**JOHN:** All right, so we are Jedi Ball. We-- [? Kayhill ?] and I-- this is Toshi, I'm John. [? Kayhill and ?] I are-- we also were taking a brain-computer interface class at the media lab, where we learned to use these news headsets-- this is a consumer-grade EEG headset. So it's reading electrical signals from my head right now. So that's what we're using to drive our game. So, all right.

**STUDENT:** So what we're using from the EEG headset is that first we're using the readings for your alpha and beta waves. So alpha waves are stronger when you are more-- your brain is more relaxed. And beta waves are stronger when you are more focused. And we're also using the [INAUDIBLE] meter on the headset to check your point of direction. And how it works in this game is that you're either using your alpha or beta waves to control the speed of your ball. And for the direction, you're going to have to tilt your head left and right. But we added a twist to it here, where you use your brain waves to influence the magnitude of the turning. And your head tilt will only influence the direction. So John, you want to demo?

**JOHN:** Let's give it a go.

**STUDENT:** All right. Let's start with just tilting. OK. And yeah, we managed to get it to just be able to reset at a press of a button.

[APPLAUSE]

**JOHN:** So what you might notice is the word "concentrating." You'll see the values for my alpha and beta waves fluctuate. If the brain is distracted, they'll change, too. So it's actually really hard to control when you're in a room full of people not surprisingly because a lot of it's based on how hard you're focused.

**STUDENT:** And how we switch between the waves is actually we track your blink. So with one blink, you just switch to the other one. But we have some problems with this because it's tracking multiple frames, so the blink could last for multiple frames and it could jump back and forth. We're still trying to figure that one out. But yeah, the game play is generally done.

**JOHN:** George, you want to say anything else?

**GEORGE:** I'm good.

**SPEAKER 1:** So this is a first. I have never used a unity, so this is a beginner course. I learned something.

For example, there is stardust here. You can see. And I wanted to learn how to put such kind of particles. And you can see there are actions. If we shift the obstacles, there is some particles appeared. And also, another particle up here at the [INAUDIBLE] when we hit the pin. So there is a script to check which obstac-- which collider hit to which collider. And you can see the spotlights are turning round. And I wanted to do this with a foggy spotlight to see some rays, but I found that this is not so easy. So this is a current challenge I want to learn.

And I used the physical material for each object. So the flaw is there are almost icy, so very low friction. And obstacle had some bounciness at 0.7 or 0.5. And actually I started to learn how to model the masses for the pin in a unity, but without using blender modelling.

[APPLAUSE]

**SPEAKER 1:** So that we can use-- [INAUDIBLE] plus zero mass scripting. And I tried. I couldn't finish this yet, so I'm using just a simple cylinder as a pin. But I found that for each-- this cylinder, standard primitive, still has some program because there are-- the cylinder collider is basically-- it's a capsule collider. So the original collider, if we use, if once we hit, it is very easy to knock it out. And so we needed to change the collider from capsule collider to miss collider.

OK, and another thing. So you can see that this is a main camera, which is following the ball. And once this ball goes to some threshold beyond that line, then the gold camera appears like that. And I had another challenge to put this gold camera has no border frames. So it may be not so easy to distinguish which one is the main camera and the sub-camera, but I tried to use texture renderer to put the camera in-- onto the canvas, but I couldn't figure out how to do that.

**JOHN:** Any questions?

**AUDIENCE:** You should send this to Disney. You should-- I can imagine a pod-racing game with these controls.

**JOHN:** Since Disney owns the Star Wars right now, I'm afraid that they'd sue us for copyright infringement.

**AUDIENCE:** You know, they sold it.

**JOHN:** Right. Yeah, but it would be fun to market it.

**AUDIENCE:** I couldn't figure somehow the alpha and beta waves influence the way the controls work. How does that combine with the tilting?

**STUDENT:** All right, so of the-- how it works is that we are [INAUDIBLE] these event values that you see, and we're multiplying it with some multipliers to apply a force on the ball. So when in tilt-only mode, what happens is your alpha and beta waves, they only affect the forward motion of the ball, so how fast the ball is moving forward. And when it's in tilt and-- tilt plus brain mode, your tilting only influences the direction, and the magnitude is determined by your alpha or beta waves as well.

**AUDIENCE:** So if you're distracted in tilting, it doesn't matter?

**STUDENT:** Yeah.

**AUDIENCE:** It only kind of matters. But if you're really focused and you tilt, it's really strong effects.

**STUDENT:** Yeah, but there is a certain threshold. So if--

**JOHN:** All right, need to concentrate? I would totally look into this right now.

**STUDENT:** Yeah, so the waves in you, if it's lower than 0.2, you won't be able to trigger the turning at all. Yeah. I saw a few other questions.

**AUDIENCE:** Yeah, so I noticed there is a connection on the border?

**STUDENT:** Oh, yes. That's just for the electrodes. So there are four electrodes on the headband. And they have to be in contact in order to get a proper reading. So what happens is bad connection basically only getting one electrode that is really contacting your forehead. And OK connection, you get-- you have two to three. And good is four. Yeah.

**JOHN:** There's a sensor here and two back here. Two here and two here.