Problem Statement and Goals
SFWRENG 4G06

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Table 1: Revision History

Date	Developer(s)	Change
2024-09-12	John Popovici	Added content to section 1.1, 1.2, and 1.4
2024-09-12	John Popovici	Added content to section 4
2024-09-17	John Popovici	Added content to section 1.3; Updated section 4 to better reflect extras
2024-09-17	John Popovici	Added content to section 2 and 3
2024-09-19	John Popovici	Updated section 2 and 3 to have measurable goals
2024-09-20	John Popovici	Added content to the reflection section
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1 Problem Statement

1.1 Problem

Games are a staple of entertainment and are used to bring people together for both competition and fun. There can often be a desire to share the experience of playing a game with someone but meeting can be hard or impossible in-person and so having an online version of popular games allows for such opportunities.

One such game is the game of Yahtzee, which while it does have online versions, are limited to the classic rule-set and do not allow for variants to be designed and played. Yahtzee is a game many know yet is not often played, yet by leveraging the most interesting game mechanics and creating different variants, we could reinvigorate the genre while paying homage to the original.

As developers, we are aiming to create an environment in which Yahtzee and Yahtzee variants can be designed and played with some preset rule-sets to be used as a starting-off point. This would allow for both the classic game as well as different variants of it, such as using 8-sided dice, to be played with a friend online.

1.2 Inputs and Outputs

Upon running the program, a game user would be capable of selecting to play either preset game configurations, or to customize their own given a set of game rules they can select and modify. In starting the game, these game rules would be instantiated and the user could play the Yahtzee version selected with another online player.

In terms of interacting with the game, two players will exist and have the ability to interact with the current game state, allowing them to make decisions based on game events. The game state will be presented through a visual user interface displaying different elements of the game, including the dice and points system(s).

1.3 Stakeholders

Our stakeholders are primarily those people that would spend their time playing the game, falling into the following categories.

Traditional Yahtzee enthusiasts are familiar with the classic Yahtzee ruleset and are generally older and may prefer the simplicity and nostalgia of the original game. They may not be too tech-savvy, but still wish to revisit the game and connect with friends, possibly exploring customization in moderation, without overwhelming complexity.

Typical gamers can span from casual to more dedicated gamers, have experience with online multiplayer, and are looking for an engaging experience with a friend. Having a faster paced experience with more skill expression and instant feedback is something they would be interested in.

1.4 Environment

The game will be run on Windows 10 devices and be run with an internet connection to enable online multiplayer. One of the players would act as the host with the other connecting such that they can play in real-time with an online connection.

2 Goals

For this project to be a success both as a capstone project and as a fun game, there are some goals we must meet.

- Online multiplayer functionality. We need to be able to connect two players to play the game together.
  Measurement: Two players can connect such that both players can affect the game state and both players are notified of the updates.

- Customizable game settings. Core game elements must be modifiable to create custom Yahtzee variants. As a goal we would need these options to be implemented:

  - The number of dice each player have
  - The type of dice used such as cube, octahedron, and more
  - Whether scoring will be done only after completing the score card, or by comparing each hand in a head-to-head fashion
  - A round timer

  Measurement: There are at least 3 options for number of dice, at least 3 options for type-types, at least 2 options for scoring methods, and an option to use a turn timer. These options would be all compatible with one another.

- Preset game settings. By having some preset game configurations, it would allow players to more quickly learn the game or jump into an environment that has been tested.
  Measurement: At least 3 preset game configurations would be available for players to load up and play.

- 3D dice rolling. Rolling the dice will need to be or look to be three dimensional to recreate the tactical feel of the original game.
  Measurement: Dice rolling will have the appearance of a die shape, depending on the die shape, and of being rolled, based on a minimum of 75% of user feedback considering it so.

3 Stretch Goals

Since we wish this game to go beyond just a capstone, and have the game be worth playing, there are stretch goals we will aim to implement as well.

- Local multiplayer. This would allow for players to play together on a single computer, but would require a different user interface and allow for different user interactions.
  Measurement: The ability for 2 players to play together using a single interface and game instance without an internet connection.

- Singleplayer variants. A singleplayer game could be achieved either through a computer-run opponent in a game, or through a custom designed experience that could leverage the different environment.
  Measurement: A single person can play at least 1 variant made specifically to be singleplayer without requiring a second human player to update the game state.

- Saving custom game setting. Having this ability would allow for a user who created a custom game variant to save them for the ability to replay it without the need to recreate those specific settings.
  Measurement: A custom game variant, as per the "Customizable game settings" goal and "More game setting customization" stretch goals, can be saved locally and loaded up to be played.

- More game setting customization. Besides the options in the goals section, some additional game customization options would include:

  - The ability to customize what hands and options are on the scorecard
  - The points each option on the scorecard would provide
  - Additional methods to score each round or each game
  - A system to allow for gambling such as doubling down on a hand or folding for less of a punishment
  - More options discovered through play-testing and theory crafting

  Measurement: Additional game options outside the ones listed in the "Customizable game settings" goal would be available.

- Dice customization. Dice could be made to appear differently, either as a means for personalization or for aiding with different impairments. An example could be a dice with pips versus a dice with a numbered faces.
  Measurement: At least 5 different dice appearance variants players can choose from, that would appear in the game.

- Post game statistics. This could allow for players to analyze a game after completion in a more quantitative manner.
  Measurement: A post-game summary showing at least 3 key game stats, available after each game.

- Dice highlighting. This would aid in determining what dice are used when scoring.
  Measurement: Dice used in scoring will be highlighted when appropriate.

4   Challenge Level and Extras

Through the implementation of not just a single Yahtzee game variant, but by implementing a system where the user can create a custom game variant and connect to another online player to play it, we are looking to achieve the advanced challenge level. We would also provide some pre-set game variants that have been tested and were found to be more fun than others.

We will include extra elements to aid in better developing our game and allow us to design for a fun gaming experience, as we wish this game to not be just a capstone project, but a game we can be proud of and put out into the world. Following industry practices in game development, we wish to potentially do the following extras:

- Focus groups, Surveys, and Interviews

- Usability testing

- User personas

- User documentation

Appendix — Reflection

1. What went well while writing this deliverable?

   - The team as a whole was excited to make our capstone a fun game, and our supervisor gave us a large degree of creative freedom. This meant that we had discussed game mechanics and what we envision from this project both as a group but also with the supervisor, and through gathering input from multiple people created the idea of a game with specific goals that we believe could work together. This passion also meant we were generating a lot of ideas that we could do but were not the main focus of the game, and the best of those are highlighted in the stretch goals section.

   - Having a well defined template where all the necessary components have headings means that we knew what the expectation was of us and could work ahead of time on the required components.

   - We had meetings, both informal and formal, to help discuss the developmental plan, which helped inform aspects of this deliverable as well.

2. What pain points did you experience during this deliverable, and how did you resolve them?

   - The challenge level and extras were the hardest section to know what to fill it in with since we have no way of knowing what extras would be the best for our project or if they would even make sense. We tried to resolve this through making educated guesses, but were worried we might need to revisit this section later once we have a better idea of what extras would have the most impact.

   - When discussing with the professor, we wanted this project to be in the advanced category, so we added given suggestions, but on looking for official approval of the project we were told we need to write it as general but "We can revisit this, but I'll need a better feel for how you are going to handle program families before we classify the project as Advanced." Since we did discuss this before, and because of the wording and intentions of having this family of games be advanced, we looked to resolve this in section 4 by updating it to mention we are looking to achieve the advanced level rather than outright saying we are.

   - Because this project has a lot of player interactions through means that are not yet selected, but also because we needed it to not be too specific, deciding on what the inputs and outputs are to be was difficult. While in theory we know we need a player to select options, select which dice to reroll, see the dice, etc, writing this into inputs

and outputs was complex. We mostly made references to "game states" and that players would interact with it as an input (since we did not want to specify how - whether though buttons, mouse drags, typing, etc) and also did something similar mentioning a graphical user interface that displays the game state as an output, since we do not know the exact methods other than that it will be graphical.

3. How did you and your team adjust the scope of your goals to ensure they are suitable for a Capstone project (not overly ambitious but also of appropriate complexity for a senior design project)?

- We wanted to ensure our project achieved four things: be achievable, be challenging enough to meet the criteria for a capstone project (ideally at the advanced level), create the game our supervisor wanted, but also be a fun game outside the scope of this course. We believe we can best achieve this through a suggestion that we allow for users to customize game settings before playing. This would increase the challenge level while still being achievable, but most importantly it would allow all types of games to be created, including the specific one our supervisor may have requested, but also test different variants and make specially tailored presets that we believe would be the most fun to play.

- Since we had many ideas for this game, but recognized that having them all be implemented would be unrealistic, we decided which would be most important to achieve and which could be done after achieving the crucial ones. This was perfectly reflected in the requirement that we split goals and stretch goals, and allowed us to keep our project focused with the option of later achieving more.

- With the game customization options and the stretch goals including singleplayer variants, we can allow for every one of us to create our own version of the game once we achieve the base project. This is important all that much more to maintain passion for the project since everyone can, in the end, create the idealized game they envision, as long as we as a team create the base capstone project first.