Problems recursion makes easier!
(or possible)

One solution to the eight queens puzzle

Thanks for the pictures, Wikipedia!

Tuesday, October 2, 12
N Queens
N Queens
One solution to the eight queens puzzle
Recursive Backtracking
Recursive Backtracking
Recursive Backtracking

or

or

or...

or

or...

or...
Base Case?

Remember the human algorithm for writing recursive algorithms!
Base Case?

Recursive step?

Zero Queens
Base Case?
Zero Queens

Recursive step?

*For every free space:*
- Copy the board & add a queen there
- Recurse on n-1 queens
- If that worked:
  - return true
- else:
  - return false

Remember the human algorithm for writing recursive algorithms!
public static void main(String[] args) {
    NQueensBoard b = nQueens(8);
    if (b != null) {
        System.out.println(b);
    } else {
        System.out.println("No solution!");
    }
}
public static void main(String[] args) {
    NQueensBoard b = nQueens(8);
    if (b != null) {
        System.out.println(b);
    } else {
        System.out.println("No solution!");
    }
}

public static NQueensBoard nQueensHelper(NQueensBoard b, int n) {
    // code!
}

Helper functions should take everything you could possibly need as arguments.

An addendum to the human algorithm!

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public static void main(String[] args) {
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    }
}

public static NQueensBoard nQueensHelper(NQueensBoard b, int n) {
    // code!
}

public static NQueensBoard nQueens(int n) {
    NQueensBoard b = new NQueensBoard(n);
    return nQueensHelper(b, n);
}

Helper functions should take everything you could possibly need as arguments.

An addendum to the human algorithm!
SpreadingNews

Is hard!

Here’s a hint.

Suppose you know how long all of your subordinates take to do their work. You will always call the slowest person first, the second-slowest person second, and so on.

See also: Collections.sort & Collections.reverse.
RatRoute

Base Case?

. . . . .
. . X . .
. . . . X
. . . . X
X . X . X
. . . C .

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RatRoute

Base Case?

Recursive step?