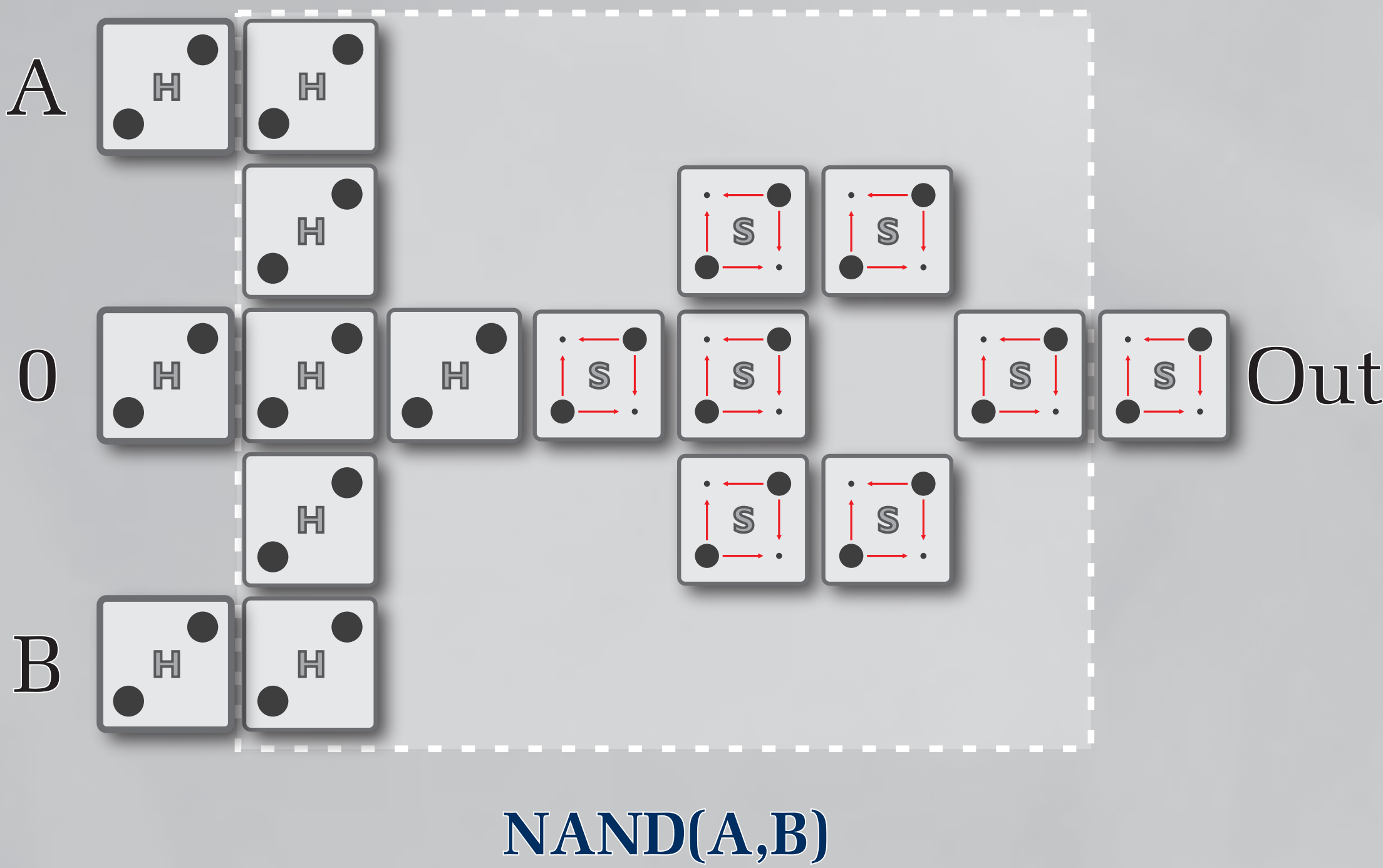


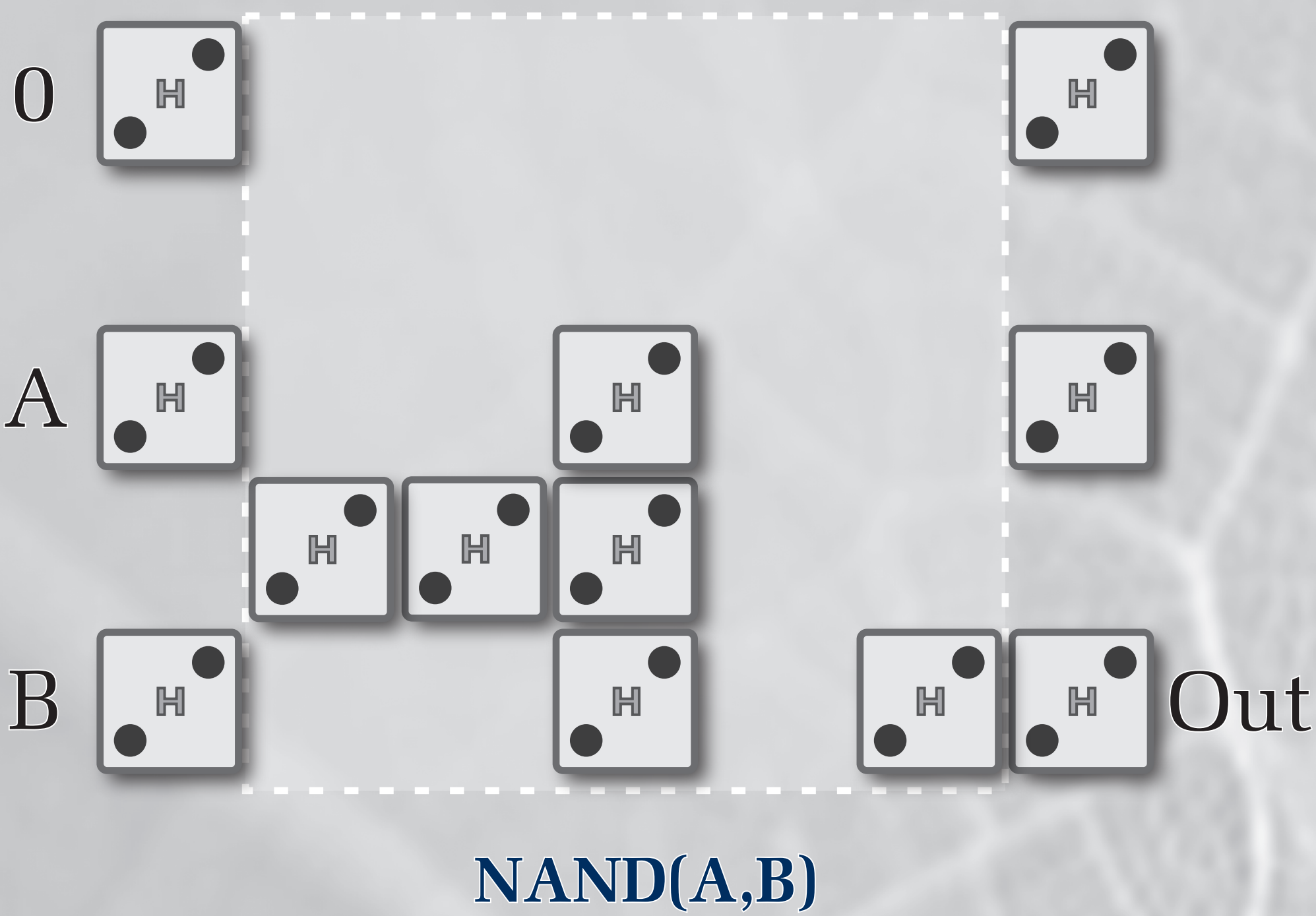


This research is based on the use of Genetic Algorithms (GA) for automatic synthesis of QCA circuits. Inputs to our GA were the positions of inputs and outputs of the logic device, its maximal size, as well as the logic function we wanted the logic circuit to perform. For reasons of stability and energy flow we typically employed three inputs and also three outputs. By means of GA we managed to design logic devices for all two input binary logic functions.

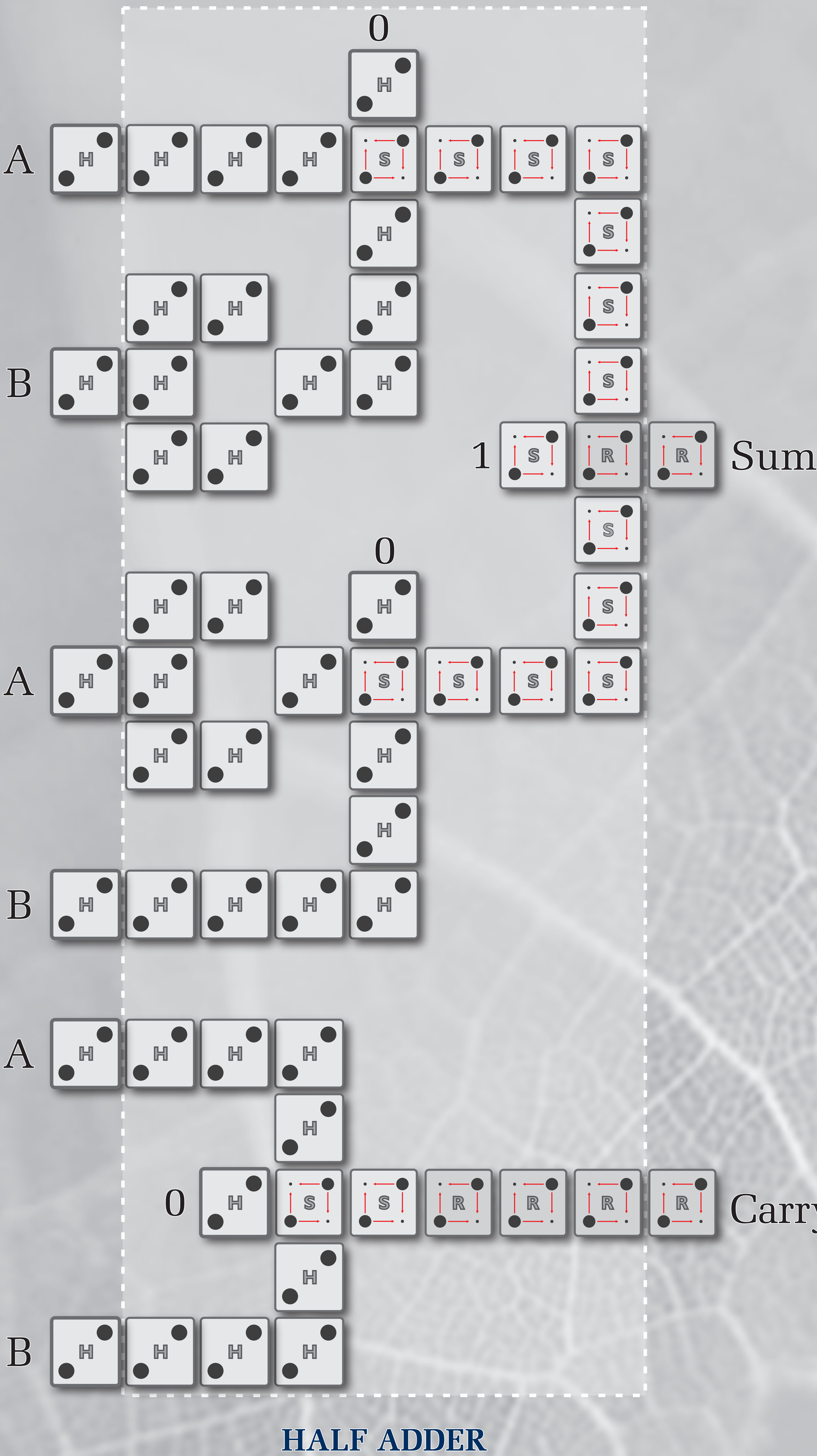
CLASSIC HUMAN DESIGN



EVOLUTIONARY DESIGN Genetic Algorithm



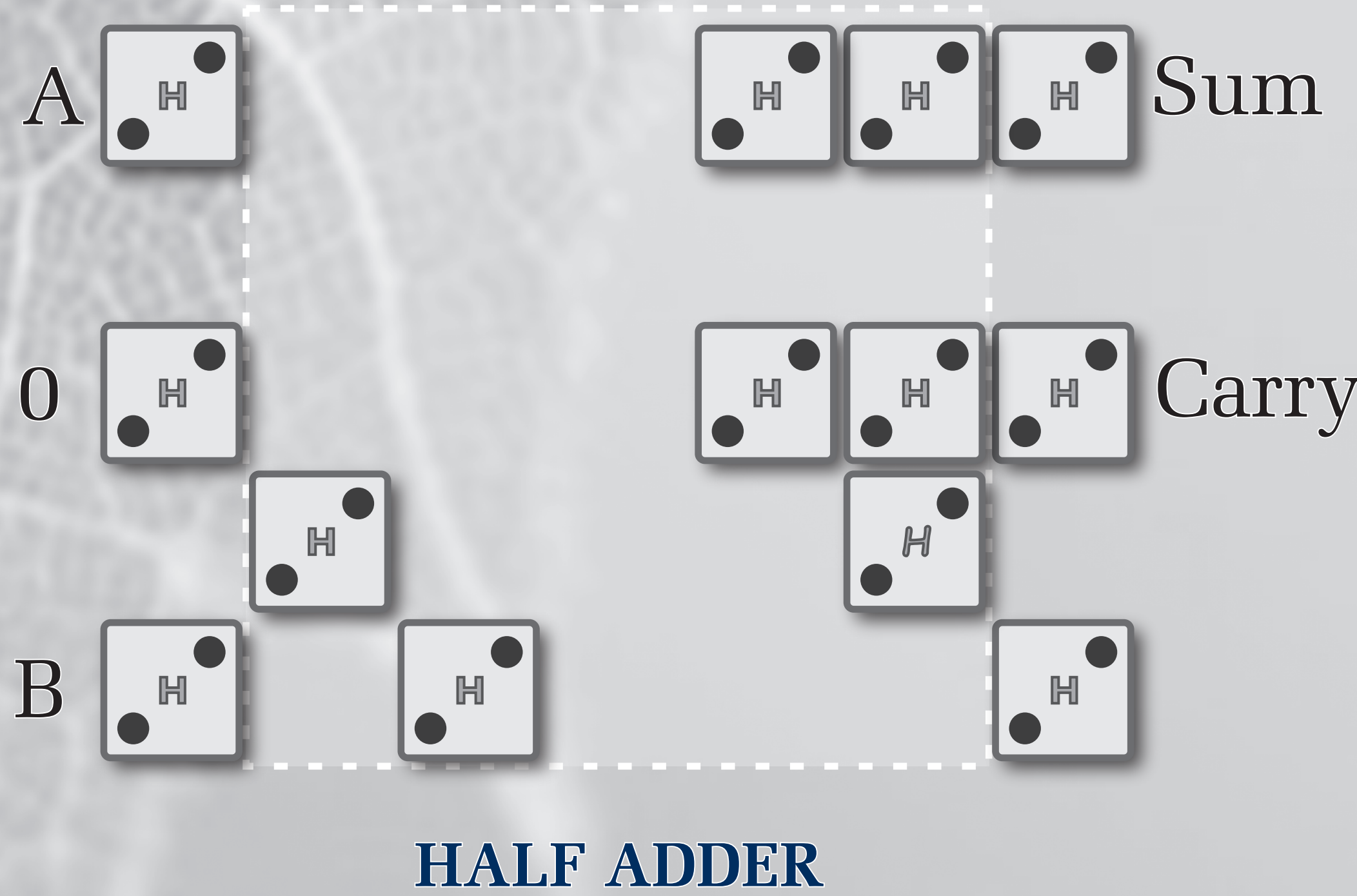
It has to be noted, however, that the clear space existing in the GA obtained structures incurs some restrictions on the distance at which the nearest wire can cross them.



A	B	NAND (A,B)
0	0	1
0	1	1
1	0	1
1	1	0

A	B	Carry	Sum
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0

Truth tables



It has to be stressed out that all cells are based around a single control signal (i.e. the inter-dot barriers are raised and lowered in all cells concurrently).