The **Damath board** consists of **64 spaces**, but only **half of them are usable** for gameplay. The usable spaces are the **white spaces**, which are numbered and represent the positions on the board. The pieces can only travel to these numbered spaces.

Numbered Board (Usable Spaces):

0 2 4 6

9 11 13 15

16 18 20 22

25 27 29 31

32 34 36 38

41 43 45 47

48 50 52 54

57 59 61 63

Mapping of Positions and Operators
The following positions on the board are associated with mathematical **operators**. These operators determine the operation applied during a **capture move**.

- **Addition**
  Positions: `6, 13, 18, 25, 38, 45, 50, 57`
- **Subtraction**
  Positions: `4, 15, 16, 27, 36, 47, 48, 59`
- **Multiplication**
  Positions: `0, 11, 20, 31, 32, 43, 52, 63`
- **Division**
  Positions: `2, 9, 22, 29, 34, 41, 54, 61`

Board Structure for Integer Damath
The Damath board consists of **64 spaces**. Each space can either hold a piece or be empty. The pieces have the following attributes:

- **Color**: Either `red` or `blue`.
- **Value**: An integer value, positive or negative.
- **Dama**: A boolean indicating whether the piece is promoted to a Dama (`true` for promoted, `false` otherwise).

Here's the current board setup for Integer Damath:

```
{
  "board": [
        { "position": 0, "piece": ["red", 2, false] },
        { "position": 2, "piece": ["red", -5, false] },
        { "position": 4, "piece": ["red", 8, false] },
        { "position": 6, "piece": ["red", -11, false] },
        { "position": 9, "piece": ["red", -7, false] },
        { "position": 11, "piece": ["red", 10, false] },
        { "position": 13, "piece": ["red", -3, false] },
        { "position": 15, "piece": ["red", 0, false] },
        { "position": 16, "piece": ["red", 4, false] },
        { "position": 18, "piece": ["red", -1, false] },
        { "position": 20, "piece": ["red", 6, false] },
        { "position": 22, "piece": ["red", -9, false] },
        { "position": 25, "piece": null },
        { "position": 27, "piece": null },
        { "position": 29, "piece": null },
        { "position": 31, "piece": null },
        { "position": 32, "piece": null },
        { "position": 34, "piece": null },
        { "position": 36, "piece": null },
        { "position": 38, "piece": null },
        { "position": 41, "piece": ["blue", -9, false] },
        { "position": 43, "piece": ["blue", 6, false] },
        { "position": 45, "piece": ["blue", -1, false] },
        { "position": 47, "piece": ["blue", 4, false] },
        { "position": 48, "piece": ["blue", 0, false] },
        { "position": 50, "piece": ["blue", -3, false] },
        { "position": 52, "piece": ["blue", 10, false] },
        { "position": 54, "piece": ["blue", -7, false] },
        { "position": 57, "piece": ["blue", -11, false] },
        { "position": 59, "piece": ["blue", 8, false] },
        { "position": 61, "piece": ["blue", -5, false] },
        { "position": 63, "piece": ["blue", 2, false] }
  ]
}
```

Movement Notations
In Damath, there are two types of movements:

1. **Normal Movement** – A piece moves to a free square on the board.
2. **Capture Movement** – A piece jumps over an enemy piece to capture it and lands on a free square behind the captured piece.

Normal Movement

Here is an example of a notation for a normal movement:

```
{
  "Move": {
        “source": {
              "position": 2,
              "piece": ["red", -5, false]
        },
        "destination": {
              "position": 4,
              "piece": null
        }
  }
}
```

- The key **"Move"** represents a normal movement.
- The **source** object includes the position and the piece being moved.
- The **destination** object includes the position where the piece will land and should always have `null` for the piece value (indicating the destination square is empty).

  In this example:

- The piece at **position 2** (red piece with value -5) moves to **position 4** (which is an empty square).

Piece Capture

Capture movement, denoted by the key **"Capture"**, adds a **"middle"** object. This represents the enemy piece being captured, and its color must be the opposite of the piece in the **source**.

Here's an example of a **capture movement** notation:

```
{
  "Capture": {
        "source": {
              "position": 2,
              "piece": ["red", -5, false]
        },
        "middle": {
              "position": 11,
              "piece": ["blue", 6, false]
        },
        "destination": {
              "position": 20,
              "piece": null
        },
        "score": -30
  }
}
```

- The **"Capture"** key represents a capture move.
- The **source** object indicates the position and the piece performing the capture.
- The **middle** object shows the position and the enemy piece being captured (the color must be opposite).
- The **destination** object represents the final landing position of the piece, which must always be empty (`null` for the piece).
- The **score** key contains the result of the capture, calculated based on the operator in the capture square.

In this example:

- The piece at **position 2** (red piece with value -5) captures the enemy piece at **position 11** (blue piece with value 6) and lands at **position 20**.
- The score for this capture is `-30`, based on the mapped operator of **position 20**.

Piece Movement
A Piece can only have a valid move if:

- It is currently their turn.
- There are free spaces in front of them.
- There is an enemy piece behind/in front of them, and there is a free space behind the enemy piece in the same direction (piece capturing).

For **Dama pieces**, they can move diagonally, as far as possible, until a piece blocks the way. If a blocking piece is present, all spaces behind it are not valid moves, except if the blocking piece is an enemy piece.

Priorities:

1. It is currently their turn.
2. There is an enemy piece in front or behind them.
3. There are free spaces in front of them.

A piece cannot be moved backwards unless:

- It is a Dama piece.
- Piece capturing is involved.

Piece Promotion
A **Dama piece** is a piece that reaches the farthest row on the enemy's side. Once a piece reaches the last row, it is promoted to a Dama piece, unlocking new abilities.

A Dama piece can move diagonally in any direction, provided the moves are valid. However, a Dama cannot jump over (capture) two or more adjacent pieces.

When a Dama piece captures an enemy piece, the score will be higher than when a normal piece performs the capture.

Piece Capturing
One valid move for a piece is capturing an enemy piece. If any piece has a move that captures an enemy, a **mandatory capture** occurs. When this happens, all other valid moves for other pieces are removed, unless they are also mandatory captures.

If a Dama piece has a mandatory capture, its moves are prioritized over non-Dama pieces, even if those non-Dama pieces have mandatory capture moves.

Scoring
Each piece has an **attribute value**, used for scoring during piece capture. The score is calculated using the following equation:

score = {pieceValue} {operator} {enemyPieceValue}

Where:

- **pieceValue** = the value of the capturing piece.
- **operator** = the mapped operator based on the position of the empty square where the piece lands after capturing.
- **enemyPieceValue** = the value of the captured enemy piece.

For **Dama pieces**, the same equation applies, but the score is **doubled** after calculation.

- If an ordinary piece captures a Dama piece, the score is also **doubled**.
- If a Dama piece captures another Dama piece, the score is **quadrupled**.
