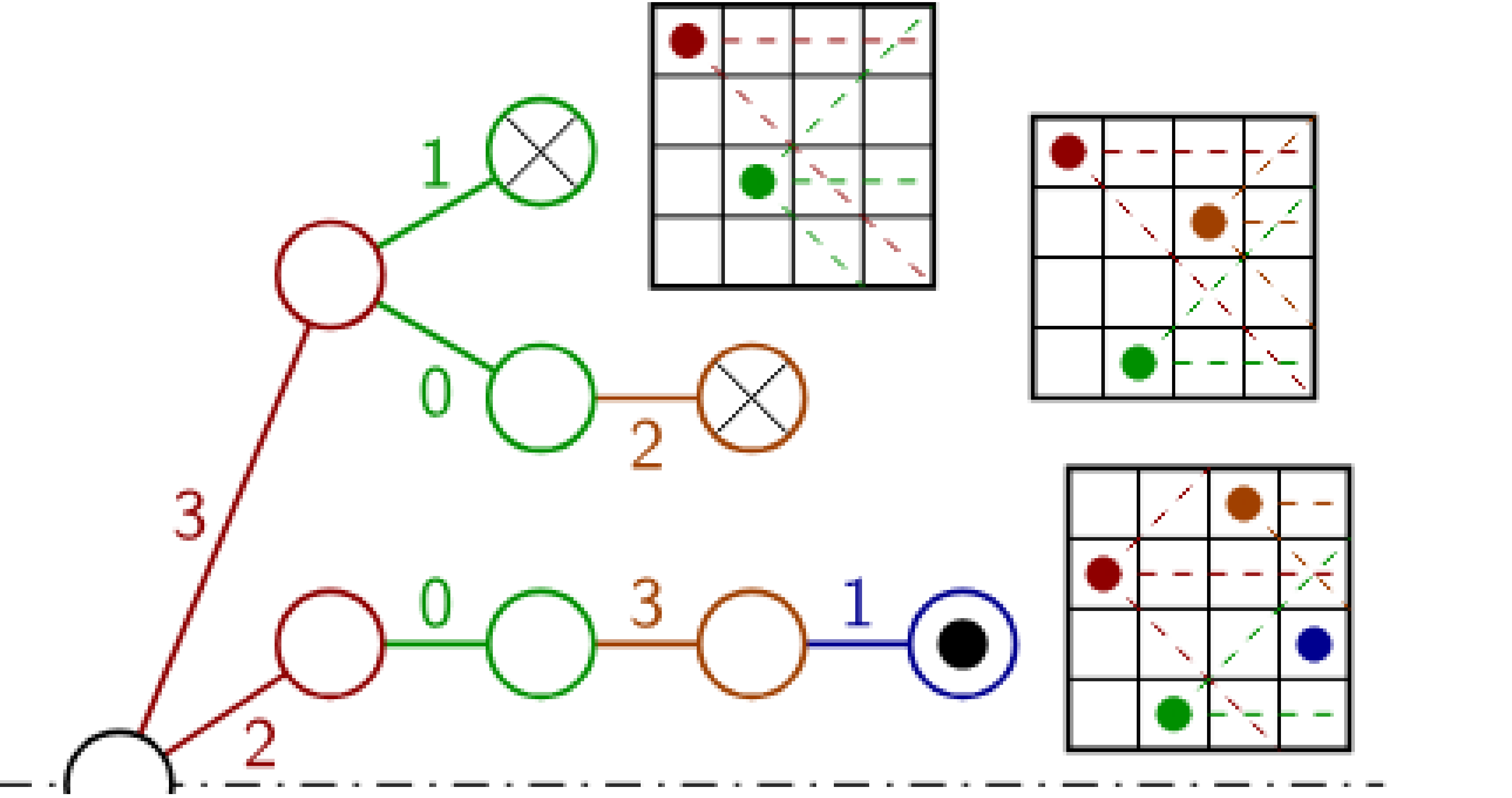


Figure 1 Backtracking search of the 4-queens puzzle.


1
3
0
2
0
3
1
2
3
2
1
0
0
1
2
3


1
0
2
3
2
0
3
1

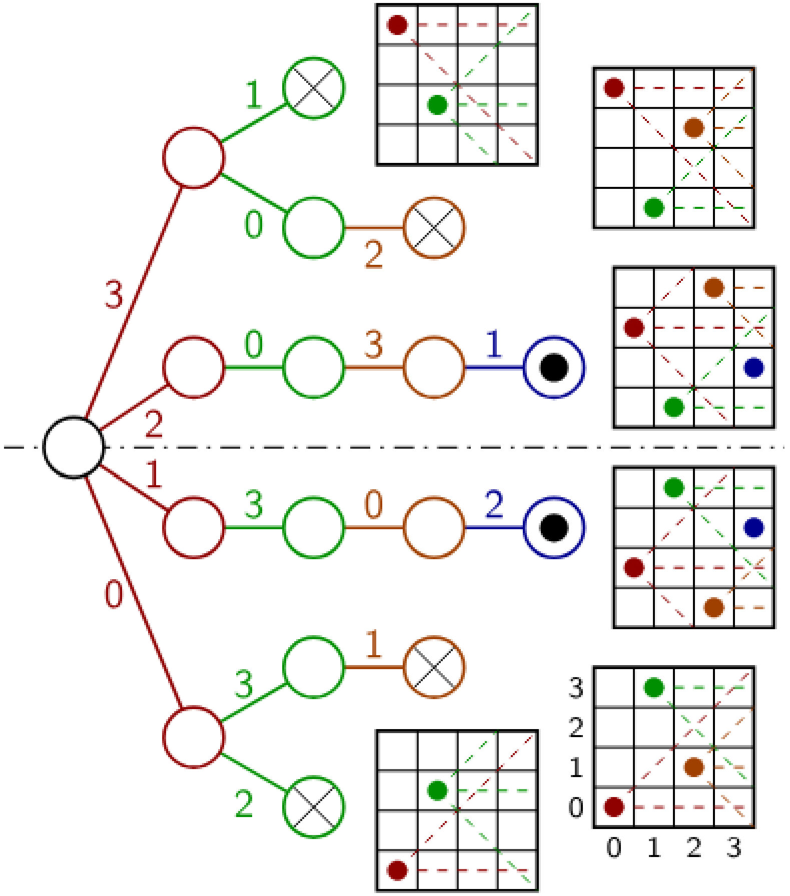
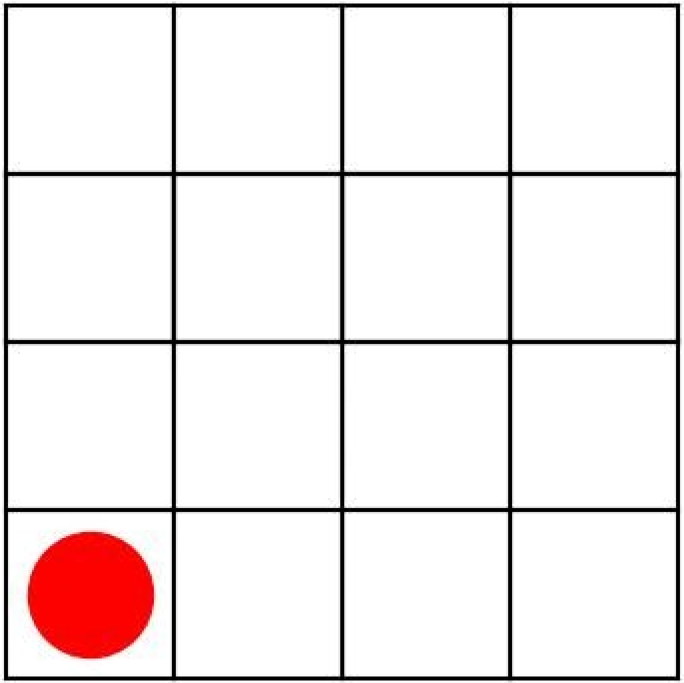
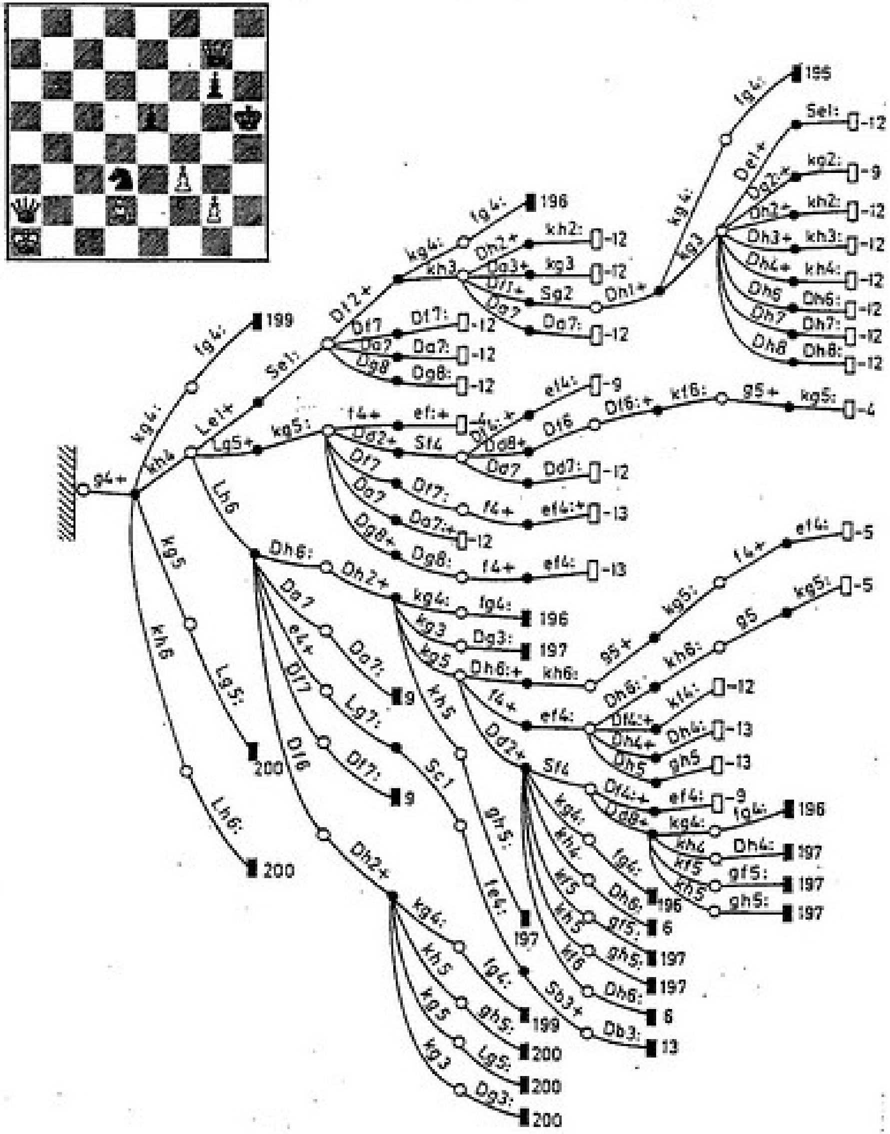


Figure 1 Backtracking search of the 4-queens puzzle.





g4+
kg4:
fg4:
199
kh4
Le1+
Se1:
Df2+
kg4:
fg4:
196
kh3
Dh2+
kh2:
-12
Dg3+
kg3
-12
Df1+
Sg2
Dn1+
Da7
Da7:
-12
kg4:
fg4:
196
kg3
Se1:
-12
De1+
De2:+
kg2:
-9
Dh2+
kh2:
-12
Dh3+
kh3:
-12
Dh4+
kh4:
-12
Dh5
Dh6:
-12
Dh7
Dh7:
-12
Dh8
Dh8:
-12
Df7
Df7:
-12
Da7
Da7:
-12
Dg8
Dg8:
-12
Lg5+
kg5:
f4+
ef:+
-4
ef4:
-9
Dd2+
Sf4
Df6
Df6:+
kf6:
g5+
kg5:
-4
Dd8+
Dd7
Dd7:
-12
Df7
Df7:
f4+
ef4:+
-13
Da7
Da7:+
-12
Dg8+
Dg8:
f4+
ef4:
-13
Lh6
Dh6:
Dh2+
kg4:
fg4:
196
kg3
Dg3:
197
kg5
Dh6:+
kh6:
g5+
kg5:
f4+
ef4:
-5
g5
kg5:
-5
Dh6:
kf4:
-12
f4+
ef4:
Df4:+
Dh4:
-13
Dh4+
Dh5
gh5
-13
Dd2+
Sf4
Df4:+
ef4:
-9
Dd8+
kg4:
fg4:
196
kh4
Dh4:
197
kf5
gf5:
197
kh5
gh5:
197
kg4:
fg4:
196
kh4
Dh6:
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kf5
gf5:
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kh5
gh5:
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kf6
Dh6:
6
Sb3+
Db3:
13
kh5
gh5:
fe6:
197
Da7
Da7:
9
e4+
Lg7:
Sc1
Df7
Df7:
9
Df6
Dh2+
kg4:
fg4:
199
kh5
gh5:
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Lg5:
200
kg3
Dg3:
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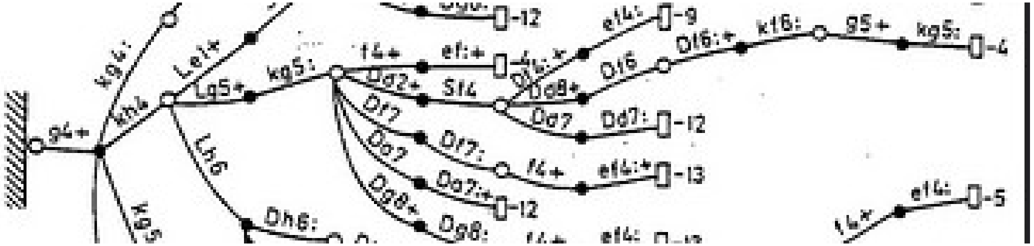
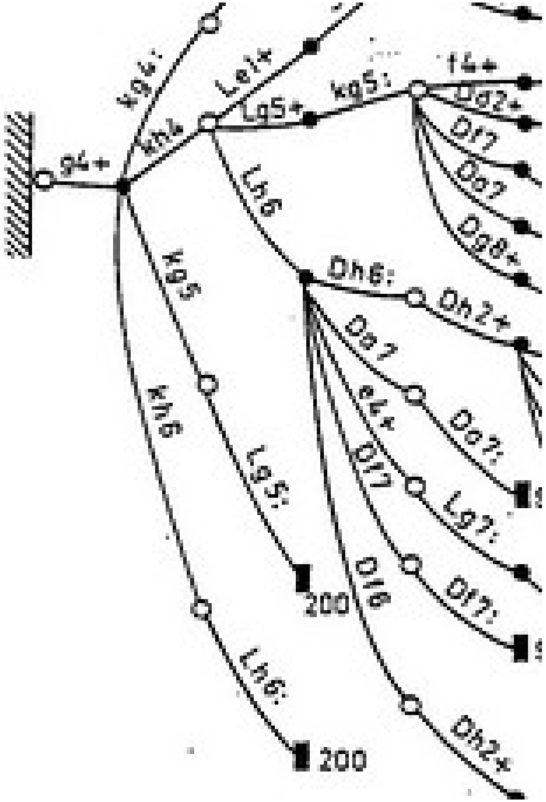
kg5
Lg5:
200
kh6
Lh6:
200



g4+
kg4:
kh4
Le1+
Lg5+
kg5:
f4+
ef:+
ef4:
-9
Dd2+
Sf4
Df6
Df6:+
kf6:
g5+
kg5:
-4
Dd8+
Dd7
Dd7:
-12
Df7
Df7:
f4+
ef4:+
-13
Da7
Da7:+
-12
Dg8+
Dg8:
Lh6
Dh6:
kg5
f4+
ef4:
-5



g4+
kg4:
kh4
Le1+
Lg5+
kg5:
f4+
Dd2+
Df7
Da7
Dg8+
Lh6
Dh6:
Dh2+
Da7
Da7:
e4+
Lg7:
Df7
Df7:
Df6
Dh2+
kg5
Lg5:
200
kh6
Lh6:
200