

EMILY: Hey there! Welcome to Grown Up with Emily, a Lingo Kids podcast that helps kids discover how to be whatever they want to be. Growing up,

WINSTON: Hey, can you guess the age of the youngest computer programmer in the world? Join us to find out, as we explore the exciting world of computer programmers.

EMILY: Hey Winston, how's your research going for our next job?

WINSTON: It's getting there, Emily. I'm just having a little bit of trouble actually understanding what it is that computer programmers do. I mean, it seems like, um...

EMILY: Oh, sorry, that's just my smartwatch. Oh, wow, I'm already at 6,000 steps, and I've still got way more moving to do today.

WINSTON: Wait, your smartwatch can tell you how many steps you've walked or jogged each day?

EMILY: Oh, yeah, Winston, you haven't seen these things? They can give you reports on all things related to your health, like how many steps you've taken, how stressed you are, your blood oxygen level, and even your heart rate! Woah!

WINSTON: Really? Hey, can I try yours on, Emily?

EMILY: Yeah, sure, why not. Here, here you go!

WINSTON: Okay! What's it say?

EMILY: It says, your resting heart rate is 76 beats per minute.

WINSTON: Alright! Is that good?

EMILY: Totally normal and healthy.

WINSTON: I didn't realize smartwatches could do so much.

EMILY: Well, you are researching computer programmers today, aren't you Winston?

WINSTON: Uh, yeah, but what's that have to do with your watch?

EMILY: Everything! Computer programmers are the ones who make all [00:02:00] the cool tech devices we use possible! Okay, so now, can you think of other things that computer programmers have created to make our lives easier? Like, the self checkout machine at the grocery store.

WINSTON: Hmm, or the cool CGI and digital effects you see in movies!

EMILY: You got one! Yes! Okay, your turn, Emily. Okay, hmm, what about a Roomba robot vacuum that knows exactly where to go and clean in your house? and how to get back to its docking station to recharge.

WINSTON: Ding, ding, ding! That sounds like a robot that needs programming to me. Okay, my turn. Um, how about airplanes that fly using autopilots? That's gotta use a computer, right?

EMILY: Ding, ding, ding! Exactly! Those are some great examples of things that computer programmers do to help make our lives easier and more fun. Part of their job is to communicate with machines using special computer languages.

WINSTON: That all sounds very mysterious to me, Emily.

EMILY: Well, it sounds mysterious to us, but it's actually very practical when you know how to use these special languages correctly. Hey, I've got a cool story that might help you understand just how useful computer programming can be. You're gonna like this. It involves a real life spaceship. Are you ready?

WINSTON: Well, when you put it like that, yeah, I'm always ready for a spaceship story, Emily. Okay, counting down in three. What is it?

EMILY: Okay, okay, okay. Picture it. It's July 20th, 1969. You're floating almost ten miles above the lunar surface.

WINSTON: Hey, I know about this. That's the day astronauts first landed on the moon, right?

It was Neil Armstrong and Buzz Lightyear!

EMILY: Close, Winston. Neil Armstrong and Buzz Aldrin. But yes, that's the day the Eagle, the lunar module, approach the moon, ready to land. But as it did, something went terribly wrong.

WINSTON: Oh no, what happened?

EMILY: The computer's lights started flashing warning messages and the astronauts called back to NASA on earth to tell them something wasn't right. That's something was off.

WINSTON: Houston, we've got a problem.

EMILY: Exactly. But they couldn't figure out what the problem was. All they knew was that the spaceship's computer, the Apollo guidance computer was going crazy with flashes and beats.

WINSTON: Oh, gosh. I bet the astronauts were scared, Emily. Being up in space all alone, so far from home or any other people.

EMILY: I would have been scared too, Winston. My heart rate would have been through the roof. But luckily, work done by computer programmers helped them out from back down here on earth.

WINSTON: Programmers helped the astronauts all the way up in space? That's incredible!

EMILY: Well, a very smart computer programmer named Margaret Hamilton had worked on the language that told the spaceship's computer what to do. And she could communicate with the Apollo Guidance Computer from way down back in Mission Control to see what the problem was.

WINSTON: And what was the problem, Emily? Were they running out of gas? Was there an alien somewhere nearby?

EMILY: Nothing quite like that. Margaret was monitoring the code that she'd written using the programming language. And the computer reported back and told her that astronauts had made a simple human error.

WINSTON: Oh, I bet they forgot to roll up the windows or buckle their seatbelts.

EMILY: That would have been an awful mistake in a Spaceship, Winston. But no, what happened was the astronauts accidentally put the spaceship's radar switch on the wrong setting.

WINSTON: Yikes! And there's probably hundreds and hundreds of buttons and switches and lights in a spaceship, too! I thought playing video games was hard. So it would be super difficult to remember what to push and not to push while you're in there.

EMILY: Fortunately, right when NASA was about to cancel the mission and tell the astronauts to turn around and come back home, Margaret's computer program was able to tell them what the issue was.

And not only that, the program she created was so, so, so, so smart that it adjusted the astronauts mistake, allowing them to land safely on the lunar surface. It was a huge achievement for humankind.

WINSTON: And for computer programming, I bet. Without the code the computer programmer wrote, the astronauts may have never landed on the moon at all.

EMILY: That's exactly right. Margaret was a brilliant programmer.

WINSTON: Wow. So computer programmers can do all sorts of jobs. From working at NASA and helping astronauts. to building video games, to making the apps that watch out for our health on smartwatches.

EMILY: And everything in between. Oh, you know what? There's actually a technology expo downtown today. It's a place where they show off all of the coolest new technology and programs.

WINSTON: Okay. That sounds pretty awesome. I'd love to see all the new games and robots and apps that computer programmers helped to make.

EMILY: Me too, Winston. Let's go check it out.

WINSTON: Last one to the door is a rotten microchip

EMILY: ! Hey! Wait up! Hold the door for me!

WINSTON: Whoa! I have never seen so many robots and computer screens! Look over there! Are those drones? Racing through an obstacle course ?

EMILY: Wow, these sure are fast. A computer programmer had to program in every inch of the course so that they could move so quick.

WINSTON: And over there, is that a robot? Check it out, it almost looks like a human. It's following me with its eyes.

MALE ROBOT VOICE: Hi there, how may I be of service?

WINSTON: Is he talking to me?

EMILY: I am a robot who uses A. I. to communicate with humans.

WINSTON: A. I.? What's that?

EMILY: Oh, that means Artificial Intelligence, Winston. It's becoming really popular. Why don't you ask the robot what it is?

WINSTON: Okay, then. Um, hey, robot. What is Artificial Intelligence?

MALE ROBOT VOICE: Artificial Intelligence was created by computer programmers. It is like a robot's brain, and helps me think and make decisions. Just like how you use your brain to solve puzzles and learn new things.

WINSTON: Gee, thanks, Mr. Robot!

MALE ROBOT VOICE: My pleasure, young sir.

EMILY: Wow, pretty cool, huh, Winston?

WINSTON: Yeah, I don't think I've ever seen anything cooler.

And computer programmers made it possible for that robot to talk to me?

EMILY: Yes, after a lot of coding and hard work, no doubt. But anyone can code if they have access to a computer, even kids.

WINSTON: How cool. I wonder who the youngest computer programmer ever was. I'm gonna look it up on my phone.

EMILY: What does it say, Winston?

WINSTON: No way. You're not gonna believe this, Emily. How old do you think the youngest computer programmer is?

EMILY: Hmm, let's see. 18 ? No, maybe 16 ?

WINSTON: Close, but you're off by 10 years, Emily. The youngest ever programmer was six years old. Wow. His name is Arham Om Talsania, and he's from India. In 2020, he broke a Guinness World Record to become the world's youngest computer programmer.

After he passed a Microsoft programming test with flying colors. That is so crazy! Six years old!

EMILY: Whoa! He must have been determined. Oh, and he really must love programming.

WINSTON: Yeah, it says here that in his spare time, he likes to play piano and program new code. He wants to work on creating video games and even robots that can help people in need.

EMILY: Aww. That would be nice of him, and it's very possible.

WINSTON: I think it's pretty neat that you could do so many different things with computer programming, too. That must mean there are lots of different jobs out there for people who know how to do it.

EMILY: Luckily, young people just like you, and little Arham for that matter, can learn how to program from free lessons on websites and in YouTube videos too.

WINSTON: Things would be a lot harder in our world without computers to help us out. Like, how would I play Minecraft? It's almost too much to wrap my mind around.

EMILY: A lot of things were certainly much more difficult to do without computers and the programs that run them. But having computers inside your house is still kind of a new thing.

WINSTON: Really?

EMILY: Well, the very first mechanical computer was created by Charles Babbage in 1822, but it didn't really look like what most people think of when they hear the word computer, and they were a lot different back then. In fact, back in the 1940s, when universities started using them to do complicated math problems, computers used to be way bigger.

They didn't even fit in most people's houses. Guess how big they were?

WINSTON: Um, like the size of a microwave?

EMILY: Mm mm. Bigger.

WINSTON: Oh, wow. As big as a refrigerator ?

EMILY: Oh, my gosh. You're not going to believe this, Winston. But early computers were actually the size of a massive room. They wouldn't even fit inside your house.

WINSTON: Well, that's so crazy!

EMILY: What's even crazier is that those early computers were so big that if they had an issue and stopped working, it could take programmers days to debug them and find the problem.

WINSTON: Debug them? What's that, Emily? Like a flea bath for computers?

EMILY: Uh oh, you're gonna love this next story, Winston, about where the word debug comes from.

WINSTON: Oh, I hope it's not something too icky. Ugh, bugs! Yuck!

EMILY: Actually, the word debug came about years ago, in a world before smartphones and tablets. There was a wonderful computer scientist and programmer named Grace Hopper, who was known for her incredible creativity and problem solving skills. And one sunny day in the 1940s, Grace was working on one of those gigantic computers called Mark I, that was indeed as big as a room. She loved this computer because it helped her solve big, complex problems. But one day, something truly odd happened that upset her. What do you think that was, Winston?

WINSTON: I don't know, but at least I know that no one stole that computer, since it was as big as a room.

EMILY: The problem was, Grace's computer stopped working. She tried to figure out why for hours and hours, but she was stumped. Until, finally, she opened up the computer and, to her surprise, she found a real life bug inside of it.

WINSTON: No way! Really?

EMILY: Yep. A moth had flown into the computer and got stuck in the gears. She took it out and the computer worked again. And that's when people started saying that Grace debugged the computer. A term programmers now use to mean to fix a piece of code that isn't working. Pretty funny, huh?

WINSTON: Wow, that is funny, Emily. But I am glad she figured out the problem.

EMILY: Well, Grace didn't stop there. She realized that computers needed a better way to understand instructions. So she invented something called a compiler.

It was like a magic translator that turned human instructions or code into a language computers could understand.

WINSTON: So Grace Hopper kind of made it possible for programmers to communicate with computers using code.

EMILY: Ah, she really was a trailblazer, Winston. And Grace believed that anyone, no matter their age or background, could learn to use computers to solve problems and have fun. And she once said, the most important thing I've accomplished other than building the compiler is training young people. She inspired kids all over the world to explore the world of computers and programming.

WINSTON: And thanks to her, we have all this new and exciting stuff to check out at this tech expo.

Without the work she did, who knows if programmers would be able to create all of these cool machines and apps and gadgets. Hey, what's everyone so excited about over here?

EMILY: Oh, check it out, Winston. Another new way that computer programmers can use their skills. Virtual reality.

WINSTON: VR! I've heard of this. Oh, I've got to try those VR goggles, Emily. Can I, can I?

EMILY: Sure, go for it. Okay, here is a spare headset. Okay, I'm going to select the Let's see. C level for you, so that you can really see how much time and effort computer programmers put into making these virtual worlds look, ugh, so astonishingly real.

WINSTON: Oh, I'm so excited! Oh my gosh, oh my gosh! Whoa! Emily, this is insane!

EMILY: Okay. What do you see inside the goggles, Winston?

WINSTON: Okay, this is awesome. Picture this. I'm sitting at the bottom of the ocean, and there's all these crabs and jellyfish around me. It's almost as if I could reach out and touch them. I had no idea programmers could create so many different programs for so many different types of machines.

VR, self driving cars, Roombas, What's next?

EMILY: Well, one thing I really love about programming is that it's not just about entertainment. There are many serious ways to use it that help people too. For instance, some programs help doctors look inside bodies for illnesses with special machines. Some help farmers grow yummy food with the assistance of robots.

Now, why don't we go back to the lab and you can start learning a bit of programming yourself.

MALE ROBOT VOICE: Sign me up.

EMILY: Thanks so much for joining Winston and I today at the Tech Expo, where we explored computer programming. Who knew that computer programmers could do so many different and fun jobs? Maybe you'll create an awesome program that people love someday too. See you next time.

Hey Winston, are you curious for more? You know it! Check out Lingo Kids, the number one learning app for kids. They have a ton of original games and videos and stuff songs that are fun, educational, and can help boost your math,

reading, and literacy skills. Download the Lingokids app and give it a try for free.