



GOODGAME

FINAL PROJECT REPORT

<https://github.com/Andre-Martin/GoodGame>

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CPSC 2350



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GOODGAME TEAM MEMBERS



ANDRE MARTIN
PROJECT LEAD



JINA PAK
API INTEGRATION LEAD



ERBOL KULANTAEV
SOFTWARE LEAD



JACQUES VAN NIEKERK
COMMUNICATION LEAD



OVERVIEW

Our team developed an application tailored for tabletop gaming enthusiasts, providing a user-friendly platform for finding a list of curated tabletop games. Users can input keywords to search for tabletop games or search by specific title names. The application is also an educational platform where users are able to interact with a chatbot, to ask about game rules, recommendations for similar games, or ask about general game knowledge.

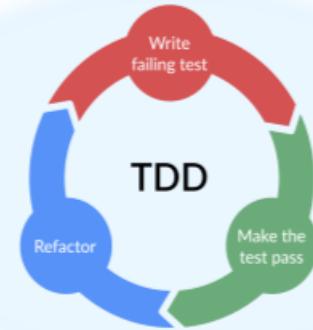
Our application offers a comprehensive database of tabletop games, provided by BoardGameGeek, allowing users to effortlessly navigate through various options. Upon selecting a game, users will have the option to engage with a chatbot feature designed to address any queries or concerns they may have regarding the chosen game. The user will also be given the option to immediately contact the chatbot from any page, to ask questions or recommendations for tabletop games.

Within our application, we will be utilizing two APIs (Application Programming Interface) to access and integrate with external databases or services. These APIs will enable seamless retrieval of information regarding tabletop games, ensuring that our platform remains up to date with the latest game releases and information.

The screenshot shows the GoodGame website. At the top, there's a navigation bar with the logo, 'Home', and 'Trending BoardGames'. Below the header is a large banner featuring the 'GG GOOD GAME' logo. To the right of the banner is a chatbot interface. The chatbot's profile picture is a black circle with a white letter 'B'. The name 'Bot' is displayed above a message bubble. The message reads: 'This chatbot was built surprisingly fast with Botpress'. Below this is a timestamp 'Apr 6, 10:55 PM'. The bot's first message says: 'Hey there! 🌟 I'm GG, your friendly AI customer associate. My mission is to make your experience with us a Good Game! 🤖'. It then asks: 'But first things first, what's your name? Feel free to type your name or nickname that you'd like me to call you during our chat.' A small emoji of a person with a speech bubble is shown next to the message. On the left side of the page, there's a sidebar with instructions on how to search for boardgames and three buttons: 'Quick Search', 'ENTER', 'GET RANDOM BOARDGAME', and 'TRENDING BOARDGAMES'. To the right of the sidebar is a cartoon character of a blue computer monitor with a face, holding a magnifying glass, which serves as the chatbot's visual representation. At the bottom right of the page, there's a 'Chat with bot' button and a note: 'We're 🚀 by Botpress'.

SOFTWARE DEVELOPMENT LIFE CYCLE

Our Project Team decided to choose the Test-Driven Development (TDD) approach within the Agile framework. This SDLC (Software Development Life Cycle) stood out from the rest because it appeared to be highly beneficial in the development of this type of project. With this chosen model, we will apply the appropriate principles to the project such as incremental development, fostering a continuous feedback loop, frequent refactoring, code improvements, and providing clear documentation throughout the project to ensure all team members have a shared understanding of the project requirements.



[WHAT WORKED]

- Scheduling meetings for our team's mixed availability was flexible following this SDLC model, leading to an overall flexible project maintenance.
- Being an agile framework, it promoted better collaboration and communication within our development team.

[WHAT DIDN'T WORK]

- TDD requires a decent amount of knowledge of development and unit testing.
- As beginner to intermediate-level student developers, learning unfamiliar and unexpected technical requirements was already difficult, but we were supposed to go even further than that due to the nature of TDD SDLC. Therefore, unfortunately, we couldn't thoroughly follow the principles of TDD due to a lack of experience and skills.

[CHANGES MADE TO PROJECT AND WHY]

- Built/Coded the project before testing due to difficulties understanding testing and its application on the testing framework and libraries.
- Some features were changed due to limitations within the BGG API such as searching by user review.
- Due to complications with Jest interacting with Vite, we switched from using Netlify & Jest to using GitHub Pages & Vitest, as our testing and deployment components
- With the testing issues we were facing, we decided to change from the Test-Driven Development model into an Agile methodology, focusing on developing before testing.



USER STORIES



Search up board games by keyword.

Interacts with users with suggested prompts.

As a **busy college student**, I want to search for games with specific keywords so that I can view a tailored list of games.

As a **Senior Engineer**, I want to utilize the assistance from an AI application so that I can ask specific questions about game titles.

- User can search for a keyword that will list games if the keyword is in the title or description

- Users can ask questions about specific games, including rules, difficulty level, and strategies.

Display information about board games.

Displays recommendations for board games based on some user prompts.

As a **middle school teacher**, I want to easily find appropriate gaming material so that I can utilize it to help educate and entertain my students.

As a **stay-at-home mom**, I want help finding games for my children so that I can teach them problem solving, mathematics, and language.

- Users can find information about games including player count, complexity, and average time spent playing the game.

- Users can ask the chatbot to make recommendations based on genre and age requirements.

Display user reviews and ratings about board games.

Capable of small conversations if the user opts to do so.

As a **high school club leader**, I want to find the best rated board games so that I can my club members will enjoy the most popular games.

As a **tech-savvy father**, I want to communicate with an AI representative on a personal level so that I can experience a realistic conversation while interacting with the application.

- Users can find up-to-date ratings and comments for each board game, including an overall average rating.

- Users can have personal interactions with the chatbot, by asking questions outside of the scope of the applications features.



APPLICATION FEATURES



FEATURE ONE: SEARCH UP BOARD GAMES BY KEYWORD

1

In this section you can search up boardgames by keywords or if you don't know what you're looking for you can click the random board game button to showcase a random board game or you can choose to look at the hottest board games at the moment.

Quick Search
Gloomhaven

2

3

1		Founders of Gloomhaven (2018) Description from the publisher:
2		Gloomhaven (2017) Gloomhaven is a game of Euro-inspired tactical combat in a persistent world of shifting motives. Players will take on the role of a wandering adventurer with their own special set of skills and their own reasons for traveling to this dark corner of the world. Players must work together out of necessity to clear out menacing dungeons and forgotten ruins. In the process, they will enhance their abilities with experience and loot, discover new locations to explore and plunder, and expand an ever-branching story fueled by the decisions they make.
3		Gloomhaven: Assault on the Morning Star (Promo Scenario) (2020) This is a digital, single-scenario promo item for Gloomhaven.
4		Gloomhaven: Beyond the End of the World (Promo Scenario) (2019) This is a digital, single-scenario promo item for Gloomhaven.
5		Gloomhaven: Buttons & Bugs (2024) Gloomhaven: Buttons & Bugs is a solo play game, with an original campaign story written by Isaac Childres, that features a playstyle similar to Gloomhaven in a fraction of the size.

- 1) Users can utilize the search bar on the Home Page of GoodGame to search for keywords, game titles, or the year a game was published

- 2) Navigation search bar available
- 3) Keyword searches produce a list of most relevant information



FEATURE TWO: DISPLAY INFORMATION ABOUT BOARD GAMES.

1



8.6

Gloomhaven (2017)

Gloomhaven is a game of Euro-inspired tactical combat in a persistent world of shifting motives. Players will take on the role of a wandering adventurer with their own special set of skills and their own reasons for traveling to this dark corner of the world. Players must work together out of necessity to clear out menacing dungeons and forgotten ruins. In the process, they will enhance their abilities with experience and loot, discover new locations to explore and plunder, and expand an ever-branching story fueled by the decisions they make.

1-4 Players	60-120min	Age: 14+	Weight: 3.9/5
Best	Playing Time	Community: 14+	'Complexity' Rating'

Categories: Adventure, Exploration, Fantasy, +2 more

Family:

Category: Dungeon Crawler, Components: Map (City Scale), Components: Miniatures, +14 more

Alternative Names:

Gloomhaven, aventures à Havreuit, Gloomhaven: Мрачная Гавань, Homályrév, +3 more

Designers Isaac Childres,

Artists: Alexandr Elichev, Josh T. McDowell, Alvaro Nebot,

Publisher: Cephalofair Games, Albi, Albi Polska, +8 more

2

Game Stats		Collection Stats	
Average Rating	8.59455	Own	96179
No. of Ratings	61578	Want In Trade	1055
Buyers Average	8.35898	Wishlist	20231
Std. Deviation	1.74042	Game Ranks	
Median	N/A	Board Game Rank	No: 3
Complexity	3.9081	Thematic Rank	No: 2
Comments	10723	Strategy Game Rank	No: 4

- 1) Users have access to a large database of information regarding a selected game, including numbers of player, playing time, age of community, and complexity rating.
- 2) Other statistics are available for a selected game, including overall ranking and popularity.



FEATURE THREE: DISPLAY USER REVIEWS AND RATINGS ABOUT BOARD GAMES.

The screenshot shows a user interface for a board game page. At the top left is a green circular icon with the number '8.6'. Next to it is the title 'Gloomhaven (2017)'. Below the title are four navigation tabs: 'COMMENTS' (highlighted in orange), 'VIDEOS', 'STATS', and 'MARKETPLACE'. On the far right, there is a large red circle containing the number '2'. The main content area displays five user reviews. Each review includes a small user icon, the reviewer's name, their rating (in a green circle), and a brief comment. The reviews are:

- Johnny-** Rating: N/A. Comment: Cons: -10/10 fiddliness -The time investment is ridiculous. -The monster AI system is very messy & unintuitive. 20 games in, we were still checking the rulebook constantly. -Play patterns can be repetitive. -It's very hard to keep track of the campaign story ("what is there at the Desecrated Crypt? Where do we have to go to fight the necromancer?"). Pros: -I keep wanting to play.
- mIDE-** Rating: 9. Comment: Kickstarter (Estimated delivery: May 2016)
- 0 1 1 2 3 5 8** Rating: N/A. Comment: If it's half as good as Forge War...
- 0Allegiance** Rating: 8.5. Comment: Excellent game. Balancing issues with some characters towards the end of the game but if a player avoids the obviously unbalanced this game promises many hours of epic game play.
- Orlo** Rating: N/A. Comment: PC (Epic games)

- 1) Users have access to the overall average rating of a selected board game, which is rated by the community forum on BoardGameGeek.
- 2) The community forum of BoardGameGeek also displays personal comments and rating for a selected game.



FEATURE ONE: INTERACTS WITH USERS WITH SUGGESTED PROMPTS.

1

B Bot This chatbot was built surprisingly fast with Botpress X

Hey there! 🎉 I'm GG, your friendly AI customer associate. My mission is to make your experience with us a Good Game! 🎲

But first things first, what's your name? Feel free to type your name or nickname that you'd like me to call you during our chat. 😊

Ryan

Hey there, Ryan! 😊

2

B Bot This chatbot was built surprisingly fast with Botpress X

Hey there! 🎉 welcome to the board game chat! How can I assist you today? 😊 🎲

Feel free to ask any questions about board games! Just make sure to type a complete question sentence with a question mark. For example, you can ask, 'What is Rummikub?' 🤔

What is Gloomhaven and how many players can play?

Hey there! Did you know that Gloomhaven is a super cool cooperative board game? 🎲 It was designed by Isaac Childres and published by Cephalofair Games in 2017. This game is all about embarking on epic adventures in a campaign-based dungeon crawl setting. You'll encounter unique playable scenarios and get to choose from a variety of playable classes. And the best part? You can play Gloomhaven with 1 to 4 players! So gather your friends and let the fun begin! 😊

3

B Keep searching?

Yes. I want to end the chat.

No, I want to go back to the previous menu.

Chat with bot



FEATURE TWO: DISPLAYS RECOMMENDATIONS FOR BOARD GAMES BASED ON SOME USER PROMPTS.

B Bot This chatbot was built surprisingly fast with Botpress X

Hey Ryan! How can I assist you today? Pick a category you'd like to explore.

1 Can you recommend me some awesome board games?

Hey there! 😊 Based on the info you gave me, I've got some awesome board game recommendations for you:

- 1 Cathedral: It's a fast-paced game that's easy to learn. Perfect for quick and enjoyable gameplay.
- 2 Azul: Get ready to artfully embellish the walls of your palace with beautiful tiles.
- 3 Agricola (Revised Edition): Help your farm prosper in this updated and streamlined version of the acclaimed game.
- 4 Tainted Grail: The Fall of Avalon: Explore, fight, and negotiate in a dark Arthurian realm.
- 5 Battlestar Galactica: The Board Game: Survive in a nightmarish world while dealing with hidden identities.

Please keep in mind that these recommendations are based solely on the info you provided and there are many more awesome board games out there. Enjoy!

😊

B Bot This chatbot was built surprisingly fast with Botpress X

Hey there! 😊 In addition to the awesome suggestions I gave you earlier, I'd love to know more about your needs. How many people will be joining in on the fun? 🎮

2 So, how many players are you looking to have? Just type in the number of players, including yourself. 🎪

4

Hey there! 😊 I've got a great recommendation for you: "The Quest for El Dorado." It's a fantastic game for 2 to 4 players and it's currently ranked 121th in the BoardGameGeek community. 🏆

If you want to learn more about it, check out this link below! 👇

<https://boardgamegeek.com/boardgame/217372/the-quest-for-el-dorado>

3 Do you want another recommendation?

B Do you want another recommendation?

No, I want to go back to the previous menu.

- 1) Users can ask for a recommended list of board games through a prompt.
- 2) The chatbot will prompt questions about recommendations to further improve the quality of the search.
- 3) Users will be given links to recommended games once enough information is collected.



FEATURE THREE: CAPABLE OF SMALL CONVERSATIONS IF THE USER OPTS TO DO SO

1

B Hey Ryan! How can I assist you today? Pick a category you'd like to explore.

I just want to have a fun chat with GG about random topics.

B Hey Ryan! What's on your mind? 😊

Do you know if Vancouver BC will have rainy weather this week?

Hey there! 🌧 According to the weather forecast, Vancouver, BC is expected to have rainy weather this week. 🌧

B Anything else you want to ask?

Yes, I have more questions.

No, I want to go back to the previous menu.

No, I want to quit the conversation.

Chat with bot

2

Please let me know more details about your needs, Kacey.

What genre of boardgames would you want to play? Ask a question with this sentence template, Kacey - "Can you recommend me (your preferred genre) board games?"

Can you recommend me a boardgame that a 7 year old boy can enjoy with 3 other friends? I wish he can learn some mathematical skills through the boardgame.

□ Answer found in Knowledge Base

Based on the context provided, I recommend the following board game for a 7-year-old boy to enjoy with 3 friends and learn mathematical skills:

"Catan Junior Game"

recent

⌚ Type here to chat with your chatbot



1) Users can utilize the chatbot as a general AI search bot, by asking various questions outside of the scope of the application.

2) Users will be given prompts to continue or finish conversations with the chatbot.

3) The chatbot offers replies that are conversational, detailed, and friendly.

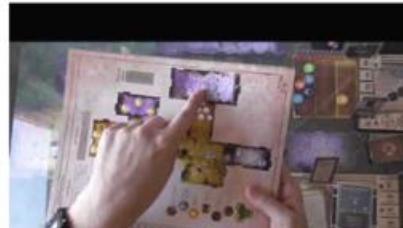


ADDITIONAL FEATURES

1

Comments	Videos	Stats	Marketplace
Title	Condition	Price	Published
Gloomhaven	new	USD 300.00	Thu, 14 Dec 2017 18:57:04 +0000
Gloomhaven	new	USD 360.00	Fri, 22 Dec 2017 19:51:51 +0000
Gloomhaven	new	EUR 158.35	Thu, 18 Jan 2018 23:16:33 +0000
Gloomhaven	new	USD 250.00	Sun, 15 Apr 2018 17:59:30 +0000
Gloomhaven	new	USD 300.00	Wed, 30 May 2018 23:04:24 +0000

2

Comments	Videos	Stats	Marketplace
 <p>GLOOMHAVEN 0II Quest 5</p> <p>Inox Encampment (core) Quest 5 Gloomhaven digital on Switch</p> <p>Category: SESSION</p> <p>Author: HomeGamerDad</p> <p>Date: 2024-03-21T02:24:51-05:00</p> <p>Language: English</p>	 <p>Gloomhaven Montañas Ventosas Parte#4Final</p> <p>Category: SESSION</p> <p>Author: Xebastron</p> <p>Date: 2024-03-21T02:24:51-05:00</p> <p>Language: Spanish</p>	 <p>Gloomhaven Montañas Ventosas Parte#3</p> <p>Category: SESSION</p> <p>Author: Xebastron</p> <p>Date: 2024-03-18T02:11:07-05:00</p> <p>Language: Spanish</p>	

- 1)** Users have access to BoardGameGeek's Marketplace for selected games. The Marketplace is a community run store where board games can be sold.

- 2)** Users have access to Videos for selected games. These videos include tutorials, gameplay footages, or developer announcements.



UNIT TESTS

As our AI bot is made from BotPress, which is more of a service, not a traditional API, the unit tests and integration tests were conducted on BotPress. There are different ways to integrate this API directly with our web application, we chose the best way at the end over further configuration setting, which was simply adding a set of preconfigured codes starting with <script/> to use this entire service. On top of that, to play safe in the free-tier usage limit, the unit test cases conducted in BotPress studio are placed here in the following pictures. The Emulator works same as the bot on our website. Test cases from BGG features are all in our code base and only some of them are placed and explained.

1. Capturing a string from a user and saving it in “userName.”

The screenshot shows the BotPress Studio interface with the following details:

- Left Sidebar:** Shows the project structure with "Main" selected. It also lists errors, timeouts, conversation ends, and a new workflow named "New workflow1". A variable list shows "userName" set to "Jina".
- Workflow Editor:** Displays a "Greetings" card with three actions:
 - A greeting message: "Hello, I'm your AI customer associate, GG. I'll be here to assist you in offering you the most optimized experience with us, Good Game."
 - A prompt to capture the user's name: "Nice to meet you, @workflow.userName". This action is highlighted with a red box.
 - A prompt to capture the user's mood: "Nice to meet you, @workflow.userMood ? I feel the sa..."
- Emulator Preview:** Shows a conversation where the bot greets the user and asks for their name. The user types "Jina". A red circle highlights the "Jina" input field. Below the input field, a message says "Captured variable userName".
- Bottom Navigation:** Includes tabs for "Event Debugger", "Logs", and "JSON", along with a "Summary" section.



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2. Capturing a string and saving it in the variable called "userMood."

The screenshot shows the GoodGame interface. On the left, the file structure includes 'Main', 'Error', 'Timeout', 'Conversation End', 'New workflow1', and 'Default Knowledge Base'. The 'All Variables' section lists several variables: 'gameInfo Not set', 'playerNumber Not set', 'randomUserRequest Not set', 'recommendationUserReq Not set', 'userMood "I'm good."', and 'userName "Jina"'. A red circle highlights the 'userMood' variable. In the center, the 'Greetings' node is selected, displaying its content: 'Hello, I'm your AI customer associat...', 'userMood', and '@workflow.userMood ? I feel the sa...'. A red box highlights the 'userMood' variable. On the right, the Emulator shows a conversation where Jina says 'How are you today?' and the user responds 'I'm good.' A red oval highlights this message. Below the Emulator, the Event Debugger shows the captured variable 'userMood'.

3. Capturing a string from a user and saving it in a variable: recommendationUserRequest.

The screenshot shows the GoodGame interface. The file structure is identical to the previous screenshot. The 'All Variables' section lists the same variables. A red circle highlights the 'recom' variable in the list. In the center, the 'Recommendations' node is selected, displaying its content: 'Please let me know more details a...', 'recommendationUserRequest', and 'Single Choice'. A red box highlights the 'recommendationUserRequest' variable. On the right, the Emulator shows a conversation where Jina asks 'Can you recommend me some board games?'. A red oval highlights this message. Below the Emulator, the Event Debugger shows the captured variable 'recommendationUserRequest'.



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4. Capturing a number from a user answer and saving it in a variable called “playerNumber.”

The screenshot shows the GoodGame interface with the following details:

- Files:** Shows the project structure with "Main" selected.
- Variables:** Shows variables like "gameInfo Not set", "playerNumber 5", and "randomUserRequest Not set".
- Workflow:** A node labeled "playerNumber" is highlighted with a red box. It has two transitions:
 - if the player number is more than 4
 - if the player number is less than an...
- Emulator:** The user has typed "I have general other recommendations beyond your preferred genre. How many players would you want to play with? Please type the player number including yourself." The response "5" is highlighted with a red circle.
- Logs:** Shows the message "Captured variable playerNumber" and the transition "Transitioned - Main:Twilight Imperium_Fourth_Edition".
- Summary:** Provides information about the game "Twilight Imperium: Fourth Edition", stating it is optimized for 6 players and ranked 9.10 out of 10.

5. Capturing a string from a user and storing it in “gameInfo.”

The screenshot shows the GoodGame interface with the following details:

- Files:** Shows the project structure with "Main" selected.
- Variables:** Shows variables like "gameInfo \"What is Rummikub...\"", "playerNumber 5", and "randomUserRequest Not set".
- Workflow:** A node labeled "gamelInfo" is highlighted with a red box. It has two transitions:
 - if no valid answer found
 - Single Choice
- Emulator:** The user has typed "about.". The response "Welcome!" is highlighted with a red circle.
- Logs:** Shows the message "Captured variable gameInfo" and the transition "Transitioned - Main:Twilight Imperium_Fourth_Edition".
- Summary:** Provides information about Rummikub, stating it is a tile-based game for 2 to 4 players.



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6. Capturing a string from a user answer and storing it in “randomUserRequest.”

The screenshot shows the GoodGame project interface. On the left, the 'Files' sidebar lists 'Main', 'Error', 'Timeout', 'Conversation End', 'New workflow1', and 'Default Knowledge Base'. The 'All Variables' section contains the following variables:

```
WORKFLOW
gameInfo "What is Rummikub.."
playerNumber 5
random1 "Why is Vancouver n...
recon "Can you recommend so...
userMood "I'm good."
userName "Jina"
```

A red circle highlights the variable 'random1 "Why is Vancouver n..."' in the 'All Variables' list. In the main workspace, a workflow titled 'Random_Chat' is shown. It starts with a 'randomUserRequest' node, followed by a 'Single Choice' node with three options: 'Yes, I have more questions.', 'No, I want to go back to previous menu.', and 'No, I want to quit the conversation.'. Below the choice node is a '+ Add Card' button. To the right, the 'Main Workflow Properties' panel states: 'This is the main workflow of your chatbot. It is executed when the user starts a conversation.' The 'Emulator' panel shows a message: 'What would you want to talk about, Jina? Please ask a question with a question mark, "?".' A blue box highlights the question 'Why is Vancouver not cold compared to other regions?' which was typed into the emulator's input field. The response from the knowledge base is: 'Vancouver is not as cold compared to other regions because it has a temperate oceanic climate ¹. The city experiences relatively mild, rainy winters and cool, fairly sunny summers ². The average temperature in Vancouver remains above freezing even in winter, which is unique compared to other major cities in Canada ³. Additionally,'. At the bottom, the 'Event Debugger' and 'Logs' tabs are visible, along with a summary of the ongoing conversation.



```
describe("Parser functions testing", () => {
  it("Parsing stats info correctly", () => {
    const result = parseXMLJsonStats(MockXMLJsonStats);

    expect(result.averageRating).toBe(MockFormattedStats.averageRating);
    expect(result.owned).toBe(MockFormattedStats.owned);
    expect(result.median).toBe(MockFormattedStats.median);
    expect(result.buyersAverage).toBe(MockFormattedStats.buyersAverage);
    expect(result.trading).toBe(MockFormattedStats.trading);
  });

  it("Parsing BoardGame info correctly", () => {
    const result = parseXMLJsonCommonInfo(MockXMLJsonThing);

    expect(result.maxPlayers).toBe(MockFormattedCommonInfo.maxPlayers);
    expect(result.minPlayers).toBe(MockFormattedCommonInfo.minPlayers);
    expect(result.maxPlaytime).toBe(MockFormattedCommonInfo.maxPlaytime);
    expect(result.minPlaytime).toBe(MockFormattedCommonInfo.minPlaytime);
    expect(result.minLength).toBe(MockFormattedCommonInfo.minLength);
    expect(result.playtime).toBe(MockFormattedCommonInfo.playtime);
  });

  it("Parsing videos info correctly", () => {
    const result = parseXMLJsonVideo(MockXMLJsonThing);

    expect(result[0].author).toBe(MockFormattedVideo.author);
    expect(result[0].category).toBe(MockFormattedVideo.category);
    expect(result[0].date).toBe(MockFormattedVideo.date);
    expect(result[0].id).toBe(MockFormattedVideo.id);
    expect(result[0].date).toBe(MockFormattedVideo.date);
    expect(result[0].language).toBe(MockFormattedVideo.language);
  });

  it("Parsing Comment info correctly", () => {
    const result = parseXMLJsonComments(MockXMLJsonThing);

    for (let i = 0; i < result.length; i++) {
      expect(result[i].rating).toBe(MockFormattedComments[i].rating);
      expect(result[i].username).toBe(MockFormattedComments[i].username);
      expect(result[i].value).toBe(MockFormattedComments[i].value);
    }
  });
});
```

These test cases are testing the utility function written to make data coming from BGG API structured and consistent, since, depending on boardgame, the data might have specific fields, or not; specific fields might be objects, or arrays and so on. These function makes sure that data stored in redux store is always consistent and have the same format.

To imitate real data from BGG API, we used mock data which looks completely the same as the data coming from BGG and parsed by utility libraries.



INTEGRATION TESTS

For the same reason mentioned above (for BotPress), all 6 integration tests are pictured below:

1. A knowledge base (data base) named BoardGameGeek is successfully implemented and is functioning.

The screenshot shows the GoodGame development environment. On the left, the 'Files' sidebar lists various workflow components like 'Error', 'Timeout', 'Conversation End', and the 'BoardGameGeek' knowledge base. The main workspace displays a conversation with an AI bot named 'BoardGameGeek'. The user asks, "What kind of board games would you want to play? Ask a question with this sentence template, Jina - 'Can you recommend me a board game that a 7-year-old boy can enjoy with 3 other friends? I hope he can learn mathematical skills by playing a board game.'" The bot responds with a list of recommendations: "Sleeping Gods", "Pandemic Legacy: Season 2", "Mice and Mystics", "Catan", "Plunder", and "Gloomhaven". Below the conversation, the 'Event Debugger' and 'Logs' tabs are visible.

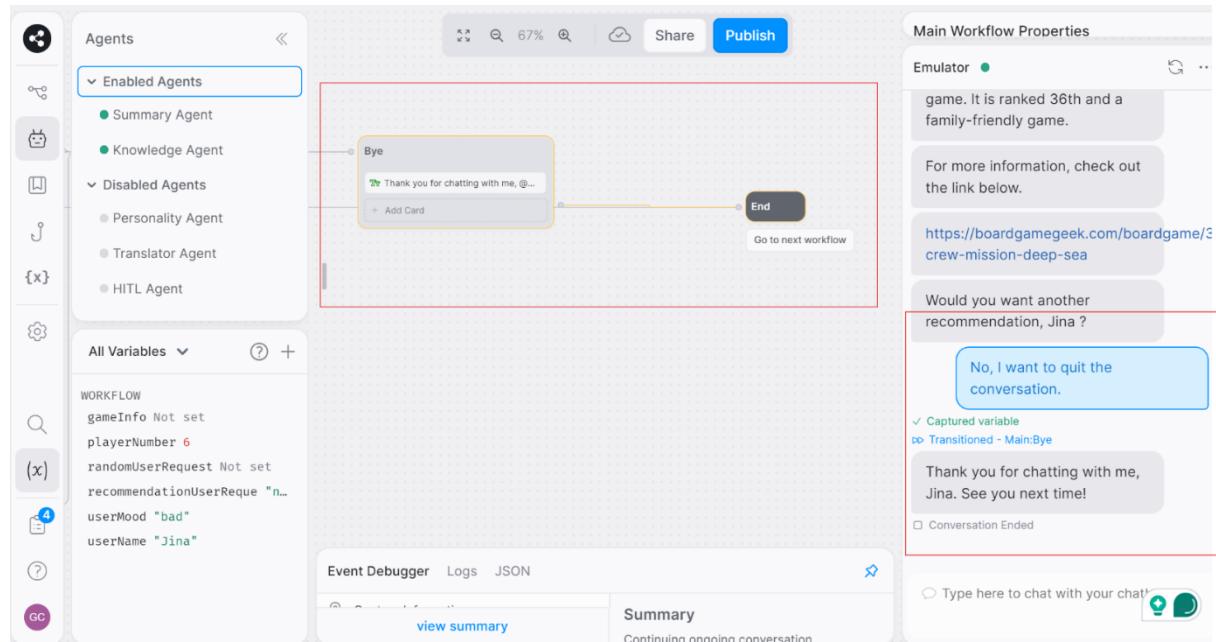
2. Transitioning from a station to station is smooth.

The screenshot shows the GoodGame development environment with a complex workflow diagram involving multiple stations. One station is labeled 'Twilight Imperium_Fourth_Edition' and another is 'The_Crew_Mission_Deep_Sea'. The user interacts with the bot, asking for recommendations and transitioning between stations. The bot provides recommendations for both games, such as 'Twilight Imperium: Fourth Edition' and 'The Crew: Mission Deep Sea'. The 'Event Debugger' and 'Logs' tabs are visible at the bottom.

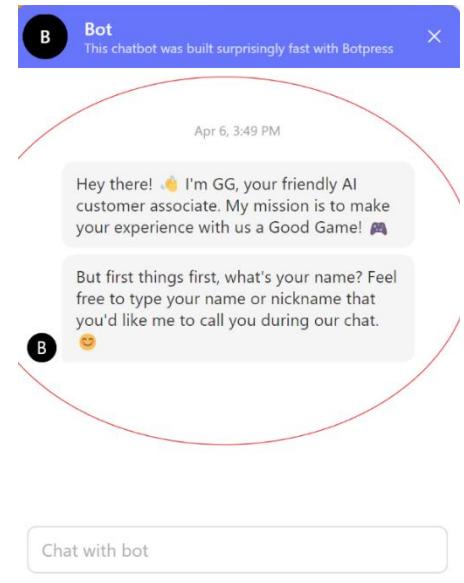


GOODGAME: PROJECT REPORT

3. The “end” node from the other node works fine as planned.



4. When a user opens the widget, the bot is triggered to start a conversation as planned.





GOODGAME: PROJECT REPORT

The screenshot shows a chatbot interface. On the right, a 'Greetings' card displays a series of messages: 'Hello, I'm your AI customer associat...', 'user Name', 'Nice to meet you, @workflow.userName...', 'user Mood', and '@workflow.userMood ? I feel the sa...'. Below this is a '+ Add Card' button. On the left, a 'Trigger1' block is connected to a 'Conversation Started' event. A red box highlights the 'Trigger1' block.

5. The chat options are collected in one drop down menu and a user freely choose one of them.

The screenshot shows a 'Routes' card with a 'Multiple Choice' section containing four options: 'I would like to know more about Good Game...', 'Can you recommend me some board games?', 'I know which board games I would like to ask ...', and 'I just want to chat with GG about random top...'. Below this is a '+ Add Card' button. To the right, an 'Emulator' window shows a conversation with a user named 'Jina'. The user says 'Nice to meet you, Jina.' and the bot responds with a dropdown menu asking 'I would like to know more about Good Game. Who are they and what is Good Game for?'. The user then asks 'Can you recommend me some board games?' and the bot replies 'I know which board games I would like to ask about.' The user also says 'I just want to chat with GG about random topics.' A red box highlights the 'Multiple Choice' section in the routes card.

6. A knowledge base (data base) named "Random Chat"

The screenshot shows a 'Random Chat' knowledge base. It lists three items: 'Search the web' (No websites added, Added 9 days ago), 'chat.openai.com' (1 pages, Added 9 days ago), and 'BoardGameGeek'. A red box highlights the 'Random Chat' item. To the right, an 'Emulator' window shows a conversation where the user asks 'What would you want to talk about, Jina? Please ask a question with a question mark, "?".' The bot responds with 'Why is math difficult?' and provides an explanation: 'Math can be difficult for several reasons. Here are some possible explanations based on the provided context: • Math requires time and energy, and many people don't have sufficient time to fully grasp math concepts, leading to a shaky foundation 1. • Learning math involves facing more difficult ...'. A red box highlights the 'BoardGameGeek' item in the knowledge base list.

works well
with in
accordance
with the
designed
structure.



```
describe("Pure components", () => {
  it("Market Place Item renders correctly and displays correct information", () => {
    const { getByText } = render(
      <MarketPlaceTabItem {...MockFormattedMP[0]} title="Brass" />
    );
    const { currency, value } = MockFormattedMP[0].price;

    expect(getByText(getTimeAgo(MockFormattedMP[0].date))).toBeInTheDocument();
    expect(getByText(` ${currency} ${value}`)).toBeInTheDocument();
  });
}

it("Market Place Item renders correctly and displays correct information", () => {
  const { getByText, getByTestId } = render(
    <CommentTabItem {...MockFormattedComments[0]} />
  );
  expect(getByText(MockFormattedComments[0].value)).toBeInTheDocument();
  expect(getByTestId("background")).toHaveStyle({
    backgroundColor: "#555555",
  });
});

it("Video Tab Item renders correctly and displays correct information", () => {
  const { getByText } = render(<VideoTabItem {...MockFormattedVideo} />);

  const formattedDate = getTimeAgo(MockFormattedVideo.date);

  expect(getByText(formattedDate)).toBeInTheDocument();
  expect(getByText(MockFormattedVideo.title)).toBeInTheDocument();
});
```

These test cases are verifying that pure components (which does not get data directly from state/store, but from props specified by parent components) are rendered and displayed correctly.

To imitate parent components sending data to these components, we used mock information which is completely the same as data being received from BGG and formatted by utility libraries and functions.



CI/CD INFRASTRUCTURE

```
1 name: "Build, Test, Deploy"
2
3 on:
4   push:
5     branches:
6       - master
7
8 jobs:
9   build:
10    name: Build
11    runs-on: ubuntu-latest
12
13 steps:
14   - name: Checkout repo
15     uses: actions/checkout@v3
16
17   - name: Setup Node
18     uses: actions/setup-node@v3
19
20   - name: Install dependencies
21     uses: bahmutov/npm-install@v1
22
23   - name: Build project
24     run: npm run build
25
26   - name: Upload production-ready build files
27     uses: actions/upload-artifact@v3
28     with:
29       name: production-files
30       path: ./dist
31
32 test:
33   runs-on: ubuntu-latest
34   steps:
35     - uses: actions/checkout@v3
36
37     - uses: actions/setup-node@v3
38     with:
39       node-version: 20.x
40
41     - name: Run `npm install`
42     run: |
43       npm install
44       npm run build
45
46     - name: Execute Unit tests
47     run: |
48       npm ci
49       npm run test
50
51 deploy:
52   name: Deploy
53   needs: build
54   runs-on: ubuntu-latest
55   if: github.ref == 'refs/heads/master'
56
57 steps:
58   - name: Download artifact
59     uses: actions/download-artifact@v3
60     with:
61       name: production-files
62       path: ./dist
63
64   - name: Deploy to GitHub Pages
65     uses: peaceiris/actions-gh-pages@v3
66     with:
67       github_token: ${{ secrets.GITHUB_TOKEN }}
68       publish_dir: ./dist
```

The screenshot shows the GitHub interface for switching branches. At the top, it says "master" and "4 Branches". Below that is a search bar with "Find or create a branch...". There are two tabs: "Branches" (selected) and "Tags". Under "Branches", there are four entries: "master" (marked with a checkmark and labeled "default"), "dev", "gh-pages", and "test". At the bottom, there is a button "View all branches".

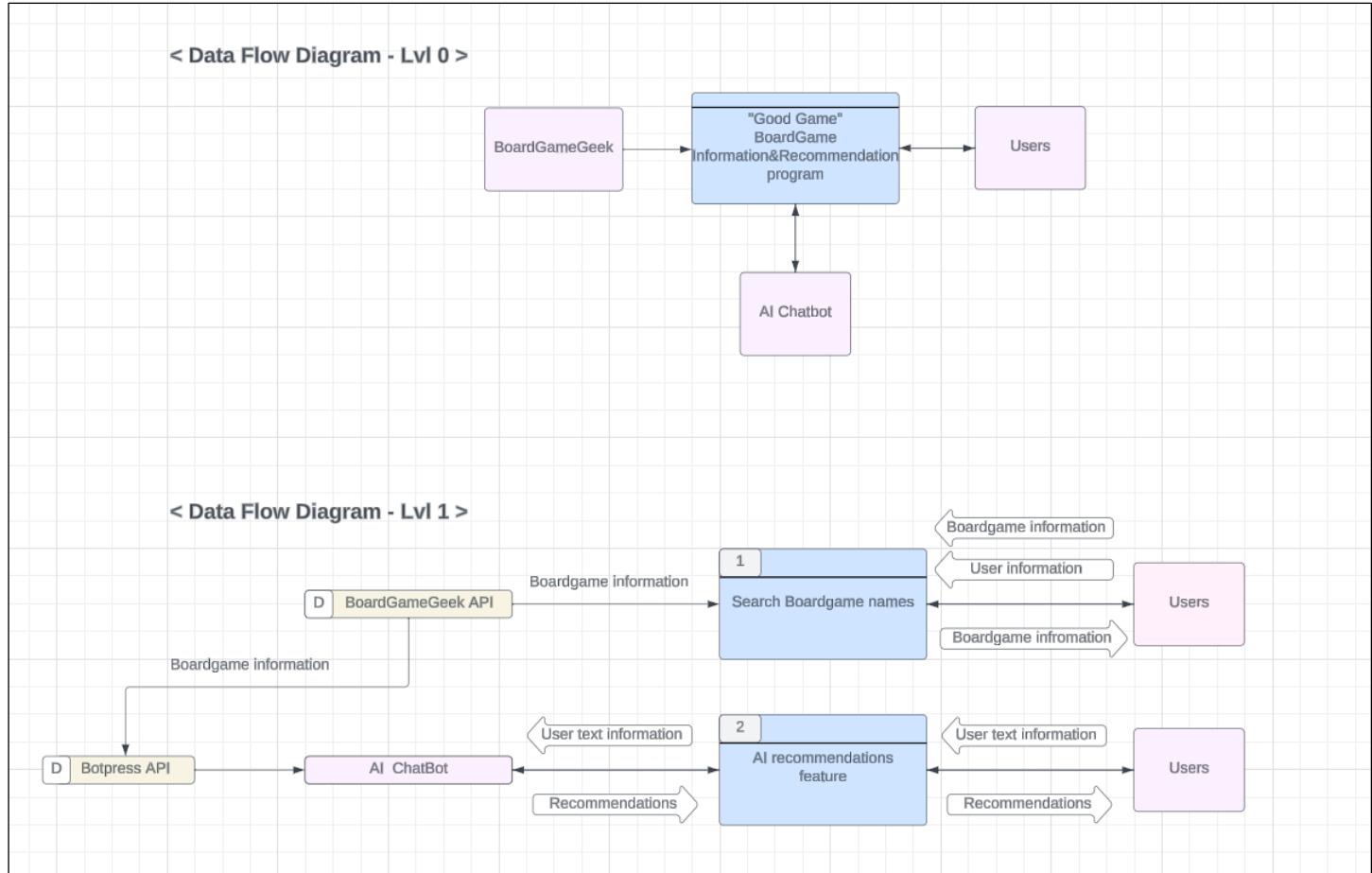
For our CI/CD Infrastructure, we prepared to complete our work on three separate branches and would submit pull requests to get approval from team members before merging a commit into the master branch.

Workflows were created (as shown on the left) to run whenever there's a push to the master branch. This is triggered after a successful pull request. The workflow will build the project, test the project, and then deploy it onto the hosted GitHub Pages. This is all done through GitHub Actions.





HIGH-LEVEL DATA FLOW DIAGRAM





LESSONS LEARNED RECORD

Project Journal

Strategies and Processes that led to Success	
Date	Description
February 10, 2024	Created our draft Work Breakdown Structure, which led to our SDLC model decision, a developed sketch of the framework, and our Level 0 Data Flow Diagram. Feedback from Parsa was offered about our progress, which ignited the productivity for our team that week and we made exceptional progress into our first Milestone.
March 11, 2024	Erbol created a template web application which demonstrated most of the current features we wanted to implement. The mock data was well written and showcased the feature potential for our application. His work done on the template was greatly appreciated and gave our team perspective on how we could improve the quality of the application without traversing close to scope creep.
Apr 4, 2024	We were successful at meeting every week (except Reading Week) to discuss our projects progress, complete upcoming Milestones, and communicate any concerns or thoughts about our project. Considering our team is under pressure from other classes and dedications, meeting every week was pivotal to our success.
Areas of Potential Improvement	
Date	Description
March 28, 2024	The AI chat bot would have a dedicated section in a big screen.
April 5, 2024	Each user would have a profile to save information from the website or store their interests and search results
April 6, 2024	Enhancement in accessibility – tab availability, detailed descriptions about images, and adding a voice communication feature on the AI chat.



PROJECT TAKEAWAYS

Project Close-Out Discussion

Project's three biggest challenges.	
Description	Factors that Contributed to Challenges
Testing before coding	Our SDLC model focused on testing, but our team was inexperienced with writing tests to work within the scope of the project. There was a steep learning curve when we reached the testing milestone.
Chatbot Integration	The BotPress application was difficult to integrate with our web application and we were reduced to working with only the chatbot widget, instead of creating a dedicated page for the chatbot.
Parsing and Formatting Data	There was difficulty with parsing data from XML to JSON, and there were extra steps required to format the data, as it was inconsistent in nature. This was due to incomplete documentation in our chosen APIs.
Project's three biggest successes:	
Description	Factors that Promoted this Success
Achieved near perfectly what we initially planned	Efficient teamwork by distributing tasks along with everyone's interests in this project. The consistent quality of meetings and having a weekly regular meeting led us to focus on the goals.
All features were correctly implemented	Considering the APIs we were using had limitations, we were successful to implement all our features into the application, including features that can enhance the experience for the user (marketplace and videos) and can potentially lead to future additions and improvements.
Having each other as a team	The team formation session helped us to open up to new people in class and to find like-minded team members who are reliable and responsible for what they are in charge of. Everybody was equally engaged and contributed in their own way.
Other successes that the team would like highlighted:	
Description	
During the entire project period, the team learned a lot about technical skills such as web development, Git and GitHub, application of SDLC, CI/CD infrastructure, etc. For aspiring programmers and software developers, the soft skills learned along with the project progression were invaluable, which is transferrable to a real professional working environment.	



TEAM INVOLVEMENT AND CONTRIBUTIONS

List of individual contributions

Name	Role	Contributions
Andre Martin	Team Lead	Contributed to GitHub repository maintenance, creating the CI/CD pipeline for GitHub actions, and assisted with the demo video creation. Ensured the team met all the deadlines for the project by sending reminders in person and through messages. Finalized all the submissions to ensure quality results, and proactively researched official documentation and shared it with teammates, which led to the successful application of the project.
Jina Pak	API Integration Lead	Contributed to everything about development & testing & integration of the BotPress AI chatbot, created the wireframe & prototype & level 0 and level 1 data flow charts, edited the demo video, ideated primitive unit/integration test cases for both APIs – BGG and BotPress, and structured Milestone 1 presentation slides. Initiated the directions, theme, API ideation, and goals of the entire project in the beginning. Led the presentation practice with team for the final presentation.
Erbol Kulantaev	Software Lead	Created Project HTML/CSS Template. Implemented the template in React project. Created frontend infrastructure for implementing BGG API into the project and storing the data in Redux store. Created utility functions to make the data from BGG API consistent and structured. Managed routes. Fully typified the project using TypeScript. Created utility types for upcoming data. Added pagination and other minor logic on the website. Refactored the codebase on MUI basis, which provided centralized CSS store. Applied any variations or changes of coding based on team communication and the project goals.
Jacques van Niekerk	Communication Lead	Produced, proofread, and maintained majority of documentation for the project, including minutes of meetings, Milestone 1 Report, Check-in Report, Final Presentation slides, and Final Report. Facilitated meetings for team members, encouraging discussions, questions and concerns, and advocated tasks to be completed for the following week. Ensured to meet the requirements and reminded team members of project objects so that the team and the project moved to the correct direction. Initiated the use of BGG API as one of our main API choices, and provided the name of the application, GoodGame. Created the logo, images, and mascots for the project, with the assistance of AI and photo editors.



List of third-party contributions

Name	Relation to member(s)	Contribution(s)
Parsa Rajabi	Course Instructor	Provided an extensive database of resources and tools to assist team in creating this application. Provided feedback during Check-ins and class discussions.
Amirali Moin	Teaching Assistant	Provided feedback to all major milestone hand-ins, including reports, videos, and assignments

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