LEVEL 4

NATIONAL GEOGRAPHIC KIDS

Robots



Melissa Stewart

Every National Geographic Kids Reader is carefully selected to match your child's reading ability.

Level 1 • Early reader

Level 1 These books contain simple sentences and are just right for kids who can decode with ease and are beginning to read fluently. They are ideal for readers of **Yellow** and **Blue** banded books.

Level 2 • Becoming fluent

Level 2 These books are a good match for kids who are developing reading stamina and enjoy a longer book. They are ideal for readers of **Green**, **Orange** and **Turquoise** banded books.

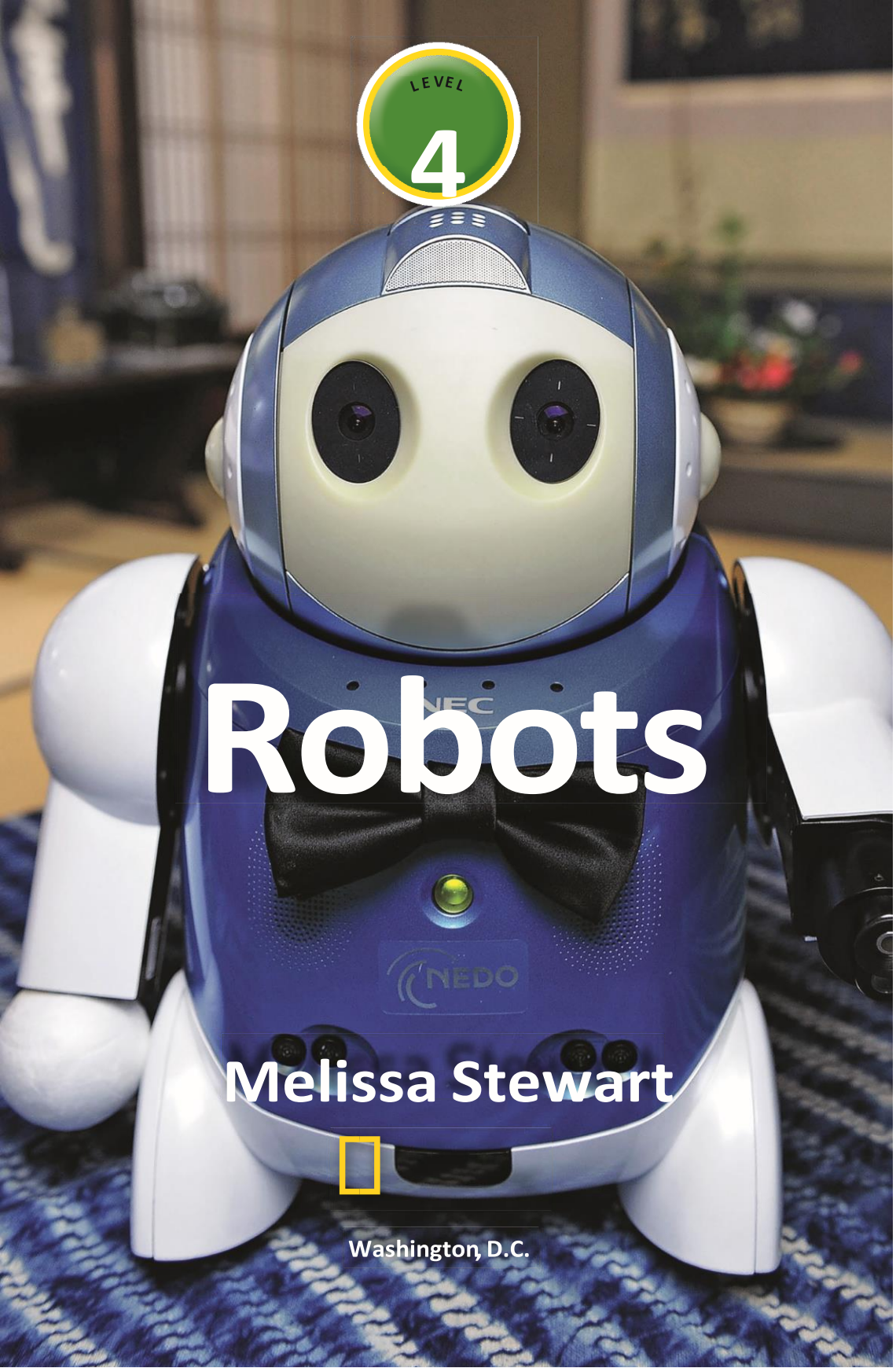
Level 3 • Becoming independent

Level 3 Best suited to kids who are ready for complex sentences and more challenging vocabulary, but still draw on occasional support from adults. They are ideal for readers of **Purple** and **Gold** banded books.

Level 4 • Independent reader

Level 4 Perfect for kids who are reading on their own with ease and are ready for more challenging vocabulary with varied sentence structures. They are ideal for readers of **White** and **Lime** banded books.

‘Banded books’ refers to the Institute of Education (University of London) Book Bands for guided reading.


LEVEL
4
Robots
Melissa Stewart
Washington, D.C.

Published by Collins
An imprint of HarperCollinsPublishers
The News Building
1 London Bridge Street
London
SE1 9GF

Browse the complete Collins catalogue at
www.collins.co.uk

In association with National Geographic Partners, LLC

NATIONAL GEOGRAPHIC and the Yellow Border Design are trademarks of the National Geographic Society, used under license.

Second edition 2018
First published 2014

Copyright ©2014 National Geographic Partners, LLC. All Rights Reserved.

Copyright ©2018 British English edition National Geographic Partners, LLC. All Rights Reserved.

ISBN 978-0-00-831739-3

10 9 8 7 6 5 4 3 2 1

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission in writing of the publisher and copyright owners.

The contents of this publication are believed correct at the time of printing. Nevertheless the publisher can accept no responsibility for errors or omissions, changes in the detail given or for any expense or loss thereby caused.

HarperCollins does not warrant that any website mentioned in this title will be provided uninterrupted, that any website will be error free, that defects will be corrected, or that the website or the server that makes it available are free of viruses or bugs. For full terms and conditions please refer to the site terms provided on the website.

A catalogue record for this book is available from the
British Library

Printed by GPS, Slovenia

If you would like to comment on any aspect of this book, please contact us at the above address or online.
natgeokidsbooks.co.uk
cseducation@harpercollins.co.uk

Paper from responsible sources

Since 1888, the National Geographic Society has funded more than 12,000 research, exploration, and preservation projects around the world. The Society receives funds from National Geographic Partners, LLC, funded in part by your purchase. A portion of the proceeds from this book supports this vital work. To learn more, visit http://natgeo.com/info.

Photo Credits

Abbreviations: GI = Getty Images; SS = SuperStock
Cover, Ed Alcock for Aldebaran Robotics; 1, Akihiro I/GI;
4 and 5, 6–7, George Steinmetz/National Geographic
Creative; 8 (UP), Ralph Crane/Time Life Pictures/GI;
8 (LOLE), SS RM/GI; 8 (LORT), SS; 9 (UPLE), Bettmann/
Corbis; 9 (UPRT), GI; 9 (LOLE), AFP/Newscom; 9, NASA; 11,
SS; 12 (UP), Leonhard Foeger/Reuters; 12 (LOLE), Matthew
Walker; 12 (LORT), Peter Menzel/Science Photo Library;
13 (UP), provided by RIKEN-TRI Collaboration Center for
Human-Interactive Robot Research; 13 (CTR LE), Sheng Li/ Reuters/Corbis; 13 (CTR RT), Katsumi Kasahara/GammaRapho/GI; 13 (LO), SSPL/GI; 14, Ed Darack/Science Faction/
Corbis; 15 (UP), Alain Le Bot/Photononstop/Corbis; 15 (LO),
AFP PHOTO/Yoshikazu Tsunoyoshikazu Tsuno/AFP/GI/
Newscom; 16 (LE), George Steinmetz/National Geographic
Creative; 16 (RT), BSIP/UIG/GI; 17 (LE), Robert Clark/
National Geographic Creative; 17 (RT), Jonathan Searle/
Reuters/Corbis; 18, DARPA/Science Photo



Library; 18 (INSET), Willee Cole/Shutterstock; 19, Amanda
Loman/Virginia Tech College of Engineering; 19 (INSET),
AdStock RF/Shutterstock; 20, cellistka/Shutterstock; 21, Yoshikazu Tsuno/AFP/GI/Newscom; 22–23, ricardoazoury/E+/GI; 24, courtesy Defense Advanced Research Projects Agency (DARPA); 25, NASA/Carnegie
Mellon University/Science Photo Library; 26, Stephen
Roberts Photography/Alamy; 27, yne News/WENN/
Newscom; 28, courtesy Rob Felt/Georgia Institute of
Technology; 29, Kim Kyung-Hoon/Reuters/Corbis; 30,
Science Photo Library Rf/GI; 31, Yoshikazu Tsuno/AFP/
GI/GI; 32, AP Images/Vincent Thian; 33, AP Images/
Koji Sasahara; 34, Peter Menzel/Science Source; 35 (1–4), Peter Menzel/Science Source; 36 (LE), Albert L.
Ortega/WireImage/GI; 36 (RT), Richard Nowitz/National
Geographic Creative; 37 (UP), Blue Sky Studios/20th
Century Fox/Bureau L.A. Collection/Corbis; 37 (LOLE),
Digital Domain/20th Century Fox/Bureau L.A. Collection/
Corbis; 37 (LORT), John M. Heller/GI; 38, NASA/JPL/Science
Photo Library; 39, 40–41, NASA; 40 (INSET), NASA; 41
(INSET), NASA; 42, Photo by Adriana Groisman, courtesy of FIRST®; 43 (UPLE), Photo by Argenis Apolinario, courtesy of FIRST®; 43 (UPRT, LOLE, LORT), Photo by Adriana Groisman, courtesy of FIRST®; 44–45, Pedro Ladeira/AFP/
GI; 46 (UPRT), Robert Clark/National Geographic Creative;
46 (CTR LE), George Steinmetz/National Geographic
Creative; 46 (CTR RT), DARPA/Science Photo Library; 46
(LOLE), George Steinmetz/National Geographic Creative;
46 (LORT), NASA; 47 (UPLE), AP Images/Koji Sasahara; 47
(UPRT), NASA/SS; 47 (CTR LE), Science Photo Library RF/GI;
47 (CTR RT), Yoshikazu Tsuno/AFP/GI/Newscom; 47 (LOLE),
Peter Menzel/Science Source







Table of Contents

Table of Contents

What's a Robot?. 4 7
Cool Robots . . . . . 12 Go
Bots!. 14
Nature Knows Best. 16
Robots at Work. 22
Robots at Home. 26
Pushing the Limits!. 30
Almost Human. 32
Real Robots or Movie Magic? 36
Robots in Space 38
You Can Build Bots. 42
Robots of the Future. 44
Glossary. 46
Index. 48

What's a Robot?

What do you think of when you hear the word ROBOT? A blinking, walking, robo-talking metal person? Some robots really do look like people, but most don't.



A robot copies human motion while playing table tennis.

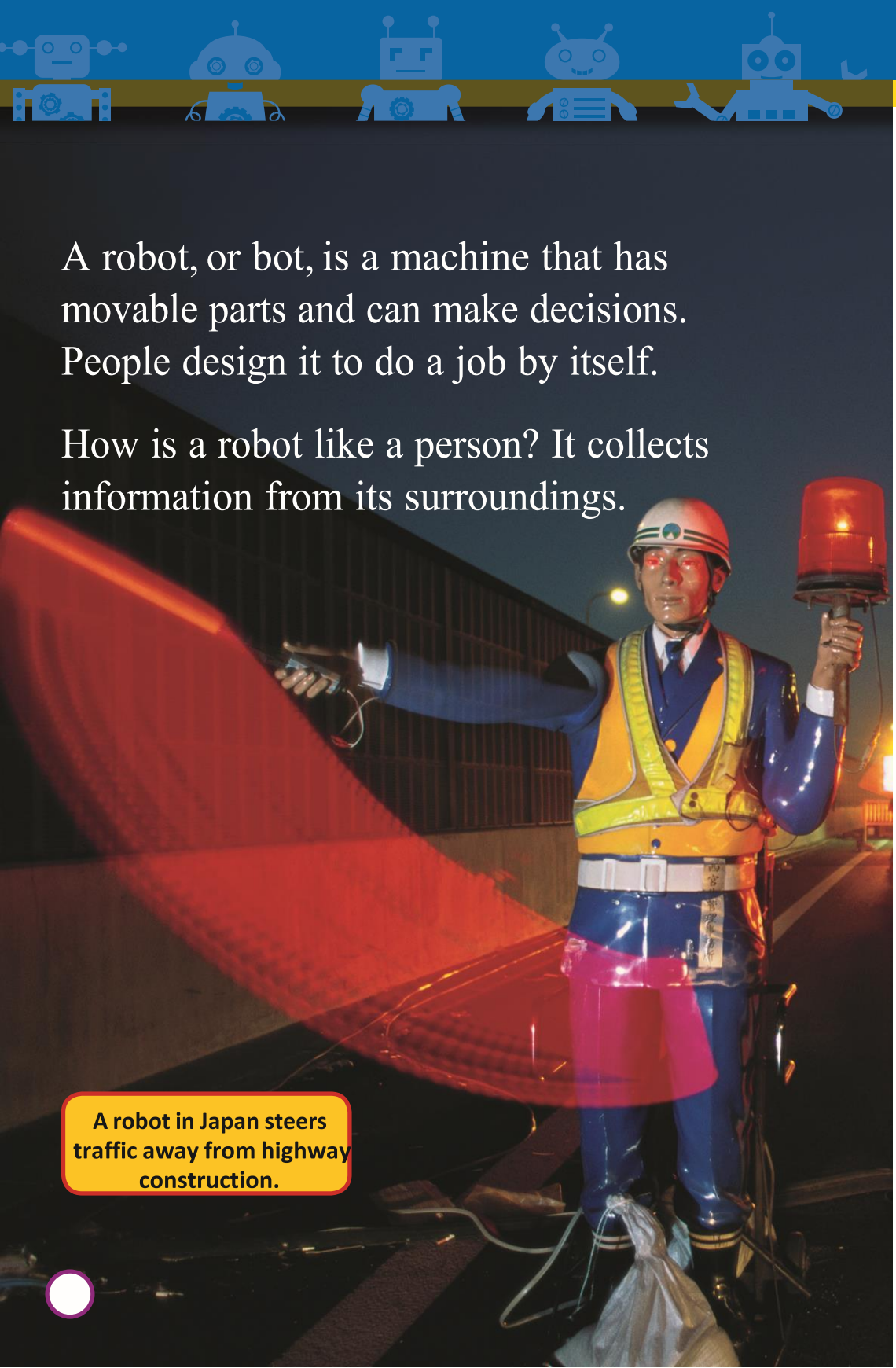
Robots come in almost every shape, size and colour you can think of. They can look like fish or flies, lobsters or spiders. Some look like nothing else you've ever seen.



A scientist gives Sojourner, a robotic rover, one last check before its mission to Mars.

A robot, or bot, is a machine that has movable parts and can make decisions. People design it to do a job by itself.

How is a robot like a person? It collects information from its surroundings.



A robot in Japan steers traffic away from highway construction.

Then it processes the information and works out the best way to do its job.

But a robot doesn't think the way a person does. It can only do things that engineers and roboticists program into its computer "brain".



Tech Talk

PROGRAM: To give a set of instructions to a machine

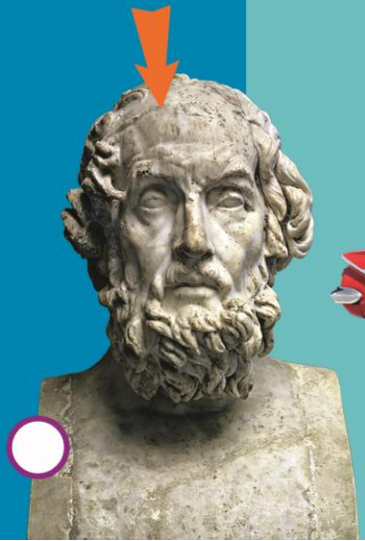
ROBOTICIST: A person who builds robots

Researchers built the first robots about fifty years ago. But people had been thinking about mechanical "humans" for a long, long time.



850 BC

Ancient Greek poet Homer described bot-like creatures that did anything their masters asked.



AD 1495

Italian artist and scientist Leonardo da Vinci drew plans for a mechanical man in his notebooks.

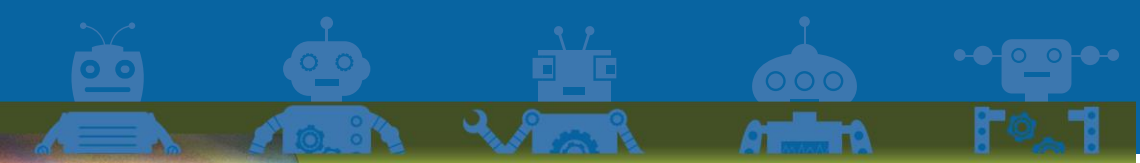
1961

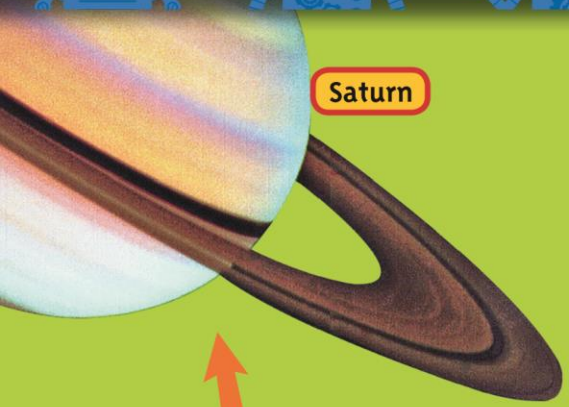
The world's first robot went to work assembling cars at a General Motors plant in Ewing, New Jersey, USA.



1970

Roboticists in Stanford, California, USA, built the first robot that could move and sense its surroundings.





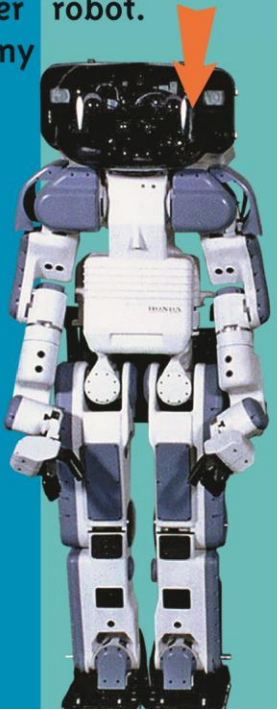


1977

The Voyager 1 and 2 space probes were launched to study Saturn, Jupiter and their many moons.

1996

Researchers at Honda introduced P2, the first human-like robot.

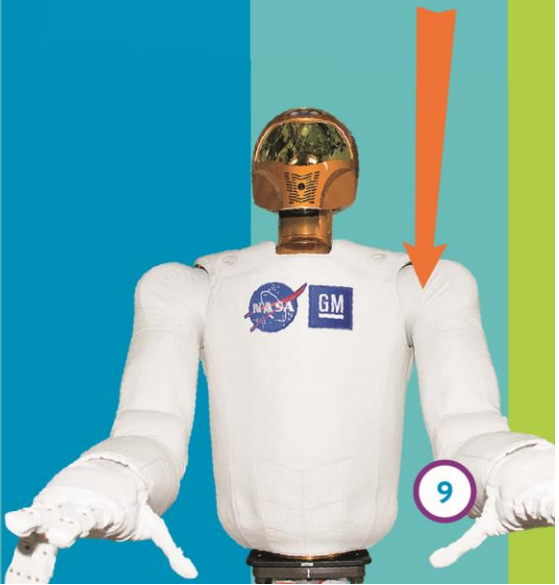


1999

Sony developed AIBO, a robotic dog that could interact with people.

2011

R2 was launched to the International Space Station, making it the first human-like robot in space.



Every robot is designed for a specific job. What the robot looks like will depend on the job it does. But no matter what a robot does, it has three kinds of parts – a computer, sensors and actuators.

A robot's computer is like a person's brain. It uses the instructions programmed by a roboticist to make decisions. The sensors are like a person's eyes, ears, nose and skin. They collect information about the robot's surroundings and send messages to the computer. A robot's actuators receive messages from the computer. They control the robot's movements, lights, speaking, and more.



Tech Talk



SENSOR: A robot part that detects light, temperature, pressure, sound or motion

ACTUATOR: A robot part that performs an action