Symbolic Chess Language

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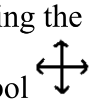
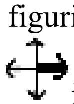
Frank Ho, the founder of Ho Math and Chess Learning Center headquartered in Vancouver, Canada, invented a set of geometric chess symbols or Symbolic Chess Language (SCL, patent pending). Each chess symbol represents a corresponding chess piece (Figures 1 and 2). This new set of chess symbols not only makes the teaching chess easier for younger children as young as 4 years old, but it also serves as a set of command language to link arithmetic and chess. The teaching idea of using this set of chess symbols is to create math and chess integrated problems or any variations of future problems as results of using these symbols, This set of chess symbols and their teaching method have been submitted for intellectual property patent protection. Problems shown herein are merely exemplary, and may be changed to suit different types of problems. Accordingly it is the inventor's intent to embrace all such alternatives, modifications and variations as fall within the spirit and broad scope of this invention.

As far as the training of playing chess itself is concerned, SCL symbols have many advantages over the regular chess fonts or 3 D figurines in training children's critical thinking skills when integrating chess into math. The transformation concept in geometric chess symbols are self-explanatory and is easier for children to understand when each symbol direction pointed by an arrow representing the actual move direction of each chess piece. Children get hands-on experience in moving those pieces by simply following the directions displayed on each chess piece.

The other advantage of using SCL is that problems related to spatial relation, pattern, shapes are created using the set of geometric chess symbols to provide children with opportunities in learning important math concepts in patterns, sequence, symmetry and transformation related math problems. For example a typical problem might involve how a 3D object such as a chess piece () is transformed into a symbol () and then a symbol is translated into a number (9) and finally a numerical value is produced as an answer.

A symbol mathematical language using the set of SCL can be developed to create an array of innovative arithmetic problems since these geometric chess symbols themselves representing the moving direction of chess figurines. For example, a black rook is represented by this symbol  and a highlighted arrow such as  indicating its direction of movement towards right. In this rook case, the symbol not only can represent the chess piece itself, it also has another attribute which has the 4 directions (up, down, left and right) of moving. The directions can be one way, two ways, three ways or four ways, so altogether, there could be 13 ways of combinations of moving directions. A simple rooks' move problem could become a very challenging problem when combined with arithmetic computation problems. The effect is children feel thrilled and are more willing to work on chess and math combined problem since each problem requires children's creativity to create the questions by following a puzzle-like mini question and the requirement of having children to write the questions reinforces the task of memorizing the basics facts of addition, subtraction, or multiplication without causing stress on children.

Ho Math and Chess™ believes the invention of this SCL has brought integrated math and chess teaching to a new horizon and we are very proud to be the leader in the continued research of math and chess integrated teaching.

Figure 1 Geometric chess symbols for black pieces

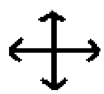
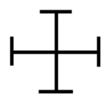
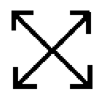
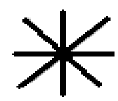
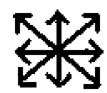
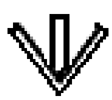
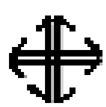
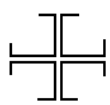
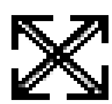
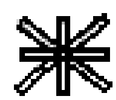
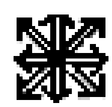
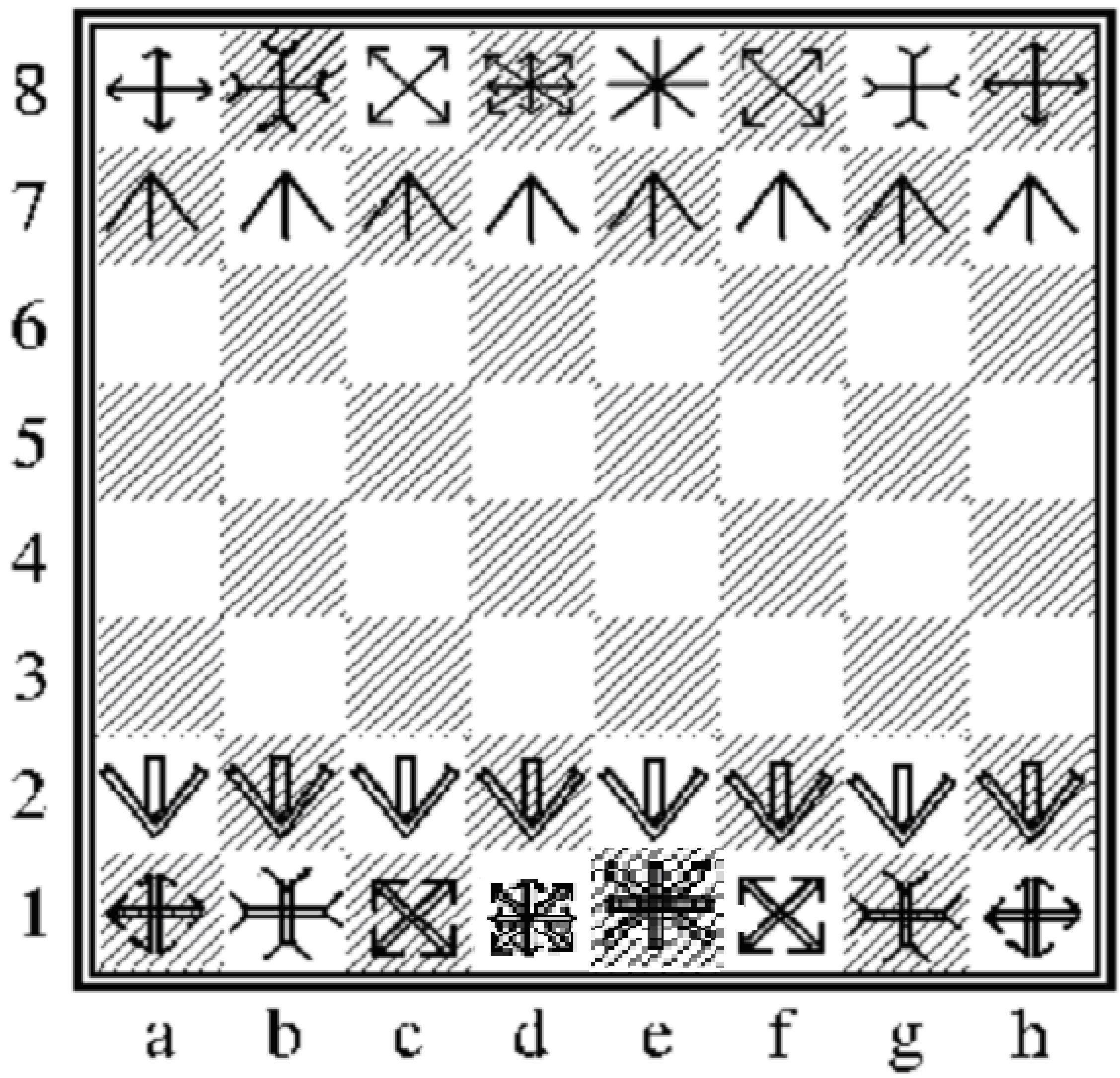
Points	1	5	3	3	0	9
Chess piece fonts	♟	♜	♞	♝	♚	♛
English name	Pawn	Rook	Knight	Bishop	King	Queen
SCL						

Figure 2 Geometric chess symbols for white pieces

Points	1	5	3	3	0	9
Chess piece fonts	♙	♖	♘	♗	♔	♕
English name	Pawn	Rook	Knight	Bishop	King	Queen
SCL						

Set up of SCL symbols

The set up of the geometric chess symbols is as follows:

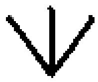
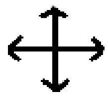
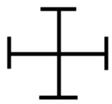
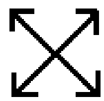
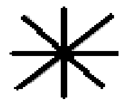
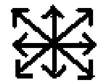


Characteristics of SCL

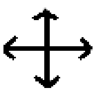
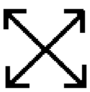
Each symbol carries 5 attributes: value, direction, color, background color, and size.

Value

Each symbol has its own value. For example, the following gives corresponding points for each symbol for Black.

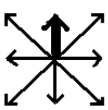
Points	1	5	3	3	0	9
Geometric chess symbols						

The static value of each symbol turns symbols into numerical values in a meaningful way. The transition and training of understanding abstract concept into forming a concrete numeric value is considered a milestone in a child's mental development. A simple example such as

 +  = 3 + 3 = 6.

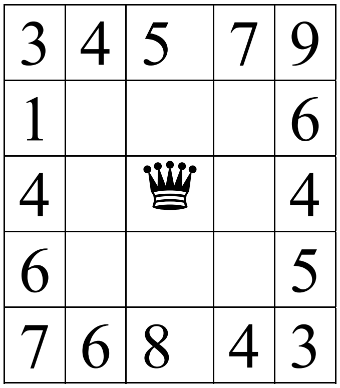
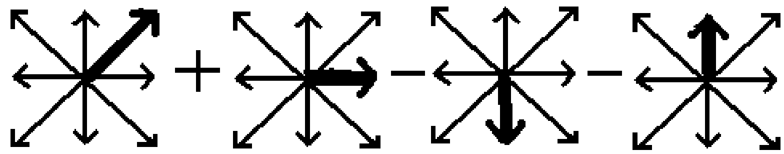
Direction

SCL serves also as a set of command language when its direction on the symbols is highlighted. For example the following symbol instructs a queen to move to the northern direction.

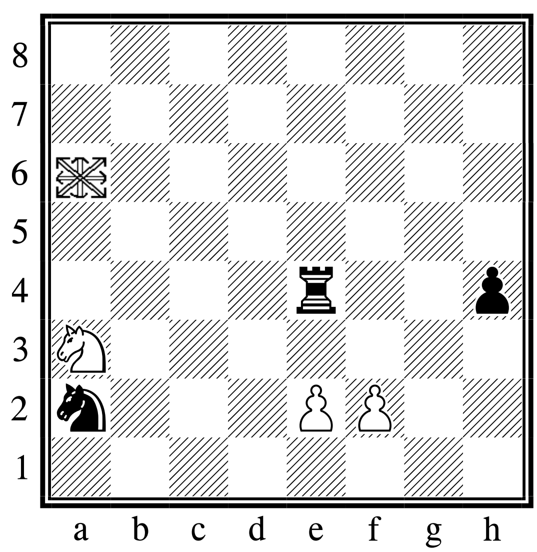


When the above symbol is used in combination with a chessboard, a result can be achieved by asking child to perform an arithmetic calculation.

The following demonstrates the concept described above.

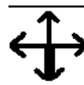
	Calculating follows directions
	 Calculate the result of the numbered squares as directed above ________. 9 + 4 – 8 – 5 = 13 – 8 – 5 = 5 – 5 = 0

More complicated problems can be created by combining the direction with coordinates specified. The following example demonstrates the idea described.

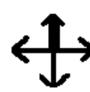


Move ♜ according to the instructions below.

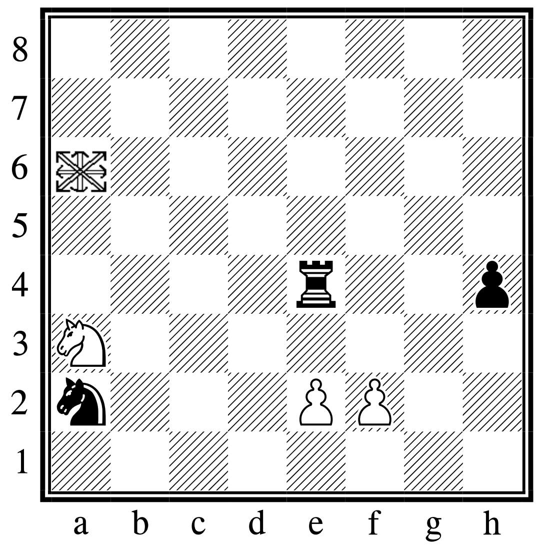
e4, 2 (move to the right 2 squares) is _______,

, 3 is _____,

, 4 is _____,

, 5 is_____.

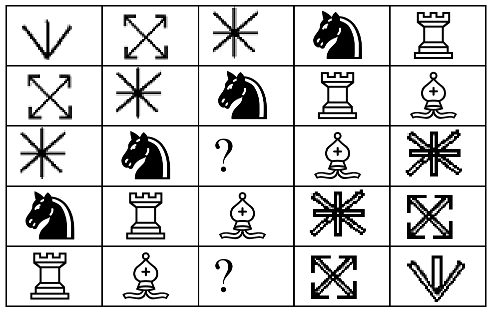
A reverse problem of the above example requires a child to think backwards. The following example demonstrates the idea.

	Move ♜ according to the instructions below. ✥e4 to g4 will require ♜ to move ___ squares. ✥e4 to ✥b5 will require ♜ to move ___ squares. ✥e4 to ✥e7 will require ♜ to move ___ squares.

Color, Background Color and different sizes

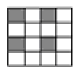
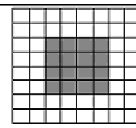
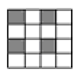
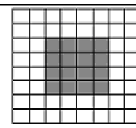
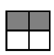
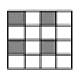
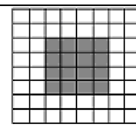
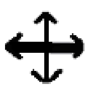
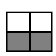
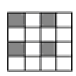
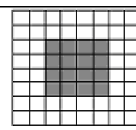
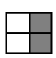
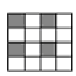
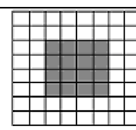
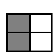
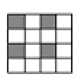
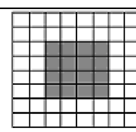
The black and white colors of chess symbols along with their black or white squares and their different font sizes present the possibilities of creating a variety of pattern problems. The following example demonstrates the concept.

Observe the following pattern and replace each ? by a chess piece.



The following demonstrates that how some repetitive and boring basic computation questions can be turned into puzzle-like questions using SCL and requires children's creativity to figure out the each question themselves. The requirement of having children to actually write out each question reinforces the learning outcome.

3	4	5	6	2	3	4	5
7	8	9	10	6	7	8	9
11	12	13	14	10	11	12	13
15	16	17	18	14	15	16	17
4	5	6	7	5	6	7	8
8	9	10	11	9	10	11	12
12	13	14	15	13	14	15	16
16	17	18	19	17	17	18	19

Product of 			of		of		
Product of 			of		of		
Product of 	of		of		of		
Product of 	of		of		of		
Product of 	of		of		of		
Product of 	of		of		of		

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