CSCE 685: DIRECTED STUDIES PROJECT PROPOSAL

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I have always been enchanted by games. Playing them, I have wanted to design and develop one. Hardly had I thought that a game so simple would need so many principles and preliminaries. Drawn to interest by these, I would like to study the foundations of game design, and principles of user interface design and experience. I also wish to enhance this project further by developing a static game that uses these principles.

As part of my project, I specifically plan to:

1. Study the principles of Game Design:
    a. core of a game
    b. generating ideas for a game
    c. defining the core loop of a game
    d. mechanics, dynamics, and system in game design.
2. Explore the instruments used to design the UI/UX of a game – Figma:
    a. Wireframe Designing
    b. UI Mocks
    c. Live Prototyping
3. Setup the environment for the game development:
    a. Figma
    b. Git repository
    c. Flutter
    d. Android Studio
    e. Apple Developer XCode
4. Develop and design a static (MVP) “MyBINGO” game using the above learnt concepts and tools.
5. Explore future improvements to the project.

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Generating Game Ideas:

Generating game ideas can be a fun and creative process, and there are a lot of potential sources of inspiration around us. The key steps in this process include research, brainstorming, and refinement. When considering potential game ideas, it is important to think about the scope of the game, such as whether it will focus on wars, world peace, health, or other topics, as well as the genre, such as simulation, role-playing, first-person shooter, and so on. Just as any idea can be turned into a movie, song, book, or painting, it can also be turned into a game.

Potential sources of inspiration for game ideas can include areas of personal interest, historical events or periods, jobs or businesses, and specific genres or game mechanics. It can be helpful to maintain a scrapbook of places, people, and things that you find interesting, as these can serve as starting points for brainstorming and idea generation.

When it comes to game design, wish fulfillment is often a key motivator for players. The ability to do things they normally wouldn't do or go places they wouldn't otherwise visit can be a powerful draw for players. Additionally, innovation is crucial in game design, as players are always looking for new and exciting experiences. Once you open your mind to the possibilities, it will no longer be a question of what to make a game about but rather how to choose the best idea from among all the possibilities.

Principles of Game Design:

1. Core of a game:

The game's core is the central concept that everything else revolves around. It represents the one thing the game is about and serves as the statement of purpose for the entire project. Everything in the game should serve to reinforce and support it.

Every single feature and system should either strengthen the core or must be necessary for it to exist in the first place. If a feature fails to do so, it should be cut or redesigned to better align with the core.

The statement of purpose for the game should be clear and focused on the core, ensuring that all development decisions align with its vision. By staying true to this principle, we can create a cohesive, engaging game that delivers a satisfying experience to players.

2. **Core loop of the game:**

The core loop determines how players progress through the game. It is the game's core in motion, representing the primary mechanics and gameplay that define the experience.

The core progression loop drives player advancement by gaining game skills and through rewards for actions taken in the game. This loop is often baked into the game levels themselves to provide a natural and seamless progression system that feels satisfying and engaging to players. As the game progresses, the difficulty increases and players are required to develop new strategies and skills to overcome challenges. By ensuring that the core loop is well-designed and tightly integrated with the game's levels and systems, we can create a truly immersive and enjoyable gaming experience that keeps players engaged and motivated to progress.

It's worth noting that not all games have a core loop in the traditional sense. Minecraft is a popular example of such a game, where the core is focused on creativity and player expression. In this game, progress is largely driven by the player's skills and imagination, rather than by a set of predefined objectives or a linear progression system. While some games may benefit from a tightly integrated core loop, other games, like Minecraft, can offer a more open-ended experience that allows players to explore and experiment with the game mechanics in their own way. Ultimately, the best approach will depend on the specific goals and design principles of the game in question.

3. **Game View:**

The game view represents the player's perspective into the game world and typically consists of information related to the player's own state as well as that of other players or entities in the game. The camera is a key element of the game view, shaping the visual play experience and providing a sense of the player's line of sight.

To maintain the game's challenge and balance, it's often necessary to hide certain information from the game view, such as the location of other players or the precise details of a game mechanic. By carefully controlling the information that is available through the

game view, designers can create a more engaging and immersive experience that challenges players to think creatively and strategically.

4. **Mechanics, Dynamics, System in Game Design:**

Game mechanics refer to the rules or sets of rules that determine specific outcomes in a game. Game dynamics, on the other hand, are the result of game mechanics and player interaction. To ensure appropriate limits on game dynamics, additional rules may be necessary. Affordances, which refer to a player's understanding of how things should work, are important for players to be able to intuitively interact with the game mechanics. Finally, emergent gameplay can arise from the interactions of players with the game mechanics, often resulting in unexpected outcomes that cannot be planned for. Fewer rules foster emergent game play and give players more scope to unexceptionally interact with the game system.

By carefully balancing mechanics, dynamics, affordances, and emergent gameplay, we can create a rich and engaging game experience that offers players a high degree of creative freedom while still being challenging and enjoyable.

5. **Goals:**

Goals refer to the specific objectives or targets that a player is striving to achieve within a game. These objectives can take many forms, such as completing a quest, defeating a boss, reaching a certain level, acquiring rare items, or accumulating a high score. Goals are an essential part of game design, as they provide players with a sense of purpose and motivation to continue playing. Well-designed goals should be challenging enough to be rewarding but not so difficult that they feel unattainable. In addition, goals should be clearly communicated to players and aligned with the overall game core.

Goals in games are not just arbitrary objectives, but rather they are carefully crafted to provoke players to use the core of the game and their skills to progress, as well as to engage with the game itself. Goals can incentivize players with rewards for achieving them, such as unlocking new content or earning in-game currency. Conversely, goals can also punish players for failing to achieve them, such as losing a life or being forced to restart a level.

Goals in games can be broken down into several key components. The objective of the goal is the specific condition that the player must complete to achieve it. This can be communicated through various means, such as an achievement system, a mission or quest board, or other in-game indicators. The state of the goal, whether it is known or secret to the player, can also impact the player's motivation to achieve it.

In addition, goals can be categorized based on their time horizon, which can impact the player's motivation to pursue them. Short-term goals are those that can be achieved within a single play session, typically lasting up to 20 minutes. Medium-term goals may take multiple play sessions to achieve, while long-term goals are typically end-game objectives that take a significant amount of time and effort to reach.

It's important for game designers to consider all these aspects when creating goals, as goals that are out of sight are often out of mind for players. By creating compelling and well-designed goals, game designers can encourage players to engage with the game mechanics, develop new skills, and fully explore the game world, that keeps them coming back for more.

6. **Defining feature set from Game Core:**

The feature set of a game is the set of elements of the game’s design that development team wants to achieve, thus strengthening the game's core concept. These features are designed to enhance the player's experience and provide them with opportunities to engage with the game's core loop and achieve their goals. The feature set can include a wide range of elements, such as game mechanics, art style, sound design, level design, and user interface.

To create a cohesive and engaging game experience, it's important to ensure that every feature in the game is aligned with the core concept and serves a purpose in reinforcing the core loop. This means that the feature set should be carefully curated and prioritized based on its importance to the overall game experience.

For example, if the core concept of a game is exploration, the feature set might include a large, open world to explore, hidden areas and secrets to discover, and tools to help the player navigate the environment. If the core concept is combat, the feature set might include a variety of weapons and abilities, enemy AI, and level design that encourages strategic gameplay.

Wish fulfillment is an important aspect of game design, as it allows players to explore and experience things that they may not be able to in their everyday lives. This includes becoming a hero, exploring new worlds, or having supernatural abilities. Game designers can achieve wish fulfillment by incorporating features into their games that allow players to explore different worlds, characters, or scenarios. These features can include things like character customization, immersive environments, and engaging storylines.

Innovation allows designers to push the boundaries of what is possible within the medium. Innovative game mechanics, unique art styles, and groundbreaking storytelling techniques can help games stand out in a crowded market and can keep players engaged and interested in the game over time. However, innovation must be balanced with a solid feature set and careful consideration of player wish fulfillment to create a truly successful and enjoyable game experience.

Ultimately, the defining feature set of a game should work together seamlessly to support the game's core concept, providing players with an immersive and engaging experience that keeps them coming back for more.

About the project - MyBINGO:

What is BINGO?

Bingo is a game of chance in which players mark off numbers on cards as the numbers are drawn randomly by a caller. It can also be used to express agreement or excitement over something. A variation of the same is "Task-based Bingo" or "Activity-based Bingo". Instead of numbers, the bingo cards contain a grid of tasks or activities that the player needs to complete. The tasks can be related to a specific theme or topic, such as a classroom scavenger hunt or a fitness challenge. Players mark off the tasks as they complete them, and the first player to complete a line or pattern of tasks calls out "Bingo!" to win the game.

Idea:

The idea of MyBINGO originated when I designed a birthday bingo game for my friend, which was an exploration hunt around the city of Houston. It was a fun and interactive way to explore the city while celebrating the occasion. I then realized that this concept could be customized for different goals, such as health and fitness, social networking, and learning. MyBINGO allows individuals to have a fun and interactive way to achieve their objectives while keeping them engaged and motivated throughout the process. With the ability to customize each grid, players can tailor their experience to their specific goals and interests. Whether it's a personal challenge or a group activity, MyBINGO offers an engaging and rewarding experience.

The Game Plan:

- **Core of MyBINGO:** The core of MyBINGO is to provide a fun and interactive way for individuals to achieve their objectives while keeping them engaged and motivated throughout the process. This is achieved through customization for personal goals, which allows players to tailor their experience to their specific interests and objectives. Whether it's fitness, social networking, or learning, MyBINGO provides a customizable and enjoyable way for players to achieve their goals.

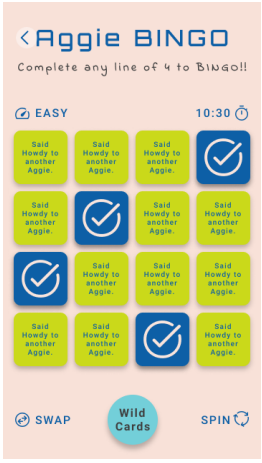
- **Core loop of MyBINGO:** The core progression loop of MyBINGO consists of multiple levels with grids ranging from sizes 3x3 to 7x7. Each level has three difficulty based sub-levels: easy, medium, and hard, resulting in a total of 15 levels for every genre.

Easy levels require to complete any horizontal or vertical line. Medium levels mandate a row and column completion. Difficult levels require completion of entire BINGO grid.

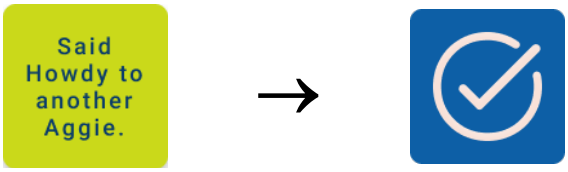
Additionally, MyBINGO allows for customization of personal goals such as health, networking, exploring, learning, and to-do lists. Personalization can be done individually or in groups with the option to gift a custom Bingo grid. Daily and weekly quests, day streaks, and the collection of points and wild cards also contributes to the MyBINGO progress loop.

- **Game View:** The Color theme is Neon-inspired to enhance the game's modern and futuristic feel, while creating a visually striking and memorable experience, like the game. The color code contains cool and neutral colors, Blue, Cyan, Green, Peach, Grey, and White.

MyBINGO consists of the level and board screens, each of which display the pending and completed tiles. Additionally, level information and available actions such as swap and spin are also displayed. Players can also access their wild card deck to help complete tasks and progress through levels. In the future, MyBINGO is planned to integrate additional features such as a leaderboard to display top performers, point system to reward players, daily/weekly quests to keep the game challenging and engaging, timer to track progress, and hints to help players who may be struggling.



- **Mechanics, Dynamics, System of MyBINGO:** To interact with the MyBINGO system, players simply tap on a tile to mark it as completed. The tile will then turn around and change color from green to blue, indicating its completion. Progress through levels is tracked by marking completed levels as blue, while other levels remain green until they are completed. The current level will be unlocked and accessible for play.



MyBINGO system includes various actions such as swapping any two random tiles with the Swap action or spinning the grid randomly clockwise or anti-clockwise with the Spin action. As players progress through the game, they can earn Wild cards that allow them to perform specific actions such as forcing the completion of a pending tile, spinning in a specific direction, or swapping two specific tiles, among others.

- **Goals:** In MyBINGO, players have a variety of goals to work towards, ranging from short-term to long-term. Short-term goals include completing daily quests and maintaining a daily streak, while medium-term goals involve progressing through levels and completing weekly quests. For those looking for a long-term challenge, there is the leader board to climb and the ultimate endgame to reach.

- **Feature Set:** Here are some of the features that align with the core of MyBINGO:
  - Develop Home Screen to enter the game.
  - Create pending and finished tiles.
  - Implement static tile fulfilment action as displayed in image earlier.
  - Generate a dynamic *N* X *N* BINGO board, where N ranges from 3 to 7.
  - Add level details like difficulty and rule, and board details like title to Game Screen.
  - Implement level completion/BINGO actions.
  - Add spin and swap actions to BINGO board.
  - Add free tile feature.

App Images:

1. Home Screen:

2. Game Screen with Free Tile:

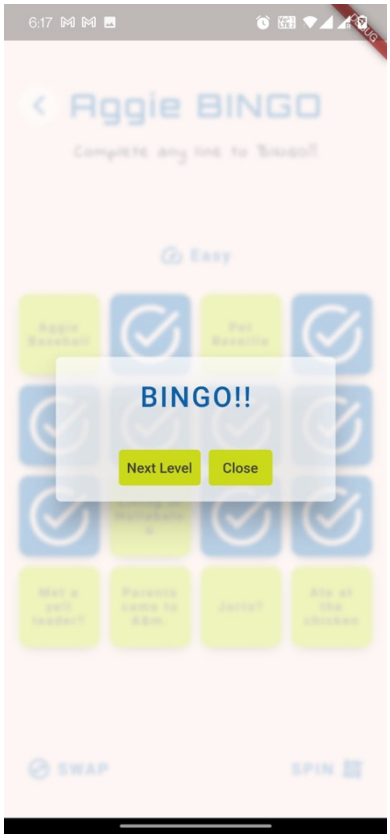
3. Tiles Marked as Completed:

4. Spin Action (Clockwise):

5. Swap Action:

6. BINGO – Easy Level:

7. BINGO:



Future Scope:

- Perform other actions from Home Screen like – Login, Personalize your Avatar, Enter BINGO Room, Select a Genre, Gift a BINGO, Verify BINGO, Buy from store, Get Help, or be a BINGO Master.
- Create Progress Screen to show completed levels, current level, and pending levels.
- Implement tile fulfilment enhancements – like tile rotation.
- Build a timer to track game time and game ranking.
- Create leaderboard to display game stats and self-standing.
- Design a game store to buy items.
- Create a Wild Card feature, gained through game progress, and bought from store in exchange for points.
- Implement Wild Cards access and use through game screen.
- Develop daily, weekly, and seasonal quests.
- Maintain and display Day streaks.
- Incentivize/ Punish by introducing rewards and penalties.
- Add dynamic tile features like secret and on-the-go tiles.
- Formulate Achievements to display completed, unlocked and available achievements.
- Implement Login and Avatar features along with personalization.
- Develop the ability to verify Evidence on Tile completion, through images, signatures, fitness tracker, or by a BINGO master.
- Download/Print completed Tiles as a memory or for motivation.
- Design features like BINGO Room, Genre Board, Gifting BINGO, Verifying BINGO, or being BINGO Master.
- Incorporate AI/ML to customize the difficulty of Bingo Boards.
- Introduce VR BINGO to enhance the experience.

Challenges:

1. **Installation:** Installing flutter was easy. However, I did face issues with "flutter doctor" command. A few dependencies were not correctly installed, and after searching the web, I was able to fix the issues.
2. **Android Studio:** I was initially using the Android Studio IDE. However, due to high latency and the IDE being very slow, I had to switch to VS Code.
3. **Project Setup:** The project that I had initialized through Android Studio was not working dur to SDK version mismatch with JDK. Even after downgrading JDK, as suggested on stack overflow, the application did not work. Hence, I had to recreate the project using command line interface – "flutter create", and it worked as a charm.

References:

1. Study the principles of Game Design: https://www.linkedin.com/learning/game-design-foundations-1-ideas-core-loops-and-goals/the-role-of-the-game-designer?autoplay=true&u=74650722
2. Flutter Tutorial: https://www.youtube.com/playlist?list=PL4cUxeGkcC9jLYyp2Aoh6hcWuxFDX6PBJ
3. Setup the environment for the game development:
    a. Flutter: https://docs.flutter.dev/get-started/install
    b. Emulator: https://developer.android.com/studio/debug/dev-options
    c. VS Code for Flutter: https://docs.flutter.dev/development/tools/vs-code

Important Links:

1. Wireframes & UI Mocks: https://www.figma.com/file/90ZukbObXwJ8CSLlO1yLcY/MyBINGO?node-id=10%3A2149&t=K6D295uiKMpp6fdb-1
2. Live Prototyping: https://www.figma.com/proto/90ZukbObXwJ8CSLlO1yLcY/MyBINGO?node-id=10-2150&scaling=min-zoom&page-id=10%3A2149&starting-point-node-id=10%3A2150
3. GitHub: https://github.com/snehasingh95/MyBINGO