

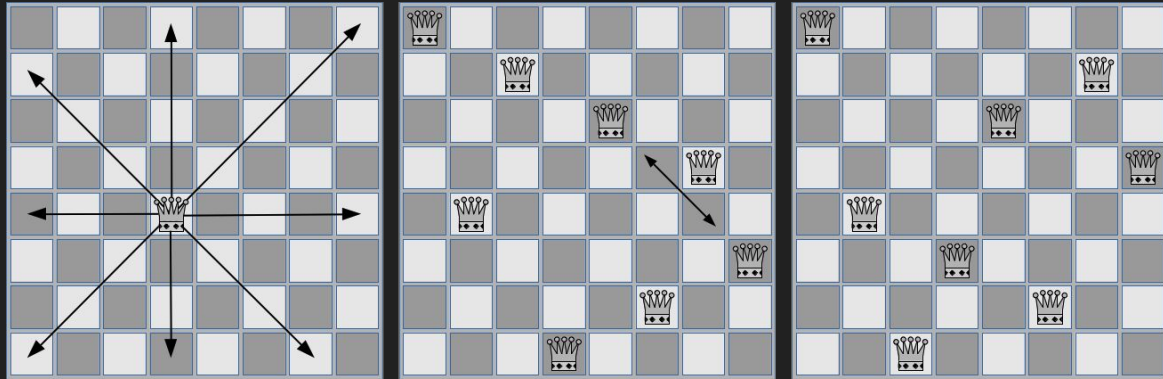
8 Queens

Problem

open.kattis.com/problems/8queens

- place 8 queens on a 8x8 chessboard
- no two queens are in the same row, column, or diagonal

given a description of a chess board, check if it is a valid solution



Solution

`open.kattis.com/problems/8queens`

1. read the position of queens
2. check if there is another queen in the same row, column or diagonal

[Solution 1](#)

[Solution 2](#)

All possible solutions?

- 8 queens on a 8x8 chessboard
- no two queens are in the same row, column, or diagonal

All possible solutions to **4** queens puzzle

- place **4** queens on **4x4** chessboard
- no two queens are in the same row, column, or diagonal

All possible solutions to **4** queens puzzle

- backtracking
 - starting from the leftmost column, recursively place queens one by one in different columns
 - when placing a queen, check for clash

All possible solutions to **4** queens puzzle

- backtracking **with cache** (3 bool arrays)
 - starting from the leftmost column, recursively place queens one by one in different columns
 - when placing a queen, check for clash
 - **after placing a queen, update cache**

All possible solutions to **4** queens puzzle

- backtracking with cache (**3 integers / bitsets**)
 - starting from the leftmost column, recursively place queens one by one in different columns
 - when placing a queen, check for clash
 - after placing a queen, update cache


```

1      q
2      (l,r,m,n,i,j)
3      {return
4      j?i?q(l,
5      r,m,n,
6      i&i-1,1)+q((
7      l|i&-i)*2
8      ,(r|i&-
9      i)/2,
10     m|i&-i,
11     n,0,0):
12     0:m==
13     n?1:q
14     (l,r,
15     m,n,~
16     (l|r|m)
17     &n,1);}main
18     (n){for(n=0;n
19     ++<15;)printf("%d "
20     ,q(0,0,0,(1<<n)-1,0,0));}

```

Thank you!