

## Exam #1 – CMPS 80K – Foundations of Interactive Game Design

100 points, worth 17% of the final course grade

*Exam Solution Key – Winter 2007*

### Game Demonstration

*The Game demonstrated was Geometry Wars: Retro Evolved on the Xbox 360.*

At the beginning of the exam, and also at the end of the exam, a brief game demonstration will be given. Based on the understanding you develop of the game from observing the demonstration, answer questions #1-4 below.

If your answer would depend on knowledge of the game you did not learn during the demonstration, or you are using additional information you know about the game beyond that shown in the demonstration, please write down any assumed information about the game you are using in your answer (however, the questions have been designed so that this should not be required).

1. (a) (3 points) Is this a game of emergence, a game of progression, or a combination (emergence game with progression components, or progression game with emergent components)?

*Either: emergence, OR emergence with progression components*

1. (b) (7 points) Why? That is, what elements of the game, and its gameplay, led to you making your answer to 1(a)?

*Jesper Juul, in Half-real, discusses several aspects of emergent rule systems. Qualities most relevant to this question are:*

- *Asymmetry between simplicity of rules and complexity of game system*
- *Notion of “emergence as variation” where the simple rules lead to a wide variety of possible states and game sessions.*

*Juul also discusses qualities of progression games:*

- *Directly set up each consecutive challenge in the game*
- *Mentions that adventure games are the most clear-cut example of progression games*
- *Designers maintain strong control over the sequence of events*

*Juul also gives the “game guide rule” for determining the difference between emergence and progression games. If the game guide for a game gives a sequential series of steps, the game is one of progression. If the game guide lists a series of strategies, the game is one of emergence.*

*OK, applying this to Geometry Wars: Retro Evolved, we observe the following rules and behaviors:*

- *Bounded gameworld (walls prevent player from going very far)*
- *Player has separate controls for movement and firing*
- *If an enemy hits the player, the player loses a life*
- *There are many enemies, each with its own patterns of movement, and difficulty to destroy.*
- *The game spawns enemies randomly, but in patterns, with an overall trend of increasing difficulty*

*The last observation is key here. Since the enemies are spawned randomly, it is not possible to have a pattern memorization strategy for the game, and hence the challenge is always driven by the interactions of the enemies that are present on the screen at any one point in time. That is, the challenge emerges from these enemy interactions, and their reactions to the player. Due to this, the game clearly demonstrates strong emergent behavior.*

*Since the player gains improved capabilities over time, and since the enemies do increase in complexity over time, the game’s behavior does evolve. Since this evolution is controlled by the designer, and it does indirectly create a set of consecutive challenges, there are **minor** progression elements in the game. It is clear that the game is not one of pure progression, because the vast majority of the player’s experience is controlled by **random** spawning events (not designer controlled events) that are governed by a series of AI policies. The intent of the designer is indirect, via the AI.*

2. (5 points) What kind of *game exhaustion* does this game use?

*The game clearly exhibits **resource exhaustion** (loss of all lives).*

*Geometry Wars will continue spawning enemies forever, and there is no level structure, so there is no possibility of gameworld exhaustion. The game has no narrative structure at all, and hence narrative exhaustion is also not possible.*

3. (5 points) What is the *cardinality of gameplay* of the game?

*The cardinality of gameplay is clearly 2D.*

*The gameworld is 2D, and the player can move freely about this world. Cardinality of gameplay only affects movement in the gameworld, and hence the fact that the player is simultaneously moving in 2D and independently can fire in 2D has no impact.*

4. (a) (7 points) Give an example of a *rule acting as a limitation* in the game. Be sure to describe the limitation created.

*Rules acting as limitations constrain the possible actions of the player, of enemies, or both.*

*The most clear limitation rule in Geometry Wars Retro Evolved is the wall surrounding the playfield, and the rule that no player or enemy can go beyond the wall. This limits the player and the enemies to stay within the playfield, and much of the challenge in the game comes from the constraints imposed by limited real estate and large numbers of enemies.*

*Other possible limitation rules include the limited lives and bombs of the player. Constraints on the movement of the enemies can also be considered rules acting as limitations.*

*Answers to this question need to clearly state a rule, AND also describe the kind of limitation the rule creates.*

4. (b) (8 points) Give an example of a *rule acting as an affordance* in the game. Describe how it creates possible actions.

*Rules acting as affordances create possibilities for action. There are several examples of such rules:*

- *Player movement rules. The player moves in the direction indicated by the left joystick.*
- *Player firing rules. The player fires in the direction of the right joystick, and the trigger releases a bomb that destroys all enemies.*
- *Enemy movement rules: Depending on the rule, these can also be considered as affordance rules. For example, the small pink squares, if present in large numbers, will form into a swarm with a pinwheel shape. This swarming rule affords the pink squares new kinds of action.*

*Answers to this question need to clearly state a rule, AND also describe briefly how the rule acts to create possible actions.*

5. (10 points) What is the *magic circle*?

*Answers should capture the notion that the magic circle is the playful state of mind, state of separation, and zone of safety from the real world that game players enter when they play a game.*

*Michael Apter definition: In the play-state you experience a protective frame which stands between you and the “real” world and its problems, creating an enchanted zone in which, in the end, you are confident that no harm can come.*

## Game Definitions

The next two questions concern a session of the following activity.

In the activity called *spin the bottle*, several people sit in a circle, with a bottle in the middle. The activity starts when one person spins the bottle. Once it stops, whomever the bottle points to must be kissed by the person who spun the bottle. The person being kissed then becomes the next spinner.

You may assume the people are engaging in the activity for fun, of their own free will (no coercion), and are not professional “spin-the-bottlers” (no person is receiving money for engaging in the activity). The people are all of consistent sexual orientation, are unmarried, are not in committed relationships, are healthy, and have varying levels of attraction to one another. You can assume there are from 8 to 15 people engaged in the activity, and it is taking place in a private setting, such as a person’s apartment. The people are all either under the age of consent, or over it.

6. (15 points) According to the Costikyan definition of a game, is *spin the bottle* a game? Justify your answer by describing how the activity meets, or does not meet, aspects of this definition.

*The game spin the bottle can be considered to pass or fail the Costikyan definition of a game, and hence the correctness of the question depends on the quality of the student’s supporting argumentation. This needs to demonstrate knowledge of the key aspects of the Costikyan definition, and correct application of the concepts to the game.*

*The Costikyan definition of a game is:*

*A game is a form of art in which participants, termed players, make decisions in order to manage resources through game tokens in pursuit of a goal.*

*Key elements of the Costikyan definition are:*

- **Art:** Games are a form of art, hence creating culture
- **Decision making players:** Players actively participating and making choices
- **Resource management:** Decisions made depend on resources available, and manipulate resources
- **Game tokens:** Representation of the state of the game, affordances for user action
- **Goal:** Objective of the game

*OK, let’s analyze spin the bottle against this definition.*

*Art. Spin the bottle is widely known in America, and hence has clearly created culture. If the prerequisite for creating art is the generation of culture, then spin the bottle is art (this is a moot point). It can be argued that spin the bottle is not art in the way that art is generally known in America, and that would be fine as well. This discussion quickly short circuits into existing debates concerning high-brow and low-brow art.*

*Decision making players. Going strictly by the explicit rules of the game, players do not make any decisions. The bottle is spun, the player kisses the person it points to. In reality, players do make decisions about who they wish to kiss, and it is not uncommon for players to withdraw from the game if they strongly do not want to kiss another player. This is a fine line, so arguments in either direction (no decision making, or yes, active decision making) are acceptable.*

*Resource management. The only resource available is the bottle itself, and where it is pointing. It is also possible to view the players themselves form another kind of resource. If a student argues that there is active decision making, then the players are a kind of resource, and decisions are being made based on the availability of other players.*

*Game tokens. The bottle is the only game token, since it represents the current state of the game (kisser and kissee).*

*Goal. Going strictly by the rules of the game, there are no goals. There is no termination criteria for the game. This is the strongest argument for spin the bottle not being a game. However, players do enter a game of spin the bottle with hidden goals of wanting to try kissing some other players, and generally wanting to experiment with kissing. As a result, the players do have personal goals from playing the game, and some outcomes are better than others.*

*If you feel your answer makes an effective argument about Spin the Bottle, but did not get full credit, bring it in for a regrade.*

7. (15 points) According to Juul's definition of a game, is *spin the bottle* a game? Justify your answer by describing how the activity meets, or does not meet, aspects of this definition.

*Like the previous question, it is possible to argue this in both directions, and hence the answer will depend on the quality of the argumentation. There is more evidence here that spin the bottle is **not** a game, however, and so arguments in favor of it being a game need to be a little bit stronger.*

*Key elements of Jesper Juul's definition are:*

*Rules*

**Games are rule-based**

**Variable, quantifiable outcome:** *Games have varying endings, with different numbers assignable to specific outcomes*

**Valorization of outcome:** *The different potential outcomes of the game are assigned different values, some positive and some negative*

**Player effort:** *The player exerts effort in order to influence the outcome*

**Player attached to outcome:** *The player is emotionally attached to the outcome of the game in the sense that a player will be a "winner" and happy in case of a positive outcome, but a loser and "unhappy" in case of a negative outcome.*

**Negotiable consequences:** *The same game [set of rules] can be played with or without realworld consequences.*

*Games are rule-based: Yes. There is a clear set of rules for spin the bottle. There is also a rich set of implicit rules as well.*

*Variable, quantifiable outcome: Spin the bottle has no defined ending, so putting numerical scores on the endings is, at face value, impossible. However, one could argue that there are implicit desired endings, where the players desire to kiss one or more other players, and their success at kissing those players, as well as the quality of the kiss, could potentially be turned into a numerical value.*

*Valorization of outcome: Again, since there are no defined endings, there can be no valorization of them. However, to the extent that players secretly wish to kiss other players are able to do this, this is considered to be a positive outcome (high valorization). Kissing people you are not attracted to, or an experience of bad kissing, leads to a less desirable outcome. Clearly there are better and worse sessions of spin the bottle, though this determination is dependent on the player.*

*Player effort: As spin the bottle is a game of chance, there is no player effort. One could potentially argue that the player might have some small degree of control over where the bottle lands, and hence this involves player effort. Still, as expressed in the rules, this is intended to be a game of pure chance, and hence clearly fails this aspect of Juul's definition.*

*Player attached to outcome. While there are no winners or losers in spin the bottle, there are clearly outcomes that are more desirable for the player (kissing people they are attracted to), and less desirable (kissing people for whom there is less attraction, or revulsion, poor kissing experiences). It is easy to see players being more or less happy depending on the outcome.*

*Negotiable consequences. A lot will depend here on the definition of "consequence." If a kiss is considered to be a real world consequence, then the game does not have negotiable consequences. However, if a kiss is felt to be a fun thing to do, and is considered to be a gesture that is part of gameplay, then real-world consequences are negotiable. For example, whether the outcome of the game leads to any further contact by the players is completely up to the players, and is not dictated by the game itself.*

8. (5 points) Describe how the rules of Conway's *Game of Life* create emergent behavior.

*In Conway's Game of Life, a very small number of simple rules, combined with a starting game state, combine together to create complex, unpredictable (without substantial prior analysis) structures. That is, the wide range of behaviors exhibited by the Game of Life system is substantially more complex and varied than the small set of simple rules might indicate, clearly demonstrating the asymmetry between rules and behavior that is the hallmark of emergent systems.*

*Note that Conway's Game of Life is different from the Milton Bradley game of the same name (which has much less emergent behavior, and is more of a game of progression.) Conway's Game of Life was demonstrated in class, and is also discussed in Juul's book *Half-Real*, and the course text *Rules of Play*.*

9. (10 points) Pick a game (name it in your answer), and give two examples of implicit game rules from that game.

*Implicit rules are those that describe expected behavior for players, yet where these behaviors are not explicitly stated in the rules. Sportsmanship rules, how to handle unusual weather events or other catastrophes, timing of player turns, etc. are all examples of kinds of implicit game rules.*

*To be considered implicit, the rule given by the player must not be one that would appear in the printed rulebook for a game (since the rulebook rules are explicitly stated by the very nature of being in the book). For computer games, it is much harder to identify implicit rules, since most of the game rules are encoded into the computer code that implements the game. However, there are some. The act of camping in a first-person shooter is typically frowned upon, though is certainly allowed by the game rules. This is a form of sportsmanship in FPS games.*

*Since students get to name their game, there is a wide range of possible acceptable answers to this question.*

10. (a) (7 points) In Game Maker, what is the difference between a sprite and an object?

*A sprite describes the visual characteristics of an on-screen entity (how it looks). An object describes the behavior of an on-screen entity. **Appearance vs. behavior.***

10. (b) (3 points) Which of the following receives events in Game Maker: sprite, object, room, action?

*An object receives events from the gameworld, and takes actions based on them.*