

Disclaimer -

I wrote this back in August 2020 using google drive to share everything. The original folder which contains everything described here can be found at -

<https://drive.google.com/drive/folders/1OFDVTAUKA0O0zBxzI4d8K27xi0Rfh6Hj?usp=sharing>

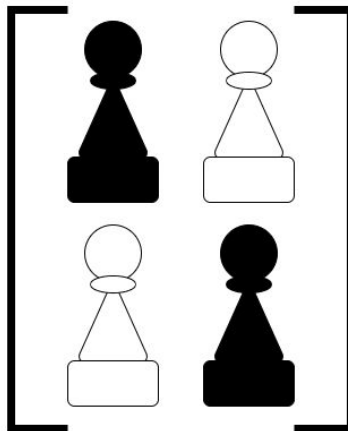
I plan on remaking this document a little bit more clearer in latex in the future.

5D Chess Game Organization and Matrix

Notation

By: Kyle L.

For the past several weeks I have been creating a document that was meant to be a brand new system for writing down 5d chess notation. However, that document has become quite bulky and can be confusing for someone who doesn't understand the mathematical terms. Thus I am using this to simplify everything down and give people the bare basics, so that the tools provided can immediately be used. That document will be included in the folder for those who have a good grasp on programming, linear algebra, and algebraic notation to try to understand the mess I made.



A. 5d Chess Game Sheet

	A	B	C	D	E	F	G	H	I
1	Date:								
2	Time:								
3	Location:								
4	White:								
5	Black:								
6			Time step		WH	O	BL		
7			1						
8			2						
9			3						
10			4						
11			5						
12			6						
13			7						
14			8						
15			9						
16			10						

This is the game sheet. Each time step obviously represents the time that a board exists in. The three cells at the top represent the current branching paths that the players can create. ‘O’ stands for the original path, and ‘WH’ and ‘BL’ stand for white and black branching paths, respectively. You would place a branch that white created under ‘WH’ and do the same for black. If additional branches are created, then you currently need to add them yourself by adding additional columns. It shall be in your best interest to number the additional branching paths.

From here, any system of notation can be written in each cell, so, if my prescribed notation system doesn’t land well, or if a better one exists, this spreadsheet can still be useful. I recommend going down to the examples section to get an initial feel for my notation before you read into it. The following pages will describe my notation system.

B. Basic Notation

The official name of my notation system is Matrix Notation and Vector Notation, depending on how the moves are stored. I am showing you how to use Matrix Notation. For ease of use, they both use the same conventions for describing moves which is called Basic Notation.

A move is considered finished once a player has pressed submit. The player can potentially have several actions that he makes, before he submits his turn in. Thus, I refer to the individual movement of pieces as the actions of a player.

To understand the movement of a piece, we need two parts of information; the name of the piece, and where the piece ends up. I also add symbols describing whether the piece has traveled through time, and where the piece was previously, to ensure that the game is recorded accurately and is easily readable.

Time Displacement

To describe that a piece is traveling through time the ‘ - ‘ and ‘ + ‘ symbols are used. When a piece travels off of a board, ‘ - ‘ will show that that piece is no longer available on that board, and that it has traveled to another board. Likewise, if a piece is incoming from another board, the ‘ + ‘ shows that the piece has been added to the current board.

Piece Names

The pieces are named as they are traditionally in normal chess, with the pawns being labeled as the lettered column they are on and knights being labeled ‘N’. additional information

on the piece names can be found here [https://en.wikipedia.org/wiki/Algebraic_notation_\(chess\)](https://en.wikipedia.org/wiki/Algebraic_notation_(chess)) .

In addition to the original pieces, there are also Unicorn ('U') and Dragon ('D') pieces.

Time and Location

The time and location of an action is specified by the current branch, time, and board square. The branch can either be O (the starting/original branch) or one of white or blacks alternate timelines. The alternate timelines are referenced by 'WH' or 'BL' followed by a number which shows how far away that timeline is from the original timeline. The time is described by a 'T' followed by the time step, which can be seen in game if you zoom out enough. Finally, the square position is the same as in algebraic notation, being 1 to 8 and a to h (again - [https://en.wikipedia.org/wiki/Algebraic_notation_\(chess\)](https://en.wikipedia.org/wiki/Algebraic_notation_(chess))). Each part of this information should be separated by a '.' to help with readability.

Additional Information

To denote that a specific piece is moving curly brackets '{}' are used after the piece's name to denote the time and location the piece is coming from. So it may be as simple as saying N{g1}.e2, which means that a knight on g1 has moved to e2. Or, it can be used to describe where a piece has come from if it has just traveled through time, such as +Q{BL1.T3.e4}.c4, which states that a queen has arrived from blacks 1st alt timeline, from timestep 3, on e4. If a piece is travelling along the same timeline or same branch, that information is allowed to be omitted as it is assumed, but pieces that travel from other boards should always at least have the branch and time they came from included. Extra information such as captures (denoted with 'x') and mate

(denoted with '#') are up to the decision of the annotator to write up. Notes can be written along the blacked out left margin.

Putting It All Together

Each cell in the grid contains the moves of both players, just like in traditional chess. As long as both players' actions occurred in the same branch and time, it can be placed in the corresponding cell. If a piece travels to a history board (otherwise known as a board which already has a future) an alternate timeline is automatically created, putting the notation of adding a piece as the first move on that timeline.

The one slight issue with my notation, is that the way that the game visually shows you moves played on the next player's board. It is helpful looking at every board move as 1 ply backwards, because each turn for white and black takes place on one timestep.

Note: - When using this notation there are some moves where a player isn't forced to play, or cannot play. For example, if one of blacks pieces is to arrive into a newly created branch, it would be labeled (... , +B{O.T5.c1}.c3). The '...' represents that white had not made a move preceding blacks move, thus he cannot branch into this cell. Additionally the '@' symbol shows that a player is legally able to play a move, but has not. So if white were to create an extra branche which black doesn't play on, it would look like (+Q{WH1.T6}.h4, @). These two extra symbols aren't as important for Matrix Notation, but are needed in Vector Notation and are better explained in the other document.

C. Examples

Examples taken from puzzles.

I added the FEN notation for the initial position the pieces are placed in before Time 1

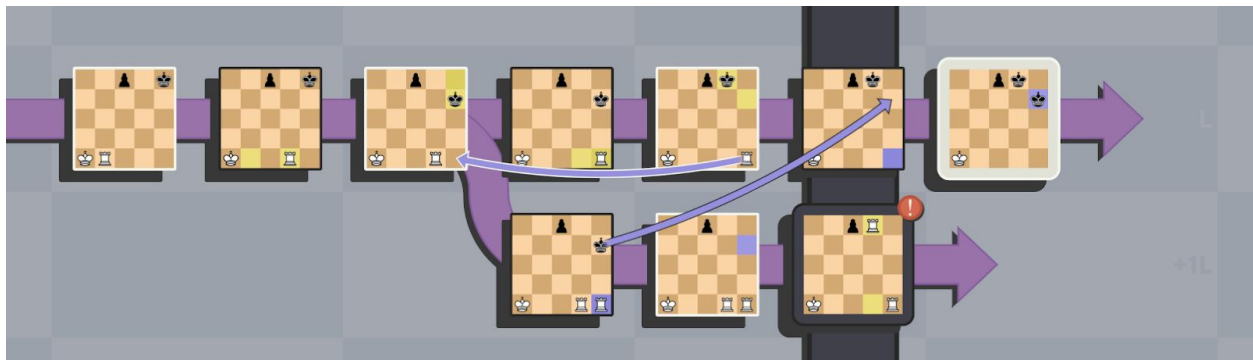
(https://en.wikipedia.org/wiki/Forsyth-Edwards_Notation)

Note: Actual games will be harder to annotate than these puzzles.

Rook tactics I

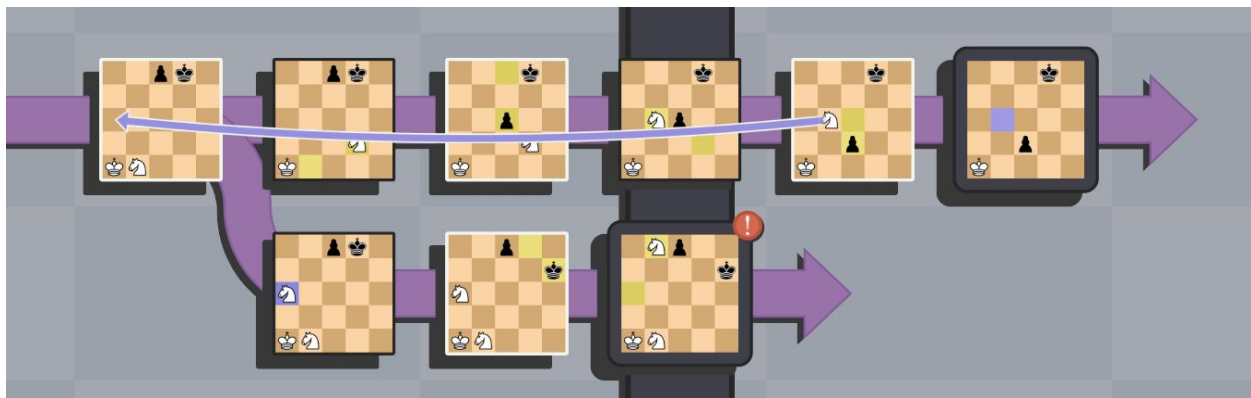
			FEN = +{4k551K32R2}			
Time step		WH1	O	BL1		
1			(Kb2,Ke4)		Given information	
2			(Re1, Kd3)			
3			(Re5#, ...)		Answer	
4						
5						
6						
7						
8						

Rook Tactics III



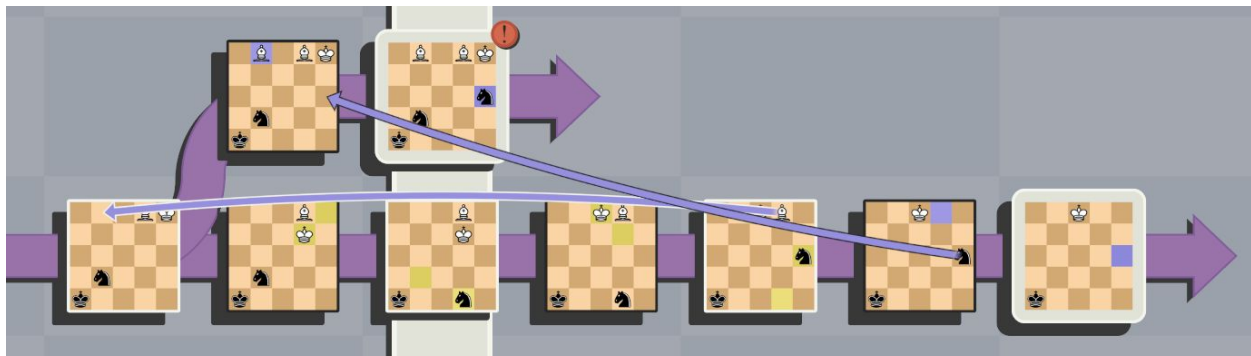
FEN = +{2p1k555KR3}						
Time step	WH1	O	BL1			
1		(Rd1,Ke4)		Given information		
2	(+R{T3}.e1,-K.O.T3)	(Re1,Kd5)		Time traveling		
3	(Rd5#, ...)	(-R.T2, +K{WH1.T2}.e4)		Answer		
4						
5						
6						
7						
8						
9						
10						

Knight tactics III



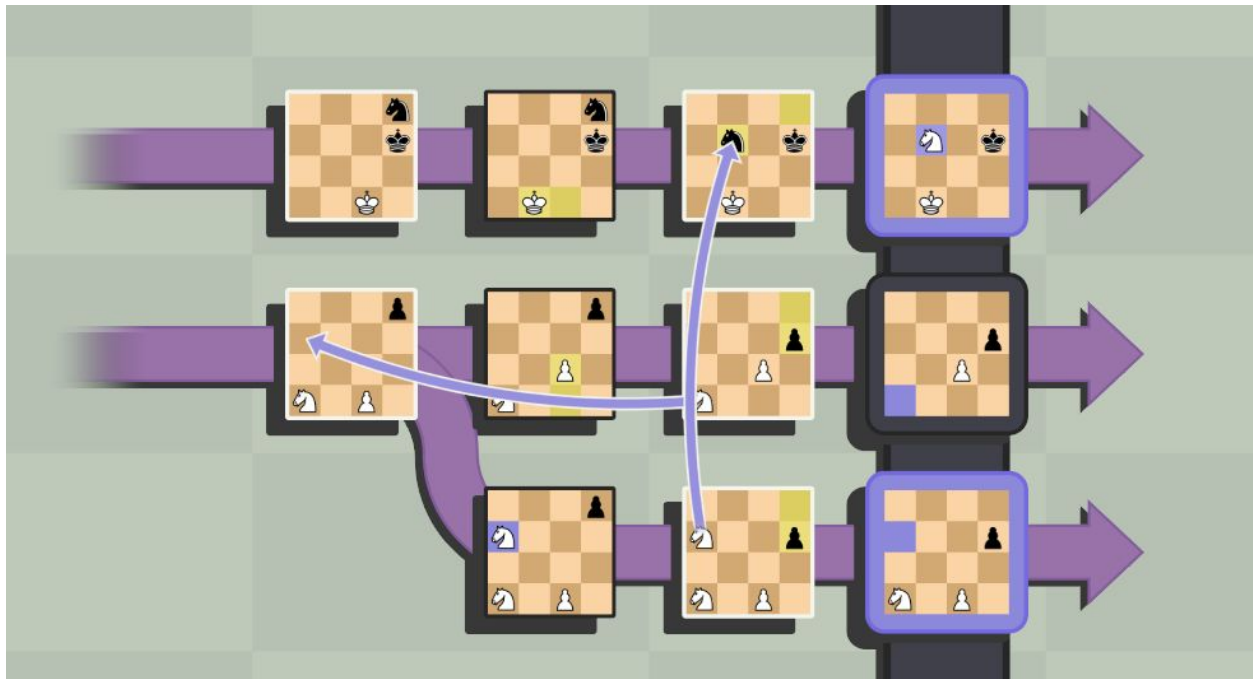
FEN = +{2pk1555KKK3}					
Time step	WH1	O	BL1		
1	(+N{O.T3}a3,Ke4)	(Nd2,c3)		Given information	
2	(Nb5#, ...)	(Nb3,c2)		Time traveling	
3		(-N.T1.a3, ...)		Answer	
4					
5					
6					
7					
8					
9					
10					
11					

Knights Tactics VII



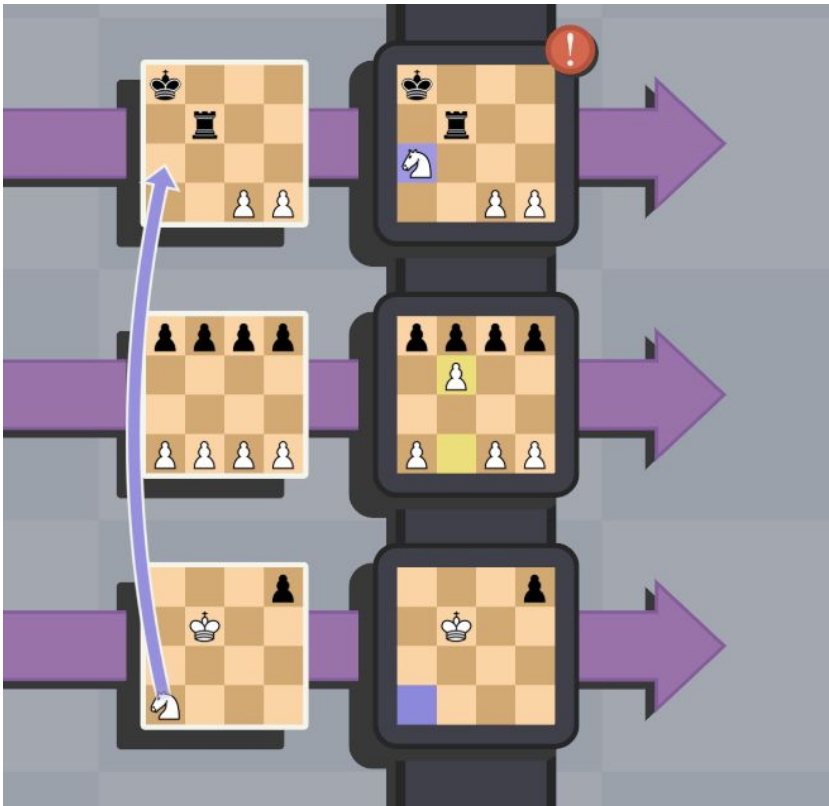
			FEN = +{3bk 5 5 1N3 K4}			
Time step		WH1	O	BL1		
1		(+B{T3}.d1, +N{T3}.a3#)	(Kb2,Nb5)		Given information	
2			(Kc1,Na3)		Time traveling	
3			(-B.T1.d1, -N.WH1)		Answer	
4						
5						
6						
7						
8						
9						
10						

Combination Attacks V



			FEN = +{3n 3k 4 2K1}	FEN = +{3p 4 4 N1P1}			
Time step		WH1	O1	O2	BL1		
1		(+N{O2.T2}.a3, d3)	(Kb1,Nb3)	(c2,d3)		Given information	
2		(-N.O1.T2.b3, ...)	(+N{WH1.T2}.xb3 #,...)	(-N.O2.T1.a3, @)		Time traveling	
3						Answer	
4							
5							
6							
7							
8							
9							

Combination Attacks II



			FEN = +{3p 1K2 4 N3}	FEN = +{pppp 4 4 PPPP}	FEN = +{k3 1r2 4 2PP}			
Time step		WH1	O1	O2	O3	BL1		
1			(-N.O3.a2, ...)	(b3, ...)	(+N{O1}.a2#, ...)		Given information	
2							Time travelling	
3							Answer	
4							Answer	
5								
6								