CS 325
Intro to Game Design

Spring 2014

George Mason University

Yotam Gingold

Tentative Schedule

Date	Topic	Chapter	Due
Thurs Jan 23	Introduction		
Tues Jan 28	The Role of the Game Designer	Chapter 1	
Thurs Jan 30	Javascript, your game designs		Analog 1
Tues Feb 4	The Structure of Games	Chapter 2	
Thurs Feb 6	Javascript/Phaser, your game designs		Analog 2, Digital 1
Tues Feb 11	Working with Formal Elements	Chapter 3	
Thurs Feb 13	More Phaser		
Tues Feb 18	Working with Dramatic Elements	Chapter 4	
Thurs Feb 20	More Phaser		Digital 2
Tues Feb 25	Working with System Dynamics	Chapter 5	
Thurs Feb 27	Conceptualization	Chapter 6	
Tues March 4	Prototyping	Chapter 7	
Thurs March 6	Digital Prototyping	Chapter 8	
Tues March 11	Spring Break		
Thurs March 13	Spring Break		
Tues March 18	Mid-term review		
Thurs March 20	Mid-term exam		

Chapter 3: Working with Formal Elements

Exercise 3.1: Poker

1. Take away the “raising” procedure, so that you state your amounts once simultaneously. What happens?
2. Also allow people to draw from the deck as many times as they want. What changes?
3. Require everyone to play with their cards visible to all the other players. Is the game still playable?

Formal Elements

- **Formal elements** are those elements that form the structure of a game: players, objectives, procedures, rules, resources, conflict, boundaries, and outcome.

Players

- Players must voluntarily accept the rules and constraints of the game.
- They enter Huizinga's "magic circle".
- We perform actions we would never otherwise consider:
  - shooting, killing, betrayal
- We perform actions we would like to think ourselves capable of:
  - courage in the face of long odds, sacrifice, difficult decisions

Invitation to Play

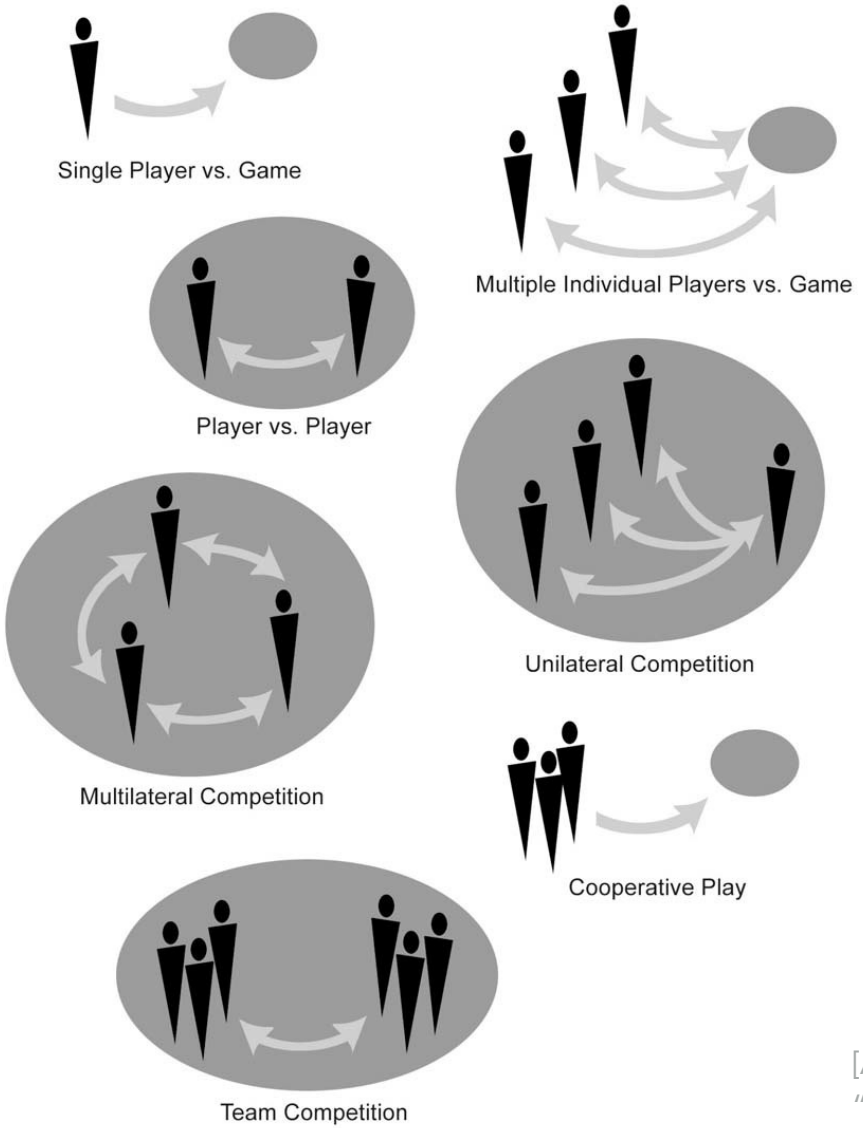
- Other arts:
  - paintings have frames
  - stages have curtains (curtains draw back)
  - movies have screens (lights dim)

- Games
  - multiplayer: players invite each other to play
  - single player: players open solitaire deck or launch program
  - more fun: Guitar Hero controller makes the fantasy more visceral. [Have players make and wear something, like a crown or stethoscope, when playing your game.]

Players: Number and Roles

- Number of players: one, two, four, two-to-eight, as many as 10,000
- Exercise 3.2: Create a three-player version of tic-tac-toe
- Roles of players:
  - uniform
    - chess or monopoly
  - non-uniform
    - Mastermind (both roles must be filled)
    - football
    - role-playing games
- Play styles: Richard Bartle (created the first MUD) classifies players into achievers, explorers, socializers, killers

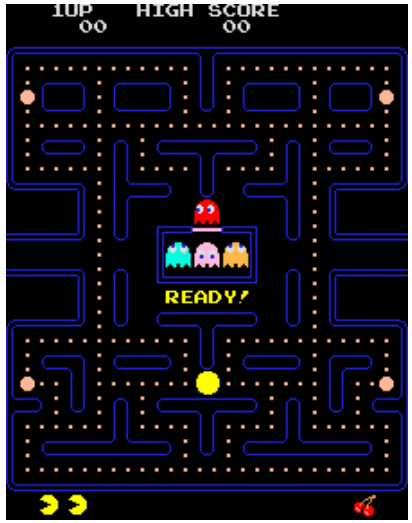
Player Interaction Patterns



[Adapted from E. M. Avedon's "The Structural Elements of Games"]

Single player versus game

- Player competes against the game system.
- Examples: solitaire, Pac-Man, 7th Guest, Tomb Raider.
- The most common pattern for digital gaming.
  - So popular, that we have to call non-solo-games "multiplayer", even though multiplayer was the historical default.
- Tend to include puzzles or other play structures that create conflict.



Multiple individual players versus game

- Multiple players competes against a game system in each others' company. (There is no "in-game" interaction between participants.)
- Examples: bingo, roulette. Slingo? Olympics?
- Rare for digital gaming.
- Good for non-competitive players who enjoy the activity and the socialization.

Player versus player

- Two players directly compete.
- Examples: checkers, chess, tennis, Street Fighter II
- Personal contest.
- Good for competitive players.

Unilateral competition

- Two or more players compete against one player.
- Examples: tag, dodge ball, Scotland Yard.
- Combines cooperative and competitive gameplay.
- “Wide open for digital game development”

Multilateral competition

- Three or more players directly compete.
- Examples: poker, Monopoly, Quake, WarCraft III, etc.
- What people think of when they think of “multiplayer gaming”
- Doesn’t have to be massively multiplayer. Board games have been tuned for three to six players.
- Suggestion: Tune your multiplayer game to encourage the same level of social interaction as a board game.

Cooperative play

- Two or more players cooperate against the game system.
- Examples: Pandemic, Harvest Time, Lord of the Rings board game, Arkham Horror board game, World of Warcraft quests, many role-playing games. Second Life?

Team competition

- Two or more groups compete.
- Examples: soccer, basketball, charades, Tribes, Team Fortress.
- Team sports are very successful in real life. Fun for the fans, too.

Exercise 3.3: Interaction Patterns

- List your favorite games for each player interaction pattern. If you don't know any, do some research and play several of them.
  - Single player versus game
  - Multiple individual players versus game
  - Player versus player
  - Unilateral competition
  - Multilateral competition
  - Cooperative play
  - Team competition

Persuasive Games by Ian Bogost

- When we create video games, we start with some system in the real world (traffic, football, etc.).
- We build a model of the source system, by writing code or rules for the behavior we want to focus on.
- **Procedurality** (Murray 1997) is the computer's ability to execute rule-based behaviors; video games are a procedural representation of something.
  - Madden Football is one model of football; another might focus on a specific position or on coaching.
  - An alternate SimCity might focus on public services.

Persuasive Games by Ian Bogost

- These models are always subjective.
- There may be a gap between a designer's procedural model and a player's subjective experience or preconceived expectations about the source system (watching football, living or running a city).
- Video games can persuade with a model that likely differs from the player's.
  - "Airport Insecurity": players don't choose what they try to get through security, but can choose whether to throw it in the trash or attempt to carry it through.

Objectives

- **Objectives** define what players are trying to accomplish within the rules of the game.
- They give players something to strive for.
- In addition to the challenge, they can also set the game's tone (capture or kill versus spell long words).
- You can give different players different objectives, several possible objectives, or let them make their own.
- There can be partial objectives or miniobjectives.
- Objectives can be integrated into the story and affect the dramatic aspects.

Objectives

- What are objectives of games you've played?
- What impact to these objectives have on the tone of the game?
- Do genres lend themselves to certain objectives?
  - ("Meet the Pyro")
- What about multiplayer objectives?
- Do objectives have to be explicit?
- What about player-determined objectives?

Objectives: Examples

- 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 ships.
- 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 communicated.
- Super Mario Bros.: Rescue Princess Toadstool from the evil Bowser by completing all eight worlds (32 levels) of the game, each of which have their 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 have their own miniobjectives.
- Civilization: Option 1: conquer all other civiliza- tions 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.

Objective: Capture

- The objective in a **capture** game is to take or destroy something of the opponent's, while avoiding being captured or killed.
  - Chess, checkers, Quake, RTS like WarCraft

Objective: Chase

- The objective in a **chase** game is to catch an opponent or elude one, if you are the player being chased.
- Single player versus, player versus player, or unilateral competition.
- Examples: Tag, Fox & Geese, assassin

Objective: Race

- The objective in a **race** game is to reach a goal—physical or conceptual—before the other players.
- Examples: footrace, Sorry, Virtua Racing, backgammon
- Players rely on skill or chance or both.

Objective: 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: tic-tac-toe, solitaire, Connect Four, Othello, Tetris, Bejeweled or any “match-three” game.
- Puzzle-like.

Objective: Rescue or Escape

- The objective in a **rescue or escape** game is to get a defined unit or units to safety.
- Examples: Super Mario Bros., Prince of Persia, Ico.
- Partial objectives or miniobjectives are often puzzle-like.

Objective: 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: Twister, Operation, staring contest, serious face.
- Not found in digital games.

Objective: Construction

- The object in a **construction** game is to build, maintain, or manage objects; this might be within a directly competitive or indirectly competitive environment.
- Like a sophisticated alignment game.
- Examples: Animal Crossing, SimCity, Settlers of Catan.
- Often use resource management or trading as core gameplay element.
- Often strategic choice rather than chance or dexterity.
- Easy to make open-ended.

Objective: Exploration

- The object in an **exploration** game is to explore game areas.
- Almost always combined with other objectives (puzzle solving, combat, find treasure).
- Examples: Adventure, Zelda, Ultima, EverQuest

Objective: Solution

- The object in a **solution** game is to solve a problem or puzzle before (or more accurately) than the competition.
- Examples: Myst, text adventures, Tetris, Connect Four, Tic-Tac-Toe, Mario/Zelda

Objective: Outwit

- The object in a game of **wits** is to gain and use knowledge in a way that defeats the other players.
- Examples: Trivial Pursuit, Jeapardy!, Diplomacy, Survivor

Objectives summary

- This isn't an exhaustive list.
- Games often mix them.

- Exercise 3.4: List ten of your favorite games and name the objectives for each. Do you see any similarities in these games? Try to define the type or types of games that appeal to you.

Procedures

- **Procedures** are the methods of play and the actions that players can take to achieve the game objectives.
- 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?

Procedures

- Most games tend to have:
  - Starting action: How to put a game into play.
  - Progression of action: Ongoing procedures after the starting action.
  - Special actions: Available conditional to other elements or game state.
  - Resolving actions: Bring gameplay to a close.

- In board games, all procedures are described in the rule sheet and put into action by the players. In digital games, they are the “controls”.
  - Rules might be hidden from players in a digital game!

Procedures

- Player inputs and actions
- Connect Four
  - Someone goes first; take turns dropping a colored checker down the slots; someone wins when they get four of one color in a row (horizontally, vertically, or diagonally)
- Super Mario Brothers
  - select/start; left/right to walk, down to crouch, A to jump/swim, B to accelerate or throw fireballs
- Comparison
  - Both have starting actions.
  - In Mario, the progression is implied by the actions (the game simulates the world) and some actions are conditional.
  - Connect Four states its resolving action, but Mario doesn't because the game decides.

System Procedures

- Digital games can have complex states and **system procedures** that work behind the scenes, responding to situations and player actions.
- Examples: A very complex calculation for the damage done by a weapon in a role-playing game.

Defining Procedures

- Keep in mind the limitations of the environment in which your game will be played.
  - Keep the rules simple for a nondigital game.
  - What kind of controller will players use?

Rules

- **Rules** define game objects and allowable actions by the players.
- How do players learn them? Who will enforce them? They can be unstated, but players may feel cheated if they're not understandable (explicitly or intuitively).
- They can close loopholes, such as "Do not pass Go, do not collect $200".

Rules

- Examples:
  - Poker: A straight is five consecutive cards; a straight flush is five consecutive cards of the same suit
  - Chess: A player can't move the king into check.
  - Go: A player can't make a move that recreates a previous state of the board ("ko").
  - WarCraft II: To create knights, a player must have upgraded to a keep and built a stable.
  - You Don't Know Jack: If a player answers incorrectly, the other players get a chance to answer.

Rules defining objects and concepts

- Objects in games have a unique status and meaning that is different from objects in the real world.
  - Game objects can be made up completely (straight flush).
  - If based on familiar objects, they are still only abstractions (king in chess).

Rules restricting actions

- Rules can restrict actions.
  - In chess, a player can't move their king into check prevents accidental loss. In Go, "ko" prevents loops.
- Basic delimitations
  - dimensions of football field, one goalie in soccer

- Note: Rules overlap with other formal aspects (e.g. players and boundaries); in fact, all formal aspects are represented in the rules or procedures.

- Exercise 3.6: What rules within the following games restrict player actions? Twister, Pictionary, Scrabble, Operation, Pong

Rules determining effects

- Rules can trigger effects based on circumstances.
  - If/then statements
  - You Don't Know Jack: "If a player answers incorrectly, the other players get a chance to answer."

Resources

- **Resources** are assets that can be used to accomplish certain goals. Resources must have utility and scarcity.
- Managing resources and determining how and when players can access them is a key part of the game designer's job.
- What resources should there be? Why paperclips and sushi in Katamari Damacy but not Diablo II?

- Exercise 3.8: Utility and Scarcity. What are the resources in Scrabble and Doom? How are they useful? How does the game make them scarce?

Resources

- **Lives**: Limited number of tries
- **Units**: when the player is represented by more than one object; finite or renewable
- **Health**: Can be a resource that is acquired and upgraded, or just an attribute that depletes.
- **Currency**: in-game economy. Could barter instead.
- **Actions**: Moves or turns (20 Questions, Magic: The Gathering, Bullet Time) can be a resource.
- **Power-ups**: magic mushroom in Super Mario Brothers

Resources

- **Inventory**: Collect and manage objects; can be limited size.
- **Special Terrain**: Triple letter squares in Scrabble, resource mines in StarCraft
- **Time**: Speed chess, hot potato, arcade racing game

- Challenge you to create original types or unusual crossovers!

- Exercise 3.9: Resource Types. Describe your favorite games that use the aforementioned resource types.

Conflict

- **Conflict** emerges from trying to accomplish the goals of the game within its rules and boundaries.
- Designed into the game via the rules, procedures, and situations that prevent players from accomplishing their goals directly.
  - Pinball: Use only flippers to keep the ball from falling out.
  - Golf: Get the ball into a hole in as few strokes as possible.
  - Monopoly: Manage your money and property to become the richest player.
  - Quake: stay alive while others try to kill you.
  - WarCraft III: Maintain your forces and resources and use them to command and control the map objectives.
  - Poker: Outbid opponents based on your hand and ability to bluff.

Conflict: Three Classic Sources

- Obstacles:
  - Can be physical, like the sack in a sack race or water on a golf coarse.
  - Can be mental, such as puzzles.
- Opponents:
  - In multiplayer games, other players are the primary source of conflict.
- Dilemmas:
  - In Monopoly, whether to buy a property or upgrade a hotel. In Poker, whether to fold or stay in.
- Exercise 3.10: Explain the source of conflict in Tetris, Frogger, Bomberman, Minesweeper, and Solitaire

Boundaries

- **Boundaries** are what separate the game from everything that is not the game.
- Agreeing to play (Huizinga's "magic circle" again) is a critical part of feeling safe that the game is temporary.
- Boundaries can be physical (edges or arena, field, or game board) or conceptual (social agreement to play, as in Truth or Dare).
- What if there were no boundaries to the field in football? What if you could add real money to the bank in Monopoly? What if a chess board expanded infinitely? They become different games.
- Emotional boundary allows players to shake hands at the end.

Boundaries

- Alternate reality games play with boundaries.
  - I Love Bees (Halo 2)
  - Cruel 2 B Kind (Ian Bogost and Jane McGonigal)
  - Big Urban Game (Lantz, Salen, Fortugno)

- Exercise 3.11: Boundaries. What are the boundaries in Dungeons and Dragons, physical or conceptual?

Outcome

- The **outcome** of a game must be uncertain to hold players' attention.
- Generally resolved through a measurable and unequal outcome, though not always necessary.
  - Massively multiplayer games and simulation games often don't have outcomes. We still call them games, even though some might not.
- At defined intervals the players (nondigital) or the system check to see if a winning state has been achieved.
- In zero-sum games, someone's gain is someone else's loss.
- What games are zero-sum? What outcomes are satisfying?

Conclusion

- Formal elements, when set in motion, create what we recognize as a game.
- By understanding how these elements work together (and thinking about new ways of combing these elements) you can invent new types of gameplay.
- Use these formal elements to analyze games you play (your game journal!).

- Exercise 3.13: Revise the rules are procedures so that they are not dependent on chance. How does this affect the gameplay?

Next Time

- **Thursday**: talking about Phaser
- **Tuesday**: Read Chapter 3.
- **Next Thursday**: your digital prototypes