

CHESS · VARIANT 116 OF 153

Raumschach

5×5×5 (3D)

BOARD

2

PLAYERS

Raumschach

Raumschach ("Space Chess" in German) is a three-dimensional chess variant invented by Ferdinand Maack in 1907. It is played on five stacked 5×5 boards, each called a **level**, giving a total space of 5×5×5 = 125 squares. Raumschach adds one new piece to the standard set: the **Unicorn**, which slides along the triagonal axes of the three-dimensional board.

THE BOARD

The board consists of five levels, labelled **A** through **E** from bottom (White's side) to top (Black's side). Each level is a 5×5 grid with files **a–e** and ranks **1–5**.

Squares are written as **Level + file + rank**. For example, **Bc3** means Level B, file c, rank 3. **Aa1** is the bottom-left corner of the lowest level.

White's pieces occupy levels A and B at the start; Black's occupy levels D and E. Level C is empty.

STARTING POSITION

WHITE (RANKS 1-2 OF LEVELS A AND B)

Level A, Rank 1: Rook(a), Knight(b), King©, Knight(d), Rook(e) **Level A, Rank 2:** five Pawns (Aa2–Ae2)

Level B, Rank 1: Bishop(a), Unicorn(b), Queen©, Bishop(d), Unicorn(e) **Level B, Rank 2:** five Pawns (Ba2–Be2)

BLACK (RANKS 4-5 OF LEVELS D AND E)

Level D, Rank 5: Bishop(a), Unicorn(b), Queen©, Bishop(d), Unicorn(e) **Level D, Rank 4:** five Pawns (Da4–De4)

Level E, Rank 5: Rook(a), Knight(b), King©, Knight(d), Rook(e) **Level E, Rank 4:** five Pawns (Ea4–Ee4)

Each side begins with 20 pieces: 2 Rooks, 2 Knights, 2 Bishops, 2 Unicorns, 1 Queen, 1 King, and 10 Pawns.

The engine `.setup` array above encodes this as one FEN-style row-group per level (A through E), matching the pattern already proven for Gygax Chess's three-level board, using U for Unicorn to avoid clashing with Knight's standard N.

PIECE MOVEMENT

In three-dimensional chess, movement is defined by how many of the three axes (rank, file, level) change simultaneously:

- ♦ **Orthogonal (1 axis):** only rank, only file, or only level changes
- ♦ **Diagonal (2 axes):** any two axes change simultaneously
- ♦ **Triagonal (3 axes):** all three axes change simultaneously, one step each

ROOK

Slides any number of squares along a **single axis** (rank, file, or level). Cannot jump over pieces. In 3D space the Rook has 6 orthogonal sliding directions ($\pm$ rank, $\pm$ file, $\pm$ level).

BISHOP

Slides any number of squares along a **two-axis diagonal** (rank+file, rank+level, or file+level, in any combination of signs). Cannot jump over pieces. In 3D space the Bishop has 12 diagonal sliding directions.

UNICORN (U)

The Unicorn slides any number of squares along a **triagonal** — moving simultaneously one step in all three axes with each step. Cannot jump over pieces. In 3D space the Unicorn has 8 triagonal directions (all 8 combinations of $\pm$ rank, $\pm$ file, $\pm$ level).

The Unicorn is colour-bound within the 3D lattice: on a 5×5×5 board, triagonals partition squares into two disjoint sets. A Unicorn can never change its triagonal colour.

QUEEN

Combines the Rook and Bishop (orthogonal and two-axis diagonal slides). Does **not** include the Unicorn's triagonal move. Cannot jump over pieces.

KNIGHT

Leaps to any square exactly **2 steps in one axis and 1 step in another** (the standard chess knight jump, extended to 3D). This gives up to 24 destinations from a central square. Always jumps over intervening pieces.

KING

Moves one step in any direction — orthogonal, two-axis diagonal, or triagonal — giving up to 26 possible destinations from an interior square. Cannot move into check.

PAWN

White Pawns move toward Black's starting area (increasing rank and/or increasing level).

Non-capturing moves (White):

- ♦ **Straight-forward:** advance one rank on the same level (e.g., Aa2 → Aa3)
- ♦ **Straight-upward:** advance one level at the same file and rank (e.g., Aa2 → Ba2)

Capturing moves (White):

- ♦ **Diagonally-forward:** advance one rank while also moving one step in file (same level, e.g., Aa2 → Ab3)
- ♦ **Diagonally-forward-upward:** advance one rank and one level simultaneously (e.g., Aa2 → Bb3)

Black Pawns move in the opposite direction (decreasing rank and/or decreasing level), with equivalent capture directions.

Pawn rules:

- ♦ No initial two-square advance. All Pawn moves are one step.
- ♦ No en passant.
- ♦ White Pawns promote on **rank 5 of level A or B**. Black Pawns promote on **rank 1 of level D or E**. Pawns that move into levels C, D, or E without reaching rank 5 of a qualifying level do not promote there.

SPECIAL RULES

- ♦ **No castling.**
- ♦ **No en passant.**
- ♦ **No double pawn push.**
- ♦ Stalemate is a draw.

NOTATION

Squares are written as Level (A–E), file (a–e), rank (1–5). Examples:

- ♦ **Aa1** – Level A, file a, rank 1 (White's back-left corner)
- ♦ **Bc3** – Level B, file c, rank 3 (centre of level B)
- ♦ **Ec5** – Level E, file c, rank 5 (Black's back-centre)

Moves: piece letter, origin square, hyphen, destination. Example: **R Aa1–Aa4** (Rook from Aa1 to Aa4).

ATTRIBUTION

Raumschach was invented by Ferdinand Maack (Germany, 1907). Rules sourced from The Chess Variant Pages at chessvariants.com/3d.dir/3d5.html.