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PROFESSOR: Welcome back. Thanks for not dropping the class yet.

AUDIENCE: I'm going to do that right now.

PROFESSOR: Funny you mention that. Let's see, just a reminder. Actually one big reminder for folks who weren't here on Friday is that we swapped around Friday and Monday's--

AUDIENCE: Yeah, I think 17th and the 20th have been swapped.

PROFESSOR: Yeah.

AUDIENCE: In terms of reading that we're going to do in the class.

PROFESSOR: So, we're still going to be playing the games on Friday. But the brainstorming activity that we had scheduled for Monday is going to be on this Friday instead. And then later on in the course. Anyone manage to get through the reading? Let's see, where should we start.

So there was a Doug Church article that was on Gamasutra. And if you're familiar with Gamasutra, or if you're not actually, it's a fairly well-read news and industry news blog for the video game industry. That particular article, I think, was originally written not for the website but for the magazine that the associated company publishes, the *Game Developer* magazine. And Doug Church is actually an MIT alum. The other article that was read, Mark [INAUDIBLE], they're both MIT alums. So that's one thing.

So Doug Church proposes a set of tools. And remember what they're called?

[INTERPOSING VOICES]

PROFESSOR: So, and Mark's framework which is--

AUDIENCE: M-A-D?

PROFESSOR: And we covered mechanics and dynamics on Friday. And today we have a little bit of time to

talk about aesthetics. But the reason why these two essays were put right next to each other was MDA is an example of what Doug Church was describing as [INAUDIBLE]. In fact, at the time when MDA came out it was pretty much the only one that caught on.

Everybody, all of the problems that Doug Church lays out in his article about the problems that we don't have a vocabulary, a consistent vocabulary, to talk about our craft and thus we can't actually deal with it. And thus we need some formal tools that everyone uses. Unfortunately not much has caught on.

MDA being one of the few that has. For a number of different reasons. First of all, it actually is a useful framework. You can think of many, many, ways to properly look at games but for a designer you need to think of something where you can actually apply it to help improve your games. And MDA actually gives you a reason why design is hard. So if nothing else, designers like it a lot because it says this is why their job is hard.

The reason being, you get to control the mechanics. But that's not what you're going for. You're not going for really interesting mechanics. They're going for really interesting aesthetics. They're going for a fun, engaging, play experience.

There are mock-- in the MDA paper, this lists eight kinds of fun. And I've asked him about this when we give this presentation here in MIT. Those eight were not meant to be comprehensive. They were meant to be, these are the eight that I could think of at the time. After this I'm going for [INAUDIBLE] that's a bouquet of different kinds of fun.

Different kinds of experiences that people are trying to get out of playing games. That's what a game designer is trying to get. The only problem is that a game designer doesn't actually control that experience. The game designer only gets to upload mechanics.

Depending on what company you are, maybe you have the title of game designer but you're also in charge of the art. You're actually also the lead programmer. It's possible that you also have more control over things than just the mechanics. But most designers, mechanics is what the job still is.

So they write the rules, the rules interact in some sort of like ridiculously hard to predict way, and then you get the experience of playing the game, the aesthetic. And you hope that's what you were going for. It usually isn't. And then you make a change to the mechanics and try again.

The nice thing about that, is that works really well with the rate of design. In fact, without a rate of design it becomes really hard to control this kind of process. Because basically, we are two orders removed from the experience that you're trying to create. It's like trying to draw on a piece of paper where not only can you not see the paper that you're drawing on, you're also controlling the brush or the pencil tied to a stick, or something like that, blindfolded. That's kind of what making game designs are like.

So that's the experience of the game design side. You can control the mechanics, and they're going towards some sort of aesthetic. And from the other side, the player is experiencing some kind of aesthetic and they can sort of work their way back. It's like, I'm getting this kind of experience. Why am I getting this kind of experience?

If you've got a particularly insightful game player, maybe they're taking CMS.300 Introduction to Video Games, and you're analyzing games. And you're trying to say, how did we get here? If anything in this class, you're going to be doing that a lot. This game, Heroes Might and Magic 3 for instance, has-- give me a particularly-- a sensation. Describe a sensation that you got when you were playing that game, that you recall.

AUDIENCE: Strategic. Out-smarting. To saying to friends. Outsmart them. Stump me.

PROFESSOR: Seem smart, make you have to think really hard and everything. So then you think about what dynamics might have resulted in that.

AUDIENCE: Fog of War.

PROFESSOR: For you to figure out is behind the areas you can't see. But it has some information that you can see that will give you clues. And then, Fog of War might already be a mechanic. The idea of, there is information that you can deduce even though you can't actually see it. And there's some probability of getting it right based on their experience with games. Fog of War being one game that gets you there.

So you can analyze it backwards. And figure out, OK that's one thing Fog of War gets you. Sometimes Fog of War just confuses you. There could be anything behind this corner. I mean technically, Final Fantasy random combat system is like Fog of War. I don't know if there is a random encounter here, I will walk into it.

AUDIENCE: [INAUDIBLE].

AUDIENCE: That's where Unix merger is complete-- Plan to the classic Final Fantasy one with slides and the classic [INAUDIBLE].

PROFESSOR: But there is actually a problem-- actually, I don't need to write this down. There is a problem with-- well, maybe it's not a problem. There is an issue that I have with [INAUDIBLE]. Doug Church uses it specifically to say, well it should be sort of a serious business right? It's formal with a capital F. We're not talking about how cool this game is, we want to be very precise in our vocabulary. We want to treat it like a serious business with a capital S, capital B.

However, the other assumption with the word formal comes from [INAUDIBLE]. You are thinking about the form of the game. In a way that if you were trying to apply the same technique to talk about art you'd be talking about the form of visual art. The form of cinema.

And that is actually a very narrow way to look at something, at a topic, that is as broad as a game. It is as if we were trying to analyze something like [INAUDIBLE] and completely ignoring the fact that you were playing it with friends from French class.

That would be an example of, well that had nothing to do with the game. Well actually, it probably had a lot to do with how you experienced the game. Play, that's the rules of chess. And you could just look at the game based on the rules of chess. You could also look at the history of chess. You could also look at who you're playing it against. Are you playing against a random person or against your dad? Big difference, or in my case my mom.

Are you playing it in a club? Are you playing it against the chess master in Harvard Square or something like that? What does this game mean? Are you using the game metaphorically in speech? My opponent wasn't checking his position. Doesn't necessarily mean that you were playing chess with someone else in order to get your point across. There's a whole range of different ways that you can look at games, even as a game designer, that isn't specifically formalist. That isn't specifically just looking at the form of the game.

Just understanding what context people are going to be playing the game in. While a lot of the games that you guys are going to be designing this semester, specifically in this class, you have to think about the fact that a lot of these games are actually going to be played by your instructors. Are going to be played in a setting very similar to this by your colleagues. Are probably going to end up being tested by dorm mates, fraternity friends, folks around campus. And all that is going to vividly influence the kind of game that you make.

For better or worse, you are pretty much making a game for an MIT audience. I am trying to change that a little bit for the last assignment. But keep in mind that's not necessarily every single game that you're going to make in the future. And that shouldn't be. But, knowing that, you can try to cater to the audience that you've got.

That has very little, in some ways, this is going to effect the design decisions that you make in your game. What will be perfectly acceptable to a competitive MIT audience might not be perfectly acceptable to your average working buyer in Target or something like that. And so what may be a perfectly engrossing game, mechanic, dynamic, aesthetic experience, that you will get.

But just like looking at the formal aspects of one game, this will be really cool if you understood the mechanic, played it out in the way the creator designed the dynamic to give you the aesthetic experience. But if you don't have the standard context when you're playing the game, as an example, then your player may not even get that far. Your player may look at your game and say this game is not for me and just walk away.

It might mean that you might-- I'm thinking of things like we just had this good discussion over lunch about the sort of games that you find on Facebook for instance. And a lot of social games-- I might have already made this point, but it has been argued that social games aren't all that social. All you do is really beg and scam your friends. That's the whole point-- In many ways, it's also the same to your friends who are doing the same thing.

And we may be separated by time, and separated by distance, we're all doing the same thing. And we could be playing this game, we could be talking about a show that we are watching in our apartments and get to discuss it, but in many ways this is just me telling you we're doing the same thing, that we're part of the same group.

And that serves a function that has almost, that really doesn't have anything to do with the formal analysis of how a game mechanic works, but it's still incredibly crucial to the popularity of those games. So keep that in mind, that even though Church makes his point-- I think a lot of designers actually ignore that when you read his essay-- that it's only one set of tools. The formal tools are only one set of tools, even.

That our tools at looking at games culturally, personally, and other things that video games cast into light-- that will effect how people experience a game and how much pleasure they're going to get out of a game. To understand video games doing what it does right? That aren't,

that don't have anything to do, necessarily, with just by looking at the self-contained system of the game.

Just as a side note, how many of you folks have heard of the narrative versus ludology debate? How many of you are sick of this? I'm sick of it too. But I bring it up for one reason, there is an interesting case that if you actually look at narratology as a study and ludology as a study, they're both formalist studies.

In fact, they're more accurate more precisely, they're both structuralist. If you look at philosophies as a sub-sect of formalism, or at least a more recent version of it, they're both basically focused on these are the elements of this art form. And this is how they interact to produce some sort of effect. And all that matters is what's contained in this art form. What's outside this art form doesn't matter.

That's what narratology does for stories. That's what ludology does for games. That's, in fact, probably why most people who study games have walked away from ludology because it's not that interesting. You just study what's inside a system. People want to see what's outside.

And so when you compare structuralistic and structuralism wins that's one case. And you only have, you may not realize that you're actually looking at your game through a very, very, narrow lens. So I'm trying to broaden the range of tools that you've got. This class is going to give you a small set of them. And it's not by any means the be all and end all of every single way and that you can look at a game. And again, you're not just restricted to the tools that I specifically teach you in this class. So keep looking out for all the new ones.

Let's see. Any questions so far? That was my rant. OK, no more ranting.

We have an activity. Do you want to run through?

GUEST SPEAKER: OK I'm going to pass around-- this is my crappy race game. So you're going to be getting one copy per pair. There's also some nifty set of dice. You'll need one copy per, one die per. And then, each person's going to need three of these poker chips. It doesn't matter the color so just grab three. You're each going to need a marker to indicate yourself. And I recommend just grabbing any given value-- There should be more than enough copies.

So you only need one board per group.

PROFESSOR: So one die for every two people?

GUEST SPEAKER: Yeah, one of those six-sided die for every two. And then you need markers for yourselves and then bonus markers. And that's what the poker chips are for. So keep the poker chips circulating.

AUDIENCE: Three per person?

GUEST SPEAKER: Three per person.

AUDIENCE: One playing piece per person.

GUEST SPEAKER: You can use coins, you can use die-- [INTERPOSING VOICES] paper, whatever you want.

PROFESSOR: So we have three of the important questions [INAUDIBLE].

AUDIENCE: How many [INAUDIBLE] take back?

GUEST SPEAKER: If you need markers for yourself, you can try one of the multi-sided polyhedral dice over here. I guess--

[INTERPOSING VOICES]

AUDIENCE: OK, OK, what now?

GUEST SPEAKER: I'm more well-versed in the--

GUEST SPEAKER: The die is to roll

GUEST SPEAKER: OK, so can everyone hold on for a second? So what we're going to ask you to do is just play through this game a couple times? Then we're going to come back and apply the MDA framework to the game itself. And then if we have time, I think we're going to spend some time tweaking it? OK, cool. So we'll interrupt you guys-- actually, ten minutes probably. It's a pretty quick game.

This has sort of gone flat. So what we'd kind of like to do is hear about-- I guess we'll just go around the room in pairs and ask you to talk. Or do you want a minute to talk, to apply MDA to this and focus on some things? So I'm not like calling anyone on the spot.

PROFESSOR: Anybody want to volunteer what, how they felt? What was the aesthetic of this game?

AUDIENCE: There is none.

GUEST SPEAKER: There's no emotional affect.

PROFESSOR: It felt competitive.

AUDIENCE: The thing is, it's a very simple aesthetic. So in the paper they say you're going to the pleasure of using the aesthetic, but here you go straight to the mechanic and you're wondering about it.

PROFESSOR: You, it definitely is easy especially because especially for board games the mechanics are written down right in front of you, it's really easy when you look at that. But how did you feel while you were playing this game?

AUDIENCE: There was a sense of tension. There was maybe a sense of [INAUDIBLE] perhaps? There was a sense of-- I mean there was the intellectual challenge of working out is there really a meaningful decision to be made here? And if there is, what is the correct decision?

PROFESSOR: So thinking can I optimize this? Especially with this crowd, I think there was an immediate try to figure out what the right thing is. And I know you were trying to figure it out.

AUDIENCE: I think he correctly figured it out.

PROFESSOR: So is there an optimal way to play this game?

AUDIENCE: Yeah, OK, so if you're losing-- If you keep putting tokens down you're going to lose anyway. So you want to be rolling in order to increase the variance. And if you're winning, you want to be putting tokens down in order to move the variance. You can imagine if it's like a distribution. If you're below the winning line you want to widen it out as much as possible so as much of that distribution is above the winning line. And if you're above the winning line you want it to be as narrow as possible so you stay above the winning line.

PROFESSOR: So your strategy is basically based on what's the currency of the game.

AUDIENCE: Yeah, until the last turn where obviously you don't want to put a token down if you're two from the end. As long as no one can win on this turn, if I'm behind him I'm rolling the die. And if I'm ahead of him I'm putting down a token.

GUEST SPEAKER: Did anyone prefer a strategy before you started thinking about what was the best one?

AUDIENCE: I'm too lazy to use the tokens so I just keep rolling.

GUEST SPEAKER: And that's also part of the aesthetic of it right? You just happen to prefer the die roll.

AUDIENCE: On the first three spaces you should be getting the average if you roll [INAUDIBLE] if you put a token down. I personally like being conservative.

PROFESSOR: You win no matter what.

GUEST SPEAKER: I'm sorry what?

AUDIENCE: That's more exciting because it does different things.

AUDIENCE: The token gives you the illusion that you're actually playing.

PROFESSOR: Did anyone like get in the situation where they are really far behind in a different color?

AUDIENCE: No.

PROFESSOR: The actual difference-- one of the things that you do get in this game is the perceived distance between players. It's actually not that far. If the one behind actually has to still get in. I think people refer to this as the American Gladiators effect. You know how, *American Gladiators*-- actually, is this your example that I'm stealing?

GUEST SPEAKER: I don't remember, honestly.

PROFESSOR: Someone I can't help from stealing.

GUEST SPEAKER: I think it's in the book at some point, but I think we had applied it to this.

AUDIENCE: Plagiarism!

PROFESSOR: Yes, yes, well I'm crediting someone for this question. Citation needed. The basic idea being-- who's seen *American Gladiators*?

GUEST SPEAKER: They might be too old.

AUDIENCE: No, no, we had *American Gladiators*.

AUDIENCE: I've never-- I don't know what it is.

PROFESSOR: OK, there are also a number of Japanese game shows which are similar to this.

The basic idea of *American Gladiators* is that it's basically an obstacle course where the

obstacles are people. Happen to be these athletic dudes and women who are either pummeling you with waffle sticks or shooting tennis balls at you out of a gun and stuff like that. And you basically have to get from the beginning to the end faster than the other team. Actually, faster than the other player. So it's two regular dudes and a whole bunch of athletes who are throwing things at you. Every time you get hit you have to go back a little bit.

But the thing about *American Gladiators* is that you have this long obstacle course. In fact, this was one of the events. This was always the final event of the entire TV show. Is that, you will have two people doing the same course. They will have to climb up a wall and then they will have to go down a zip line.

GUEST SPEAKER: But it was a cargo net specifically. So it was really difficult to climb up it.

PROFESSOR: Yeah, the big webbing kind of thing. It was like climbing the rigging off a ship. It was really, really, difficult. So what happens is that if you have two people who are really, really, far apart-- one person is way ahead-- and that person starts climbing the cargo net? It takes that person forever to get to the end of the cargo net, because climbing up cargo net is really, really, hard no matter who you are. That gives the person behind plenty of time to catch up and start climbing the cargo net.

But then, the person who was the leader in the first place hits the zip line. And all of a sudden there's a huge increase in distance. So this whole idea that they never really were all that far-- they never really changed their position. For most *Gladiators* games the winner has already been decided by their points. Because the first person who reaches the cargo net tends to win the match. But it looks like the lead just shrank because suddenly you've got both of them in one camera shot.

And then you've got that cute-- mom likes to call that dramatic tension. Which I think is a better description than it's other term for the same thing which is drama. Because it's not drama. It's just tension really. But that's an aesthetic. You're going for the aesthetic of tension and coming up with a game that makes you feel like the fight is closer than it actually is. Or allowing someone to close the gap quickly because, many of you have pointed about, these things probabilistically mean exactly the same thing as a die roll.

Let's see. But the ability to increase a awkward gap to open up and then to close, that's actually a dynamic. That's actually a result of a number of different rules that are in the particular of the game. It's not written down that it's going to happen. But it's pretty much going

to happen if you have two people playing those particular strategies, and one thing that happens pretty often.

What are the constraints that you're seeing in the design of this game here? What did this game have to do in order for it to be a viable in-class exercise?

AUDIENCE: Fit on a sheet of paper.

PROFESSOR: Fit on a sheet of paper. That's a huge one actually. Because first of all, it limits how many spaces you've got. Assuming everyone's using something like a die or a coin or something.

GUEST SPEAKER: I mean, you can laugh at that but it's literally how it went. I wanted it to fit on a sheet of paper and the spaces had to accommodate a die. So the number of spaces is a result of that.

AUDIENCE: It was almost like an accident.

PROFESSOR: Well you probably could have fit a few more squares in there.

GUEST SPEAKER: Probably, but you place some margins.

PROFESSOR: Yeah.

AUDIENCE: The rules have to fit on one sheet of paper as well. So the rules can't be that complicated.

PROFESSOR: Most of these rules are single sentences for the most part, because we are more than [INAUDIBLE]. It had to be quick. It had to work within 10 minutes. In fact, it had to work so you get through a few games within 10 minutes. Anyone only manage to get through one?

AUDIENCE: That'd be really hard.

PROFESSOR: So different aesthetics. So, this game tries to get really, really, tense. But obviously, the decisions that you're actually making in this game is minimal. You get to say, well if you are already losing, that has [INAUDIBLE]. One rational thing to do. But if you were playing this game, as Jason recommended, if I were playing this game against myself there really is no optimal strategy. I could pick two different strategies for each side.

AUDIENCE: It's whoever plays first basically. Whoever plays first is by default going to win.

PROFESSOR: On average.

AUDIENCE: I won every game but one. I did bad rolling dice.

GUEST SPEAKER: Because if you roll them now--

PROFESSOR: So I would like actually, folks to try mixing this up a little bit. Pick a rule in here, any rule, and alter it. You can do things like adding more squares. You can change the movement chart. One idea that I had, and someone was thinking probably more recent than me, which is what happens if you use the higher of two dice rolls instead of just one? [INAUDIBLE] to the probability. Play around with that. See what that feels like. And if that feels just boring try doing something else. So we've got 15 minutes?

GUEST SPEAKER: Yeah, that's reasonable.

PROFESSOR: And then, you'll tell the class about what you changed and how that changed the feeling of the game. Cool?

So, every two people, work with a team. Explain how your game, how your version works, and have the other group play it and vice versa. And what we're going to do once everyone's done, you will tell the class what you felt the other group's game felt like. So let someone else figure out what your game aesthetic is.

So, does any team want to just go first in describing the other team's game? OK, starting with you.

AUDIENCE: Do you want us to describe the rules they changed?

PROFESSOR: Uh, sure.

AUDIENCE: Or just say-- the main change in this version was that it's modular. So you have to land exactly on the end or otherwise you wrap around. It changed the aesthetic a lot because it stopped being a race against your opponent and became more of trying to figure out how you can use your tokens to precision just hit the end.

PROFESSOR: Oh, OK.

AUDIENCE: More methodical and thoughtful. You decide whether or not you're going to stockpile tokens to give you more winning squares and then you just waited until you landed on a winning square.

PROFESSOR: So you get a dis-computational motive to the game?

AUDIENCE: It was not as competitive.

AUDIENCE: So one of the discussions we had was, what if you had three tokens you could just get to the end. Because we made our tokens move four spaces.

PROFESSOR: OK.

AUDIENCE: But I just realized, you have to do the die roll after that.

AUDIENCE: Yeah.

AUDIENCE: Oh, yeah.

AUDIENCE: They had a really creative role where they had a 10 here. So it goes from 0 to 9. And you roll under a cup and that's the number of spaces away from the end. So from 0 to 9 that the winning point is. And at your turn you can either play normally or you can check to see where the winning point is.

If you've won, that triggers you winning. But you cannot win unless you physically check and confirm that you've won. So it eats up a turn, but it could be that after two rolls of two and this was a nine you've won. And it was a lot of fun basically because we had to figure out the optimal strategy but it was just fun.

PROFESSOR: So what's it feel like when you're trying to figure out what you're going to do?

AUDIENCE: He beat me by checking when it was far away and being lucky.

PROFESSOR: So if you don't check you have to reach the end to win. So you have to check, usually, anyway.

AUDIENCE: One thing Alecia had in mind when we were thinking about the rule was there ought to be information that you can get from how your opponent reacts after they look under the cup. So if they then go and start rolling again or what have you, or they then start options. But there must be some way that you can get a leak of information from their behavior which makes it interesting in a different way.

AUDIENCE: If you've have already seen the cup, and you get past the point, do you have to check to win?

AUDIENCE: Yeah, we played two different variants. One where you did. One where you didn't.

AUDIENCE: Oh, I see.

AUDIENCE: Well, you don't have to check the second time. If you check the first time and then you pass it you win.

AUDIENCE: So that's why there's one way of playing it.

PROFESSOR: So the person who checks could win even they're already passed the point? Am I understanding this right?

AUDIENCE: Well, if he's the first past the point. If you don't have check to win, so if you just need the knowledge of what the endpoint is, then if he passes it first he wins. If when he checks both players are at that spot then it's a tie.

PROFESSOR: Oh, ok.

AUDIENCE: But since it's a sequential game it's impossible. Other than, at the moment of the check if both players are at the same spot is it possible for them to win at the same time. So that's not really an issue.

AUDIENCE: What if I check, and you're past me, and you have passed the check spot?

AUDIENCE: I don't win.

AUDIENCE: OK.

AUDIENCE: Because I never checked. So as long as I don't know I don't win.

PROFESSOR: Hey, he makes me think of a different variant. But OK.

AUDIENCE: So what they did was they introduced a couple new rules. The first rule being that, the person who rolls first on their first turn they cannot put down a token. So they actually have to roll. The second rule is, whenever you roll if you have a bonus token on the stockpile you have two options after you roll.

One is, you can take it off and move two spaces like normal. The second is, you can choose to make that block impassible. So what this does is your opponent cannot land on that block. If they are already on that block they get pushed one block back. If they are behind it, and they roll and they move to that block, they get pushed one block behind it.

PROFESSOR: So they're changing the block while you're playing.

AUDIENCE: Yes.

PROFESSOR: And how did that feel while you were actually playing?

AUDIENCE: We didn't actually use it that much.

AUDIENCE: I felt like the penalty for the impassable block should have been more. Because if you land on the block that they're on, and make them move back one, that token would otherwise have made you move forward two. So it doesn't really reward you for that. I felt it could have been really awesome if the penalty was significantly more severe. Because it's hard to get in front of them enough to actually make a block impassable and have them land on it later.

AUDIENCE: Probably to all the way back or something.

AUDIENCE: Yeah exactly.

PROFESSOR: So try multiplying it by two and see what happens.

AUDIENCE: Yeah, and then you can always go land on it.

PROFESSOR: If you're like, hmm, that should have changed the game play but that didn't. One of the tricks in chapter one was just make it bigger and see what happens. If nothing else it will just give you more information on whether you should be spending any more time with this direction. Or whether it really isn't going to affect the way how people play because people don't end up caring about it.

So the rule of twos is just multiply something by two, or half it by two, and see what happens. Obviously halving by two would not in this work. Who else?

AUDIENCE: So actually they had these tokens as power-ups. And you would never actually take them off to move more spaces. You would just keep adding tokens and you could roll. So you can spend one turn to put a token on and in consequent rolls you could essentially say, I have N tokens therefore I roll N plus 1 dice and subtract N.

PROFESSOR: I think that's one dice.

[INTERPOSING VOICES]

AUDIENCE: --and then you roll a die for each token you have, and then you move back one space for each

token you have.

PROFESSOR: Interesting.

AUDIENCE: So it moves your average and your maximum up each time.

AUDIENCE: So you could act it as a power yourself up.

AUDIENCE: And you could also remove tokens to take away tokens from the other guy, right?

AUDIENCE: Yeah.

AUDIENCE: Which we never actually did.

AUDIENCE: I guess we forgot to go into that, you don't take out all the tokens when you do your special move. They stay in there. Because, mathematically speaking if you take them off it makes it worse.

PROFESSOR: So, I mean, that's an important object lesson in how to explain the rules to the people. How'd it feel while you were playing their version?

AUDIENCE: It made my mind tired, being $N + 1$ minus N . But, it was interesting. I actually used it. Before I said I would only use the die, but this time I actually used tokens.

PROFESSOR: And what happened when you actually used the token? Was it like yes!

AUDIENCE: Like I said, the math made it too hard.

PROFESSOR: Well something happened. It made you use the tokens as opposed to ignoring them.

AUDIENCE: It was interesting.

AUDIENCE: So, the rule that they gave was that if you are behind the player-- by behind, they mean if your piece is behind the other one.

AUDIENCE: Losing, in second place.

AUDIENCE: Right, but not in the imaginary sense. Well, whatever. If you're physically behind them then when you use a token you get to use one extra space ahead.

PROFESSOR: OK, if you use two tokens do you end up getting?

AUDIENCE: It's still one space.

PROFESSOR: So how did that feel?

AUDIENCE: It actually changed the strategy a little bit because in the beginning you basically don't want to be the person that moves first. Because then your opponent can just use all their tokens and get a lot better than you.

PROFESSOR: Oh, I see.

GUEST SPEAKER: You may want to talk about tokens and what it feels playing it ahead of you so that you can use them, you can--

[INTERPOSING VOICES]

AUDIENCE: Rather than you just sit at the start point every time.

AUDIENCE: So pretty much the person who goes second?

AUDIENCE: Is at an advantage.

PROFESSOR: So that should be a negative feedback loop, which we'll we get to I guess in the next class, but the whole idea being there is a gap between players. And you have game mechanics specifically designed to narrow the gap. Those are negative feedback loops.

AUDIENCE: Mario Kart!

PROFESSOR: Mario *Kart's* blue shell, it's the other direction right? To knock back the person who's leading rather than helping you catch up. Actually, a lot of *Mario Kart's* mechanics are basically designed to help reduce the lead. All right, cool.

AUDIENCE: They add one rule in keeping everything else equal. They add a second die and then the way it worked was you arbitrarily assigned people odd or even numbers. And then you roll and would go on that particular turn. And then that person, whoever it was assigned to, would play. And then you would roll again to see who would went the next turn and so on and so forth?

PROFESSOR: How'd that feel?

AUDIENCE: I got a tad memory with *Mario Kart*.

PROFESSOR: It's like what, again?

AUDIENCE: Many mechanics describe as very *Mario Kart*.

PROFESSOR: Well, *Mario Kart* is actually a collection of a lot of fairly fundamental mechanics.

AUDIENCE: I felt like just rolling to see who'd win. The sense that you were just playing for luck.

PROFESSOR: So it amplified the randomness basically?

AUDIENCE: Yeah, which I actually detest personally.

AUDIENCE: That rule is like initiative rule in *Star Wars Miniatures* and *Dungeons and Dragons*. And like in that case where there's actual strategic decisions to be made it's actually cool. Because it means that you never know whether you're going to be able to capitalize on the position that you're in at the end of the turn.

AUDIENCE: But since we both know optimal strategy for the original game it was just pure luck. So there was no strategy.

PROFESSOR: So it almost becomes like a gambling game or a game of chance. Cool.

AUDIENCE: They added different dice you could roll for different effects. Such as, if you roll the D20 you can go 10 spaces. If you need to go 17, 18--

AUDIENCE: Or 18, 19, 20.

AUDIENCE: -- Or 18, 19, 20. So they added the D10 which also had similar effects and deviate. So Patrick and I pretty much experimented with-- well, he just rolled D20 the entire time. And I experimented with rolling the D8 and the D10.

AUDIENCE: Why would you not roll the D10?

AUDIENCE: I started feeling impatient. I would forget everything about Alec and what he wanted to do. And every turn I would roll the D20 hoping to get 18, 19, or 20.

AUDIENCE: By the way, with the D20 if you don't roll any of those you go zero spaces. So that's actually the risk.

PROFESSOR: So you could either win the game or go nowhere.

AUDIENCE: So I roll the D20 wanting to get 18,19, or 20. And not until I roll the 18, 19, or 20 would I care where he was on the board.

PROFESSOR: It's you and the dice. It's just you and the randomness.

AUDIENCE: I rolled twice too.

PROFESSOR: Like what you described earlier is that whether you're behind or in front of someone changed the way that you would play in the original version. Now, no longer really matters anymore, right? It's just you and the dice. And when the universe loves you, you just automatically win.

AUDIENCE: The intention was to have the D20 for when you were way behind and the other one if you were only slightly behind. Apparently that's not how it was used. [INAUDIBLE] design, right?

PROFESSOR: Well, a good example of the aesthetic you were going for not being the aesthetic that was actually experienced. So, it's still a powerful aesthetic it's just a different thing than what you planned.

I think I might have skipped you guys? Sorry about that.

AUDIENCE: So their new rule was, if you are physically ahead and you roll a six instead of only going three you would go four.

PROFESSOR: If you're physically ahead and you roll a six you go? Oh, OK.

AUDIENCE: [INAUDIBLE].

AUDIENCE: At first, we tried playing it in a similar way of how we did before. And it really felt like the person who was ahead was ahead even more. And now everyone's rolling, because as soon as you roll you get a higher expectation value.

PROFESSOR: So you prefer the low-ball luck rather than the?

AUDIENCE: So the problem is if you put a token down and they roll at least a one so you're guaranteed you're going to be the high. And then they have a higher expectation.

PROFESSOR: How does it feel to play? Mathematically that's what it means, but--

[INTERPOSING VOICES]

AUDIENCE: Actually, in playing the first game I don't think it actually came up at all.

AUDIENCE: And then in the second game, I believe it did? And to me it didn't really feel like it changed.

AUDIENCE: For me, the entire time I felt like the person who was ahead was more ahead.

AUDIENCE: It would come up more if your board was longer. It really encourages you to stockpile for the first few turns. But if you're encouraged more than you might want to search. That's contrary to--

GUEST SPEAKER: When you guys were going over mistakes did you feel like it changed your strategy?

AUDIENCE: Yes.

AUDIENCE: It made rolling feel like a [INAUDIBLE]. Which was the point right? That's what you guys were aiming for?

AUDIENCE: The alternate rule that we had toyed with was, if you're ahead and you put down a token you have to roll. And if you get a six you have to move one step back. So there's a one in six chance that there'll be a penalty for [INAUDIBLE]. Because precisely what you mentioned, which is that when you're ahead the dominant strategy is to reduce the variance. So we were just playing with stuff to make you want to roll more basically.

PROFESSOR: OK, so dynamically that tells you to roll more. I would say aesthetically you have the whole *Monopoly* situation where the person who's winning just keeps winning. And there are times when you actually want that feeling.

Especially when it came to the game of *Monopoly*, the whole point of the game was huge financial embarrassments. And it's like, wow I have no money and I'm just going to keep losing money. That was the point of the game actually. That's why it's called *Monopoly*.

AUDIENCE: The thing about it is, the person who's physically ahead may not actually be ahead in terms of absolute game play because the other person has stockpiled tokens. And we weren't sure whether determining who was ahead by counting the tokens in the equation or not was a better game rule if we didn't have that type of test.

PROFESSOR: Give it a shot [INAUDIBLE]. The one thing we came up with was-- at first we thought it wouldn't change the game at all I guess. Which was basically, instead of spending tokens to go forward two steps you spend tokens to knock your opponent back two steps. Completely changed the game play.

AUDIENCE: We tried that. It sucks.

AUDIENCE: Stock piled first and then you knock people back so you didn't go anywhere for the first 10 turns. And then you realize that nothing is going to happen.

AUDIENCE: And then we just kept rolling.

AUDIENCE: Rolled the rest of the time.

PROFESSOR: Which is a completely different way to play the game. That whole process of stockpiling right at the beginning is-- sure, we could have both started with a stack of three each because that's really what happened three turns in. But the whole act of-- that felt really like, OK clearly you're setting out to kill me.

AUDIENCE: Can you move?

PROFESSOR: No, we had it so it wouldn't be a point spending it when you're right at the beginning. But there was that whole arms race feel that really didn't happen the first game. All it did really was make the game longer, but it felt mean.

OK, that's pretty much it for today I guess.

GUEST SPEAKER: And we need the poker chips and all the dice back but you can keep the game boards if you're really happy with them.

AUDIENCE: How long did this game take you to make?

GUEST SPEAKER: It took longer to make the board than to make the rules.