Chapter 3

Working with Formal Elements

Exercise 3.1: Gin Rummy

Let's take the classic card game gin rummy. There are two basic procedures to a turn in gin rummy: drawing and discarding. Take away the discard procedure and try to play the game. What happens?

Now take away both the discard procedure and the draw procedure, and then play the game. What's missing from the game?

Put the drawing and discarding procedures back, but take out the rule that says that an opponent can "lay off" unmatched cards to extend the knocker's sets. Is the game still playable with this change?

Now put back the original rules, but take away the objective and play the game again. What happens this time?

What does this exercise tell us about the formal elements of games?

Formal elements, as I've said, are those elements that form the structure of a game. Without them, games cease to be games. As you saw in the opening exercise of this chapter, a game without players, without an objective, without rules or procedures is not a game at all. Players, objective, procedures, rules, resources, conflict, boundaries, and outcome: These are the essence of games, and a strong understanding of their potential interrelationships is the foundation of game design.

After you grasp these basic principles, you can use the knowledge to create innovative combinations and new types of gameplay for your own games. This chapter will delve more deeply into each of the formal elements discussed in Chapter 2 and break them down into conceptual tools that you can use to analyze existing games or help make design decisions in your own games.

Players

We've determined that games are experiences designed for players and that players must voluntarily accept the rules and constraints of the game in order to play. When players have accepted the invitation to play, they are within Huizinga's "magic circle," as discussed in Chapter 2. Within the magic circle, the rules of games take on a certain power and a certain potential. Bound by the rules of play, we perform actions that we would never otherwise consider—shooting, killing, and betrayal are some. But we also perform actions we would like to think ourselves capable of and have never had the chance to face—courage in the face of untenable odds, sacrifice, and difficult decision-making. Somehow, through a strange and wonderful paradox, those restrictive and binding statements that are game rules, when put into motion within the safety of the magic circle, mysteriously create the opportunity for play.

Invitation to Play

Other arts also create their own temporary worlds: the frame of a painting, the proscenium of a stage, a motion picture screen. The moments of entry into these worlds are ritualized in recognizable moments: the dimming of the lights, the drawing back of the curtains, and, for games, the invitation to play. One of the most important moments in a game is this invitation. In a board or card game, the invitation is part of the social makeup of the game—players invite each other to play. The offer is accepted and the game is begun. In a digital game, the process is much more technical. Usually there is a start button or an entry screen. But some games make an extra effort to extend a more visceral invitation. One of the best examples of this is the Guitar Hero controller. A small plastic mock-up of a guitar, when strapped on by a player, suddenly becomes an excuse to *act* like a guitar player, not just play the game, but play the fantasy of the game. Crafting this invitation to play, making it visceral and compelling to your target audience is an important part of playcentric design.

It might seem obvious that you need to create an engaging invitation to get players interested in playing your game. But there are other decisions you'll need to make about players in your game. For example, how to structure their participation: How many players does the game require? How many total players can the game support? Do various players have different roles? Will they compete, cooperate, or both? The way you answer these questions will change the overall player experience. To answer them, you'll need to look back to your player experience goals and think about what structure will support your goals.

3.1 Costumed players at Comi-Con

Number of Players

A game designed for one player is essentially different from a game designed for two, four, or 10,000 players. And a game designed for a specific number of players has different considerations than a game designed for a variable number of players.

Solitaire and tic-tac-toe are games that require an exact number of players. Solitaire, obviously, supports only one player. Tic-tac-toe requires two players—no more, no less—the system will not function without the exact number of players. Many single-player digital games support only one player. This is because, like solitaire, their structure supports one player competing against the game system.

On the other hand, there are games that are designed to be played with a range of players. Parcheesi is a game designed for two to four players, while Monopoly is designed for two to eight players. Massively multiplayer games like EVE Online and World of Warcraft are designed to function for a variable number of players, ranging into the tens of thousands; however, a single player can be alone in World of Warcraft, and many of the formal elements of the system will still function.

Exercise 3.2: Three-Player Tic-Tac-Toe

Create a version of tic-tac-toe that works for three players. You might need to change the size of the board or other elements of the game to do this.

Roles of Players

Most games have uniform roles for all players. In chess and Monopoly, there is only one role for all players. But some games have more than one role for players to choose between. In Mastermind, one player chooses to be the code-maker, while the other chooses to be the code-breaker. The system requires both roles to be filled, or it will not work. Also, many

3.2 Create character screens: World of Warcraft and City of Heroes

team games, like football, have different player roles that make up the full team. Role-playing games, as the name implies, have a variety of roles for players to choose between. Players can take on the role of healers or fighters or magic wielders. These roles define many of the player's basic abilities, and often players will create more than one character in an online world so that they will have the opportunity to play several different roles.

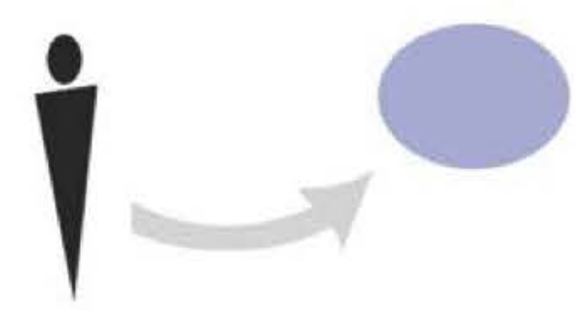
In addition to roles that are defined within the game rules, however, you might also want to consider other potential play styles as types of roles when you are designing your game. Richard Bartle, creator of the first multiuser dungeon (MUD), wrote a widely referenced article describing the four basic player types he found in his MUD. These were: achievers, explorers, socializers, and killers.[1] Bartle posits that players often have a primary play style and will only switch if it suits their purposes. Online worlds such as Second Life offer players a completely open-ended play environment where roles are player defined. This design decision tends to encourage creativity and self-expression rather than competition. So if you are designing a game with different roles for your players, or if you provide the opportunity for players to define their own roles, the nature and balance of these roles will be a critical consideration.

Player Interaction Patterns

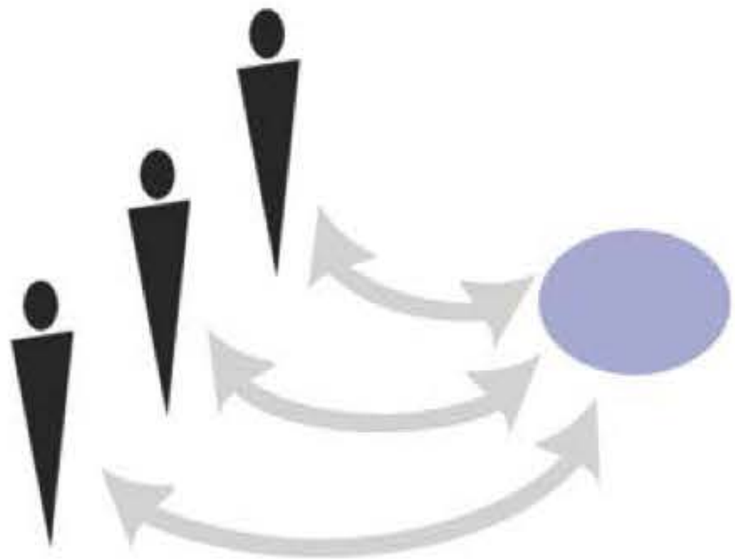
Another choice to consider when designing your game is the structure of interaction between a player, the game system, and any other players. The following breakdown of interaction patterns is adapted from the work of E. M. Avedon in his article "The Structural Elements of Games."[2] You'll see that many digital games fall into the pattern "single player versus game," and, more recently, "multilateral competition." There's a lot of potential in the other patterns that is rarely taken advantage of, and I offer these ideas to you in the hopes that they can inspire you to look at new combinations and possibilities of player interactions to use in your designs.

1. Single player versus game

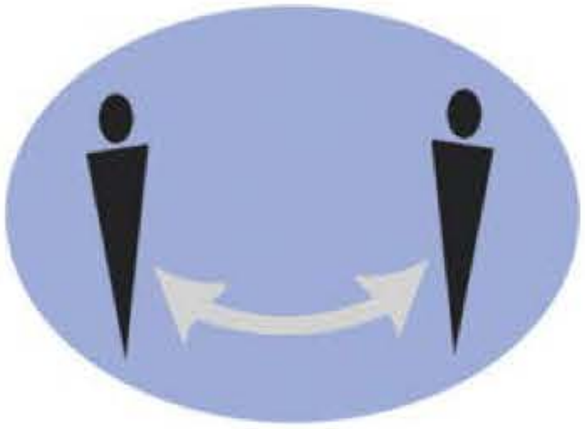
This is a game structure in which a single-player competes against a game system. Examples include solitaire, Pac-Man, and other single player digital games. This was once the most common pattern for digital gaming, though today most single-player games also include a multiplayer mode. You'll find this pattern in mobile games, console games, and PC games. Because there are no other human players in this pattern, games that use it tend to include puzzles or other play structures to create conflict. It is perhaps because of the success of this pattern that we now



Single Player vs. Game

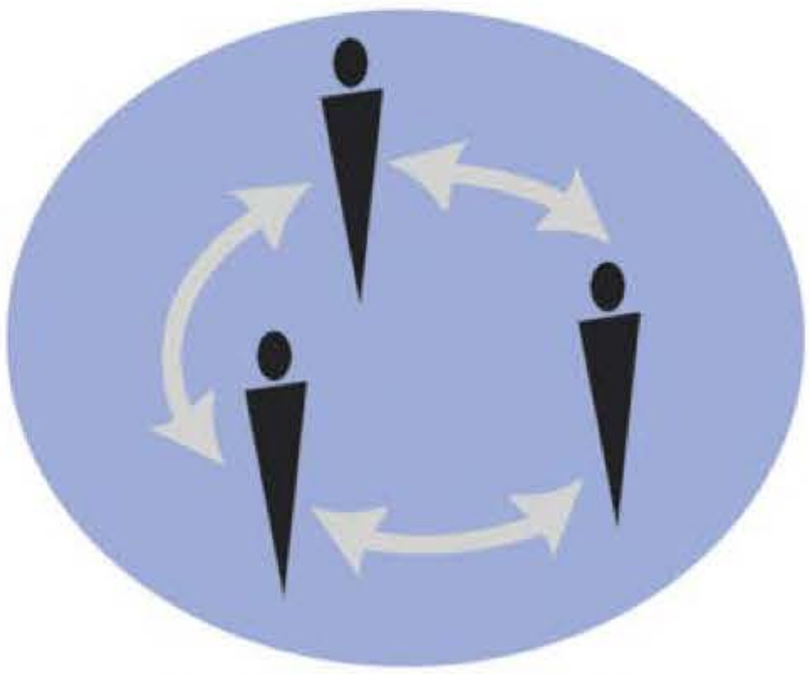


Multiple Indvidual Players vs. Game



Player vs. Player

Unilateral Competition

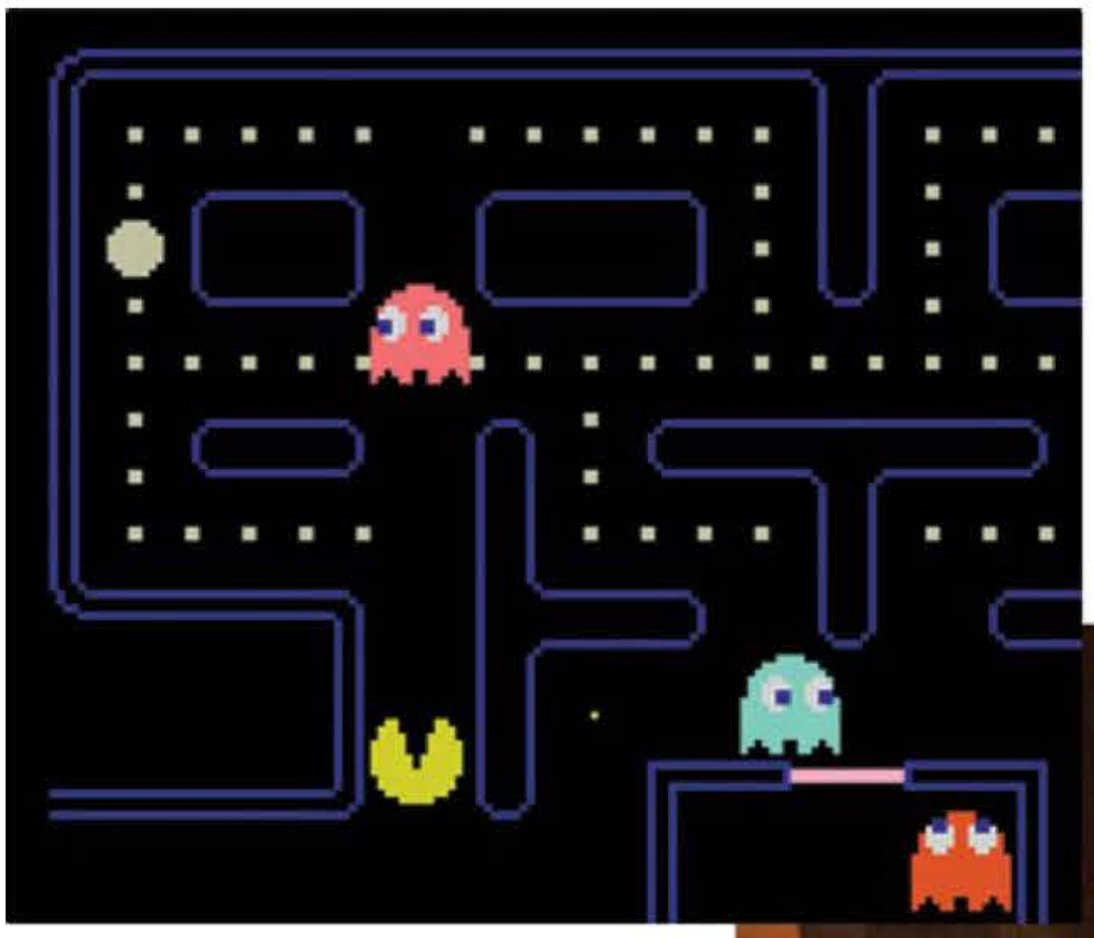


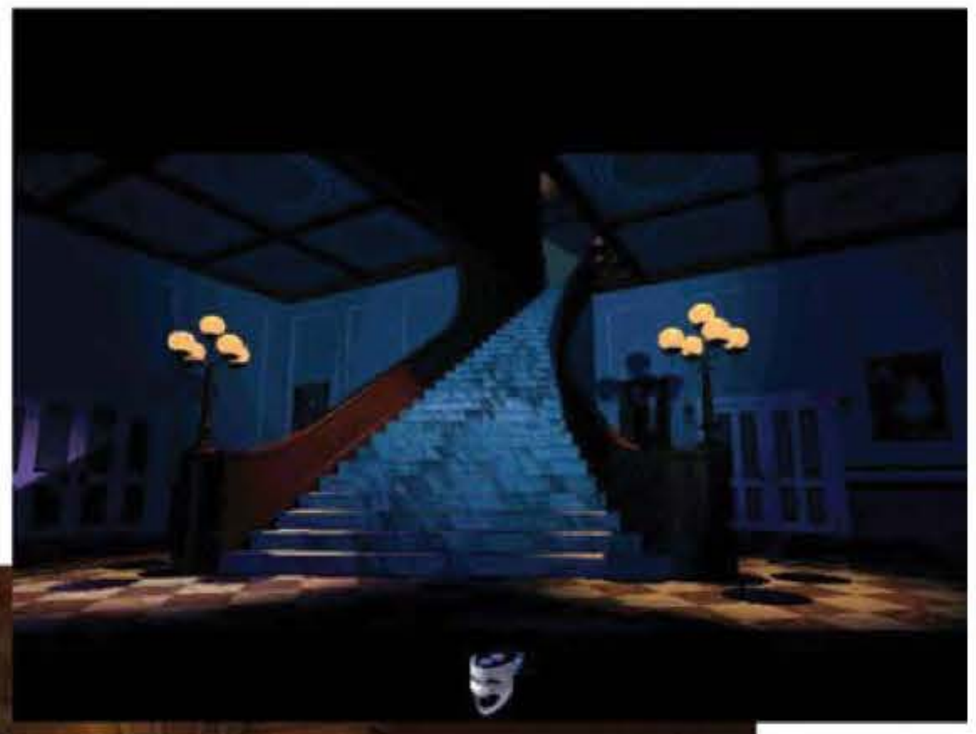
Multilateral Competition

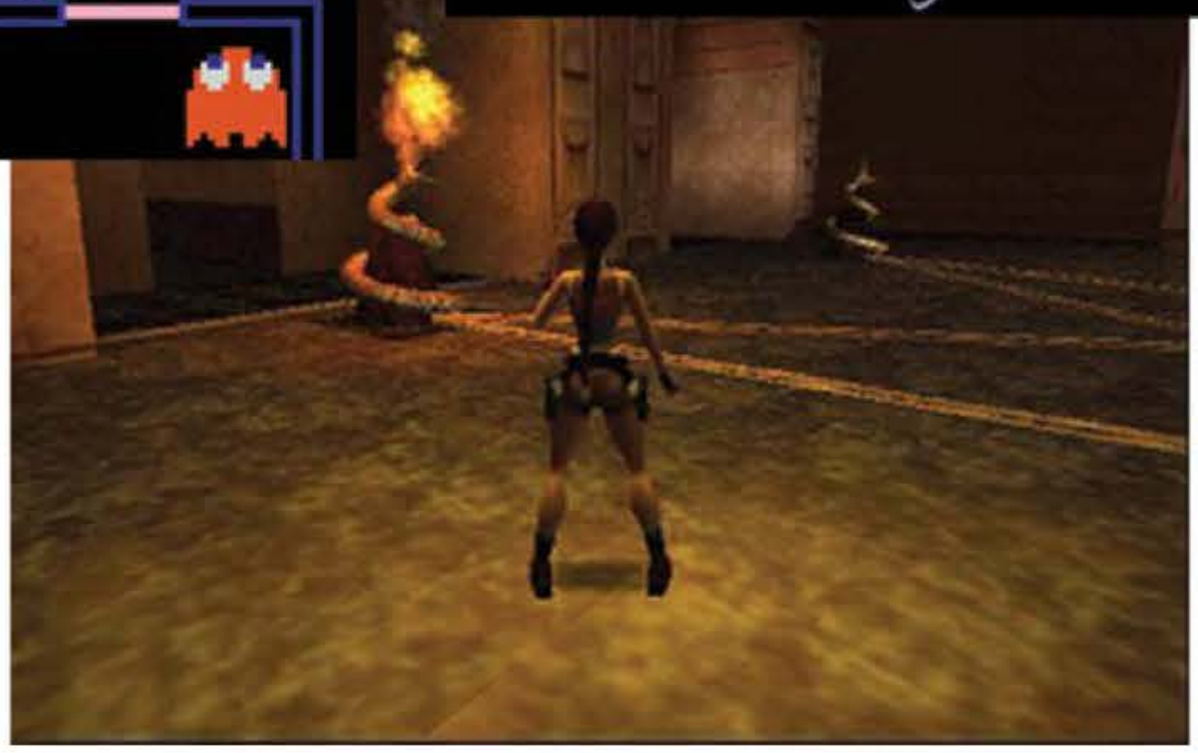
Cooperative Play

Team Competition

3.3 Player interaction patterns







3.4 Single player versus game examples: Pac-Man, The 7th Guest, and Tomb Raider

Pac-Man © 1980 Namco Ltd. All Rights Reserved. Courtesy of Namco Holding Corp.

refer to digital games that have more than one player as "multiplayer" games when, in fact, analog games were multiplayer by definition for thousands of years.

2. Multiple individual players versus game

This is a game structure in which multiple players compete against a game system in the company of each other. Action is not directed toward each other, and no interaction between participants is required or necessary. Examples include bingo, roulette, and Farmville. This is a pattern that has become very popular since the advent of Facebook because of the asynchronous aspect to many social games. Essentially, this pattern is a single-player game that is played in the company (virtual or real) of other players who are also playing the same game. This pattern works well for noncompetitive players who enjoy the activity and the social arena, for example, casino games.

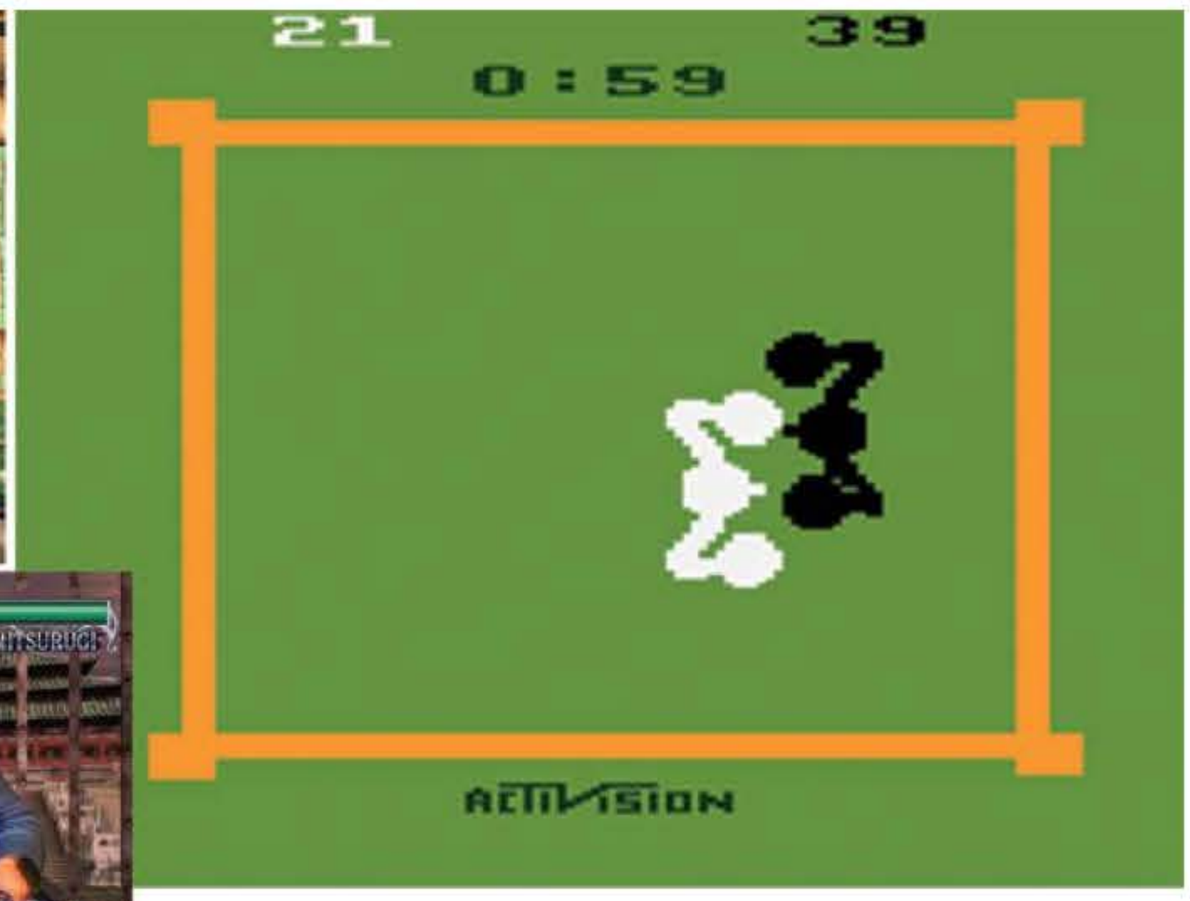
3. Player versus player

This is a game structure in which two players directly compete. Examples include checkers, chess, and tennis. This is a classic structure for strategy games and works well for competitive players. The one-on-one nature of the competition makes it a personal contest. Two-player fighting games such as Soul Calibur II, Mortal Kombat, and others have employed this structure successfully. Again, the intense competition marks this pattern for focused, head-to-head play.

4. Unilateral competition

This is a game structure in which two or more players compete against one player. Examples include tag, dodge ball, and the Scotland Yard board game. A highly undervalued structure, this pattern works as well with "free-for-all" games like tag as it does with intensely strategic games like Scotland Yard.

3.5 Multiple individual players versus game: Farmville 2



3.6 Player vs. Player: Boxing for Atari 2600 and Soul Calibur II for Xbox

Soul Calibur II © 2003 Namco Ltd. All Rights Reserved. Courtesy of Namco Holding Corp.

3.7 Unilateral competition: Scotland Yard

As does tag, Scotland Yard pits one player, Mr. X, against all the other players. However, unlike tag, Scotland Yard has the larger group (the detectives) trying to catch the singled-out player (the criminal). This game balances between the two forces because the criminal has full information about the state of the game, while the detectives have to work together to deduce the state from clues left by the criminal. It's a very interesting model for combining cooperative and competitive gameplay.

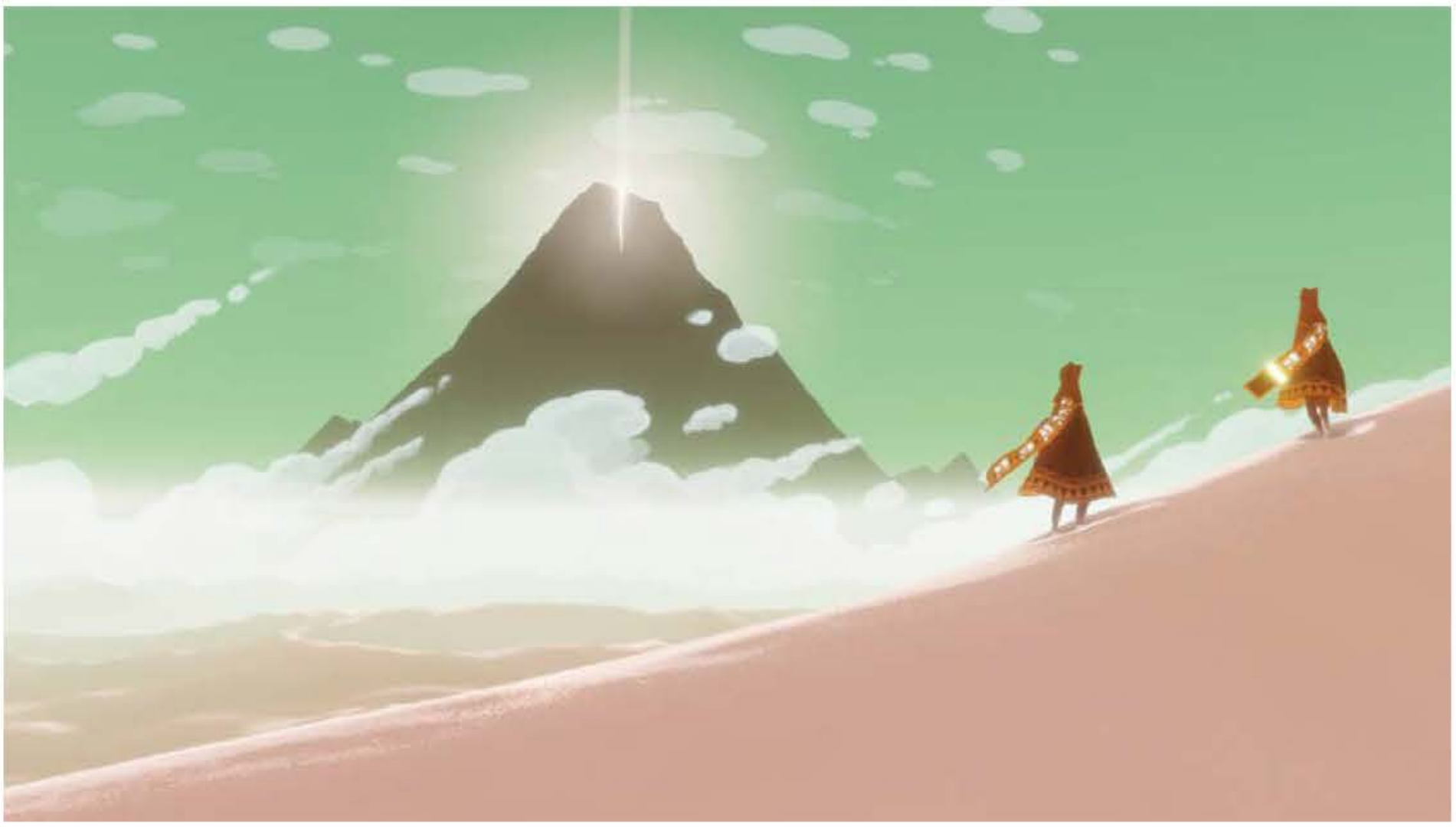
5. Multilateral competition

This is a game structure in which three or more players directly compete. Examples include poker; Monopoly; multiplayer games like Call of Duty: Black Ops, StarCraft II, and Halo 4; etc. This is the pattern that most players think of when they refer to "multiplayer" gaming. Nowadays, the trend is to think of multiplayer in terms of massive numbers of players, but as the thousands of years of predigital multiplayer game history supports, there's still plenty of room for innovative thinking in terms of smaller, directly competitive groups. Board games with this pattern of player interaction have been "tuned" for generations for groups of between three to six players; clearly there's a social force at work that makes this an ideal group size for direct competition. Want to do something fresh in digital gaming? Try tuning your multiplayer game to encourage the same high level of social interaction that occurs with a three- to six-person board game.

6. Cooperative play

This is a game structure in which two or more players cooperate against the game system. Examples include Left 4 Dead 2, Journey, and Portal 2. This pattern has seen a lot of innovation lately, including the minimalist design of Journey. Designer Jenova Chen created a vast mysterious world in which two travelers meet along their respective paths. Only able to communicate by singing out a single note, players used creative methods to convey ideas, forming deeply meaningful relationships with their fellow travelers. Portal 2's cooperative campaign required

3.8 Multilateral competition: Super Bomberman and Mario Party



3.9 **Cooperative play: Journey**

players to work together creatively to solve levels in a very rewarding fashion. It is very exciting to see more designers experiment with this interaction structure.

7. Team competition

This is a game structure in which two or more groups compete. Examples include soccer, basketball, charades, Defense of the Ancients, and Team Fortress 2. Team sports have proved the power of this pattern of player interaction over and over, not only for the players but for a whole other group of participants—the fans. As if responding to the need for this particular multiplayer pattern, teams (called clans or guilds) sprang up almost immediately upon the introduction of multiplayer and massively multiplayer digital games. The team- and class-based features in Team Fortress 2 allow for an incredible range of play styles and modes of competition. Think about your own experiences with team play—what makes team play fun? What makes it different from individual competition? Is there an idea for a team game that comes from your answers to those questions?

Exercise 3.3: Interaction Patterns

For each of the interaction patterns, create a list of your favorite games in each pattern. If you can't think of any games in a particular pattern, research games in that area and play several of them.

3.10 **Team competition: Team Fortress 2**

Persuasive Games

by Ian Bogost

Ian Bogost is the Ivan Allen College Distinguished Chair in Media Studies and Professor of Interactive Computing at the Georgia Institute of Technology and founding partner at Persuasive Games LLC. He is the author of numerous books, including Persuasive Games: The Expressive Power of Videogames and How to Do Things with Videogames.

How do video games express ideas? Without understanding how games can be expressive in a general sense, it is hard to understand how they might be persuasive. And how do video games make arguments? Video games are different from oral, textual, visual, or filmic media, and thus when they try to persuade, they do so in a different fashion from speech, writing, images, or moving images.

How Video Games Express Ideas

Video games are good at representing the behavior of systems. When we create video games, we start with some system in the world—traffic, football, whatever. Let's call this the "source system." To create the game, we build a model of that source system. Video games are software, so we build the model by authoring code that *simulates* the behavior we want to focus on. Writing code is different from writing prose or taking photographs or shooting video; code models a set of potential outcomes, all of which conform to the same general rules. One name for this type of representation is *procedurality* (Murray 1997); procedurality is a name for a computer's ability to execute rule-based behaviors. Video games are a kind of procedural representation.

Consider some examples: Madden Football is a procedural model of the sport of American football. It models the physical mechanics of human movement, the strategy of different sets of plays, and even the performance properties of specific professional athletes. Sim City is a procedural model of urban dynamics. It models the social behavior of residents and workers, as well as the economy, crime rate, pollution level, and other environmental dynamics.

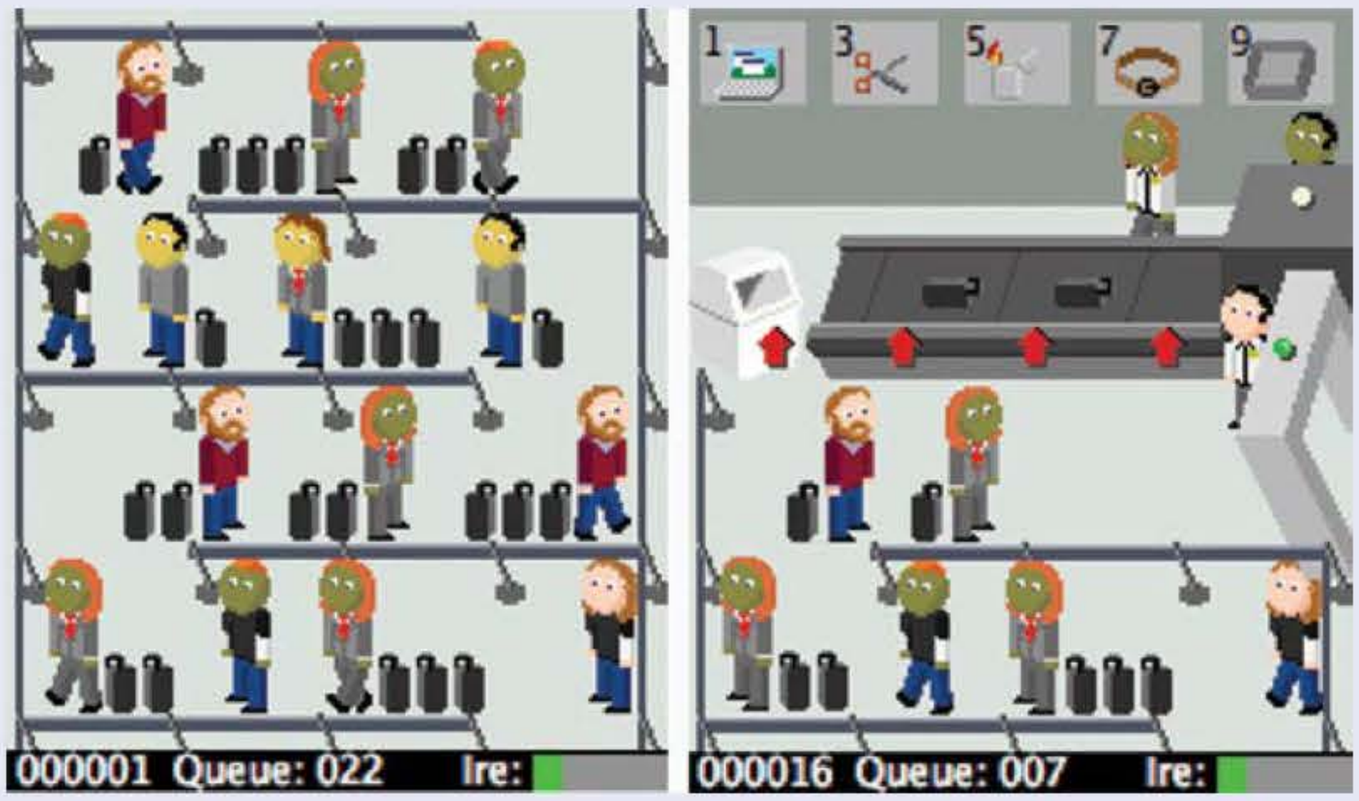
So, in a video game, we have a source system and a procedural model of that source system. A player needs to interact with the model to make it work—video games are interactive software; they require the player to provide input to make the procedural model work. When players play, they form some idea about the modeled system and about the source system it models. They form these ideas based on the way the source system is simulated; that is to say, there might be many different ways of proceduralizing a system. One designer might build a football game about the strategy of coaching, while another might build one about the duties of a particular field position, such as a defensive lineman. Likewise, one designer might build a city simulator that focuses on public services and new urbanism (Duany, Plater-Zyberk, & Alminana 2003), while another might focus on Robert Moses-style suburban planning. This is not just a speculative observation: It highlights the fact that the source system never really exists as such. One person's idea of football or a city or any other subject for a representation of any kind is always *subjective*.

The inherent subjectivity of video games creates dissonances, gaps between the designer's procedural model of a source system and the players' subjectivity, their preconceptions and existing understanding of that simulation. This is where video games become expressive: They encourage players to interrogate and reconcile their own models of the world with the models presented in a game.

How Video Games Persuade

Most of the time, video games create procedural models of fantasy lives, like that of the pro ballplayer (Madden), or a blood elf (World of Warcraft), or a space marine (DOOM). But we can also use this facility to invite the player to see the ordinary world in new or different ways. One way to use video games in this fashion is for persuasion, to make arguments about the way the world works.

Consider a game we created at my company, Persuasive Games. Airport Insecurity (Persuasive Games 2005) is a mobile game about the Transportation Security Administration (TSA). In the game, the player takes the role of a passenger at any of the 138 most trafficked airports in the United States. The gameplay is simple: The player must progress through the security line in an orderly and dignified fashion, taking care not to lag behind when space opens in front of him, as well as to avoid direct contact with other passengers. When he reaches the x-ray check, the player must place his luggage and personal items on the belt. The game randomly assigns luggage and personal items to the player, including "questionable" items like lighters and scissors, as well as legitimately dangerous items like knives and guns.



Airport Insecurity

For each airport, we gathered traffic and wait time data to model the flow of the queues, and we also gathered as much as we could find in the public record on TSA performance. Government Accountability Office (GAO) analysis of TSA performance used to be reported publicly, but the agency reportedly started classifying the information after it became clear that it might pose a national security risk. The upshot of such tactics is that the average citizen has no concept of what level of security they receive in exchange for the rights they forego. While the U.S. government wants its citizens to believe that increased protection and reduced rights are necessary to protect us from terrorism, the effectiveness of airport security practices is ultimately uncertain. The game made claims about this uncertainty by modeling it procedurally: The player got to choose if they would dispose of their dangerous items in a trash can near the x-ray belt or if they would test the limits of the screening process by carrying them through.

Consider another example, this one a live-action game played via text messaging on mobile phones in a real-world environment. Cruel 2 B Kind, which ubiquitous game researcher and designer Jane McGonigal and I created, is a modification of games like Assassin where players attempt to surreptitiously eliminate

each other with predetermined weapons like water pistols. But in Cruel 2 B Kind, players "kill with kindness." Each player is assigned a "weapon" and "weakness" that corresponds with a common, even ordinary pleasantry. For example, players might compliment someone's shoes or serenade them. While Assassin is usually played in closed environments like college dorms, Cruel 2 B Kind is played in public on the streets of New York City or San Francisco or anywhere in the world.

Cruel 2 B Kind

Players not only don't know who their target is, they also don't know who is playing. In these situations, players are forced to use guesswork or deduction to figure out who they might target. As a result, players often "attack" the wrong groups of people or people who are not playing at all. The reactions to such encounters are startling for all concerned; after all, exchanging anonymous pleasantries is not something commonly done on the streets of New York. Cruel 2 B Kind asks the player to layer an alternative set of social practices atop the world they normally occupy. Instead of ignoring their fellow citizens, the game demands that players interact with them. This juxtaposition of game rules and social rules draws attention to the way people do (or more properly, don't) interact with one another in everyday life.

Disruptive and Strange

Persuasive games model ideas about the world and how it works in the subjective opinion of the game's designer. As players, we come to a video game with an idea of the world and how it works. A game presents a model of that same world, but that model has its own properties that likely differ from the player's. When we put the two models together, we can see where they converge and diverge—this is what we do when we play games critically. Procedural arguments can do just this: produce player deliberation, not by making those arguments seamless and comfortable, but rather by making them disruptive and strange.

References

Bogost, I. *Persuasive Games: The Expressive Power of Videogames*. Cambridge: MIT Press, 2007.

Bogost, I. *Unit Operations: An Approach to Videogame Criticism*. Cambridge: MIT Press, 2006.

Duany, A., Plater-Zyberk, E. and Alminana, R. *The New Civic Art: Elements of Town Planning*. New York: Rizzoli Publications, 2003.

Murray, J. *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. New York: Free Press, 1997.

Objectives

Objectives give your players something to strive for. They define what players are trying to accomplish within the rules of the game. In the best-case scenario, these objectives seem challenging—but achievable—to the players. In addition to providing challenge, the objective of a game can set its tone. A game in which the objective is to capture or kill the opponent's forces will have a very different tone from a game in which the objective is to spell more or longer words.

Some games are constructed so that different players have different objectives, while other games allow the player to choose one of several possible objectives, and still others allow players to form their own objectives as they play. Additionally, there might be partial objectives, or mini-objectives, in a game that help the players to accomplish the main objective. In any case, the objective should be considered carefully because it affects not only the formal system of the game but also the dramatic aspects. If the objective is well integrated into the premise or story, the game can take on strong dramatic aspects.

Some questions to ask yourself about objectives as you design your own games are:

- What are some objectives of games you have played?
- What impact do these objectives have on the tone of the game?
- Do certain genres of play lend themselves to certain objectives?
- What about multiple objectives?
- Do objectives have to be explicit?
- What about player-determined objectives?

Here are some examples of objectives from games you might have played:

- *Connect Four*: Be the first player to place four units in a contiguous line on the playing grid.
- *Battleship*: Be the first player to sink all five of your opponent's battleships.
- *Mastermind*: Deduce the secret code of four colored pegs in as few steps as possible.
- *Chess*: Checkmate your opponent's king.
- *Clue*: Be the first player to deduce who, where, and how a murder was committed.
- *Super Mario Bros.*: Rescue Princess Toadstool from the evil Bowser by completing all eight worlds (32 levels) of the game, each of which has its own miniobjectives.
- *Spyro the Dragon*: Rescue your fellow dragons who have been turned to stone, and defeat the evil Gnasty Gnorc by completing all six worlds of the game, each of which has its own miniobjectives.
- *Civilization*: Option 1: conquer all other civilizations on the board, or Option 2: colonize the star Alpha Centauri.
- *The Sims*: Manage the lives of a virtual household; as long as you can keep your household alive, you can set your own goals for the game.
- *Katamari Damacy*: Gather enough material by rolling the sticky katamari ball to create stars that can repopulate the sky.
- *Gone Home*: Explore the Greenbriar family home and discover what has happened to them.
- *Pokémon Go*: Catch as many Pokémon in and around the real world as you can.

Are there any generalizations we can make about the types of objectives that might help us in our design process? A number of game scholars have made attempts to categorize games by their objectives. Here are some of the categories they defined.[3]

1. Capture

The objective in a capture game is to take or destroy something of the opponent's (terrain, units, or both), while avoiding being captured or killed. Examples of this type of game are strategy board games like chess and checkers, as well as action games like Quake, SOCOM II, and their brethren. Also in this category are real-time strategy games like the WarCraft series and Command & Conquer. There are, in fact, so many examples of games with this type of objective

3.11 Capture or kill: SOCOM II and DOOM

that it is difficult to make any generalizations. Suffice to say that the concept of capture or killing the opponent's forces is one that is deeply ingrained in games today and has been since antiquity.

2. Chase

The objective in a chase game is to catch an opponent or elude one, if you are the player being chased. Examples of chase games include tag, Fox & Geese, Assassin, and Need for Speed: Rivals. Chase games can be structured as single player versus game, player versus player, or unilateral competition. For example, tag and Fox & Geese are unilateral competitions, or one player versus many. Assassin is player versus player with each player chasing and being chased simultaneously. Need for Speed has an innovative social system that allows players to transition seamlessly between playing alone against the computer and playing online with friends. Chase games can be determined by speed or physical dexterity, as in tag and Need for Speed, or by stealth and strategy, as in Assassin. Also, a game like Scotland Yard, discussed on page 63, is a chase game that is determined by logic and deduction. There is clearly a wealth of possibilities for games using this type of objective.

3. Race

The objective in a race game is to reach a goal—physical or conceptual—before the other players. Examples could be a footrace, a board game like Uncle Wiggly or Parcheesi, or a simulation game like Virtua Racing. Race games can be determined by physical dexterity (such as with the footrace and, to some extent, Virtua Racing) or chance (such as with Uncle Wiggly and Parcheesi). They can also be determined by a mix of strategy and chance, such as in backgammon.

4. Alignment

The objective in an alignment game is to arrange your game pieces in a certain spatial configuration or create conceptual alignment between categories of pieces. Examples include tic-tac-toe, solitaire, Connect Four, Othello, Tetris, and Bejeweled. Alignment games are often somewhat puzzle-like in that they involve solving spatial or organizational problems to achieve the goal. They can be determined by logic and calculation, as in Othello and Pente, or by chance opportunity combined with calculation, as in Tetris and Bejeweled. Conceptual alignment is used in many games that require the players to make matches or sets of game pieces.

5. Rescue or escape

The objective in a rescue or escape game is to get a defined unit or units to safety. Examples are Super Mario Bros., Prince of Persia 3D, Emergency Rescue: Firefighters, and Ico. This objective is often combined with other partial objectives. For example,

3.12 Chase games: Need for Speed Rivals

Need for Speed: Rivals trademark Electronic Arts.

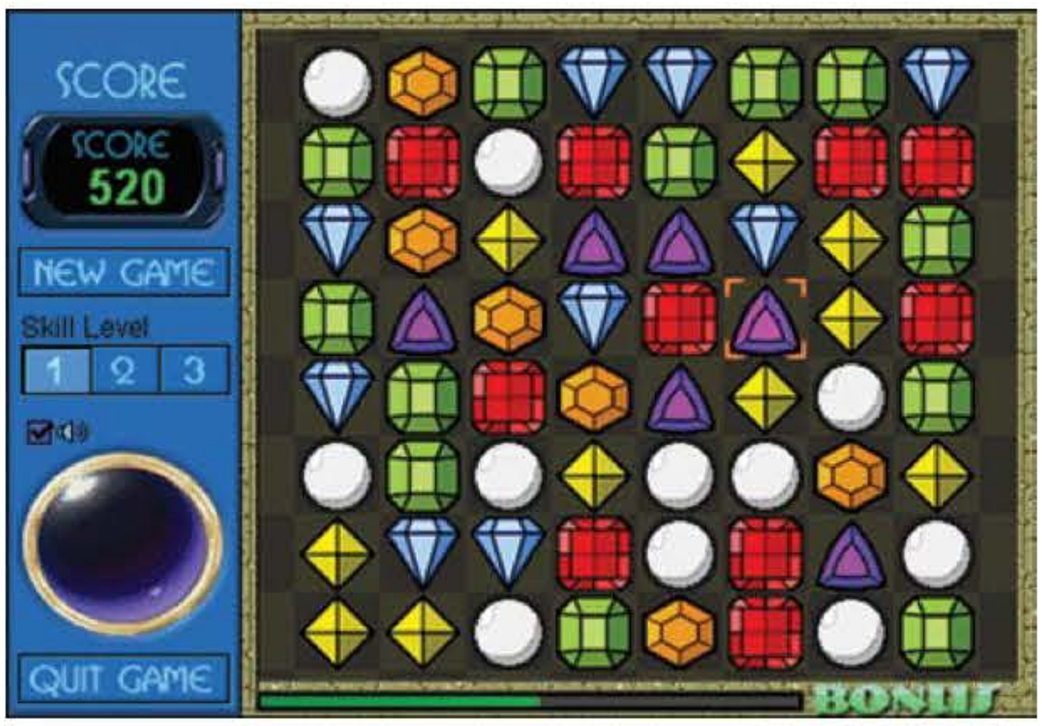
3.13 Race games: Pole Position and Gran Turismo 4

Pole Position © 1982 Namco Ltd. All Rights Reserved. Courtesy of Namco Holding Corp.

in Super Mario Bros., the overall objective, as mentioned previously, is to rescue the Princess. But each of the game levels also has their own objectives that are more puzzle-like (see Solution on page 72).

6. Forbidden Act

The objective in a forbidden act game is to get the competition to break the rules by laughing, talking, letting go, making the wrong move, or otherwise doing something they shouldn't. Examples include Twister, Operation, Ker-Plunk!, and Don't Break the Ice. This is an interesting game type that isn't often found in digital games, perhaps because of its lack of direct competition or the difficulty in monitoring



3.14 Alignment: Bejeweled

3.15 Rescue or escape: Prince of Persia 3D

3.16 Forbidden act: Milton Bradley's Operation

fair play. From the examples, it is clear to see that there is often a physical component to games with this objective, sometimes involving stamina or flexibility, and sometimes just plain chance. One interesting experimental game that has a forbidden act objective is Johan Sebastian Joust, a physical game in which players try to hold their Sony Move controller still, while bumping and interacting with their opponents to get them to move their controllers too quickly. Anything goes, including kicking and pushing and the winner is the last player standing.

Not included in the work of the scholars mentioned previously, but interesting nonetheless, are objectives such as the following items.

7. Construction

The object in a construction game is to build, maintain, or manage objects; this might be within a directly

3.17 Construction: Animal Crossing and Settlers of Catan

competitive or indirectly competitive environment. This, in many instances, is a more sophisticated version of the alignment category. Examples of this type of game are simulation games like Animal Crossing, Minecraft, SimCity, or The Sims, or board games like Settlers of Catan. Games with a construction objective often make use of resource management or trading as a core gameplay element. They are usually determined by strategic choice making rather than chance or physical dexterity. Also, construction games can often be left open to player interpretation as to what ultimate success is within the game; for example, players choose what type of city to build in SimCity or household to encourage in The Sims.

8. Exploration

The object in an exploration game is to explore game areas. This is almost always combined with a more competitive objective. In the classic game of exploration, Colossal Cave Adventure, the objective is not only to explore Colossal Cave but also to find treasure along the way. In games like the Zelda series, the objectives of exploration, puzzle solving, and sometimes combat intertwine to form multifaceted gameplay. Open-world adventure games like The Elder Scrolls V: Skyrim and Grand Theft Auto V also use exploration as one of several objectives in their game structures, as do experimental games like Dear Esther or narrative games like Gone Home.

9. Solution

The object in a solution game is to solve a problem or puzzle before (or more accurately) than the competition. Examples include graphic adventures like the Myst series, text adventures like the classic Infocom titles, and many games that fall into other categories but have puzzle qualities. These include some I have mentioned already: the Mario and Zelda games, Tetris, and The Sims. Some games of pure strategy fall into this puzzle-like category as well: Connect Four and tic-tac-toe.

10. Outwit

The object in a game of wits is to gain and use knowledge in a way that defeats the other players. Some games of this type focus on having extra-game knowledge, like in Trivial Pursuit or Jeopardy! Others focus on gaining or using in-game knowledge, such as Survivor and Diplomacy. This second type of game provokes interesting social dynamics,

3.18 **Exploration: Dear Esther and The Legend of Zelda: The Wind Waker**

3.19 **Solution: Day of the Tentacle**

3.20 **Outwit: Diplomacy**

which have yet to be truly explored in digital games, though a number of real-world games use this type of objective, such as Area/Code's Identity and Ian Bogost and Jane McGonigal's Cruel 2B Kind.

Summary

This list is by no means exhaustive, and one of the most interesting things about objectives in games is when they are somewhat mixed. For example, the genre of real-time strategy mixes war with construction, forming a split focus that appeals to gamers who might not be interested in either pure war games or pure construction games. What you can do with a list like this is use it as a tool to look at the types of objectives you like in games, as well as those you do not like, and see how you might use these objectives in your own game ideas.

Exercise 3.4: Objectives

List ten of your favorite games and name the objective for each. Do you see any similarities in these games? Try to define the type or types of games that appeal to you.

Procedures

As discussed in Chapter 2, procedures are the methods of play and the actions that players can take to achieve the game objectives. One way to think about procedures is: Who does what, where, when, and how?

- Who can use the procedure? One player? Some players? All the players?
- What exactly does the player do?
- Where does the procedure occur? Is the availability of the procedure limited by location?
- When does it take place? Is it limited by turn, time, or game state?
- How do players access the procedure? Directly by physical interaction? Indirectly through a controller or input device? By verbal command?

There are several types of procedures that most games tend to have:

- *Starting action*: How to put a game into play.
- *Progression of action*: Ongoing procedures after the starting action. This includes the "core loop," a set of activities that repeat to move the game forward.
- *Special actions*: Available conditional to other elements or game state.
- *Resolving actions*: Bring gameplay to a close.

In board games, procedures are usually described in the rule sheet and put into action by the players. In digital games, however, they are generally integrated into in the control section of the manual because they are often accessed by the player via the controls. This is an important way in which procedures differ from rules because rules might actually be hidden from the player in a digital game, as I'll discuss on page 76. Here are some examples of procedures from both a board/tabletop game and a digital game.

Connect Four

1. Choose a player to go first.
2. On her turn, each player drops one of his color checkers down any of the slots in the top of the grid.

3.21 Super Mario Bros. and Connect Four

3. The play alternates until one of the players gets four checkers of his color in a row. The four in a row can be horizontal, vertical, or diagonal.

Super Mario Bros.[4]

Select button: Use this button to select the type of game you wish to play.

Start button: Press this button to start the game. If you press it during play, it will pause/unpause the game.

Left arrow: Walk to the left. Push button B at the same time to run.

Right arrow: Walk to the right. Push button B at the same time to run.

Down: Crouch (Super Mario only).

A Button

Jump: Mario jumps higher if you hold the button down longer.

Swim: When in water, press this button to bob up.

B Button

Accelerate: Press this button to run. If while holding B, you press A to jump, you can jump higher.

Fireballs: If you pick up a fire flower, you can use this button to throw fireballs.

Comparison

Notice that both Connect Four and Super Mario Bros. specify a starting action. The progression of action in Connect Four is clearly shown in steps 2 and 3, while

in Super Mario Bros., which is a real-time game, the progression is implied by the left and right walk commands, which move the player through the game. Connect Four doesn't have any special actions, but Super Mario Bros. has commands that are only applicable in certain situations: that is, "when in water press this button to bob up," and "if you pick up a fire flower, you can use this button to throw fireballs." Connect Four also states the resolving action: when one player gets four checkers in a row. Super Mario Bros. does not state the resolving action; this is because the resolution is adjudicated by the system, not the players.

Exercise 3.5: Procedures for Blackjack

List the procedures for blackjack. Be specific. What is the starting action? The progression of action? Any special actions? The resolving action?

System Procedures

Digital games can have much more complex game states than nondigital games. They can also have multifaceted system procedures that work behind the scenes, responding to situations and player actions. In a role-playing combat system, character and weapon attributes can be used as part of a system calculation determining whether a particular player action succeeds, and if so, how much damage it causes. If the game were to be played on paper, as many role-playing games are, these system procedures need to be calculated by the players, using dice to generate random numbers. If the game is played digitally, the same system procedures are calculated by the program rather than the players.

Because of this, digital games can involve more sophisticated system procedures and process them more quickly than nondigital games. This does not

3.22 SSX Tricky: Learn the trick procedures to score "Tricky Points"

mean that digital games are more complex than nondigital games. When I discuss system structures in Chapter 5 on page 129, I'll look at systems that have simple procedures, which lead to extremely complex results. For example, games like chess or Go are nondigital systems that have intrigued players for thousands of years with their innate complexity, all of which stems from the relationship of very simple game objects and the procedures for manipulating them.

Defining Procedures

When you are defining the procedures for your game, it's important to keep in mind the limitations of the environment in which your game will be played. Will your game be played in a nondigital setting? If so, you will want to make sure the procedures are easy for players to remember. If your game will be played in a digital setting, what type of input/output devices will that setting have? Will players have a keyboard and mouse, or will they have a proprietary controller? Will they sit close to a high-resolution screen or several feet from a low-resolution screen?

It is especially important to consider the "core loop," which, as mentioned earlier, is a special set of procedures that repeat throughout play to move the game forward. So, for example, roll the dice, move your piece, and do what it says on the square you land on is a simple core loop for a board game. In a digital game, the core loop may include checking many conditions of the game state, such as where players are in the world and if they are colliding with anything important. The core loop also checks for player input so that the system knows how to proceed—whether to move a particular player or take action on an object in the world. In an analog game, players must adjudicate the outcome of actions themselves during each cycle, so designing your core loop in such a way that players can grasp it quickly and process all of its steps easily and keep the game moving forward is important in both digital and analog games. Dan Cook discusses game loops in more detail in his sidebar on page 153.

Procedures are, by nature, affected by these constraints. As a designer, you need to be sensitive to constraints and find creative and elegant solutions so that the procedures are intuitive to access and easy to remember. These types of questions will be addressed in more detail in Chapter 8, when I discuss the prototyping of interfaces and controls for digital games.

Rules

I said in the last chapter that rules define game objects and define allowable actions by the players. Some of the questions you might ask yourself about rules are: How do players learn the rules? How are the rules enforced? What kinds of rules work best in certain situations? Are there patterns to rule sets? What can we learn from those patterns?

Like procedures, rules are generally laid out in the rules document of board games. In digital games, they can be explained in the manual or they can be implicit in the program itself. For example, a digital game might not allow certain actions without explicitly stating that fact; the interface might simply not provide controls for such an action, or the program might stop a player from performing that action if it is attempted.

Rules can also close up loopholes in the game system. One classic example of this is the famous rule from Monopoly: "Do not pass go, do not collect $200." This rule is applied when a player is sent to jail from any spot on the board. It is important because if it was not stated, a player could make the argument that moving past "go" all the way to jail entitled him to collect $200, transforming the intended punishment into a reward.

When you are designing rules, as when you are designing procedures, it's important to think of them in relation to your players. Too many rules

might make it difficult for the players to manage their understanding of the game. Leaving rules unstated or poorly communicating them might confuse or alienate players. Even if the game system (in the case of a digital game) is tracking the proper application of rules, the players need to clearly understand them so that they do not feel cheated by the consequences of certain rules.

Here are some sample rules from several different types of games that we can use as reference for the following discussion:

- *Poker*: A straight is five consecutively ranked cards; a straight flush is five consecutively ranked cards of the same suit.
- *Chess*: A player cannot move her king into check.
- *Go*: A player cannot make a move that recreates a previous state of the board—this means an exact replication of the whole board situation.
- *WarCraft II*: To create knight units, a player must have upgraded to a keep and built a stable.
- *You Don't Know Jack*: If a player answers a question incorrectly, the other players get a chance to answer.
- *Jak and Daxter*: If a player runs out of green mana, they are "knocked out" and return to the last checkpoint of the level.

Even from this short list, there are some generalities that start to emerge concerning the nature of rules, which are discussed below.

Rules Defining Objects and Concepts

Objects in games have a unique status and meaning that is totally different from objects in the real world. These game objects, defined as part of the game's rule set, can be completely fabricated, or they can be based on real-world objects. But even if they are based on familiar objects, they are only abstractions of those objects and still need to be defined in the rules as to their nature in the game.

Think about the poker rule regarding the concept of a straight or a straight flush. This is a concept unique to the game. There is no straight outside of the realm of poker. When you learn the rules of poker, one of the key concepts to learn is the makeup and values of certain hands—a straight being one of these hands.

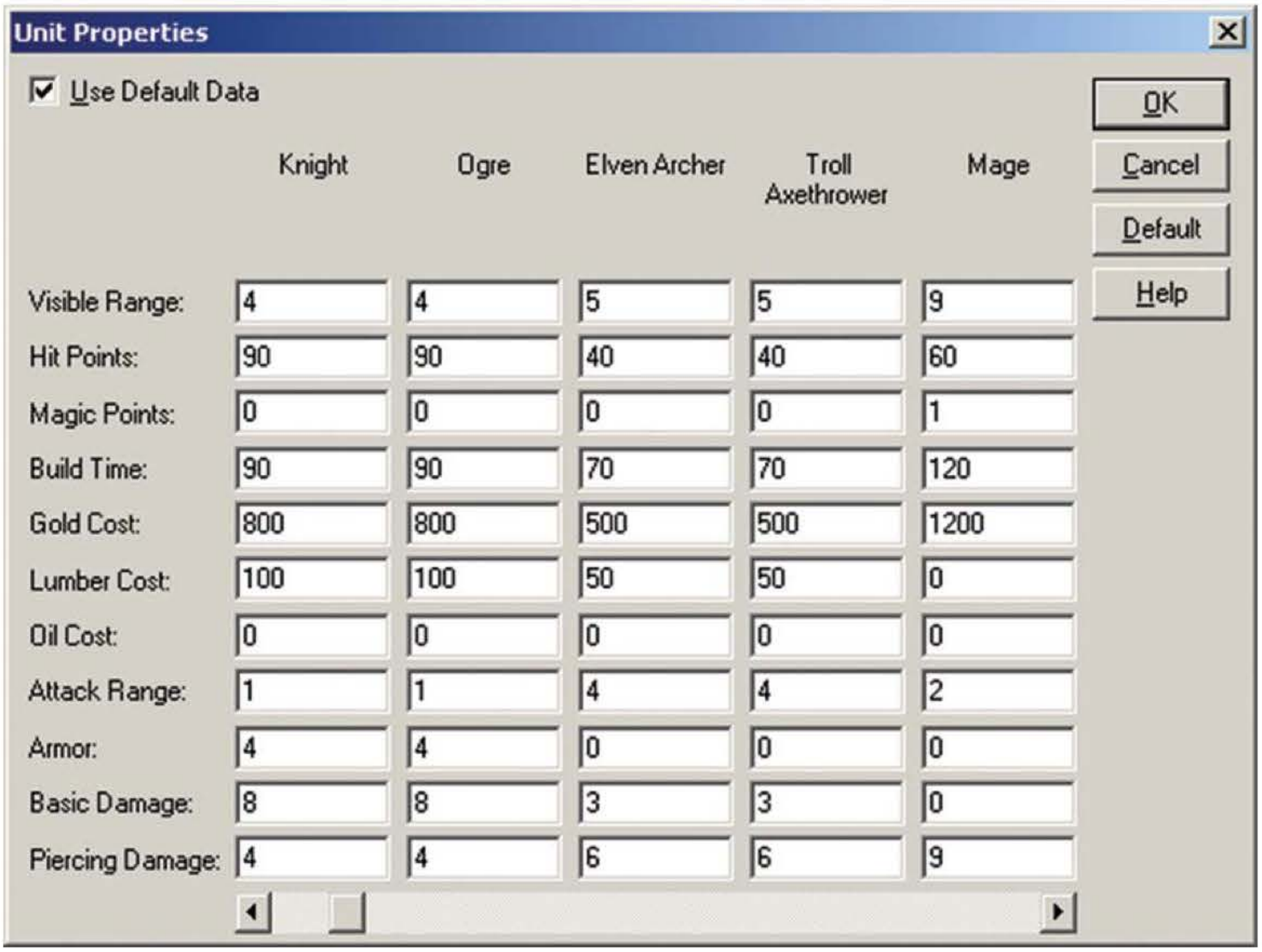
Then again, there is chess. We know that chess has objects in its system called kings, queens, bishops, etc., all of which have counterparts in the real world. But this is misleading; the king in a chess game is an abstract object with explicit rules defining its nature. A king outside of the game bears no resemblance to this abstract game object. The rules of chess have simply used the notion of a king to give context to the behavior and value of this important piece.

Board games and other nondigital games generally define their objects explicitly as a part of their rule sets. Players must read and understand these rules, and then they have to be able to adjudicate the game themselves. Because of this, most nondigital games limit themselves to fairly simple objects, with only one or two possible variables or states for each, usually denoted by some physical aspect of the equipment, board, or other interface elements. In a board game like chess, the only variables for each piece are color and position, both of which the player can easily track visually.

Digital games, on the other hand, can have objects such as characters or fighting units that are made up of a fairly complex set of variables that define their overall state. Players might not be aware of this entire state because, unlike a board game, the program can track the variables behind the scenes. For example, here are the default variables underlying both knights and ogres in WarCraft II:

- *Cost*: 800 gold, 100 lumber
- *Hit Points*: 90
- *Damage*: 2–12
- *Armor*: 4
- *Sight*: 5
- *Speed*: 13
- *Range*: 1

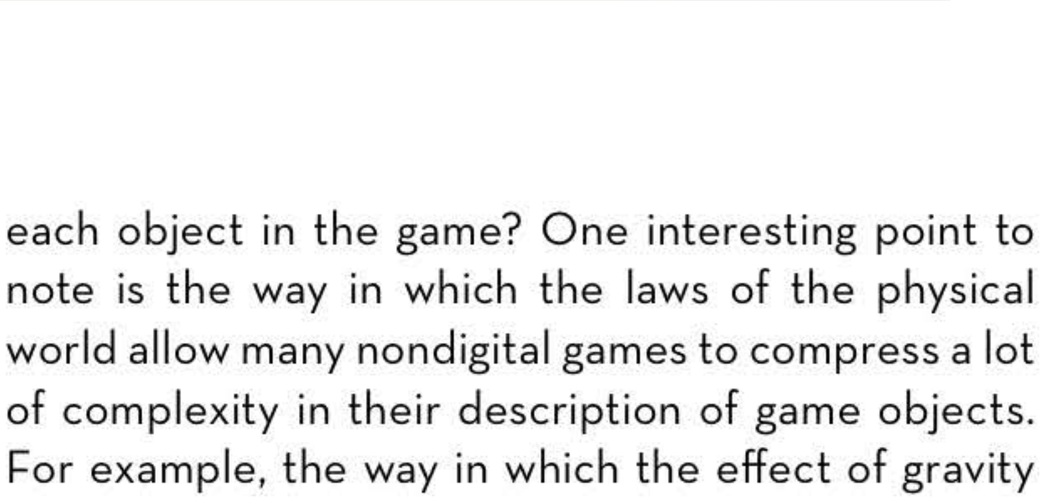
While these variables are important to how the play proceeds, and they are in fact available to



3.23 WarCraft II—Unit properties

players via the interface, they are not something that players must directly manage and update. Even the most advanced player probably does not consistently calculate their strategy using these mathematical variables. Rather, they gain an intuitive knowledge of the knight's cost, strength, power, range, etc., versus the other units on the board through their play experience.

When defining your game objects and concepts, an essential thing to keep in mind is how players will learn the nature of these objects. If the objects are complex, will the players have to deal with that complexity directly? If the objects are simple, will players feel they are differentiated enough from each other to make an impact on the gameplay? Do the objects evolve? Are they only available under certain circumstances? How will players learn the nature of each object in the game? One interesting point to note is the way in which the laws of the physical world allow many nondigital games to compress a lot of complexity in their description of game objects. For example, the way in which the effect of gravity



3.24 Dimensions of a football field

in Connect 4 is used to create an implicit rule about how players can place pieces on the board.

Rules Restricting Actions

The next general rule concept we can see reflected in my list of sample rules is the idea of rules restricting actions. In chess, the rule that "a player cannot move their king into check" keeps players from losing the game by accident. The example from Go where "a player cannot make a move that recreates a previous state of the board" keeps the players from becoming locked in a never ending loop of play. Both of these address potential loopholes in the game systems.

Additionally, rules restricting actions can take the form of basic delimitations: "the play takes place on a field of 360 × 160 feet" (football) or "a team shall be composed of not more than 11 players, one of whom shall be the goalkeeper" (soccer). In both of these cases, we can see that the rules overlap with other formal aspects—namely the number of players and the boundaries of the game. This is actually true of all formal aspects, which will be represented in either the procedures or the rules in some way.

Another example of rules that restrict actions is in the type of rules that keep gameplay from becoming imbalanced in one or more players' favor. Think about the effects of the rule from WarCraft II where "in order to create knight units, a player must have upgraded to a keep and built a stable." What this means is that one player cannot simply choose to use their resources early in the game to create knights, while other players are still creating lower-level fighting units. All players must progress along a fairly similar path of resource management to gain more powerful units.

3.25 Jak II—Almost out of mana

Exercise 3.6: Rules Restricting Actions

There are many types of rules that restrict action. Here is a list of games: Twister, Pictionary, Scrabble, Operation, and Pong. What rules within these games restrict player actions?

Rules Determining Effects

Rules also can trigger effects based on certain circumstances. For example, "if" something happens, there is a rule that "xyz" results. In our list of sample rules, the condition from You Don't Know Jack falls into this type of rule: "If a player answers a question incorrectly, the other players get a chance to answer." Also, this rule from Jak and Daxter is of the same quality: "If a player runs out of green mana, they are 'knocked out' and return to the last checkpoint."

Rules that trigger effects are useful for a number of reasons. First, they create variation in gameplay. The circumstances that trigger them are not always applicable, so it can create excitement and difference when they come into play. The example from You Don't Know Jack shows this quality. In this case, the second player gets a chance to answer the question, already having seen the results of the first player's guess. Because of this, they have an advantage, a higher percentage chance of answering correctly.

Additionally, this type of rule can be used to get the gameplay back on track. The rule from Jak and Daxter shows this. Because the game is not competitive in the sense that it is a single-player adventure, there is no reason for the player to "die" when they lose all their mana. However, the designers want the player to be penalized in some way so that they will

take care with their actions and try to keep from losing mana. Their solution is the previous rule: Players are penalized, but not badly, for losing all their mana. This gets the game back on track, incentivizing the players to work harder to keep their mana loss in check.

Defining Rules

As with procedures, the way in which you define your rules will be affected by your play environment. Rules need to be clear to players, or, in the case of digital games that adjudicate for players, they need to be intuitively grasped so that the game seems fair and responsive to given situations. In general, it is important to keep in mind that the more complex your rules are, the more demands you will place on the players to comprehend them. The less well that players understand your rules, whether rationally or intuitively, the less likely they will be able to make meaningful choices within the system and the less sense they will have of being in control of the gameplay.

Exercise 3.7: Rules for Blackjack

In the same way that you wrote down the procedures for blackjack in Exercise 3.5, now write down the rules. It is harder than you think. Did you remember all the rules? Try playing the game as you have written it. You might realize that you have forgotten something. What rules did you forget? How did those missing rules affect the play of the game?

Resources

What exactly is a resource? In the real world, resources are assets (i.e., natural resources, economic resources, human resources) that can be used to accomplish certain goals. In a game, resources play much the same role. Most games use some form of resources in their systems, such as chips in poker, properties in Monopoly, and gold in WarCraft. Managing resources and determining how and when to control player access to them is a key part of the game designer's job.

How does a designer decide what resources to offer to players? And how does a player control access to those resources to maintain challenge in the game? This is a hard question to answer in the abstract. It is easier if I take an example that you are probably familiar with.

Think of a role-playing game like Diablo III. What are some of the resources you might find in such a system: money, weapons, armor, potions, magic items? Why don't you find things like paper clips or pieces of sushi? While it might be fun to find such random items, the truth is, a piece of sushi won't help you to achieve the goals of the game. The very same items might actually have useful value in another game. For example, in Katamari Damacy, which was discussed in Chapter 1 on page 11, paper clips and sushi are just two of the quirky types of game resources you need to deal with. In this game, the main value of these resources lies in their size relative to your katamari, or "sticky ball." In each of these examples, the designers have carefully planned how you can find or earn the very resources that you need to accomplish the goals they have put before you. You might not find or earn as much as you would like, but if you meet the challenges the game presents, you will gain enough resources to allow you to move forward. If you did not gain these resources, the game system would be unbalanced.

By definition, resources must have both utility and scarcity in the game system. If they do not have utility, they are like our example of sushi in Diablo III: a funny and strange thing to find, but essentially useless. On the same note, if the resources are overly abundant, they will lose their value in the system.

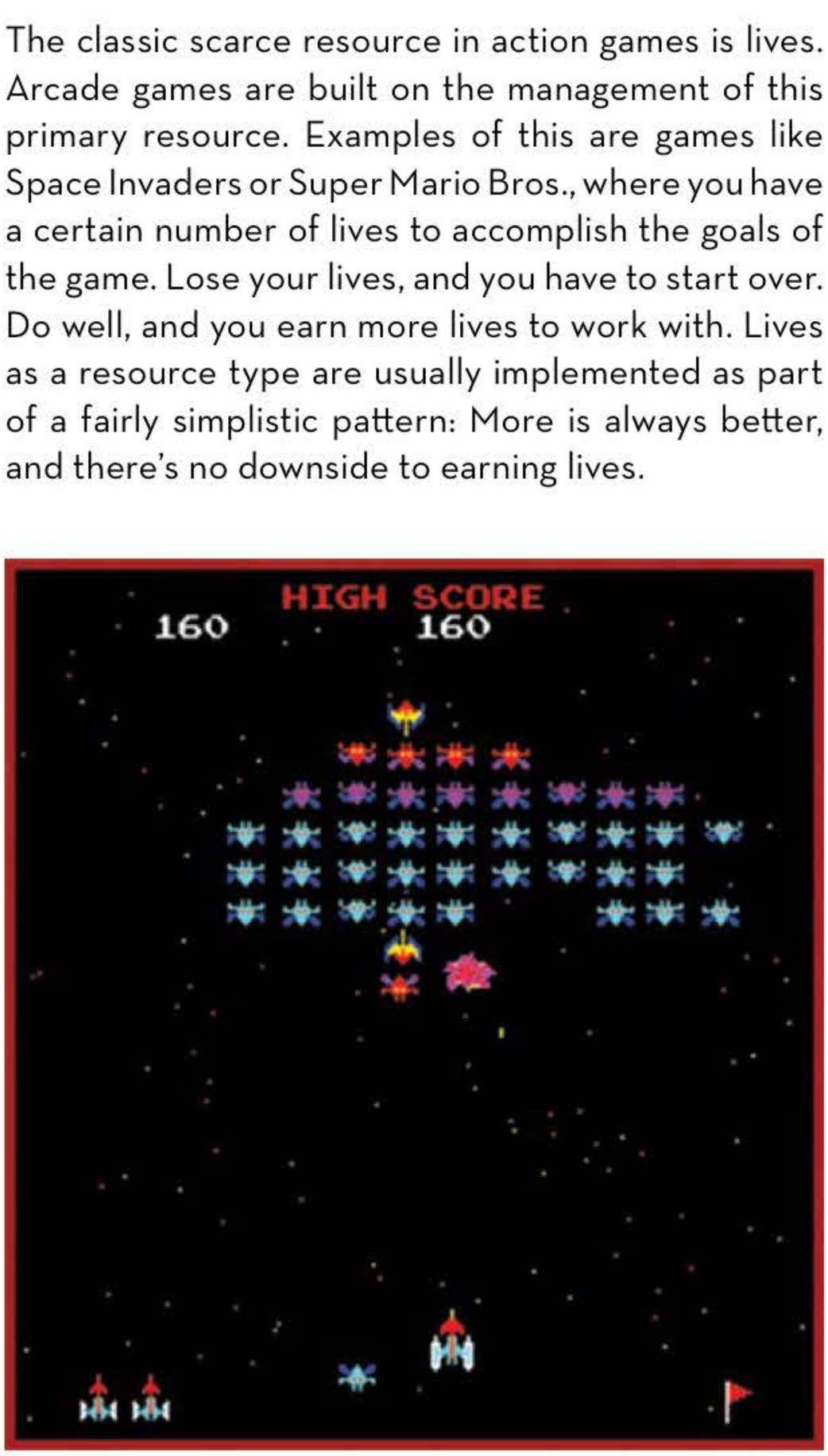
Exercise 3.8: Utility and Scarcity

What are the resources in the games Scrabble and Call of Duty? How are they useful to players? How are they made scarce by the game system?

Many designers fall into the trap of copying existing games when it comes to resource management. One way to break your game away from the tried and true is to think about resources in a more abstract sense. Look at the basic functions of resource types and try to apply them in new and creative ways. To illustrate what I mean, let's review some abstract examples that you should consider when designing your game.

Lives

The classic scarce resource in action games is lives. Arcade games are built on the management of this primary resource. Examples of this are games like Space Invaders or Super Mario Bros., where you have a certain number of lives to accomplish the goals of the game. Lose your lives, and you have to start over. Do well, and you earn more lives to work with. Lives as a resource type are usually implemented as part of a fairly simplistic pattern: More is always better, and there's no downside to earning lives.



3.26 Galaxian: Two lives left

Galaxian © 1979 Namco Ltd., All Rights Reserved. Courtesy of Namco Holding Corp.

Units

In games in which the player is represented in the game by more than one object at a time, they generally have unit resources to manage rather than lives. Units can be all of one kind, as in checkers, or a number of different types, as in chess. Units can keep the same values throughout the game, or they can upgrade or evolve, as in real-time strategy games. Units can be finite (i.e., when they are lost, they are lost for good), or they can be renewable, as in games that allow players to build new units over time. When units are renewable, they often have an associated cost per unit. Determining this cost per unit and how it balances with the rest of the resource structure can be tricky. Playtesting is the one good way to determine if your cost per unit is balanced.

3.27 Checkers: Simple units

Health

Health can be a separate resource type, or it can be an attribute of an individual life in a game. No matter how it is thought of, when health is used as a resource, it helps to dramatize the loss or near loss of lives and units. Using a resource like health usually means that there is some way to increase health, even as it is lost as part of gameplay.

How might players raise health levels in a game? Many action games place medical kits around their levels—picking one up raises a player's health. Some role-playing games force players to eat or rest to heal their characters. Each of these methods has its uses in a particular genre. The action game uses a method that is very fast, while being somewhat unrealistic. The role-playing example is more realistic within the story aspect of the game, but it is slow and potentially frustrating to players.

Currency

One of the most powerful resource types in any game is the use of currency to facilitate trade. As we'll see in Chapter 5 on page 140, currency is one of the key elements of an in-game economy. It is not the only way to create an economy—many games also use barter systems to accomplish the same goals. Currency in games plays the same role it does in real life: It greases the wheels of trade, making it easier for players to trade for what they need without having to barter using only the goods they have on hand. Currency need not be limited to a standard bank note system, however.

3.28 Diablo—Low health meter on lower left of screen

Actions

In some games, actions, such as moves or turns, can be considered resources. An example of this is the game of 20 Questions. Your questions have utility and scarcity in this system, and you have to ration them carefully to guess the answer within your limit. Another example is the phase structure of the turns in Magic: The Gathering. Each turn is made up of phases; some specific actions can be performed in each phase. Players must plan their turns carefully not to waste any potential actions.

Even real-time games can restrict actions that are too powerful, and by doing so, these actions become resources that need to be managed by the players. An example of this can be seen in Enter the Matrix, where the "focus" feature allows players to enter "bullet time," a feature that slows down the action so they can move more quickly relative to their opponents. You have only so much time to focus, however, before you return to normal time. Managing the use of your focus time is a key part of gameplay.

Power-ups

One classic type of resource is the power-up. Whether it is magic mushrooms in Super Mario Bros. or blue eco in Jak and Daxter, power-ups, as their name implies, are generally objects that give a boost of some sort to the player. This boost can increase size, power, speed, wealth, or any number of game variables. Power-up objects are generally made scarce, so that finding them doesn't make the game too easy. Power-ups are also generally temporary, limited in number, available for only a short time, or useful only in certain game states.

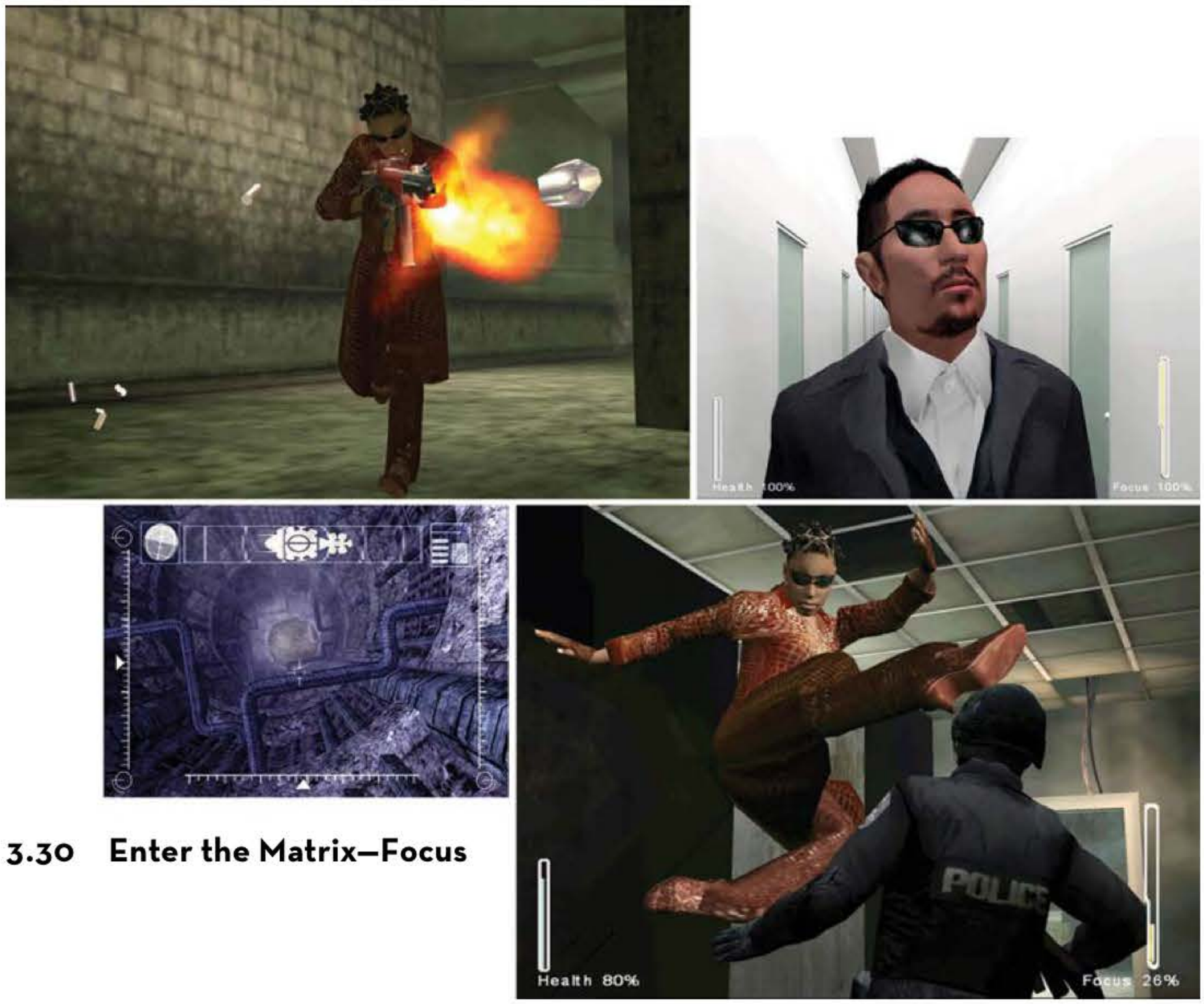
3.29 Ultima Online—Player knapsack with sack of gold

Inventory

Some game systems allow players to collect and manage game objects that are not power-ups or units. As a generic term, I am calling these game objects "inventory" after the way in which they are usually managed. I've already mentioned the armor, weapons, and other objects found in role-playing games such as Diablo III. These objects help players to accomplish game objectives, and they are made scarce by their high price at purchase or by the opportunity cost of finding them in dungeons guarded by more and greater monsters. The concept of an inventory of game objects is not limited to role-playing games: trading-card games like Magic: The Gathering ask players to manage their inventory of cards, limiting the number of cards they can have in their playing deck. Additionally, objects like ammunition or weapons can also be thought of as inventory. Like all of the other types of resources mentioned above, inventory objects must have utility and scarcity so that players are making meaningful choices when managing these objects.

Special Terrain

Special terrain is used as a resource in an important part of some game systems, especially those that are map-based systems, such as strategy games. In games like WarCraft III, the currency of the game (wood, gold, oil) is extracted from special areas of



3.30 Enter the Matrix—Focus

the terrain, so these areas become important primary resources. Other types of games can also use terrain as a resource in ways you might not have thought of. The triple letter squares in Scrabble are important resources found on the terrain of the game board, as are the bases on the diamond of a baseball field.

Time

Some games use time as a resource—restricting player actions by time or phases of the game in periods of time. A good example of time used as a resource can be seen in speed chess, where players have a total amount of time (e.g., 10 minutes) to use over the course of a game. Players alternate turns as normal, but a game clock keeps track of

3.31 Super Mario Bros.—Magic mushroom

3.32 Scrabble—Triple letter score

each player's used time. Other examples of time as a resource are the children's games hot potato and musical chairs. In each of these cases, players struggle not to be "it," whether that means holding the hot potato or being the only one without a chair, when the time is up. Time is an inherently dramatic force when used as a resource. We are all familiar with the tension of a countdown deadline or the anticipation caused by a ticking bomb in an action

3.33 Chess clock

movie. When used as a resource that players must ration or work against, time can add an emotional aspect to a game design.

Exercise 3.9: Resource Types

For each of the resource types just described, create a list of your favorite games that use resources of that type. If you can't think of any games that use a particular type of resource, research games that do and play several of them.

These are just some of the resource types that you should think about using when designing your own games. Challenge yourself to both create your own original types of resources and take resource models from one genre and adapt them to games where they're seldom, if ever, used. You might be surprised with the results.

Conflict

Conflict emerges from the players trying to accomplish the goals of the game within its rules and boundaries. As I have already mentioned, conflict is designed into the game by creating rules, procedures, and situations (such as multiplayer competition) that do not allow players to accomplish their goals directly. Instead, the procedures offer fairly inefficient means toward accomplishing the game objective. While inefficient, these means challenge the players by forcing them to employ a particular skill or range of skills. The procedures also create a sense of competition or play, which is enjoyable in

3.34 Pong and Quake III opponents

some way, so that players will submit themselves to this inefficient system to gain the ultimate sense of achievement that comes from participating.

Here are some examples of things that cause game conflicts to emerge:

- *Pinball*: Keep the ball from escaping the field of play using only the flippers or other devices provided.
- *Golf*: Get the ball from the tee to the hole, past any obstacles on the course, in as few strokes as possible.
- *Monopoly*: Manage your money and your properties to become the richest player in a tightly constrained real estate market.
- *Quake*: Stay alive while player or nonplayer opponents try to kill you.
- *WarCraft III*: Maintain your forces and resources while using them to command and control the map objectives.
- *Poker*: Outbid opponents based on your hand or your ability to bluff.

These examples point to three classic sources of conflict in games: obstacles, opponents, and dilemmas. Let's look at each of these more closely to see what they offer in terms of various types of gameplay.

Obstacles

Obstacles are a common source of conflict in both single- and multiplayer games, though they play a more important role in single-player games. Obstacles can take a physical form, such as the sack in a sack race, the water on a golf course, or the bumpers on a pinball table. Or obstacles can require mental skills to surpass, such as the puzzles in an adventure game.

Opponents

In multiplayer games, other players are typically the primary source of conflict. In the previous examples, Quake uses other players in addition to nonplayer opponents and physical obstacles to create conflict in the game. Also, Monopoly's conflict comes from interactions with other players.

Dilemmas

As opposed to physical or mental obstacles and conflict from direct competition with other players, another type of game conflict can come from dilemma-based choices that players have to make. An example of a dilemma in Monopoly is the choice of whether to spend money to buy a

property or use that money to upgrade a property that is already owned. Another dilemma would be whether to stay in or fold in poker. In both cases, players have to make choices that have a range of potential consequences. A dilemma can be a powerful source of conflict in both single- and multiplayer games.

Exercise 3.10: Conflict

Explain how conflict is created in the following games: Tetris, Frogger, Bomberman, Minesweeper, and solitaire. Does the conflict in these games come from obstacles, opponents, dilemmas, or a combination of these?

Boundaries

Boundaries are what separate the game from everything that is not the game. As discussed on page 37, the act of agreeing to play, to accept the rules of the game, to enter what Huizinga calls the "magic circle" is a critical part of feeling safe that the game is temporary, that it will end, or that you can leave or quit if you don't want to play anymore. As a designer, you must define the boundaries of the game and how players will enter and exit the magic circle. These boundaries can be physical—like the edges of an arena, playing field, or game board—or they can be conceptual, such as a social agreement to play. For example, ten people can be physically sitting in a room where Truth or Dare is being played, but two of them might not have agreed to play and are therefore outside the boundaries of the system.

Why are boundaries an important aspect of game design to consider? Think about what might happen if there were no boundaries in a familiar game system. Imagine a game like football. What if you tried to play football (either in a physical setting or on a computer) without boundaries? Players could run anywhere they wanted to; they could run as far as they could physically get without being tackled by the other team or blocked by random objects like buildings or cars. What does this do to the strategy of football? What about the abilities necessary for play? Apply this line of thinking to other games you know. Can you see how they would be intrinsically different if their boundaries were not closed? What if you could add real money to the bank in Monopoly? Or if you could add cards to the deck in poker? What if the edges of a chess board were infinitely expanding? It is clear without even playing these games that without their boundaries, they would become totally different games. This is not necessarily a bad thing—an interesting design exercise would be to take a familiar game and change its boundaries to see how it affects the play experience.

In addition to the purely formal aspect for game boundaries, however, there's also an emotional one. The boundaries of the game serve as a way to separate everything that goes on in the game from daily life. So while you might act the part of a cutthroat opponent facing off against your friends within the boundaries of a game (taking over their civilizations or destroying their forces), you can shake hands at the end of the game and walk away without any real damage to your relationships. In fact, you might

3.35 Boundaries of a tennis court

The Mechanic is the Message

by Brenda Romero

Brenda Romero is an award-winning game designer, artist, writer and Fulbright scholar who has worked in the game industry since 1981. As a designer, she has contributed to many seminal titles, including the Wizardry and Jagged Alliance series and titles in the Ghost Recon and Dungeons & Dragons franchises. Her analog series of six games, The Mechanic is the Message, has drawn national and international acclaim and is housed in the National Museum of Play.

The Mechanic is the Message is a collection of seven analog games designed to answer a question, "Can game mechanics capture and express difficult emotions like photographs, paintings, music, and books?" The answer may seem an obvious and resounding, "Yes!" but in video games, we often communicate deeper meaning through text, cut scenes, and other graphical means. In this series of games, and taking a formalist view, I wanted the meaning to arise from the mechanics instead. After all, mechanics are the one thing that makes a game a game.

The series began in February 2007 when my daughter Maezza, then 7, came home from school and discussed her day with me. "What did you learn about today?" I asked her. "The Middle Passage," she replied. I stopped what I was doing and focused on her exclusively. Maezza's father is half black, half Irish, and as such, the Middle Passage is an important part of her personal history. "How did you feel about that?" I asked. She went on to discuss the Middle Passage with a memory that would have made any parent or teacher proud, naming names and citing key moments in abolition. What was missing, however, was any sense of emotion or connection. She was only 7, so I wasn't expecting her to fall apart, but still, some sense of connection, of empathy, seemed appropriate given the gravity of the topic. When she finished her list of buzzwords, she looked toward her game console and asked, "Can I play a game, Mommy?"

"Sure," I said. Impulsively, I grabbed a bunch of wooden pawns, some paint and a few brushes and set them in front of her. As a game designer, I often prototype my games in the analog, so am fortunate to have a home loaded with all kinds of game-making goods. "Make me some families. Use different colors," I said. So, she started. She made a blue family, a pink family, a yellow family. Nearly an hour had passed when I approached her, grabbed some of the pawns and put them on a boat (an index card). Next to the boat, I placed a pile of pennies that would serve as food. "Wait," she said. "You forgot the mommy." She picked it up and put it on the boat. See, I'd grabbed people at random, and as such, I'd neglected to grab every member of the affected families. I put the pawn back. "She wants to go," said Maezza, returning the mommy to the boat. I was insistent. "No one wants to go," I told her. "This is the Middle Passage." She looked at me in a way that only a game designer's child can look, as if to say, "Your prototype is broken. Your rules don't make sense, but okay. I'll go along."

The rules of the game were simple: It takes 10 turns to cross the ocean. Each turn, we roll a die to see how much food we use. We were about halfway through the trip, and Maezza was rolling high. "I don't think we're going to make it," she said. "What do we do?" She had reached a turning point.

"We can keep going and hope we make it, or we can put some people in the water," I answered. She was seven, so I didn't want to hit her over the head with it, but I didn't want to hide the reality from her either. She understood precisely what I meant. She stared at the boat for a bit, the opposing shores on the opposite sides of the table and finally asked, "Did this really happen, Mommy?"

After Black History Month at school, after movies, after books, after posters, after lectures, it was finally the mechanics of a simple and spontaneous game and the time she took to experience it (the time in the "magic circle") that brought the connection home. That day ended with our family discussing the Middle Passage at length and on a very personal level.

Train

I was determined to repeat the experience, and decided to make a series of six games, each of which focused on a different difficult moment in human history. I've covered the Cromwellian Invasion of Ireland (Síochán Leat), the Trail of Tears (One Falls for Each of Us), Mexican immigration (Mexican Kitchen Workers) and daily life in Haiti (Cité Soliel). The game that is perhaps the best known of the series is Train.

Train is a three-player game in which you are tasked with getting passengers from the start of the rail line to its terminus. The game consists of 3 tracks (one for each player), 60 pawns and 6 train cars. Each turn, you may roll a die to add passengers or to move the train that many spaces, or you may select or play a card. Players typically roll the die and add passengers on their first turn before beginning their trek down the track on their next roll. The cards allow players to speed up or slow down the movement of the trains. The rules for Train, however, are not quite so black and white. There is ambiguity written into them on purpose. For instance, if the player opts to play the Derail card, it forces them to return half the passengers to the beginning station, and further says the others refuse to re-board. What does the player do with those pawns? The game doesn't say. The players have to figure it out for themselves.

Some players have declared them dead; others have left them there at the side of the track only to add them via die roll later. Still others have grabbed them, declared them "free" and announced that they were going to Denmark. As the game's designer, I was acutely aware of the possibility space surrounding the game. Every line in the rules permitted or prohibited some behavior, and I considered each line again and again. I wanted players to explore that possibility space ("The rules don't say I *can't* do it!"), find their way within it and thus find their own complicity or salvation. At the end of the tracks, at the terminus, the player draws a card, which tells them where they've delivered their passengers. Each is labeled with the name of a Nazi extermination camp. It's a grim and jarring moment for players. Some have cried. Many gasp. Others recognize the symbolism in the game (the tracks rest atop a broken window with smashed glass which symbolizes Kristallnacht), the pawns are yellow and the trains are boxcars, and realize these trains are going nowhere good. They begin to derail their own cars to free people, puzzling their fellow players.

For me, the key design moment in games comes in finding the system I want to represent. Systems are inherent in everything around us, from how we get to school to the classes we take to the grades we receive. With my games and particularly my games that focus on difficult subjects, I look for the systems that allow

the event to happen in the first place, and human-on-human tragedy at such a scale always requires such a system. Then, I decide how I want that person to feel as a direct result of interacting with the system. This is, perhaps, the most important decision I make.

In Síochán Leat, for instance, I want the player to feel the powerlessness of the English onslaught while gradually being forced to turn on their fellow Irish countrymen in order to survive. Train questions the player's complicity. Will we blindly follow the rules even if we pull those rules from a Nazi typewriter? Will we stand by and watch when we know that what's being done is inherently evil? In One Falls for Each of Us, my game about the Trail of Tears, I want the player to feel the power of systems to overtake us, to envelop our thinking. The game features 50,000 individual pieces (one for Each of Us), and at a single glance, the player is both overwhelmed and systemic in their thinking, "How will I ever move all this?" The mechanics that I choose reinforce the player's role in the system. In fact, the role creates the mechanics for me. If you're transporting passengers, the rules of doing that suggest themselves. I never force mechanics or accept mechanics that compromise the larger system. They integrate naturally, controlling the player's behavior and giving meaning to the role the game dictates they play. Mechanics also allow the player room to find their own emergent way, imparting tremendous meaning. With Train, for instance, one player wanted to find peace with his family's past. The game, he told me, allowed him to do that. I don't know what his family's past was, but the rules, being only rules, allow the player to fill the game with their own meaning instead of just the one dictated by the designer. Mechanics, when integrated in such a way, do not need cut scenes to tell players how to feel.

Why is it important to make games with meaning in their mechanics? Why is the mechanic the message? For me, pure mechanic is pure player. There is nothing else—no story, no cut scene, no text, no outside influence—to accept responsibility for what has happened. The player followed the rules and the result and resultant meaning is theirs alone. To the exact extent that the rules allow them, they accept their role and change the world state as a result. There are no procedural gaps for exposition—the metaphorical equivalent of a driver jumping into the backseat for someone else (the cut scene) to take over for a while. Instead, the player drives the game from beginning to end.

feel closer to them, having met in this game-world competition.

As designers, boundaries are another tool we have in crafting the player experience. Some games are very free form and do not require strictly defined boundaries to work. For example, tag is usually played with loosely defined boundaries with no detriment to the overall experience. Recent game designers have begun playing with the idea that interaction with outside elements is an interesting design choice for their systems. The genre of games called alternate reality games (ARGs) use a combination of real-world and online interaction to create their game play.

An early example of this was I Love Bees, an ARG created to promote the release of Halo 2. The game, which was accessed at the website www.ilovebees.com, sent players to real-world locations to find ringing pay phones where they would receive further information and instructions. See Elan Lee's comments on the design of I Love Bees in his Designer Perspective on page 274. Other games that break physical and conceptual boundaries are sometimes called "big games," large-scale games that take over public spaces for playful interactions. Games like the Big Urban Game by Frank Lantz, Katie Salen, and Nick Fortugno; Humans vs. Zombies by Chris Weed and Brad Sappington; or the viral folk game Ninja, which has been popularized on college campuses and indie game festivals, are examples of this type of boundary-breaking play. Also, mobile games like Zombies, Run!, discussed in Adrian Hon's sidebar in

3.36 Big Urban Game and PacManhattan—Turning cities into game boards

Chapter 15 on page 476, are able to use information about the player's location and movement to integrate gameplay with real-world interaction.

The way that these experimental games treat the boundaries of their systems are exciting innovations, though they are something of an exception at this time. Most games are typically closed systems. These games clearly define that which is within the game versus that which is outside the game, and they purposefully keep the in-game elements from interacting with outside forces. But it is up to you as the game designer to determine just where and how these boundaries are defined and when or if to ever breach them, and it is clearly a trend in current game design to consider how your game might be enhanced by opening its boundaries, or making them semi-permeable to real-world information or actions.

Exercise 3.11: Boundaries

What are the boundaries in the tabletop role-playing game Dungeons & Dragons? Can you think of physical and conceptual boundaries?

Outcome

As described previously, the outcome of a game must be uncertain to hold the attention of the players. That uncertainty is generally resolved in a measurable and unequal outcome, though this is not always necessary: Many massively multiplayer online worlds do not have the concept of a winner or even an end state. Also, simulation games might not have a predetermined win condition. Some games are designed to be played indefinitely. These games are built to reward players in other fashions than by winning or finishing the game. Though some people might not call these games because they differ from the basic definition, I don't find it useful to remove these powerful experiences from our consideration of games. Rather, I believe that expanding our definition or exploring the border cases makes for a more interesting and useful stance.

For traditional game systems, however, producing a winner or winners is the end state of a game. At defined intervals, either the players (in the case of a nondigital game) or the system check to see if a

winning state has been achieved. If it has, the system resolves and the game is over.

There are a number of ways to determine outcome, but the structure of the final outcome will always be related to both the player interaction patterns discussed earlier and the objective. For example, in pattern one, single player versus game, the player might either win or lose, or the player might score a certain amount of points before ultimately losing. Examples of this outcome structure are solitaire, pinball machines, or a number of different arcade games.

In addition to the player interaction patterns described on page 59, the outcome is determined by the nature of the game objective. A game that defines its objective based on points will most certainly use those points in the measure of the outcome. A game that defines its objective as capture, like chess, might not have a scoring system—rather, chess games are won or lost based solely on meeting the primary objective, capturing the king.

Chess is what is called a "zero-sum" game. By this I mean that if we count a win as +1 and a loss as a −1, then the sum for any outcome is zero. In chess, one player wins (+1), and one player loses (−1). No matter which player wins, the sum is always zero.

But many games are not zero-sum games; a non-zero-sum game is one in which the overall gains and losses for the players can be more than or less than zero. Games such as World of Warcraft are not zero sum because the overall outcome of this complex, ongoing game world is never equal to zero. Cooperative games, such as the Lord of the Rings board game by Reiner Knizia, are also non-zero sum because a gain by one player does not mean a loss by the others. Narrative games, such as Gone Home, are also non-zero sum because they are not competitive in nature. Non-zero sum games often have more subtle gradations of reward and loss than zero-sum games, for example, ranking systems, player statistics, multiple objectives, or even player-created objectives, all of which can create measurable outcomes without the finite judgment of a zero-sum game.

On page 359, I discuss the way in which non-zero-sum games can create interesting player dilemmas and complex, interdependent risk/reward scenarios that can make for interesting gameplay. Look at the games you play: What types of outcomes are most satisfying? Does that answer change in different situations, for example, social games versus sporting events? When you determine the outcome for a game that you are designing, be sure to keep these types of considerations in mind.

Exercise 3.12: Outcome

Name two zero-sum games and two non-zero-sum games. What is the main difference in the outcomes of these games? How does this affect gameplay?

Conclusion

These formal elements, when set in motion, create what we recognize as a game. As we have seen throughout this chapter, there are many possible combinations of these elements that work to create a wide variety of experiences. By understanding how these elements work together and thinking about new ways of combining these elements, you can invent new types of gameplay for your games. A good practice for a beginning game designer is to use these formal elements to analyze games that you play. Use the game journal you began in Chapter 1 to start a record of your analysis of the games you play. This will increase both your understanding of gameplay and your ability to articulate complex game concepts.

Exercise 3.13: Revise Rules and Procedures

The rules and procedures of backgammon are fairly simple. Change them so that they are not dependent on chance. How does this affect the gameplay?

Designer Perspective: Tim LeTourneau

Former SVP of Games, Zynga

Tim LeTourneau is an experienced game producer whose credits include SimCity 3000 (1999), The Sims (2000), The Sims 2 (2004), MySims (2007), and FarmVille 2 (2012). Before Zynga, he worked at EA/Maxis on the SimCity and The Sims series of games.

On game designers:

I wouldn't call myself a game designer. I would call myself a game producer, and more importantly a game maker. I've had the opportunity through my career to work with some of the most talented designers in the industry and not only learn from them, but interpret their designs to the screen with a focus on the player.

On games that have inspired him:

Beginning my career in game production at Maxis, I think I have been most inspired by games with interlocking systems that influence and react to one another. The tapestry of simulation layers and their workings in SimCity 3000 was really the first time I got under the hood of a game. How those systems interacted with one another, and even more importantly how you communicated that interaction to the player is the foundation of much of my design thinking. Couple that with the ability for players to express themselves through the mastery of those systems, and you have the foundation of my design philosophy. I love games that put the power to create in the hands of the players—I'm not sure if you can call Lego a game, but it's definitely been one of my biggest inspirations.

What is the most exciting development in the recent game industry?

Smartphones. Everyone now has the ultimate gaming system in their pocket and it's connected to a world of other gamers.

On his design process:

So many of the games that I have worked on are based on the simulation of real-world elements, so I often start with a question of what would people find fun to play with digitally. More importantly, can we translate that real-world experience into something engaging and understandable on the screen?

As a process, it usually starts as a brainstorm with a bunch of creative folks from a variety of disciplines (engineering, art, production, and of course design). Past the initial brainstorm, as a particular interest starts to resonate, I like to move to a mind-mapping type of approach to see whether the idea has legs—how deep can we take it. Mind mapping is particularly effective when looking at how simulation layers might work with one another because you can start to draw connections between nodes and formulate how they will interact with one another—the interactions are the game design.

From there it is about getting prototypes created for key interactions—prototypes come in a variety of shapes and sizes, but the key is to get something to which you can respond. Prototypes help build conviction, and that conviction is what drives the game forward.

Once conviction is built, you have to start to understand how you will build it "for real." One of the things I've seen is that there can be a desire to take a "prototype" to "shippable." Prototypes are disposable. They are meant to create clarity and provide direction; they are learning tools.

Beyond the design, the tech and the team are what are going to make or break your game. And my true philosophy is that "games are made by teams." It's all about assembling the right team with the right chemistry. True polish comes from passionate team members who have pride in what they are making and a desire to deliver an incredible experience to the player.

Do you use prototypes?

Absolutely! They take a variety of forms. As a process, it's generally a question of what approach is going to give the most clarity the fastest. I think the most important element of prototyping is having a clear understanding of what you want to learn from the prototype. Paper, physical, visual, and code can all be effective, provided you know what you want to learn from the start. I have found that the best prototypes are generated by the individual most interested in proving the case, and that they pick the medium they think is most effective for doing so. The key to prototypes is that they are disposable—they are sketches, not blueprints.

On a particularly difficult design problem:

Oftentimes the design is not the problem; the communication of the design is the real challenge. For example, in Farmville 2 we had a very cool design for water on the board. Water is a key resource in the game and is required to grow crops. Players harvested water from wells (which run on timers). However, crops planted by water didn't require watering (so planting crops near water was beneficial and strategic). Even though we taught players to harvest from the wells, which they seemed to get intuitively, once their wells were dry, they would consistently try to collect from the water on the board. No matter what we used to communicate the difference, there was invariably a consistent moment of frustration and confusion on the part of the players when they ran out of water. For the team, water on the board was one of our favorite features and created a lot differentiation between farms. How did we solve the problem? We cut water on the board. Regardless of our passion for the feature, we recognized that it was causing confusion rather than delight. I have learned to never be afraid to cut something that isn't working, no matter how cool it might be. Some of the best games are a reflection of the features the designers chose not to include—great design is often the practice of great editing.

What are you most proud of in your career?

That is such a great question. I often ask this in interviews. I am most proud of Hot Date (the 3rd Sims expansion pack). My pride came not only from the game itself, which allowed The Sims to finally leave their homes and get out on the town. But more importantly, it was also the first game team that I built; a team that stuck together for four more expansion packs.

On advice to designers:

Great designers not only understand the art and craft of design, they understand the business of game making. The more you know about the business, the more effectively you can bring your designs to fruition.

Further Reading

Callois, Roger. *Man, Play and Games*. Urbana: University of Chicago Press, 2001.

Church, Doug. Formal abstract design tools. *Game Developer Magazine*. August, 1999.

Hunicke, Robin, LeBlanc, Marc and Zubek, Robert. MDA: A Formal Approach to Game Design and Game Research. *AAAI Game AI Workshop Proceedings*. July 25–26, 2004. Available online at http://www.cs.northwestern.edu/~hunicke/pubs/MDA.pdf

Salen, Katie and Zimmerman, Eric. *The Game Design Reader: A Rules of Play Anthology*. Cambridge: The MIT Press, 2006.

End Notes

1. Bartle, Richard. "Hearts, Clubs, Diamonds, Spades: Players who Suit MUDS." April 1996. http://www.mud.co.uk/richard/hcds.htm
2. Avedon, E.M., "The Structural Elements of Games," *The Study of Games*. New York: Robert E. Krieger Publishing, Inc. 1979. pp. 424–425.
3. Adapted from the work of Fritz Redl, Paul Gump, and Brian Sutton-Smith, "The Dimensions of Games," *The Study of Games*. New York: Robert E. Krieger Publishing, Inc., 1979., pp. 417–418; David Parlett, The Oxford History of Boardgames. New York: Oxford University Press, 1999.
4. Nintendo, Super Mario Bros. Manual, 1986.