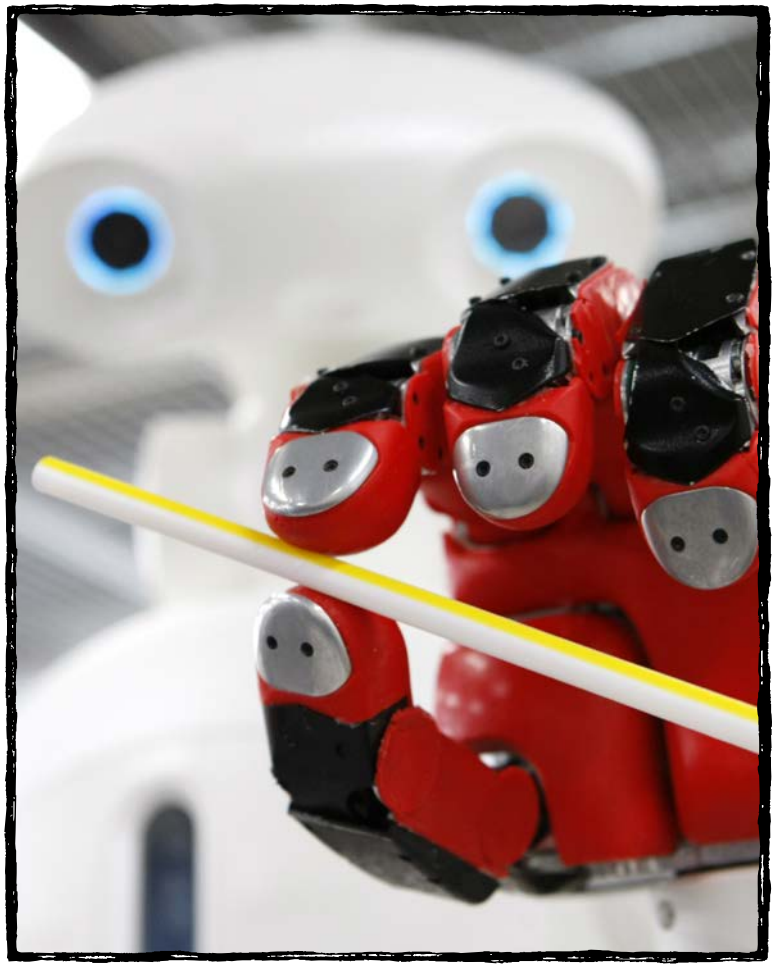
Robots

A Reading A–Z Level T Leveled Book
Word Count: 1,221

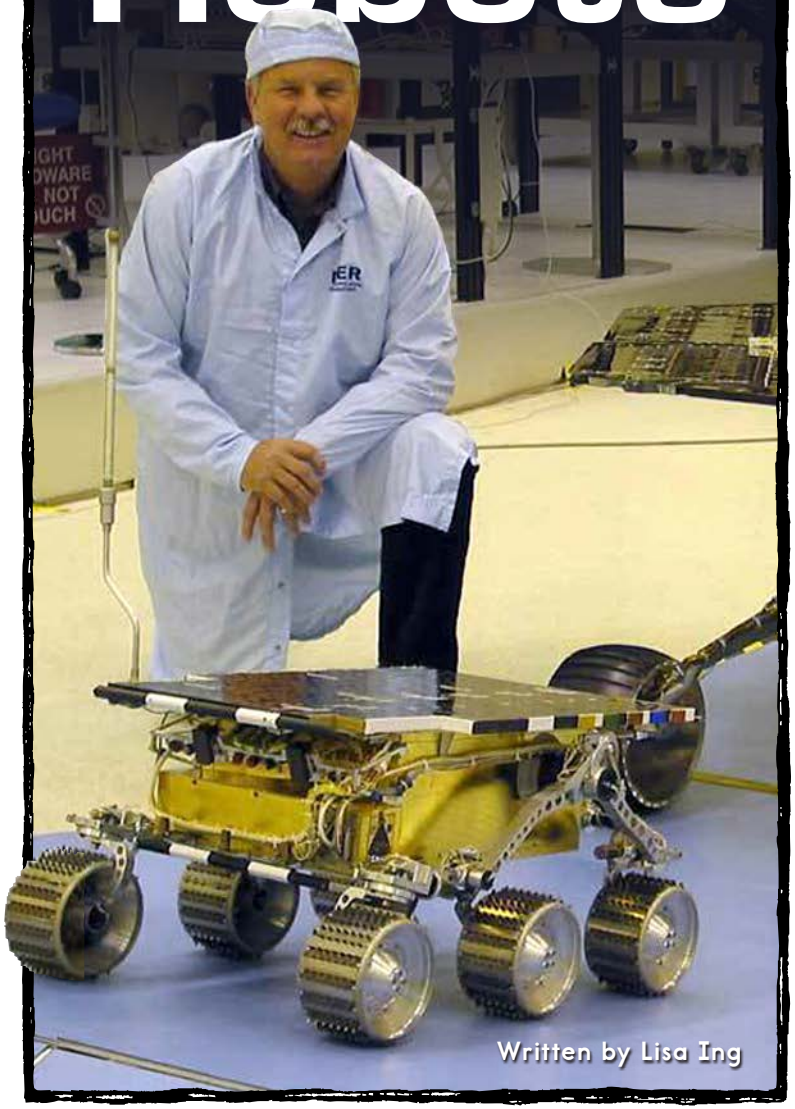


Reading A–Z

Visit **www.readinga-z.com**
for thousands of books and materials.

LEVELED BOOK • T

Robots



Written by Lisa Ing

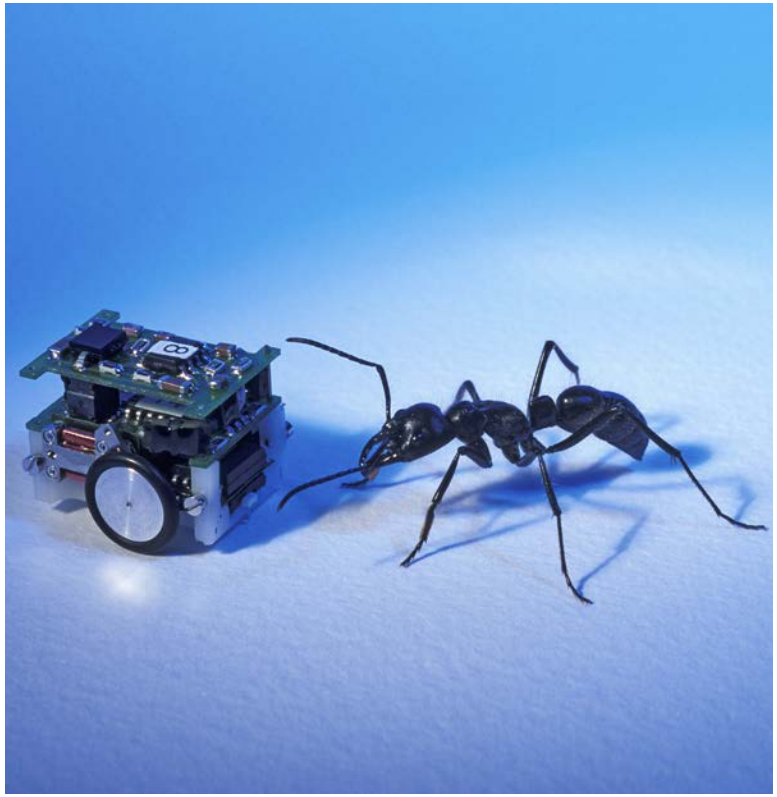
www.readinga-z.com

Glossary

artificial intelligence *(n.)*	a computer program that can make decisions, respond, and think (p. 14)
bottom-up processing *(n.)*	programming that combines small, simple programs into a whole (p. 11)
defusing *(v.)*	taking an explosive device apart so that it doesn't blow up (p. 4)
geologists *(n.)*	scientists who study the structure, physical makeup, and history of Earth (p. 10)
labor *(n.)*	difficult physical work (p. 7)
obtained *(v.)*	gained control or ownership (p. 9)
painstaking *(adj.)*	taking a lot of detailed effort and thought (p. 5)
radiation *(n.)*	a dangerous form of energy that can cause burns, sickness, and death (p. 8)
radioactive *(adj.)*	giving off radiation (p. 8)
specialized *(adj.)*	made to perform just one task (p. 6)
top-down processing *(n.)*	programming that puts one complicated intelligence or thought process in charge of all other processes (p. 11)
versatility *(n.)*	the ability to do many different things (p. 11)

Index

Robots



Written by Lisa Ing

www.readinga-z.com

Photo Credits:
Front cover, pages 5, 10: courtesy of NASA/JPL–CalTech; back cover: © REUTERS/Issei Kato; title page: © Pascal Goetgheluck/Photo Researchers, Inc.; page 3: © John Heller/AP Images; page 4: © Archives du 7eme Art/Photos 12/Alamy; page 6 (top): © Michael Rosenfeld/Science Faction/Corbis; page 6 (bottom): courtesy of NASA/Ames Research Center/Eric James; page 7: © REUTERS/Claro Cortes IV; page 8: © Louise Murray/Photo Researchers, Inc.; page 9: © AP Images/Carnegie Mellon University; page 11: © Peter Menzel/Science Source; page 12: © REUTERS/Toshiyuki Aizawa; page 13: © REUTERS/Peter Morgan; page 15: © REUTERS/Kiyoshi Ota

Front cover: A scientist poses with Sojourner, a Mars rover.

Title page: This tiny robot is used to study ants.

Back cover: Twendy-One, a robot designed to help elderly and disabled people in their homes

Robots
Level T Leveled Book

Written by Lisa Ing

www.readinga-z.com

Correlation

LEVEL T	
Fountas & Pinnell	P
Reading Recovery	38
DRA	38

Can you tell the robot from the person?

Conclusion

All of us depend on robots, but few people ever see the robots that keep our lives running. In the future, we might see robots that clean house, mow lawns, and respond to voice commands. But even the best robots will never be able to replace people. Humans are creative and adaptable, and even the most advanced robots are not.

Do You Know?

There might be a robot in your family's car. Some windshield wipers turn on automatically when it begins to rain. The wipers have sensors and computers that turn the wipers on and off. These wipers are robot arms.

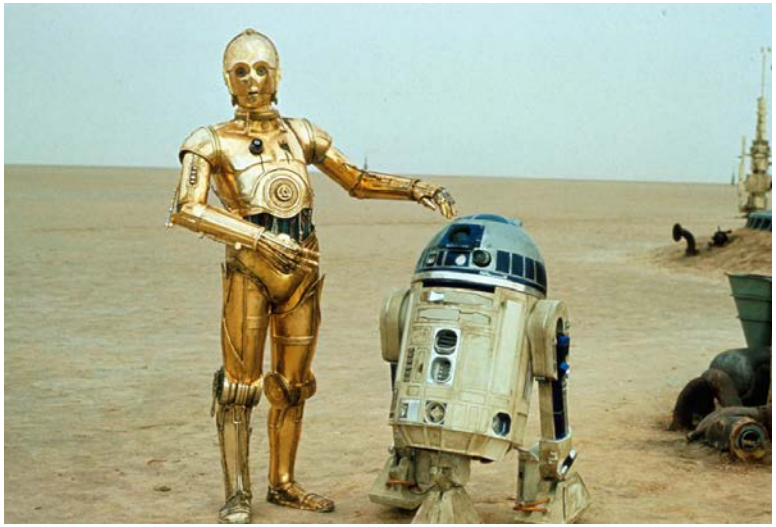
This is pretty amazing, but Deep Blue isn't really smarter than Garry Kasparov. Deep Blue does not think at all. It looks through its database of possible chess moves. Then, it calculates which move or strategy has the best mathematical chance of winning the current game. So in a sense, Deep Blue is something like an extremely powerful calculator—it does not "think." And Deep Blue can only play chess, while Garry Kasparov can walk, talk, write, and do all the other things that humans do.

True **artificial intelligence,** or AI, involves human-level intelligence. It involves the ability to learn, react to new information, and make decisions independently. Scientists are still working on creating computers and robots with real AI.

Do You Know?

The Turing Test measures whether a computer is intelligent enough to appear human. A judge communicates with a human and a computer at the same time. If the judge cannot tell the difference, the computer (and the scientists behind it) wins. To beat this test—and to react to the billions and billions of possible questions a human judge could ask—a computer has to be truly intelligent.

Table of Contents



C-3PO and R2-D2 from *Star Wars* are far more advanced than real robots.

What Are Robots?

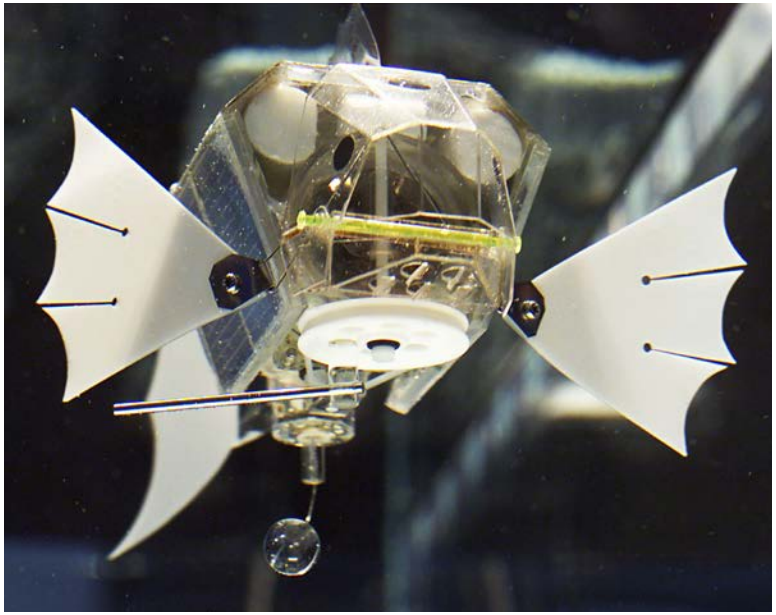
You may think of robots as the humanlike machines you've seen in movies, television shows, and books. But in real life, robots aren't as advanced as R2-D2 from *Star Wars.* Most robots cannot imitate humans or think for themselves. However, real robots can do many interesting things. They can perform dangerous tasks such as exploring active volcanoes, visiting distant planets, and **defusing** bombs. They can also do more common tasks such as building cars and playing chess. Perhaps one day people will be able to build robots as smart as humans.

Robot Intelligence

The computer Deep Blue faced off against Grand Master chess player Garry Kasparov in a six-game series. Even though Deep Blue could calculate up to 100 million moves per second, Kasparov won.

A year later, Deep Blue and Kasparov faced each other again. Before the rematch, Deep Blue was improved so that it was twice as fast. This time, the computer beat the world's best human chess player.

Garry Kasparov loses to Deep Blue in 1997.

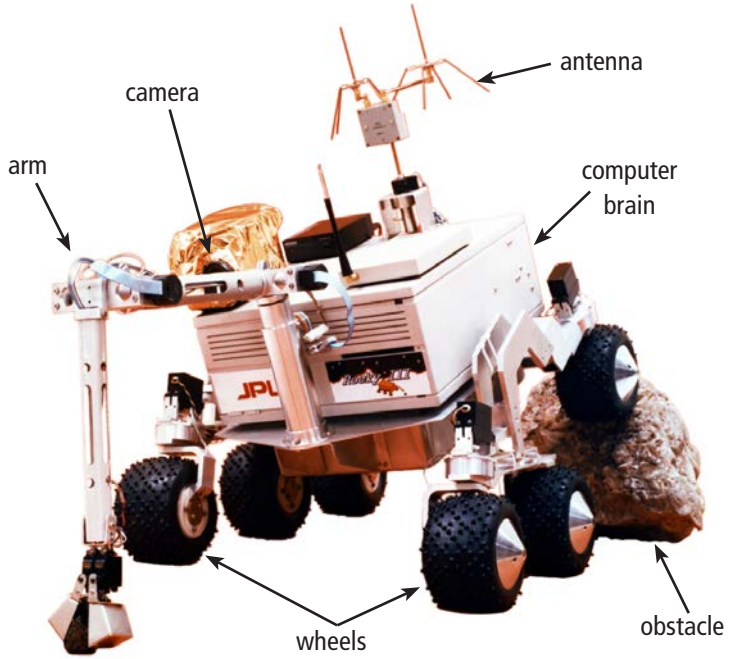


This solar-powered robot fish is one of many toys built to look like sea animals. Toymakers have also created robots that look and move like shrimp, crabs, and jellyfish.

Some scientists have developed robot animals as a way to research the way real animals act. Robo-tuna, Wanda, and Rodolph are robots that re-create the way fish swim and dolphins use sonar.

Several companies have manufactured robot dogs as expensive toys and companions. These dogs bark, move, and perform tricks. More advanced models can recognize their owners' voices and respond with actions or flashing lights.

Robots are machines with mechanical bodies, information sensors, and computer brains. Most robots can move or have moving parts. Many robots can also use devices like video cameras and microphones to act as their "eyes" and "ears" to gather information from the world around them. Robots are programmed to perform certain tasks, either independently or by remote control. The program plans every step of the robot's job in **painstaking** detail. Most robots cannot do anything that they have not been programmed to do.



This robotic vehicle, seen going over an obstacle, has parts that include an arm, camera, wheels, computer brain and antennae

This simple robot arm helps make solar cells.

Simple robots can perform simple tasks, such as moving car parts on an assembly line. For this job, the robot only needs one arm, a sensor that tells it where the parts are, and a program that governs lifting the part and putting it down in the right place.

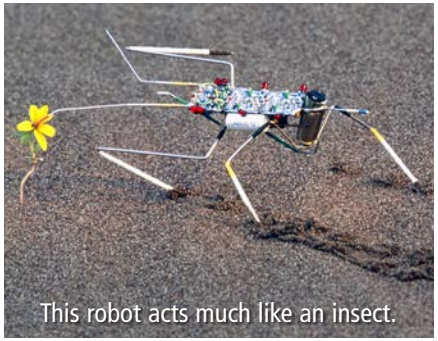
As robots get more complex, more programs have to be packed into their computer brains. It is much easier to build ten robots to do ten different things than it is to build one robot to do those ten things. Therefore, robots tend to be **specialized** for the tasks they perform. A huge robot arm looks very different from a small explorer robot, and they could not do each other's job.

A complex rover robot

Mechanical Animals

People have tried to build humanlike robots for decades. The problem is that it's hard for robots to imitate human **versatility,** or the ability to do many things. In fact, the more automatic a task is for a human, the harder it is to program a robot to do it. Every person learned to walk, but after that, we do it by instinct. It is hard to program **top-down processing,** where robots have big, complex programs that control many different movements and processes.

Scientists have developed robot animals that use **bottom-up processing.** This means that scientists program a robot to perform only one very simple task, such as rolling or walking on many legs. Then, the scientists add more simple programs one-by-one. This idea began with robots that imitate insects. These tiny bug-bots move and react just like insects, and can send signals to each other.



This robot acts much like an insect.

Scientists test Opportunity's ability to drive over obstacles.

The *Spirit* and *Opportunity* robots explored the surface of Mars in 2004. These identical robots were programmed to act as **geologists,** or scientists who study rocks. They were equipped with tiny rock drills, microscopes, and instruments that can tell what rocks are made of. Scientists controlled these robots by sending radio signals over 78 million kilometers (48 million mi) through space.

Robots don't need food, water, or air. They don't age or get bored, and they don't even need a return trip home. For these reasons, much future space exploration will involve robots rather than people.

Tireless Workers

Imagine working at a job picking up nails and putting them into boxes as they pass through an assembly line. Imagine that this is the only thing you do all day and night, and you never get to take breaks to eat, sleep, or go to the bathroom.

Robots have replaced workers on many assembly lines.

No human being wants to do this job—within a few minutes, you'd be bored and unable to focus. After a while, you'd be tired, cranky, and exhausted. But robots do this job perfectly every time, without complaining.

The word *robot* comes from the Czech word *robota,* which means "forced **labor,**" or hard, boring work. In fact, most robots in operation today are factory robots. Many are simple robot arms of varying designs. Some can grip pieces of metal while others weld them together, and still others drill or spray-paint parts. Robot arms with a lighter touch can sort items, such as chocolates and tiny screws.

Dangerous Situations

Robots can go places that are too dangerous for humans. After an accident at a nuclear power plant in 1979, officials sent in robots to evaluate the damage and help clean up. The **radiation** from the nuclear accident would have killed any living creature. Nuclear plants currently in operation use remote-controlled robots to move **radioactive** equipment and conduct inspections.

A bomb disposal robot

Some robots can locate and defuse bombs and land mines. In addition to being much more precise and sensitive than human experts, these robots are also replaceable if the bombs explode. Other robots actually are bombs! These robots, called "smart missiles" or "smart bombs," contain sensors that detect the target and battery-run computers that control the flight path.

Robot Explorers

Robots that are built to explore are particularly advanced and interesting. *Dante II* is an eight-legged crawler robot built to get superheated gas samples from inside Mount Spurr, an Alaskan volcano. It was damaged during its mission, but *Dante II* successfully **obtained** its samples. The year before, eight scientists died trying to get samples of the volcanic gases.

The remote-controlled *Nomad* robot explored the Atacama Desert in Chile, traveling 214 kilometers (133 mi) in 45 days while collecting rock and soil samples. The Atacama Desert is similar to the terrain on the Moon and Mars. *Nomad* even explored icy Antarctica.

The Nomad robot was designed to explore Antarctica.