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MODULE nQueens
EXTENDS Integers, FiniteSets

CONSTANTS size  The size of the chess board

VARIABLES Queens  The set of queens

abs(r) ≜ IF r < 0 THEN − r ELSE r

Horizontal(p, q) ≜ p[2] = q[2]

Vertical(p, q)   ≜ p[1] = p[1]

Diagonal(p, q) ≜ abs(p[1] − q[1]) = abs(p[2] − q[2])

CanAttack(p, q) ≜ ∨ Horizontal(p, q)
                  ∨ Vertical(p, q)
                  ∨ Diagonal(p, q)

Init ≜ Queens = [⟨x, x⟩ : x ∈ 1 .. size]
nQueens ≜ ∧ Cardinality(Queens) = size
          ∧ ∀ q ∈ Queens : q[1] ∈ 1 .. size ∧ q[2] ∈ 1 .. size
          ∧ ∀ p, q ∈ Queens : ∨ p = q
                              ∨ ¬CanAttack(p, q)

\* Modification History
\* Last modified Tue Feb 23 20:54:29 EST 2021 by jstrunk
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