Game Design & Development

Objectives

- What is Game Design and Development?
- Game Design Process
- Game Design Elements
- Game Testing and Quality Assurance
- Marketing and Distribution
- Future of Game Design and Development

What is Game Design and Development?

- Definition of game design and development
  - Game design and development is the process of creating games from ideation to release, involving a range of disciplines such as art, design, programming, and audio engineering.
- The role of game designers and developers
  - Game designers are responsible for creating the game mechanics, gameplay, story, and characters, while game developers are responsible for the technical aspects of the game such as programming and implementing the design.
- Types of games
  - There are various types of games, including action, adventure, role-playing, strategy, puzzle, and sports games.

Types of Games

- Action Games: These games emphasize physical challenges, such as combat, jumping, and other movements. Examples include:
  - Call of Duty: Vanguard
  - Far Cry 6
  - Monster Hunter Rise
- Adventure Games: These games focus on exploration, puzzle-solving, and story-driven gameplay. Examples include:
  - Hogwarts Legacy
  - Shadow of Tomb Raider
  - Uncharted

Types of Games Cont..

- Role-Playing Games (RPGs): These games allow players to take on the role of a character and immerse themselves in a fictional world. Examples include:
  - Final Fantasy VII Remake
  - Tales of Arise
  - Horizon Forbidden West
- Strategy Games: These games require players to plan and execute strategies to achieve their goals. Examples include:
  - Civilization 6
  - Homeworlds: Deserts of Kharak
  - Company of Heroes 2

Types of Games Cont..

- Simulation Games: These games simulate real-world scenarios or activities. Examples include:
  - American Truck Simulator
  - Snowrunner
  - The Sims 4
- Sports Games: These games simulate real-world sports, allowing players to compete against each other or against AI opponents. Examples include:
  - F1 Manager 2022
  - FIFA 23
  - NBA 2K23

Types of Games Cont..

- Puzzle Games: These games require players to solve puzzles or challenges to progress through the game. Examples include:
  - Portal Reloaded
  - Little Nightmares 2
  - Trine
- Platformer Games: These games require players to navigate through levels by jumping or moving around obstacles. Examples include:
  - Cuphead – The Delicious Last Course
  - Shovel Knight Dig
  - Unravel 2

Types of Games Cont..

- Fighting Games: These games focus on one-on-one combat between characters. Examples include:
  - Injustice II
  - Mortal Kombat 11
  - The King of Fighter XV
- Horror Games: These games aim to scare players with eerie environments and terrifying enemies. Examples include:
  - Evil Within II
  - Dying Light II
  - Metro Exodus

Game Development Process

Planning

- What are we building?
- What is our budget?
- Who is the audience?
- Which platform will it be on?

Pre-production

- Storyboarding, storytelling.
- Technological capabilities.
- Early prototyping.
- Milestone scheduling.

Production

- Modeling, designing.
- Audio, visual effects.
- Physics, mechanics.
- Developing, rendering.

Testing

- Bug identifying.
- Feature exploitation.
- Is the game too easy/hard?
- Is the game even fun?

Pre-launch

- Alpha/Beta releases.
- Marketing hype.
- Gaming conventions.
- Independent advertising.

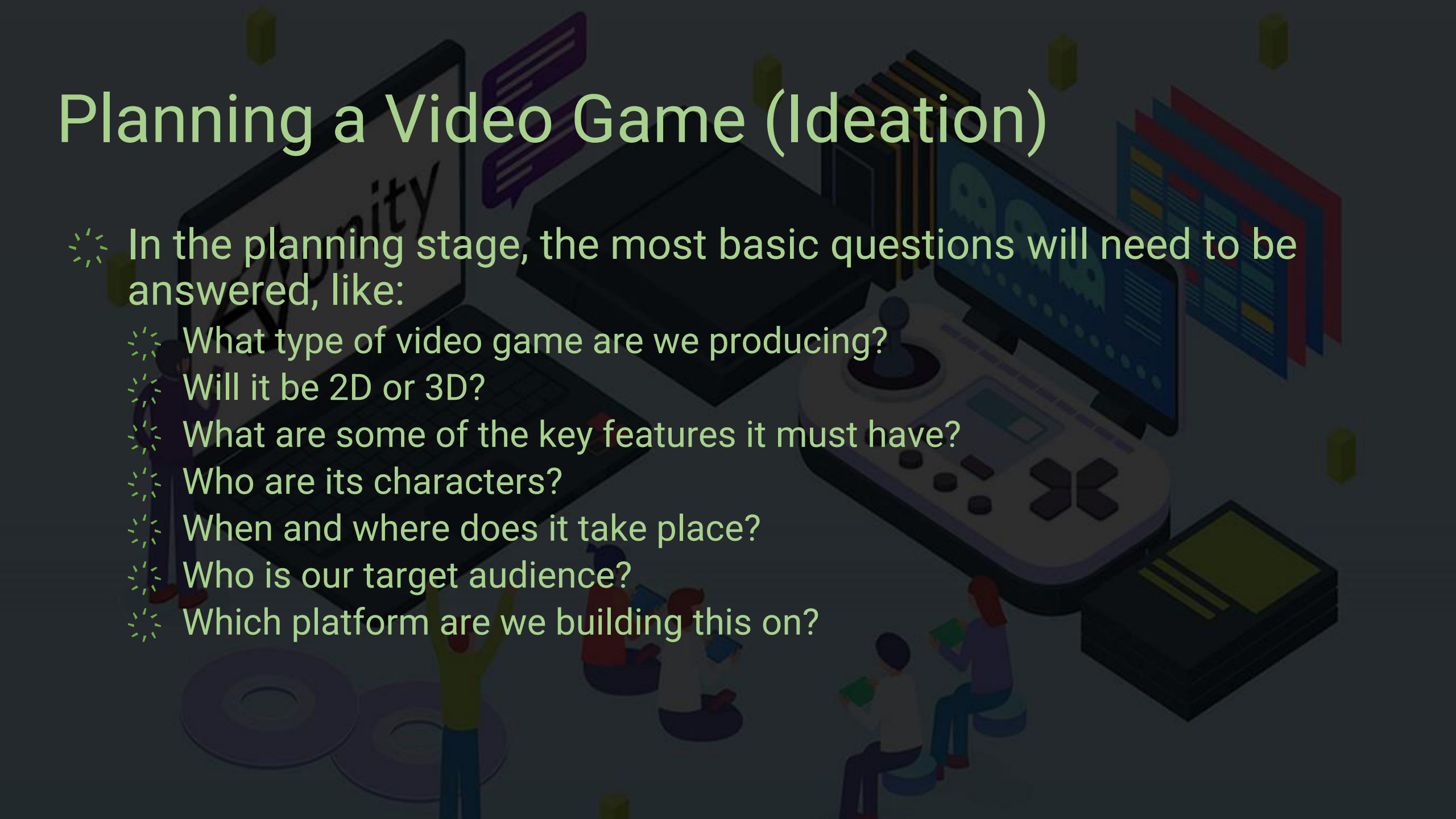
Launch

- Major bug squashing.
- Minor bug squashing.
- Polishing.
- Master release.

Post-production

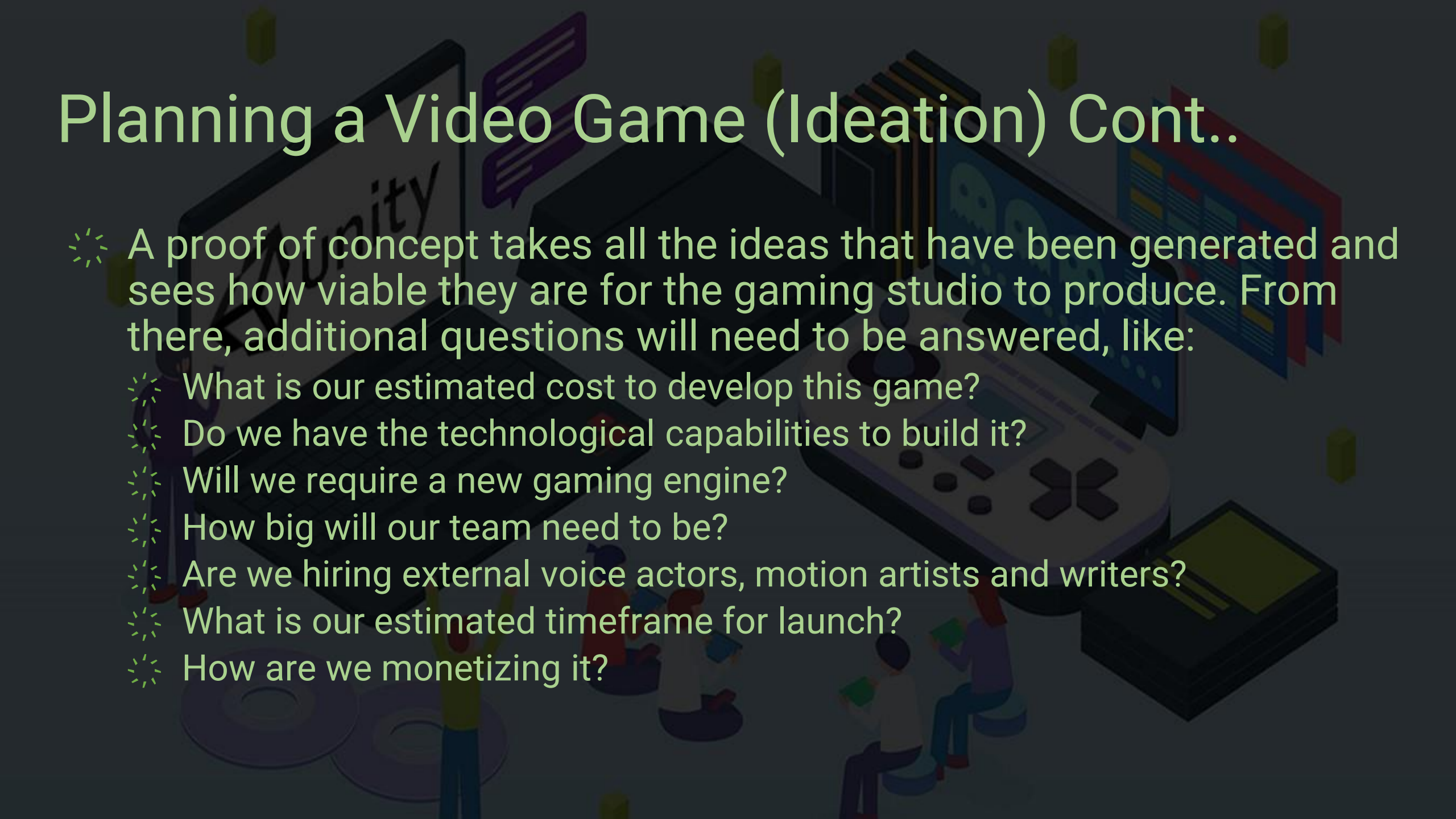
- More bug squashing.
- Game patching.
- Game balancing.
- New content development.

Planning a Video Game (Ideation)



- In the planning stage, the most basic questions will need to be answered, like:
  - What type of video game are we producing?
  - Will it be 2D or 3D?
  - What are some of the key features it must have?
  - Who are its characters?
  - When and where does it take place?
  - Who is our target audience?
  - Which platform are we building this on?

Planning a Video Game (Ideation) Cont..



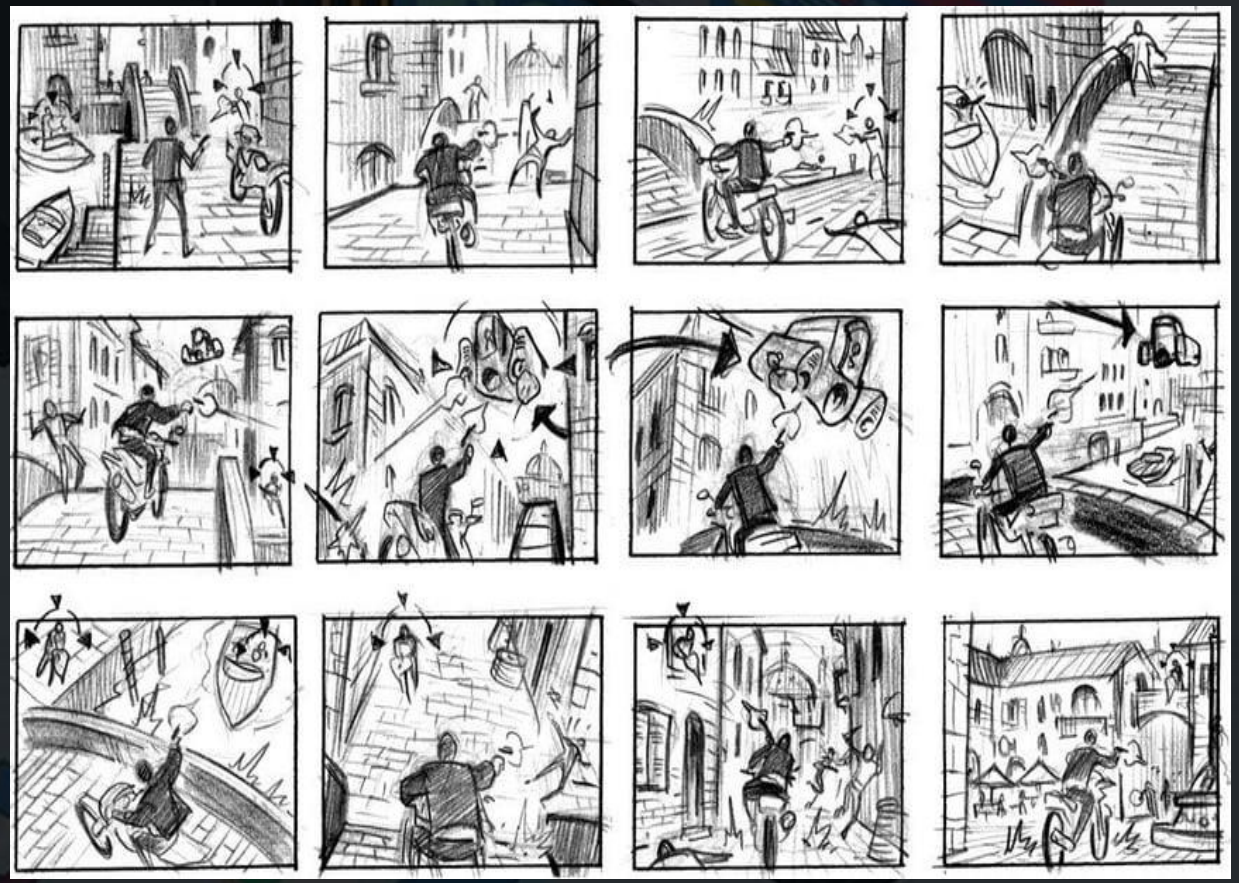
- A proof of concept takes all the ideas that have been generated and sees how viable they are for the gaming studio to produce. From there, additional questions will need to be answered, like:
  - What is our estimated cost to develop this game?
  - Do we have the technological capabilities to build it?
  - Will we require a new gaming engine?
  - How big will our team need to be?
  - Are we hiring external voice actors, motion artists and writers?
  - What is our estimated timeframe for launch?
  - How are we monetizing it?

Pre-Production

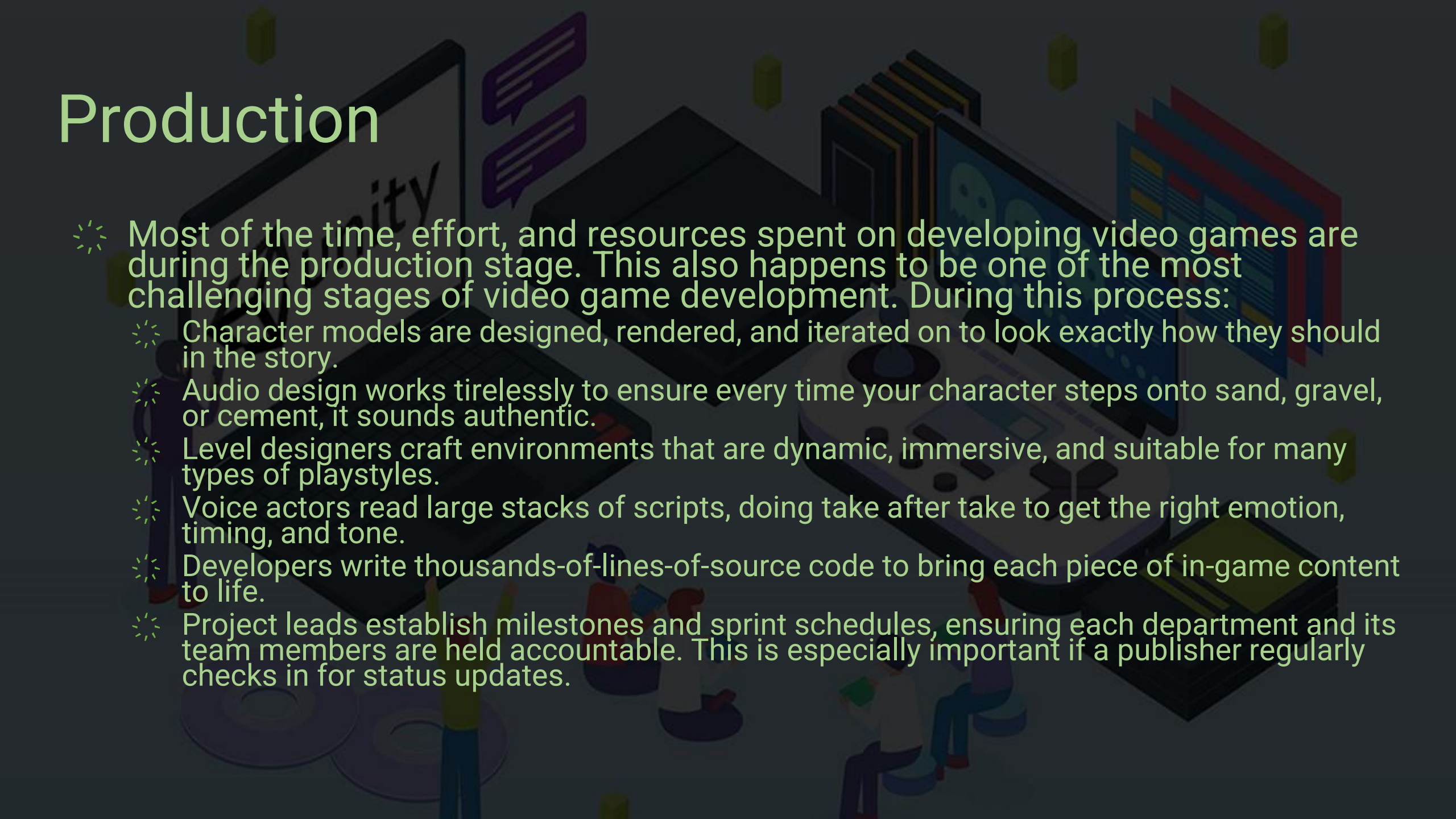
- The next stage of game development is called pre-production where multiple departments collaborate. A few examples of this collaboration may look like:
  - Writers meeting with the project leads to flesh out the narrative of the story. Who are the main characters in this tale? What are their backstories? How does each character relate to one another?
  - Engineers meeting with writers, letting them know that under the current technological constraints, we can't fill that environment with 100 characters or the game will crash.
  - Artists meeting with designers to ensure visuals, color palettes, and art styles are consistent and aligned with what was laid out in the planning phase.
  - Developers meeting with engineers to flesh out all the in-game mechanics, physics, and how objects will render on a player's screen.
  - Project leads meeting with multiple departments to figure out the "fun factor," which you'll find out later isn't easy to pinpoint until the testing stage.

Pre-Production Cont..

- From here, it’s common for studios to prototype characters, environments, interfaces, control schemes, and other in-game elements to see how they look, feel, and interact with one another. This is essentially the “let’s see what we’re working with” moment before moving onto the bread-and-butter of development – production.



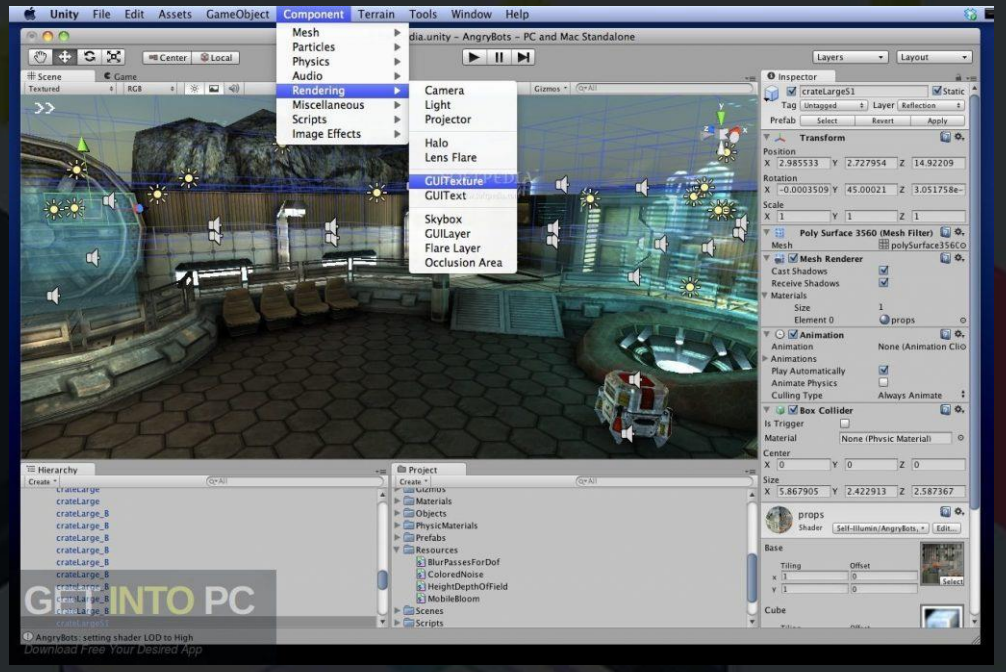
Production

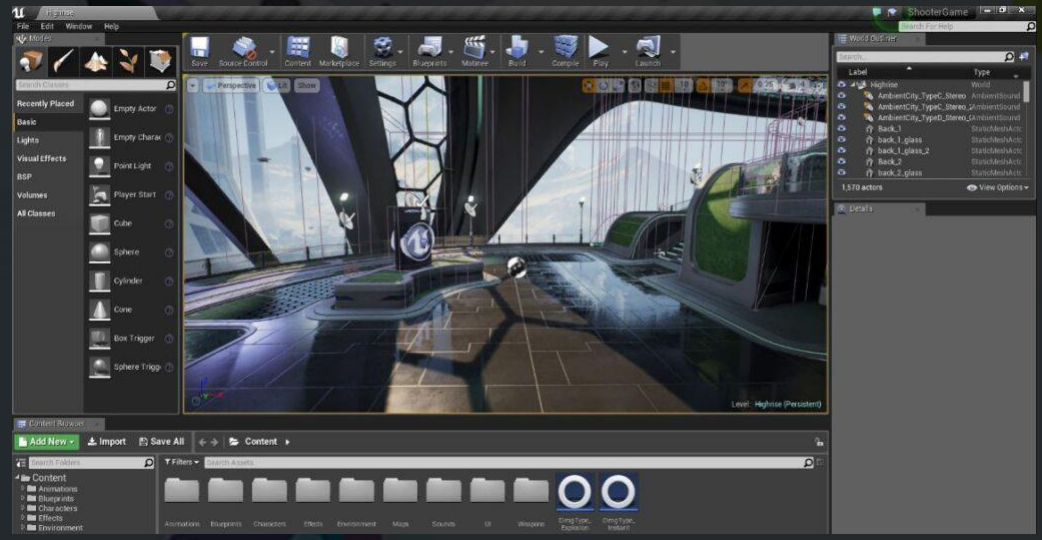


- Most of the time, effort, and resources spent on developing video games are during the production stage. This also happens to be one of the most challenging stages of video game development. During this process:
  - Character models are designed, rendered, and iterated on to look exactly how they should in the story.
  - Audio design works tirelessly to ensure every time your character steps onto sand, gravel, or cement, it sounds authentic.
  - Level designers craft environments that are dynamic, immersive, and suitable for many types of playstyles.
  - Voice actors read large stacks of scripts, doing take after take to get the right emotion, timing, and tone.
  - Developers write thousands-of-lines-of-source code to bring each piece of in-game content to life.
  - Project leads establish milestones and sprint schedules, ensuring each department and its team members are held accountable. This is especially important if a publisher regularly checks in for status updates.

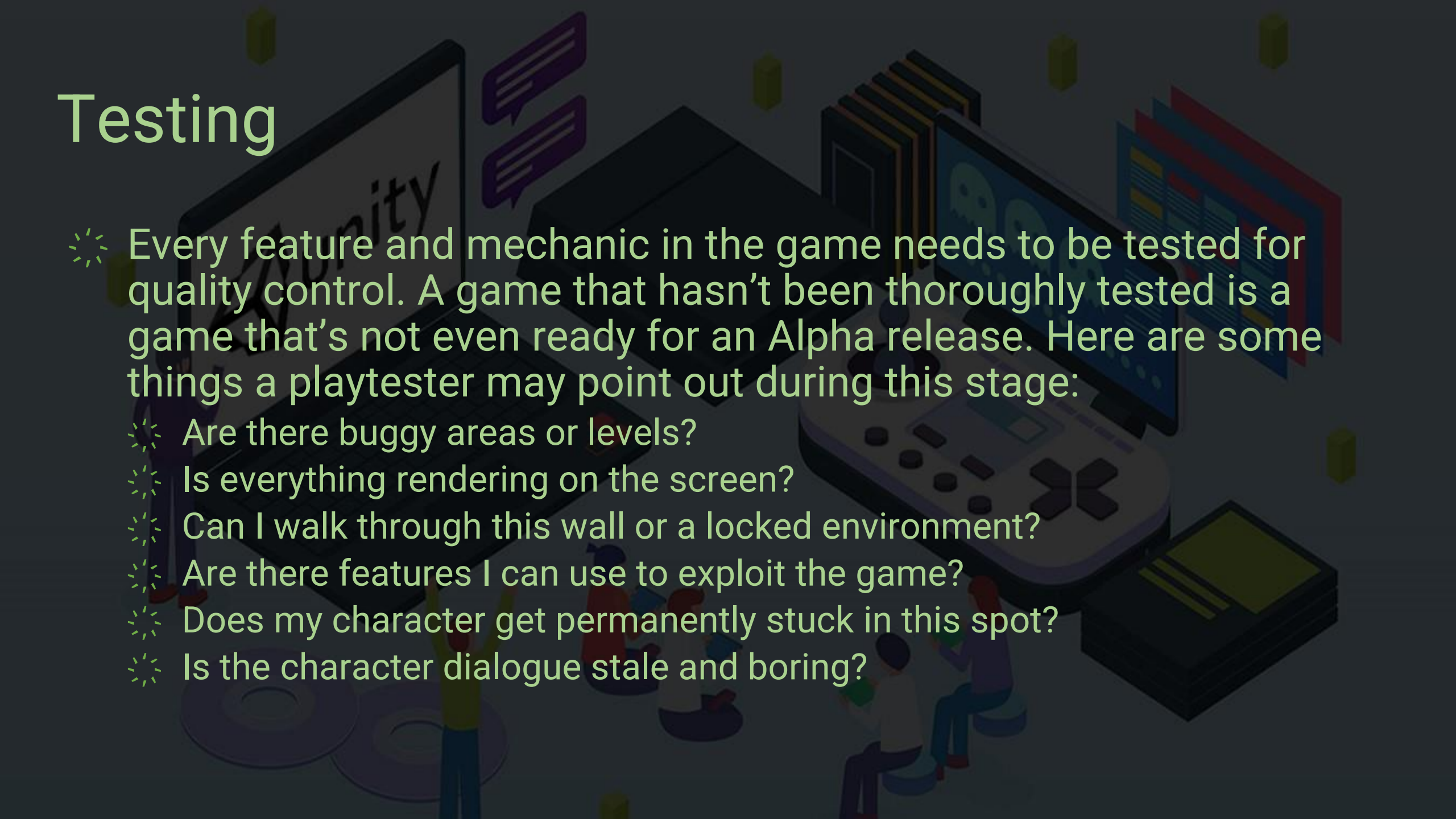
Production Cont..

- These events and many more could take years of iterating to get right, and that’s assuming only a few changes are made along the way, which is hardly the reality.
- In video game development, it’s not uncommon for entire segments of a game – months worth of work – to get scrapped after it's completed.





Testing



- Every feature and mechanic in the game needs to be tested for quality control. A game that hasn’t been thoroughly tested is a game that’s not even ready for an Alpha release. Here are some things a playtester may point out during this stage:
  - Are there buggy areas or levels?
  - Is everything rendering on the screen?
  - Can I walk through this wall or a locked environment?
  - Are there features I can use to exploit the game?
  - Does my character get permanently stuck in this spot?
  - Is the character dialogue stale and boring?

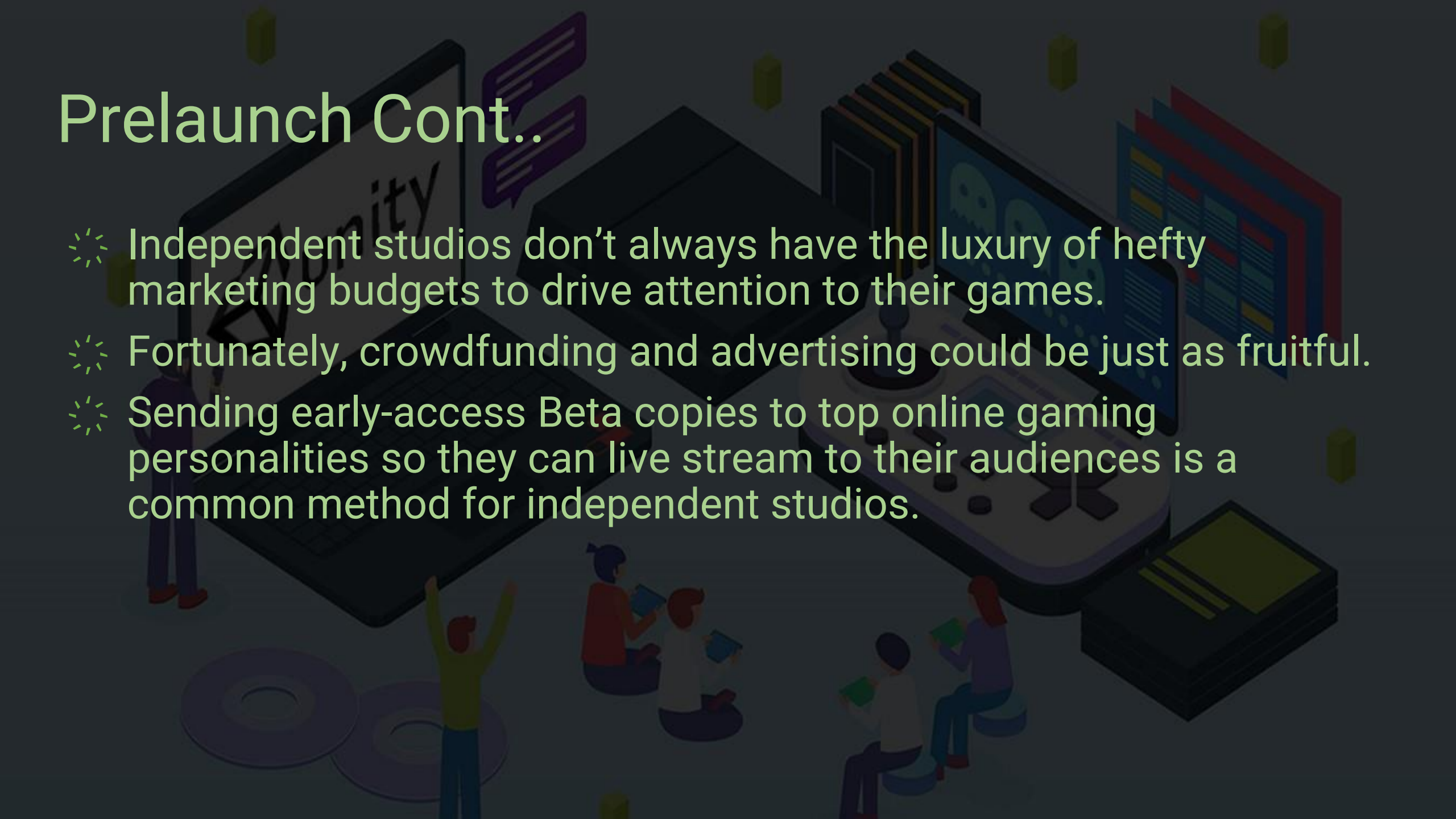
Testing Cont..

- After countless hours of testing and iterating, the game should be ready for a late-Alpha or even Beta release, depending on how polished the in-game features are. This is the first time the public will get their hands on the game.

Prelaunch

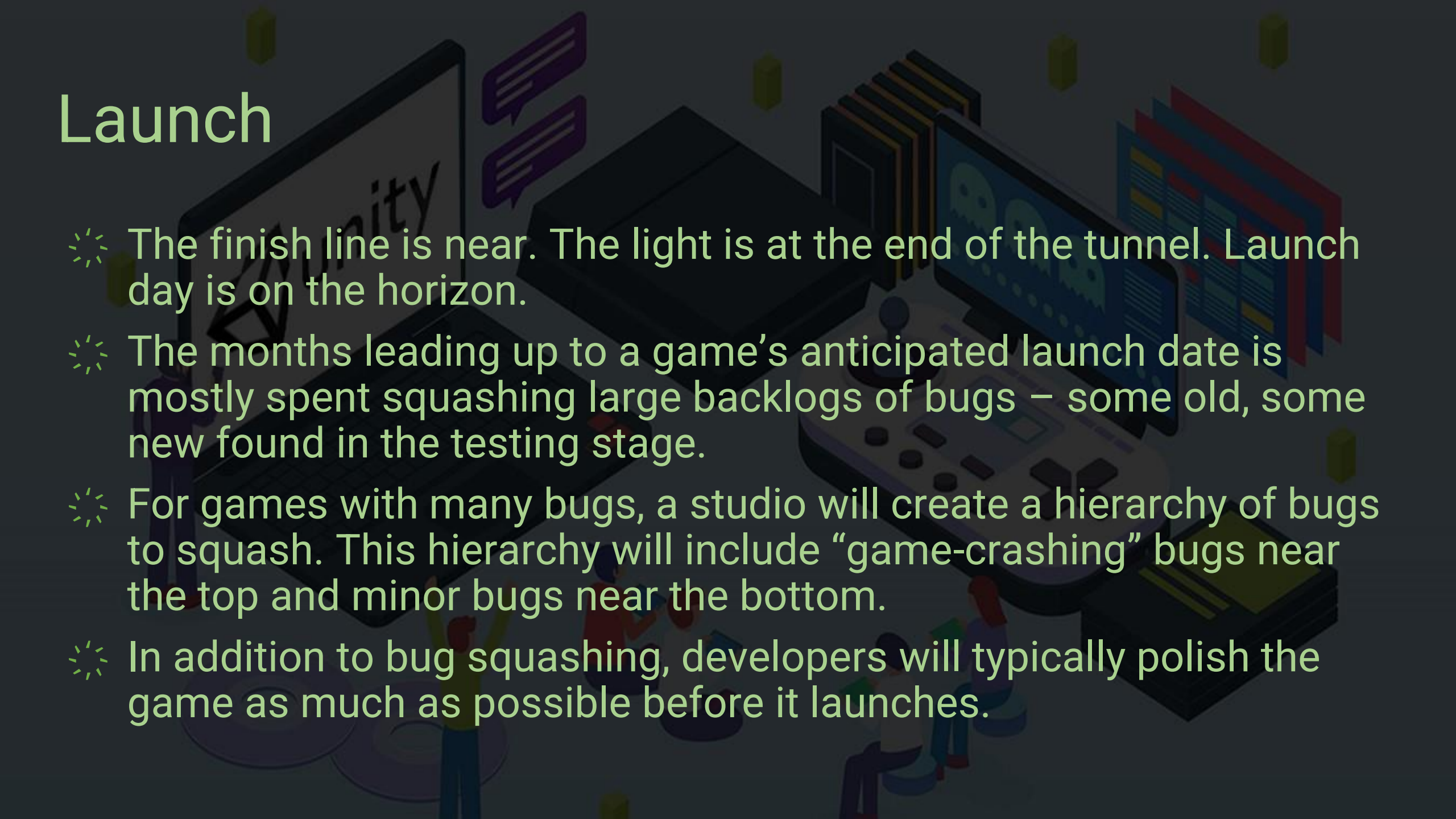
- The pre-launch stage is a stressful time for gaming studios. Questions of self-doubt may seep in as you wonder how the public will react to your first functional product.
- “Will they think our game is fun? Are they going to find new bugs? What sort of media coverage are we going to get from this?”
- But before a formal Beta copy is released, the game will require some marketing. After all, how else will people learn about it?
- Publishers almost always expect a hype video with a mix of cinematics and sample gameplay to drive attention. They may also schedule a spot at one of the major gaming conventions, like E3 or PAX, for an exclusive preview of the game.

Prelaunch Cont..



- Independent studios don’t always have the luxury of hefty marketing budgets to drive attention to their games.
- Fortunately, crowdfunding and advertising could be just as fruitful.
- Sending early-access Beta copies to top online gaming personalities so they can live stream to their audiences is a common method for independent studios.

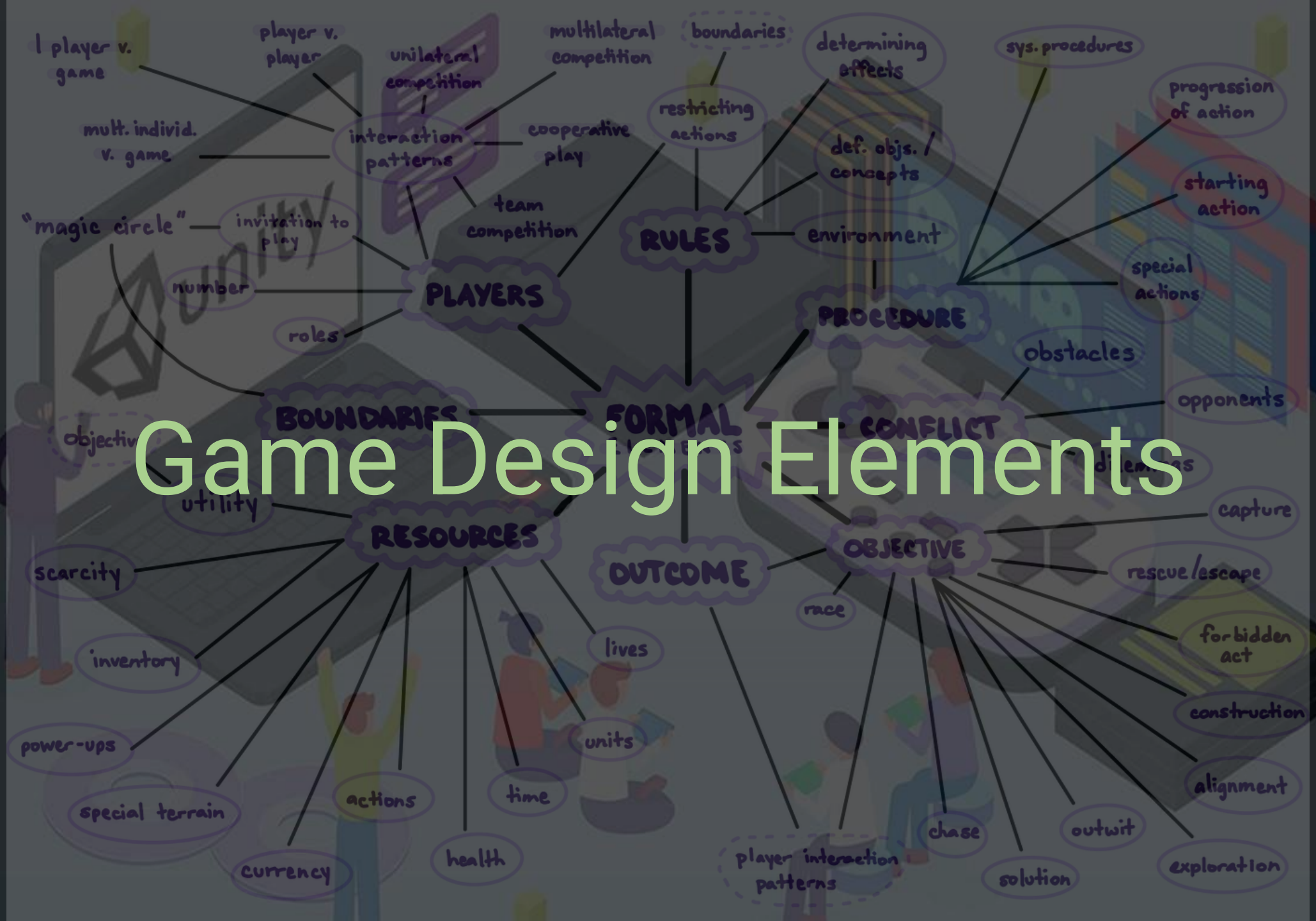
Launch



- The finish line is near. The light is at the end of the tunnel. Launch day is on the horizon.
- The months leading up to a game’s anticipated launch date is mostly spent squashing large backlogs of bugs – some old, some new found in the testing stage.
- For games with many bugs, a studio will create a hierarchy of bugs to squash. This hierarchy will include “game-crashing” bugs near the top and minor bugs near the bottom.
- In addition to bug squashing, developers will typically polish the game as much as possible before it launches.

Post-production

- Post-launch is one of the most exciting times for any gaming studio. Years of hard work has finally paid off, and video game sales are (hopefully) pouring in. But even now, there's still work to be done.
- It's not uncommon for video games to launch with batches of minor bugs. The first few months during the post-launch stage are typically spent identifying and squashing these bugs. Gaming studios also rely on players to submit bug reports or speak up about bugs in online forums. This is all part of post-launch support.
- Another part of post-launch is to provide regular software updates for the game. These updates range from game-balancing patches to new downloadable content, or DLCs.
- Releasing fresh content is common in today's gaming industry because it increases the replay value and appeal of a game. New levels, storylines, and multiplayer modes are just a few of the many DLC options a gaming studio could explore.



Game Design Elements

Gameplay Mechanics

- Gameplay refers to the mechanics and rules that govern how a game is played. These mechanics and rules determine the player's interactions with the game world, the goals they must achieve, and the challenges they must overcome.
  - **Controls:** The player uses buttons, joysticks, or other input devices to control the game's characters or objects.
  - **Physics:** The game's objects and characters obey the laws of physics, creating a realistic or stylized game world.
  - **AI:** The game's non-player characters (NPCs) have programmed behavior and respond to the player's actions.
  - **Progression:** The game is divided into levels, stages, or chapters, with increasing difficulty and complexity.
  - **Quests and objectives:** The player has specific goals to achieve, such as collecting items, defeating enemies, or solving puzzles.
  - **Character development:** The player's character can improve their abilities, acquire new skills, and gain experience points over time.

Gameplay Rules

- **Win and lose conditions:** The player must meet certain requirements to win, such as reaching a certain score, completing all levels, or defeating a final boss. Conversely, they will lose the game if they fail to meet these conditions.
- **Time limits:** The player must complete certain tasks within a set time limit, adding pressure and urgency to the gameplay.
- **Health and damage:** The player's character can sustain damage and lose health, which may require the use of health packs or other restorative items.
- **Resource management:** The player must manage their inventory, ammo, or other resources carefully to progress through the game.
- **Restrictions:** The game may limit the player's actions or abilities in various ways, such as a no-jumping rule or a restricted area.

Story and Narrative

- Story and narrative refer to the plot, characters, and storytelling elements of a game. These elements add depth, emotion, and meaning to the gameplay experience, creating a more immersive and memorable game.
  - **Plot:** The game's overall story, including the setting, conflict, and resolution.
  - **Characters:** The game's protagonists, antagonists, and supporting characters, each with their own motivations and personalities.
  - **Dialogue:** The conversations and interactions between characters, including cutscenes and scripted events.
  - **Worldbuilding:** The game's lore and backstory, including history, culture, and geography.
  - **Themes:** The game's underlying messages or ideas, such as love, friendship, betrayal, or survival.

Characters and Game World

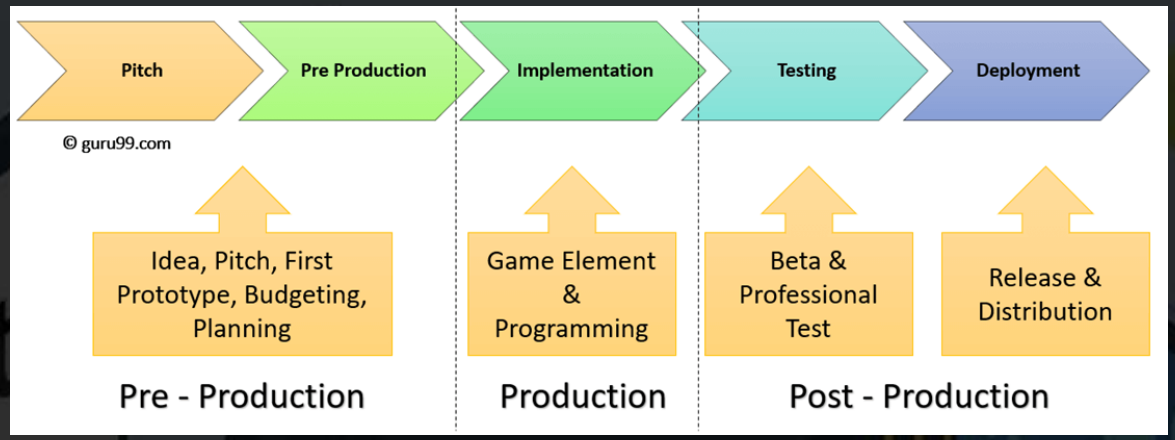
- Characters and game world refer to the characters and setting of a game. These elements define the game's atmosphere, tone, and visual style, creating a sense of immersion and interactivity for the player.
  - **Characters:** The game's playable and non-playable characters, each with their own unique appearance, personality, and backstory.
  - **Setting:** The game's environment, including the landscapes, buildings, and objects that make up the game world.
  - **Atmosphere:** The mood and tone of the game, including lighting, sound effects, and music.
  - **Art style:** The visual style of the game, including graphics, colors, and design.
  - **Interactivity:** The player's ability to interact with the game world, including exploration, puzzles, and combat.

Visual Design

- Visual design refers to the art style and graphics of a game. These elements define the game's look and feel, creating a unique and memorable experience for the player.
  - **Art Style:** The overall look and aesthetic of the game, including color schemes, character designs, and environmental design.
  - **Graphics:** The level of detail, resolution, and quality of the game's visual elements, including textures, lighting, and effects.
  - **User Interface:** The design of the game's menus, HUD, and other interface elements that the player interacts with.
  - **Animation:** The movement and actions of the game's characters and objects, including cutscenes and cinematics.

Sound Design

- Sound design refer to the audio elements of a game, including sound effects and music. These elements play a crucial role in creating an immersive and engaging experience for the player.
  - **Sound Effects:** The audio cues that accompany the player's actions, such as footsteps, gunfire, and explosions, and environmental sounds, such as wind, water, and wildlife.
  - **Music:** The game's soundtrack, including background music that sets the tone and mood for different levels and cutscenes.
  - **Voice Acting:** The spoken dialogue of the game's characters, providing context and emotion to the story and gameplay.
  - **Ambient Sound:** The background sounds that create a sense of place and atmosphere, such as the hum of machinery or the chatter of a crowd.
  - **Foley:** The additional sound effects that help create a realistic and immersive environment, such as the rustling of leaves or the clinking of dishes.



Game Testing and Quality Assurance

Types of testing

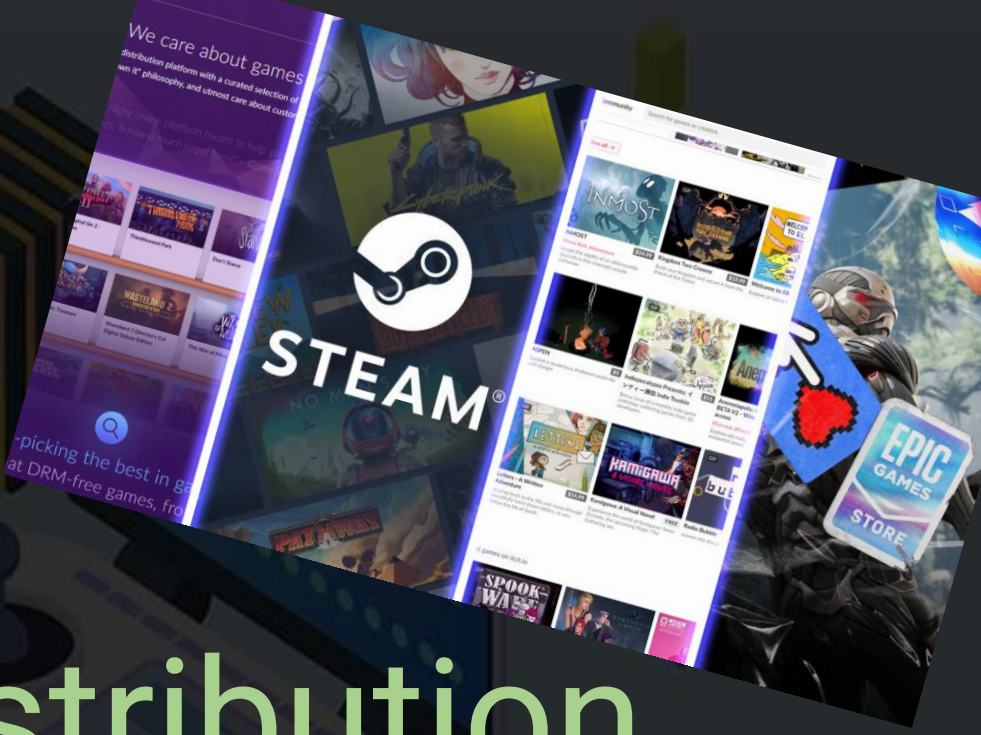
- Testing is an essential part of game development, ensuring that the game is functional, engaging, and bug-free. There are several types of testing involved in game development, including alpha testing, beta testing, and user testing.
  - **Alpha Testing:** Alpha testing is the first stage of testing and is typically done in-house by the development team. The purpose of alpha testing is to identify and fix major bugs and issues before the game is released to a wider audience. The game may not be fully playable or feature complete during alpha testing.
  - **Beta Testing:** Beta testing is the second stage of testing and involves releasing the game to a small group of external testers. The purpose of beta testing is to identify and fix minor bugs and issues before the game's official release. Beta testing also allows developers to gather feedback on gameplay mechanics, level design, and other aspects of the game.
  - **User Testing:** User testing involves releasing the game to a larger group of external testers, often through a public beta or early access release. The purpose of user testing is to gather feedback from a wide range of players and identify any issues that may have been missed during alpha and beta testing. User testing can also help developers refine gameplay mechanics, difficulty levels, and other elements of the game based on player feedback.

Importance of quality assurance

- Quality assurance (QA) is the process of ensuring that a game is bug-free and runs smoothly. This is essential to the success of a game, as players expect a seamless experience and will quickly become frustrated if the game is riddled with bugs and glitches.
  - **Identifying Bugs and Glitches:** QA testers play the game extensively, looking for any bugs or glitches that could impact gameplay or immersion. They then report these issues to the development team for fixing before the game's release.
  - **Improving Game Performance:** QA testers also identify performance issues, such as slow loading times or frame rate drops, and work with the development team to optimize the game's performance.
  - **Enhancing User Experience:** By ensuring that the game runs smoothly and is free of bugs, QA testers help to create a more enjoyable and engaging experience for players.
  - **Maintaining Reputation:** A game riddled with bugs and glitches can harm the reputation of the developer and impact sales. QA testing helps to ensure that the game is of high quality and meets player expectations.

Debugging and fixing bugs

- Debugging is the process of identifying and fixing issues in the game's code or mechanics. Bugs and glitches can significantly impact the player experience, and it is essential to address them as quickly as possible.
  - **Identifying Bugs:** The first step in debugging is identifying bugs. This can be done through in-game testing, player feedback, or using debugging tools that highlight issues in the code.
  - **Reproducing Bugs:** Once a bug has been identified, the developer must reproduce it to understand its cause and develop a fix.
  - **Fixing Bugs:** Once the cause of the bug has been identified, the developer can begin fixing it. This may involve changing the game's code or mechanics, testing the fix, and then releasing a patch or update to the game.
  - **Testing Fixes:** It is essential to test fixes thoroughly to ensure that they do not introduce new bugs or issues. This may involve extensive testing by both developers and QA testers before the fix is released to the public.



Marketing and Distribution

Target audience

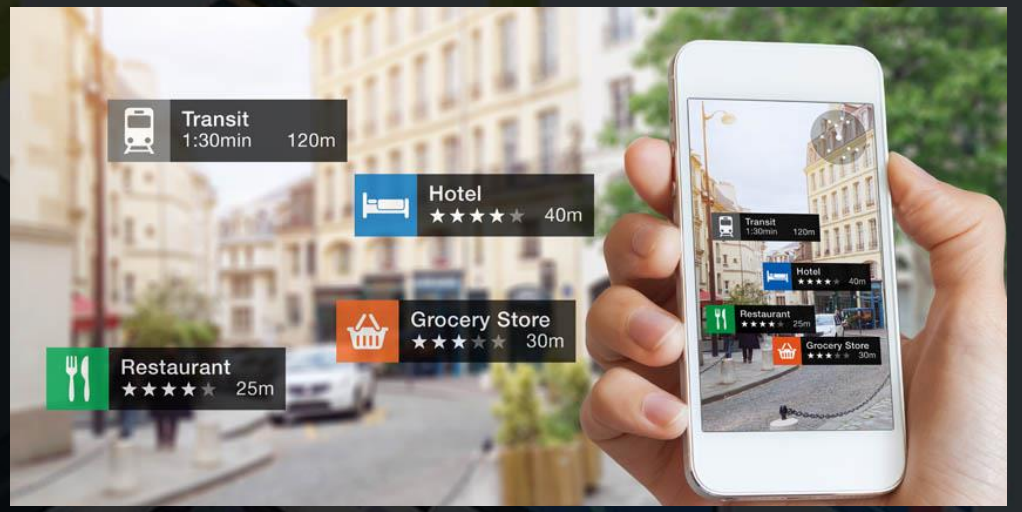
- Identifying the target audience for a game is essential to its success. Knowing who your game is designed for can help you create a game that meets the needs and desires of your players.
  - **Demographics:** Consider the demographic characteristics of your target audience, such as age, gender, location, and income. This information can help you create a game that appeals to their interests and desires.
  - **Interests:** Consider the interests of your target audience, such as their favorite genres, hobbies, and lifestyle. This information can help you create a game that aligns with their interests and provides an enjoyable experience.
  - **Gaming Habits:** Consider the gaming habits of your target audience, such as the platforms they use, the frequency and duration of their play, and the types of games they typically enjoy. This information can help you create a game that is accessible and enjoyable for your players.
  - **Market Research:** Conduct market research to gather information about your target audience's preferences and behaviors. This information can help you create a game that meets their needs and desires and sets you apart from competitors.

Distribution channels

- Once a game is complete, it needs to be distributed to players. Identifying the best distribution channels is essential to getting the game into the hands of your target audience.
  - **Physical Copies:** Physical copies of games can be sold through retailers, such as video game stores and department stores. This distribution channel can be beneficial for players who prefer to own a physical copy of the game.
  - **Digital Copies:** Digital copies of games can be sold through online platforms, such as Steam, Epic Games Store, and console-specific stores like PlayStation Store, Xbox Store, and Nintendo eShop. This distribution channel is convenient for players who prefer to download and play games instantly.
  - **Subscription Services:** Subscription services, such as Xbox Game Pass, PlayStation Now, and EA Play, offer players access to a library of games for a monthly fee. This distribution channel can be beneficial for players who want to try a variety of games without purchasing each game individually.
  - **Crowdfunding:** Crowdfunding platforms, such as Kickstarter and IndieGoGo, can be used to raise funds to develop and distribute a game. This distribution channel is useful for indie developers who may not have the resources to fund a game themselves.

Promotional strategies

- Promoting a game effectively is essential to its success. The right promotional strategies can help a game reach its target audience, generate buzz, and increase sales. Here are some effective promotional strategies for marketing your game to potential players.
  - **Social Media:** Use social media platforms, such as Twitter, Instagram, Facebook, and YouTube, to promote the game. Share updates, behind-the-scenes content, and gameplay footage to keep potential players engaged and interested.
  - **Influencer Marketing:** Partner with social media influencers and YouTubers to promote the game to their followers. This can be an effective way to reach a large audience and generate buzz.
  - **Events and Conferences:** Attend gaming events and conferences, such as E3, PAX, and Gamescom, to showcase the game to potential players and generate buzz. This can also be an opportunity to get feedback and insights from players and industry professionals.
  - **Press Releases and Reviews:** Send press releases and review copies of the game to gaming journalists and media outlets. Positive reviews and coverage can help generate buzz and increase sales.
  - **Demo Versions and Free Trials:** Release demo versions or free trials of the game to allow players to try it out before purchasing. This can be an effective way to generate interest and increase sales.



Emerging Technologies

Virtual Reality

- Virtual reality (VR) technology allows players to enter and interact with a completely immersive digital world. VR is an emerging technology that has the potential to transform the gaming industry.
  - **Immersive Gameplay:** VR technology allows players to become fully immersed in the game world, making gameplay more immersive and engaging.
  - **New Game Mechanics:** VR technology enables new game mechanics that were previously impossible. For example, players can physically interact with objects in the game world, leading to more realistic and interactive gameplay.
  - **Enhanced Graphics:** VR technology enables enhanced graphics and visual effects, allowing for more realistic and immersive game worlds.

Augmented Reality

- Augmented reality (AR) technology adds digital elements to the real world, creating a hybrid reality that blends the virtual and physical worlds. AR is an emerging technology that has the potential to transform the gaming industry.
  - **Interactive Gameplay:** AR technology enables interactive gameplay where players can physically interact with digital elements in the real world.
  - **Real-World Integration:** AR technology allows game elements to be integrated into real-world environments, creating a more immersive and realistic experience.
  - **New Game Mechanics:** AR technology enables new game mechanics that were previously impossible, such as using real-world objects to progress through the game.

Blockchain

- Blockchain technology is a decentralized digital ledger that is used to record transactions. While not specific to gaming, blockchain technology has the potential to revolutionize the gaming industry.
  - **Secure Transactions:** Blockchain technology enables secure and transparent transactions between players, preventing fraud and ensuring fairness.
  - **Ownership of Assets:** Blockchain technology enables ownership of digital assets, such as in-game items and virtual currency, to be tracked and verified.
  - **Decentralized Gaming:** Blockchain technology enables the creation of decentralized games that are owned and controlled by the players rather than a central authority.