**Response Time:**

**Q&A Pair Dataset:  
  
Analysis:**

* **Overall Performance:** The response times for different query types range from **6.45 seconds** to **7.45 seconds**, indicating a fairly consistent system performance. There is only a slight variation between the different types of queries.
* **Fastest Response Time:** Location queries (e.g., "*Where can I find the Dectus Medallion (Left) in Elden Ring?")* had the fastest average response time at **6.45 seconds**, suggesting that these queries are processed efficiently by the system, possibly due to their straightforward nature in retrieving location data.
* **Slowest Response Time:** Game Mechanics queries (e.g., "*How does weapon scaling work?*") had the longest average response time at **7.45 seconds**. This is likely because game mechanics-related questions require more detailed, technical information, and may involve additional data processing to integrate multiple data points.
* **Trend:** Other types, such as Enemy Strategy (**6.53** and **7.18 seconds**) and Questline (**7.15 seconds**), show very similar response times, suggesting that the system handles these queries with comparable efficiency. The minor differences in response times indicate that more complex queries, like game mechanics, take slightly longer, while location and enemy strategy queries are handled more quickly.

**Game-Specific Dataset:**

**Analysis:**

* **Overall Performance**: The system’s response times for various query types range from **6.57 seconds** to **8.93 seconds**. This shows that the system is relatively consistent, with a small variance depending on the query type.
* **Fastest Response Time**: Quest queries, such as "*What are the rewards for completing 'Echoes of the Past'?"*, had the fastest average response time (**6.57 seconds**). This suggests that the system processes quest-related queries more efficiently, likely because they are more straightforward and require fewer data integrations compared to other types.
* **Slowest Response Time:** Location queries, such as "What are the special features of the Enchanted Forest?", had the slowest average response time (8.93 seconds). This could be due to the complexity of location-based queries, which may involve retrieving detailed information about in-game features, areas, or maps. Additionally, the slower response times for location queries might indicate issues with the quality of the data being retrieved, potentially due to the structure or formatting of the underlying data.
* **Trend**: There is minimal difference in response times for Item (**8.08 seconds**), Enemy (**8.09 seconds**), and Spell (**7.31 seconds**) queries, all of which fall within a similar range. This indicates that the system handles these query types fairly equally in terms of processing time. Similar times for Item and Enemy queries suggest that retrieving item or enemy data does not significantly differ for the system, while Spell queries tend to be processed a little faster, possibly due to less data required.

**Comparison:**

The system's response times for Q&A queries range from **6.45** to **7.45 seconds**, demonstrating consistent performance across different types of queries. Location queries were the fastest (**6.45 seconds**), likely due to their simpler nature. Game Mechanics queries had the slowest response times (**7.45 seconds**) due to their technical complexity, requiring more detailed data processing. Other query types, such as Enemy Strategy and Questline, showed similar performance, with minimal differences in response times.

The response times for game-specific queries ranged from **6.57** to **8.93 seconds**, with location queries taking the longest time (**8.93 seconds**). Quest queries were the fastest (**6.57 seconds**), indicating that they are processed more efficiently. The slower response times for location queries may be linked to the complexity of the data and possible issues with the dataset's formatting or structure. Since the game-specific dataset does not include direct question-answer pairs, queries may involve more intricate data retrieval processes, which could explain the higher response times for some types.

Overall, the Q&A Pair dataset showed better efficiency, while the Game-Specific dataset's slower performance could be due to dataset formatting, or the understanding of the information being complex and retrieved.

**Web Search:  
Analysis**:

* **Overall Performance:** The system's response times for queries with varying complexity range from **12.74 seconds** to **36.49 seconds**. This indicates that the system performs relatively efficiently for simpler queries, but response times increase significantly for more complex questions requiring deeper reasoning.
* **Fastest:** The Legend of Zelda: Breath of the Wild query, “*Where is the Master Sword?*”, had the fastest average response time at **12.74 seconds**. This is expected, as it’s a simple, straightforward question that involves only factual retrieval, without requiring complex analysis or multi-step reasoning.
* **Slowest:** The Elden Ring query, “*How do the weapon scaling mechanics compare to Dark Souls 3, and which is best for dexterity builds?”,* had the slowest average response time at **36.49 seconds**. This is likely due to the complexity of the question, which involves comparing multiple game mechanics, analysing detailed information, and considering the nuances of different build types. The system likely needed to apply Chain of Thought (CoT) analysis to generate the complex response, which contributed to the increased time.
* **Trends:**
  + Simple queries (e.g., Master Sword in *Zelda*) are processed more efficiently with relatively lower response times.
  + Medium complexity queries (e.g., leveling smithing in *Skyrim* and unlocking endings in *Cyberpunk 2077*) show a moderate increase in response time, likely due to the need for more reasoning or pulling from multiple data points.
  + Complex queries (e.g., farming strategy in *Diablo 4* and comparing scaling mechanics in *Elden Ring*) require significantly more processing time, as expected, due to their intricate nature and the need for advanced reasoning and analysis.

The system is efficient at handling simple queries, with a reasonable response time increase for more complex questions. As the complexity rises, the response times grow significantly, particularly when deep reasoning and multi-step analysis are required. This pattern is expected, as complex queries benefit from the system's Chain of Thought (CoT) analysis, but this comes at the cost of slower response times.

**Ambiguous Queries:  
  
Analysis**:

* **Overall Performance:**  
  The system’s response times for ambiguous queries range from **11.56 to 13.75 seconds**, showing noticeable variability compared to previous query types. The increased processing time likely stems from the system’s need to infer context, request clarification, or attempt a broad search to find relevant results.
* **Fastest Response Time:**  
  The query *"Where is it?"* from *Skyrim* had the shortest response time at **11.56 seconds**. This suggests that location-based queries, even when ambiguous, may be resolved faster due to the system relying on structured game data or common patterns in location-based retrieval.
* **Slowest Response Time:**  
  The query *"What’s the reward?"* from *The Witcher 3* took the longest at **13.75 seconds**. This could be due to rewards being tied to various quests, choices, or conditions, requiring the system to search multiple data sources before generating an answer.
* **Trends:**
  + The response times are generally higher than previous datasets, reinforcing that ambiguity increases processing difficulty.
  + Ambiguous queries involving **"best" or "why" questions** (*Best weapon?*, *Why won’t this work?*) took slightly longer, likely due to their subjective nature requiring more context.
  + Queries asking about **mechanical effects or object functions** (*What does this do?*) were processed slightly faster, suggesting the system may have predefined responses for common gameplay mechanics.

Ambiguous queries generally take longer to resolve due to their lack of context, requiring additional processing time for clarification or broader searches. While structured data may help resolve some queries faster (*e.g., location-based ones*), subjective or multi-variable queries tend to introduce additional delays. This suggests that improving the system’s ability to detect and refine ambiguous inputs could enhance efficiency.

**Unknown Data:  
  
Analysis:**

* **Overall Performance:** The response times for unknown data queries range from **10.17 to 11.36 seconds**, showing a relatively consistent handling of missing information. The system either attempts an external search or quickly identifies the data as unavailable. External lookups likely contribute to variations in response time.
* **Fastest Response Time:** The query *"Can you romance Commander Zavala?"**(Destiny 2)* had the shortest average response time at **10.17 seconds**. This suggests that the system quickly determined that no relevant data was available as a game mechanic, leading to a faster fallback response.
* **Slowest Response Time:** The query *"How to craft a netherite bow?"**(Minecraft)* took the longest at **11.36 seconds**. This could be due to an attempted external search before recognising that such an item does not exist in the game. Longer response times may indicate additional processing when the system needs to verify if the requested data exists.
* **Trends:**
  + **General Consistency**: The system processes unknown data with relatively minimal variation in response times.
  + **Recognizing Fictional Data**: Queries about nonexistent game mechanics or features (e.g., "netherite bow") tend to take longer, possibly due to extra validation steps.
  + **External Search Influence**: Queries like "latest patch notes" may prompt the system to search online sources, contributing to slight delays.

The system effectively handles unknown data queries by either identifying missing information quickly or attempting an external lookup. Faster responses happen when the system immediately recognises non-existent content, while slower responses suggest additional verification or web searches. Future optimisations could focus on reducing search delays and refining how the system determines when to attempt external retrievals.

**Response Quality:  
Q&A Pair Dataset:**

**Analysis**:

* **Overall Performance:** The system provides highly accurate and relevant responses with very few discrepancies. The average accuracy and relevance scores are consistently high (5 out of 5). The responses are clear and informative, covering all necessary details. The conciseness scores vary slightly, with two responses rated 4, but these still offer concise enough information for the queries.
* **Accuracy:** All answers score a perfect 5 for accuracy, meaning the system delivers correct information for each question. It provides the right details, such as item locations, strategies, and quest steps, matching the expected responses.
* **Relevance:** Similarly, the relevance of the responses is perfect across all queries, as they address exactly what was asked without deviating from the core topics.
* **Conciseness:** The conciseness is also largely high, with the exception of the two responses related to the "Questline" and "Game Mechanics" queries, which score 4. These responses include all necessary information but could potentially be slightly more streamlined. For instance, the "Questline" response could be shorter without losing any critical details, and the "Game Mechanics" answer might have been more succinct.

The system performs excellently in terms of accuracy and relevance, consistently providing correct and relevant information. There is slight room for improvement in conciseness, particularly for the more complex queries that involve multiple steps or technical details. Overall, the system is highly capable of answering game-related questions with clarity and precision.

**Game-Specific Dataset:**

**Analysis:**

* **Overall Performance:** The system provides high-quality responses across all queries, with the majority of the responses being highly accurate, relevant, and concise. However, some minor issues exist, particularly with regard to accuracy in specific cases like the "Fire Golem" location and the "Quest" reward query, where additional contextual information was provided that could have been removed or provided.
* **Accuracy:** The responses generally score very well for accuracy (5 out of 5), but there are two queries with slight accuracy issues:

1. **"Where can I find the Fire Golem?"** – One of the responses provided an inaccurate response, it left out *“Lava Crater, just before the path to the Fire Temple”*, which is why the accuracy faltered.
2. **"What are the rewards for completing 'Echoes of the Past'?"** – The system leaves out the 4,000 XP mentioned in the expected response, potentially affecting the completeness of the information provided.

Despite these slight issues, the majority of the responses are perfectly accurate and provide the correct game data.

* **Relevance:** Relevance scores are perfect across all responses, indicating that the system addresses the exact question asked. For each query, the responses align with the expected details, covering the key aspects of the question, such as location, features, and rewards. No unnecessary information is included, and the system stays focused on the core query.
* **Conciseness:** Most responses are concise and direct, with no extraneous information added. However, two responses could be slightly more streamlined:

1. **"Where does the Healing Aura spell do?"** – While the response includes all the necessary details, the phrasing could be simplified slightly to reduce wordiness. For instance, "Healing Aura restores 75 health to all allies within a 10-unit radius" might be more concise than the slightly repetitive phrasing used in the system's response.
2. **"What are the rewards for completing 'Echoes of the Past'?"** – This response could have been more concise by omitting the mention of "*Norman's Abyss*," which was unnecessary to answer as the game is already selected. Additionally, the XP amount should be included to maintain a complete answer.

The system delivers highly accurate, relevant, and mostly concise responses to the queries. The slight issues in accuracy and conciseness do not significantly affect the quality of the overall responses, but there is room for minor improvements. The system should focus on providing complete answers without introducing unnecessary context, particularly when the context doesn't add value to the player's understanding of the query. The response quality is generally high and serves as a strong foundation for handling similar game-related questions.

**Comparison:**

The two datasets provided responses for game-specific queries, but with some notable differences in both content and structure The responses in the Q&A dataset were highly accurate, relevant, and concise. There were only minor deviations in phrasing, but the overall detail in answering complex queries, such as specific strategies or questlines, was strong, with no significant issues in the provided information.

In contrast, the Game Specific Dataset included a wider variety of query types, such as item locations, spell mechanics, and quest rewards. The responses in this dataset were generally accurate and relevant, though there were occasional issues with conciseness and accuracy. For instance, some answers contained unnecessary context, such as references to *Norman's Abyss*, or missed out on specific details like XP rewards for completing quests. While the conciseness was generally good, there were instances where the response could be much better formatted.

Overall, both datasets performed well, with Q&A dataset demonstrating slightly more consistency in providing precise and clear responses, while Game Specific Dataset, although still strong, could benefit from slight improvements in accuracy and conciseness.

**Web Search:**

**Analysis:**

* **Overall Performance:** In this set of queries, the system generally performs well across the board, maintaining high relevance and conciseness. However, there are problems in accuracy, particularly for the simpler and more complex questions. While the responses are mostly informative and clear, some specific details, such as locations or strategies, were missed or slightly inaccurate.
* **Accuracy**
  + **Simple Question**: The system’s response regarding the location of the Master Sword misses a crucial detail by stating the sword is located *"on a stone platform in front of the Great Deku Tree,*" whereas it should be in Korok Forest.
  + **Medium Question**: The response about Skyrim’s smithing strategy is accurate and provides a good amount of relevant detail, though there is a minor difference in phrasing ("crafting Dwarven Bows" vs. "focus on crafting"), which slightly affects the precision of the wording.
  + **Complex Question**: The farming strategy for **Diablo 4** is mostly accurate, but the description misses the high-level detail about specific Helltide events and how they provide increased legendary material drop rates.
* **Relevance**
  + **Simple Question**: The system's response is highly relevant, providing a clear and correct location for the Master Sword and additional context, even though it was slightly inaccurate.
  + **Medium Question**: The response to the Skyrim smithing strategy is entirely relevant, covering the steps needed for efficient levelling and providing specific details about the required resources.
  + **Complex Question**: The response about legendary material farming in Diablo 4 is also highly relevant, accurately capturing the essential aspects of the farming strategy and focusing on the right activities, although it could provide more in-depth information.
* **Conciseness**
  + **Simple Question**: The response is concise and to the point, providing necessary information without excessive elaboration. However, it could have been slightly more specific about the location within the Korok Forest.
  + **Medium Question**: The response is concise and covers all the required points, offering a direct solution without unnecessary information.
  + **Complex Question**: The response is quite concise, though it could include a bit more detailed explanation about why Helltide events are specifically advantageous for farming.

The system performs well overall with its responses, especially in terms of relevance and conciseness. Accuracy, however, suffers in the simpler and more complex queries, with some missing or incorrect details. For the medium complexity question, the system demonstrates solid accuracy, relevance, and conciseness. To improve, the system should aim to incorporate more precise details, especially in complex queries where specific, high-value information can make a difference.

**Ambiguous and Unknown Queries:  
Analysis:**

* **Overall Performance:** The system performs well when responding to both ambiguous and unknown queries. It handles ambiguity by asking clarifying questions and provides useful information when data is missing or incorrect. In cases where the question is unclear or the data doesn't match the expected input, the system seeks additional details to ensure the response is more accurate and relevant. In the case of unknown queries, the system effectively explains the absence of data and provides alternative responses or guidance.
* **Ambiguous Queries:** For ambiguous queries, the system excels in prompting users for clarification. For example, when asked about the "best weapon in Elden Ring," the system asks for more specific details about the player's build, acknowledging that different weapons are suited to different playstyles. This approach helps to narrow down the query and provides a more personalised response. Similarly, when asked about the "reward in The Witcher 3," the system recognises the ambiguity and asks for clarification on which reward the user is referring to, such as rewards from specific quests or activities.
  + **Accuracy**: The responses are accurate because they address the uncertainty in the question and guide the user to provide more information.
  + **Relevance**: The responses remain highly relevant to the context of the game, offering specific clarifications.
  + **Conciseness**: The responses are concise while still requesting the necessary details to generate an accurate answer.
* **Unknown Queries:** For unknown queries, the system effectively acknowledges when it doesn't have data available and provides a helpful alternative. For example, when asked about romancing Commander Zavala in Destiny 2, the system clearly states that romance mechanics do not exist in the game and offers a straightforward explanation. Similarly, when asked about the "Diamond Pickaxe" in Stardew Valley, the system explains that no such item exists and offers guidance on how to upgrade the pickaxe instead.
  + **Accuracy**: The system accurately corrects the misconception or provides the correct information.
  + **Relevance**: The responses are still relevant, addressing the user's implied query despite the lack of the exact requested information.
  + **Conciseness**: The responses are clear and to the point, directly correcting the question or offering alternative information.

In both ambiguous and unknown query scenarios, the system performs well by asking for clarifications when necessary and providing informative responses when it cannot fulfil a direct answer. It navigates ambiguity effectively by seeking more specific details and clarifying the user’s intent, while it handles unknown data by correcting misconceptions and providing alternative guidance. Overall, the system performed well in these tests.