kreher-stinson

Algorithms from the book implemented in GAP

Version 1.0

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Chapter 1

Generating Combinatorial Objects

1.1 Subsets

1.1.1 KSSubsetLexRank

▷ KSSubsetLexRank(*number, subset*)   (function)

Returns the rank of *subset* as a subset of the set of numbers from 1 to *number* (Algorithm 2.1).

1.1.2 KSSubsetLexUnrank

▷ KSSubsetLexUnrank(*number, rank*)   (function)

Returns the subset of $\{1..number\}$ whose rank is *rank*. (Algorithm 2.2).

Chapter 2

Bactracking

2.1 Knapsack

2.1.1 KSCheckKnapsackInput

▷ KSCheckKnapsackInput(*profits, weights, capacity*)   (function)

Checks for valid input data for the Knapsack problems (Problems 1.1-1.4).

2.1.2 KSKnapsack1

▷ KSKnapsack1(*profits, weights, capacity*)   (function)

Implementation of Algorithm 4.1.

2.1.3 KSKnapsack2

▷ KSKnapsack2(*profits, weights, capacity*)   (function)

Implementation of Algorithm 4.3.

2.2 Generating all cliques

2.2.1 KSAllCliques

▷ KSAllCliques(*graph*)   (function)

Implementation of Algorithm 4.4.

2.3 Exact cover

2.3.1 KSExactCover

▷ KSExactCover(*number, cover*)   (function)

Finds an subcollection of S (which is a set of subsets of $\{1,..,n\}$) that is an exact cover of $\{1,..,n\}$, if it exists.

2.4 Exercises

2.4.1 KSQueens

▷ KSQueens(*Size, of, board*)   (function)

Solves the n queens problem.

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