



Sprint 2 Deliverable

Architecture and Design Rationales

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1. Complete Class Diagram

A Complete Class Diagram for the 9MM game, including Class names, attributes, methods, relationship between classes, and cardinalities.

2. Design Rationales

(explaining the 'Whys')

2.1. Classes

Explain two key classes that you have debated as a team, e.g. why was it decided to be made into a class? Why was it not appropriate to be a method?

The Game Class

The game class is required for initialisation of the game and keeps track of the state of the game until a player wins. Some of this information includes the two players, the game board. Additionally, the game class has the responsibility of switching turns and interacting with other classes such as the RuleChecker to enforce legal moves to be made by the players. The Game class is required as it acts as the game master and orchestrates the state of the game, which allows the flow of the game to be smooth through using all the available information and consolidating them into a single source of truth. As all these logic is only scalable when a clear separation of concerns is enforced, the Game class is created to avoid the a single long methods code smell, which will occur if it was to perform all these described tasks.

The Board Class

The board class will encapsulate all the objects that are elements to the board. For example all the positions, pieces and mills formed. It also serves as a medium for pieces and positions to interact with each other, having all the pieces and positions consolidated together allows the application to detect and stay aware of the existence of the pieces and the occupancy of any positions. Having access to all the information in a consolidated board class allows the RuleChecker class to compute all the legal movies based on the state of the board, the state of board will be accessed by the Game class, which will allow the Game class to switch turns. The board class also has access to the two players, which will allow the two players to be distinguished by their respective colours.

The Piece Class

The game will have up to a maximum of 18 pieces. Therefore, it is not reasonable to declare 18x (number of unique state) variables, which becomes inefficient when it comes to accessing information regarding a piece. This approach, without any sort of standardisation, will make the application really difficult to remain. Hence the rationale behind this Piece class, the piece class will allow all the information regarding a piece to be captured in a single class. Some of this information includes colour and the respective methods allowing the management of the pieces.

The Position Class

The position class exists for the same reason as the piece class, as there are multiple positions on the board, the need for separation of concerns regarding each position allows for more efficient development. The positions class also allows the RuleChecker to determine legal moves as all the neighbouring positions are stored as an array and made aware to within each position object

The Mill Class

The RuleChecker Class

2.2. Relationships

Explain two key relationships in your class diagram, e.g. why is something an aggregation not a composition?

2.3. Inheritance

Explain your decisions around inheritance, why did you decide to use (or not use) it? Why is your decision justified in your design?

The Player Class

The Computer Class

The Move Class

The Fly Class

The Remove Class

The Place Class

2.4. Cardinalities

Explain how you arrived at two sets of cardinalities, e.g. why 0..1 and why not 1...2?

2.5. Architecture

Explain why you have applied a particular design pattern for your software architecture?

Explain why you ruled out two other feasible alternatives?

3. References

[1] Reference: <https://www.figma.com/>