**MS. SCHLAU:** Welcome, students, to a very special lecture by yours truly. Because today…

**PROFESSOR EINSTEIN:** Christoph! We forgot to call Christoph. He has to be part of this. After all, we are going to auction off a photo of his research team. JOWO? Hello, Christoph.

**CHRISTOPH:** Hello Professor. Hello Ms. Schlau.

**PROFESSOR EINSTEIN:** We almost forgot you. Haha. Today we're doing a big online auction for the Kinderuniversity Foundation. Your research team's light elephant is on the list.

**CHRISTOPH:** Really? Great. I feel really truly honored.

**PROFESSOR EINSTEIN:** JOWO, would you please show us the two pieces of art that we'll be auctioning today. Here, this painting is my contribution. How do you like it?

**CHRISTOPH:** Hmmm… yes, a really beautiful deer.

**MS. SCHLAU:** In a late 19th century type of way. I personally like the light elephant more.

**PROFESSOR EINSTEIN:** What? Really? What kind of taste you have, Ms. Schlau.

**MS. SCHLAU:** It's original, timeless, and we're about to see how it's made.

**PROFESSOR EINSTEIN:** Huh? What is that?

**MS. SCHLAU:** This picture was made by JOWO. Expressive, don't you think?

**PROFESSOR EINSTEIN:** -What?! This happened recently when JOWO accidentally bumped into a bucket of paint. He ruined one of my white canvases. I'm all for a bit of fun, Ms. Schlau, but we cannot permit such an item to enter into this serious auction.

**MS. SCHLAU:** Now you've hurt a sensitive artist's soul, Professor. I suggest that we wait and see what the art market says. JOWO, please start the online auction now. And in the meantime, we'll take a look at how that light elephant is made.

Today is the **elephant**'s ***(ELEFANT)*** birthday. Of course, he needs a special present. But what? Even I don't know. Perhaps chocolate, he thinks. Mhm. Everyone gives that. Or a frog trio? No.

**PROFESSOR EINSTEIN:** It should be something wonderful. Something homemade. Something with art. Or a picture that lights up - that would be great, too.

**MS. SCHLAU:** And here these two are doing something quite special with **light *(LICHT)***. They're Marcel and Daniel. They work at night to paint with light. They're real artists.

**PROFESSOR EINSTEIN:** Once their pictures are finished, they look really fantastic. Whoops. I've never seen anything quite like that.

**MS. SCHLAU:** Here's a bird made out of light.

**PROFESSOR EINSTEIN:** And there is a whole flock of birds. There's another picture made of light. A chameleon, that changes from **green *(GRÜN)*** to **red *(ROT)***. Brilliant!

**MS. SCHLAU:** And now, Andre has the perfect idea for a present. A light painting. That would be the perfect birthday gift for the elephant. But can Andre learn how?

**PROFESSOR EINSTEIN:** Marcel and Daniel want to try to teach him. Light artists work best where it's dark, which is why Marcel and Daniel's studio is – where? – in the basement, of course. Here is where they store everything needed for their art. Brushes, canvases – they're ready to paint. But today with light.

**MS. SCHLAU:** But Marcel and Daniel don't need any brushes. Instead, they use many **lamps *(LAMPEN)*** and lights for their light art - for example, bright LEDs or a simple flashlight. This one creates a very warm light. If you put a colored filter on there - like this two-colored one, it makes a great light.

**PROFESSOR EINSTEIN:** A lot if these things they have made themselves. This seems to be one our artists really like. A modified paint roller. And here is a brush. This would be the small version, and, of course, it also lights up. Naturally. That was obvious.

**MS. SCHLAU:** The lights are so pretty, but in the dark they're even prettier.

**PROFESSOR EINSTEIN:** They use many beautiful, colorful lights as brushes. But what are they **painting *(MALEN)*** on? What is the canvas? Ah, you need a camera. Normally for clear photos you set a short exposure time. Like a thousandth of a second. When you take the photo, light enters the **camera *(KAMERA)*** for a split second.

**MS. SCHLAU:** But the trick with light painting is to let as much light as possible enter the camera: A long exposure time. And with six seconds, that gives you enough time to paint directly on the camera's sensor. The sensor is sort of like the canvas that is being painted on.

**PROFESSOR EINSTEIN:** It's great they have so many things in this basement that they can use to show us what happens with different exposure times.

**MS. SCHLAU:** It is exactly like the shutter on a camera.

**PROFESSOR EINSTEIN:** The yellow golf balls represents light. If Marcel opens the lid just briefly, Andre is not able to throw the ball, or rather: the light, inside. If it's open for one second, it works a little better. And when it's open for six seconds, a bunch of light gets into the can. Let's take a look.

**MS. SCHLAU:** A lot of light.

**PROFESSOR EINSTEIN:** Now they will try with an actual camera.

**MS. SCHLAU:** Here we have a one-thousandth of a second exposure.

**PROFESSOR EINSTEIN:** First Marcel sets a very short exposure time. The result: the camera clearly captured the lights for a brief moment. There was no time to actually paint anything. Now he changes the exposure time. Marcel sets it for one second. Very nice!

**MS. SCHLAU:** In that time the team is already able to create a small drawing. Daniel made a backwards 3 and Andre made a line. You can hardly see the people. Now the whole thing will be exposed for six seconds. And… action!

**PROFESSOR EINSTEIN:** Six seconds is plenty of time for a magnificent painting. Look at that. Andre drew something beautiful. What a great picture. But why are he and Daniel barely visible?

**MS. SCHLAU:** To understand this the artists try another experiment. They hang laundry and a bright light outside. And when Marcel measures the light with an instrument, you can clearly see that the light is much brighter than the things that don't light up. In the dark you only see things that light up or are illuminated. Everything else disappears – that means they do as well.

**PROFESSOR EINSTEIN:** So now we understand how the photography works. Now it's time to practice painting. First, draw on a sheet of paper. And when that looks good, it should also work with a flashlight.

**MS. SCHLAU:** Does he have to do everything at once or can he take a short break? It's best to use just one line, but that won't quite work with the elephant.

**PROFESSOR EINSTEIN:** It's important to keep the shape simple. Because every time you need to move the flashlight, you might not remember where you should continue painting. And the toenails. This blue looks just like our elephant. It goes in here. And let's take a look.

**MS. SCHLAU:** It's lighting up **blue *(BLAU)***. Great! Blue light! The expert Daniel gives the field researcher important tips.

**PROFESSOR EINSTEIN:** The first tip is to hold the flashlight like a pen So that you can push the button with your index finger. This makes everything much easier. So, turn on the light and you see something. Turn it off, and there's nothing.

**MS. SCHLAU:** The big moment. He's using the light from a flashlight to paint the elephant on the camera's sensor.

**PROFESSOR EINSTEIN:** Now, the second try. Third try. And the fourth: Even better. Number 5. Look at that: the elephant is clearly recognizable. Sixth try: Tadaa! A picture of the elephant painted with a blue colored flashlight. Brilliant!

**MS. SCHLAU:** Now our field researcher is motivated to try. They want to photograph an entire animation film with a light elephant. They've thought up a great story line. Andre plays himself – who else? – and will decorate the birthday table and then go to bed. The elephant wakes up and has a little adventure. Turn off the light and get to work!

**PROFESSOR EINSTEIN:** For the final **film *(FILM)***, we will need at least 140 photos of the light elephant as he moves around the room.

**MS. SCHLAU:** This time the expert Daniel takes over the painting. Marcel takes the photos as usual. Paint an elephant – take a picture. Paint the elephant a little bit further onto the table - take a picture. And so on and so forth.

**PROFESSOR EINSTEIN:** All the photos placed into a quick sequence create the final film. And now we'll show you the result. Enjoy the birthday film made from light painting: The Elephant and the **cake *(TORTE)***. Marvelous. Simply marvelous. These are real artists, Christoph.

**CHRISTOPH:** Oh yes. Absolutely.

**PROFESSOR EINSTEIN:** Ah, the auction is over. I am so excited.

**MS. SCHLAU:** JOWO, show us the proceeds that each painting brought.

**PROFESSOR EINSTEIN:** 29.85€ for my deer? I… I expected more. The paint alone cost me double that.

**MS. SCHLAU:** 10,550€ for the light elephant. Congratulations, Christoph!

**CHRISTOPH:** Oh, thank you. I'm happy we were able to help the foundation.

**MS. SCHLAU:** 990,000€ for JOWO's abstract piece of art?! A sensation! It was purchased by a buyer in New York. It's being considered the first work of art created by artificial intelligence.

**PROFESSOR EINSTEIN:** I… uh… I… I'm… I feel… Oh, oh ohhh…