

# 1 Eight Queens

Eight queens must be placed on a chessboard so that no queen attacks any others. A chessboard is a square grid with eight columns, or *files*, and eight rows, or *ranks*. When a queen is placed on a square, it attacks any other queen that sits on the same rank, file, or diagonals.

$$SIZE == 8$$

$$RANK == 1 \dots SIZE$$

$$FILE == 1 \dots SIZE$$

$$SQUARE == RANK \times FILE$$

$$DIAGONAL == 1 - SIZE \dots SIZE * 2$$

$up, down : SQUARE \rightarrow DIAGONAL$	$\forall f : FILE; r : RANK \bullet$ $up(f, r) = r - f \wedge$ $down(f, r) = r + f$
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$Queens$ $squares : FILE \succcurlyeq RANK$	$\{squares \triangleleft up, squares \triangleleft down\} \subseteq SQUARE \succcurlyeq DIAGONAL$
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