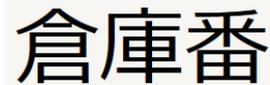


1. SOUKOBAN (SOKOBAN) history

1981: created in Japan by **Hiroyuki Imabayashi**, winner of a competition. H.I. later founded the company **Thinking Rabbit**.



1982: Thinking Rabbit publishes the game (with 20 levels) for the NEC PC-8800 home computer (operating system NEC PowerMOS), and then for other Japanese computers (also a SEGA console)

1987: A DOS version of Sokoban 1984 (53 levels) is created together with **Ascii Corporation** (Japan) and published by **Spectrum Holobyte** (California).

1988: Versions for Apple IIE and C64 by Spectrum Holobyte.

2. Spectrum Holobyte SOKOBAN 1984 graphics

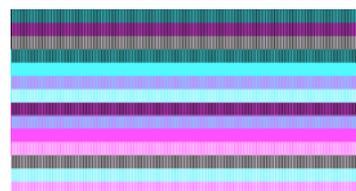
Rudimentary graphics based on the CGA format of the original IBM PC (color graphics adapter using the Motorola 6845 chip).

CGA is a **digital** format with the RGBi 4 bit colour format: 3 bit = $2^3 = 8$ different colours (K,RGB+complements W,CMY) + 1 intensity bit = $2*8 = 16$ colours)



and a graphics resolution of 300x200 pixels using 4 colours (out of 16) of one of the two available palettes.

Sokoban uses the “high-intensity” palette 1 (3 colour bits, high-intensity bit always 1):



3. SOKOBAN = a hard game

There are several categories of computational complexity

P class problem:	input = n symbols related to the size of the problem. The solution can always be found in a finite (possibly very large) number of steps which can be expressed as a polynomial of the type $c \cdot n^k$ where k = order of the polynomial.
NP class problem:	The solution can not be found in a polynomial time or steps.
PSPACE-complete	A category thought to be outside N and NP (no demonstration yet found!): can be solved in polynomial space (=finite memory) and all other problems can be transformed into PSPACE-complete in polynomial time. SOKOBAN and SUDOKU are examples of PSPACE-complete puzzles.

The demonstration for Sokoban has been made by Joseph Culbertson (University of Alberta, 1997):

<http://webdocs.cs.ualberta.ca/~joe/Preprints/Sokoban/paper.html>

A SOKOBAN game can emulate a finite tape **Turing machine**, a hypothetical machine that can simulate any computer algorithm, see

<https://www.cl.cam.ac.uk/projects/raspberrypi/tutorials/turing-machine/one.html>

4. Playing the original SOKOBAN

The non-public website for Computarium workshop leaders <http://computarium.lcd.lu/COMPUTERMUSEUM/workshops/> contains two self-installing packages with the Spectrum Holobyte Sokoban.

- the self-extracting DOSBOXPortable.exe is the recommended version for all MS Windows versions: it installs the DOSBOX emulator together with self-starting SOKOBAN
- the 32 bit version does not need DOSBOX and can be extracted into any folder; SKB.exe starts the game.
- SOKOBAN uses the IBM CGA screen and the keyboard, moves the person with the arrow keys. **There is no UNDO and no PULL, so a single mistake may forcibly terminate the session!**

This Sokoban has **53 levels** and starts into level 4, which is too difficult for beginners.

- first type **ENTER** (one or two times) to enter the room and the lift.
- Type the following keys to quit level 4 and go back into the lift for choosing level 1: **ENTER ENTER ESC 1 A**
- **Quit the game by ESC 0 A then move to Exit door or brutally abort DOSBOX by CTRL F9**

5. Cheat codes

Here some start sequences for the first 4 levels and level 9; supplementary difficulties may arise later in the game! U2 means UP two steps, L1 LEFT 1 step etc.:

Level 1	U1 L3 U1 U3 L1 U1 L2
Level 2	R1 D1 R2 D3 R2 U2 L1 U2 ...
Level 3	L1 D2 L2 D4 L1 ...
Level 4	L2 U1 L4 U1 L2 U2 L1 U2 R6 U1 R2 U1 ...
Level 9	R1 U1 R2 D1 R5 L2 U2 L1 D1 ...

ONLINE Sokoban with identical levels 1-50 (but non-vintage graphics): <https://sokoban.info>