

# Bidding card game of Diamonds with GenAI

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## 1 Introduction

This report explores utilizing AI, specifically the GenAI tool particularly Gemini , to devise strategies for the bidding card game "Diamonds". Through iterative prompts, the game's mechanics were conveyed to the tool, aiming to assist in code generation aligned with the game's specifications. Challenges arose as the tool's limitations became evident during the coding phase. This report documents the journey, highlighting challenges, insights, and the evolving landscape of AI-assisted gaming strategy development.

## 2 Objective

The objective of this report is to explore the utilization of AI, specifically the GenAI tool, for developing strategies in the bidding card game "Diamonds". Through an iterative process, the report aims to convey the game's rules to the AI, analyze the AI's understanding, and assess its ability to generate code aligned with the game's specifications. The report seeks to identify challenges encountered during this process, highlight insights gained, and reflect on the effectiveness of using AI for strategy development in the context of "Diamonds".

## 3 Description of the game

The Diamond Card bidding game typically involves three players, though a two-player variant exists. Each player is assigned a suit for bidding, excluding spades and diamonds. Diamonds serve as the currency for scoring, awarded by the banker. At the onset of each round, the banker presents a deck of cards from 2 to 14 for bidding. Players must bid for the banker's diamond card, ensuring their bid falls between 2 and 14 and has not been used before. The computer also places a bid. The highest bidder wins the round, gaining the banker's diamond card, while the other player receives nothing. In case of a tie, both players receive half the card's value. The card's value is added to the winner's points tally, following the same values as the cards used for bidding (Joker=11, Queen=12, King=13, Ace=14). This cycle repeats for 13 rounds, with players aiming to maximize their points. Once a card is used for bidding, it is discarded, and players cannot skip their turn to bid. Additionally, the banker's diamond card is discarded after awarding points.

## 4 Conversation with GenAI

- **Describing Game to GenAI:** Begin by articulating all rules, mechanics, and the flow of the "Diamonds" bidding card game to the GenAI tool through initial prompts. Request the GenAI tool to reiterate its understanding of the conveyed game rules and mechanics to ensure accuracy and completeness.
- **Repetitive Clarification Prompts:** Address any additional questions or uncertainties raised by the GenAI tool through repetitive clarification prompts. Provide any missing information or examples as needed to enhance the AI's comprehension of the game's nuances and intricacies.
- **Code Generation Process:** Initiate the code generation process by prompting the GenAI tool to produce code for the "Diamonds" game based on the conveyed rules and specifications. Engage in iterative refinement by repeatedly prompting the GenAI tool to enhance the generated code, ensuring alignment with the intended game mechanics and logic.
- **Testing:** Conduct iterative testing of the code provided by the GenAI tool to evaluate its functionality, accuracy, and adherence to the specified game rules. Identify and address any discrepancies, errors, or inefficiencies through iterative improvements and adjustments to the code alongside the testing process.

## 5 Challenges

- **Describing the Game to GenAI:** The initial challenge encountered was effectively conveying the rules and mechanics of the "Diamonds" bidding card game to the GenAI tool. This proved particularly difficult when dealing with a non-traditional game with distinct rules or variations. The GenAI tool sometimes struggled to adapt to unfamiliar game structures, often defaulting to its existing knowledge base and failing to fully incorporate the provided prompts.
- **Transitioning Understanding to Code:** Despite reaching a point where the GenAI tool could adequately reiterate its understanding of the game, translating this comprehension into executable code presented another hurdle. The tool appeared to falter in transitioning its understanding to code implementation, necessitating a revisit to the process of clarifying game mechanics and rules. Despite repeated clarifications during the understanding phase, the generated code still failed to meet expectations until the tool was provided with explicit examples of function structures and descriptions to guide its coding process.

These challenges underscored the limitations of the GenAI tool in effectively translating complex or nuanced game rules into executable code without explicit guidance and reinforcement. Despite iterative refinement, the tool struggled to autonomously generate code that accurately reflected the intricacies of the "Diamonds" bidding card game.

## 6 Conclusion

In conclusion, the journey of utilizing the GenAI tool for "Diamonds" strategy development has been insightful but with notable challenges. While the tool demonstrated learning capabilities, describing game nuances and transitioning understanding into code posed difficulties. This experience led to the realization that GenAI serves as a helpful aid but cannot replace human understanding. Its limitations, including occasional confusion, highlight the importance of balancing AI capabilities with human expertise. Moving forward, leveraging AI in strategy development requires a nuanced approach, recognizing both its strengths and limitations alongside human insight.

## 7 Findings

### 7.1 Poor Learn and Implement System:

It was observed that while the GenAI tool could reach a point where it could accurately reiterate the correct game rules, it struggled to retain this understanding when transitioning to writing code for the game. Despite achieving comprehension of the game mechanics, the tool often failed to effectively implement this knowledge into executable code.

### 7.2 Unreasonable/Uncertain Responses:

It was found that the GenAI tool is prone to confusion when presented with strategic prompts. It easily becomes uncertain and inconsistent in its responses, often deviating from its initial understanding or failing to stick to its responses for the same prompts. This inconsistency undermines the reliability of the tool in generating consistent and accurate outputs.

### 7.3 Good Tool Under Good Supervision:

While GenAI tools are increasingly utilized, it is essential to recognize that their effectiveness depends heavily on well-written strategic prompts and supervision. Despite its limitations, the GenAI tool can be a valuable asset when guided effectively. It is imperative to acknowledge both its benefits and limitations, utilizing it alongside human supervision to maximize its potential in strategy development.

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## 8 Appendices

- Code
- Transcript