

kreher-stinson

**Algorithms from the book implemented
in GAP**

Version 1.0

29 January 2016

**Rafael Villarroel-Flores
Citlalli Zamora-Mejía**

Rafael Villarroel-Flores Email: rvf0068@gmail.com
Homepage: <http://rvf0068.github.io>

Citlalli Zamora-Mejía Email: cizame@gmail.com

Copyright

© 2016 by Rafael Villarroel-Flores and Citlalli Zamora-Mejía

kreher-stinson package is free software; you can redistribute it and/or modify it under the terms of the [GNU General Public License](#) as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

Contents

1	Generating Combinatorial Objects	4
1.1	Subsets	4
2	Backtracking	5
2.1	Knapsack	5
	Index	7

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 CheckKnapsackInput

▷ `CheckKnapsackInput(profits, weights, capacity)` (function)

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

2.1.2 Knapsack1

▷ `Knapsack1(profits, weights, capacity)` (function)

Implementation of Algorithm 4.1.

2.1.3 Knapsack2

▷ `Knapsack2(profits, weights, capacity)` (function)

Implementation of Algorithm 4.3.

2.1.4 KSAllCliques

▷ `KSAllCliques(graph)` (function)

Implementation of Algorithm 4.4.

2.1.5 KSQueens

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

Solves the n queens problem.

2.1.6 KSExactCover

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

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

Index

CheckKnapsackInput, [5](#)

Knapsack1, [5](#)

Knapsack2, [5](#)

KSA11Cliques, [5](#)

KSExactCover, [6](#)

KSQueens, [5](#)

KSSubsetLexRank, [4](#)

KSSubsetLexUnrank, [4](#)