

## Robotics – introduction

### 1. Read the text, write the letters of suitable sentences or phrases into the gaps.

- a in factories, laboratories, or warehouses
- b In his play machines behave like people.
- c like an arm
- d can „see“ the environment and
- e like handling nuclear or radioactive materials
- f The reality is less exciting.
- g understands the messages from the sensors and

### Robots: the fantasy and the facts

We can thank the world of literature for the words *robot* and *robotics*. The word *robot* was first used by the Czech playwright Karel Čapek in his 1921 play, *RUR (Rossum's Universal Robots)*. \_\_\_\_\_ Isaac Asimov used it in a short story in 1941.

Robots often star in films too, for example dangerous machines like *Terminator* or cute ones like R2D2 in *Star Wars*. \_\_\_\_\_ Industrial robots don't have personalities and they don't think like people. Most real robots are designed to save people from dangerous jobs, \_\_\_\_\_, or boring, routine work \_\_\_\_\_. They are also used for doing activities that are too precise for human beings.

A simple robot is made of:

- Mechanical links, **joints**, that connect the moving parts
- Mechanical devices \_\_\_\_\_ that can react to the environment – **end effectors**
- Electric or pneumatic motors or systems that create the movement - **actuators**
- **Sensors** that \_\_\_\_\_ give information to the device
- **Computer system** that \_\_\_\_\_ directs all the actions.



### 2. Find the words in the text that mean:

- always done in the same way \_\_\_\_\_
- respond to a change \_\_\_\_\_
- a piece of equipment designed to do a particular job \_\_\_\_\_
- a part of a machine that can sense heat, light etc. \_\_\_\_\_

## Types of robots

3. Try to order (drag) the types of robots from the most simple ones (1) to the most sophisticated (5). Then read the text and check your answers.

ANDROID/HUMANOID AUTOMATON CYBORG FLEXIBLE MACHINE MOBILE ROBOT



- 1.
- 2.
- 3.
- 4.
- 5.

## Classification of types of robot

One way of classifying robots is in terms of their similarity to humans. An automaton is any machine capable of operating independently, such as a clothes dryer. A flexible machine is a special case of an automaton with different capabilities, that can be programmed as the need arises. An example is a welding robot on the factory floor that can be programmed to participate in other production operations. A mobile robot is a flexible machine capable of moving freely in its own environment. It can partly select its own goals and communicates with other agents, including humans. An android or humanoid is a mobile robot whose structure approximately resembles a human structure. Finally, a cyborg is a humanoid with organic structures. Cyborgs have some physiological structures similar to those of humans.

### 4. What are they? Write the types to the definitions

Machine capable of independent operation following a predetermined series of behaviours, e.g. a cuckoo clock

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Flexible machine capable of moving and communicating with humans, e.g. a sentry robot

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Humanoid having both organic and inorganic structures, with some physiological similarity to humans

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Mobile robot of human proportions

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Versatile, programmable automaton, e.g. an assembly robot

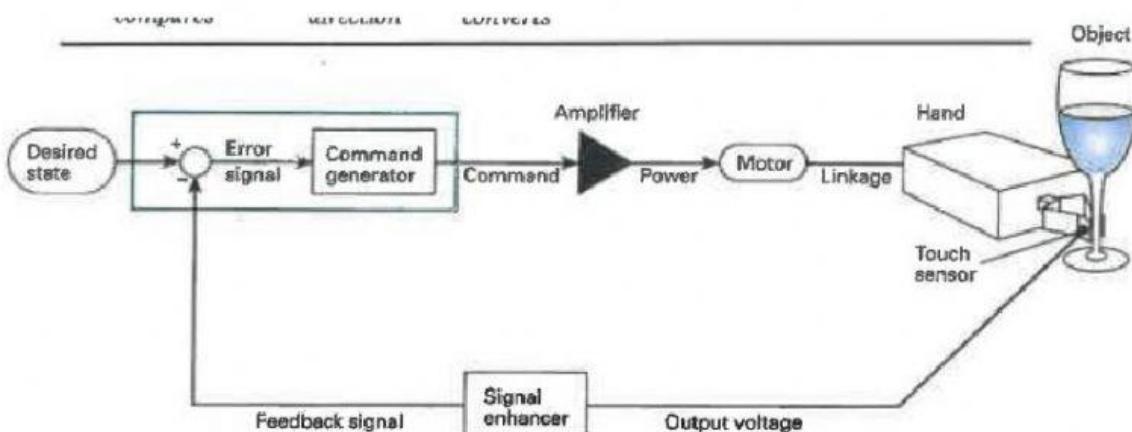
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5. Using the diagram, fill in the gaps in the text with the following words:

*attached, closed-loop, compares, converts, direction, grasp, proportional*

#### Co-ordination of control in robots

The diagram shows a <sup>1</sup> \_\_\_\_\_ system for the force required to <sup>2</sup> \_\_\_\_\_ an object. The desired level of force is fed into the control module, which <sup>3</sup> \_\_\_\_\_ it with the actual amount of force as indicated by the feedback signal. The discrepancy enters the command generator, which determines the <sup>4</sup> \_\_\_\_\_ and extent of adjustment necessary. The resulting command passes into an amplifier which produces power <sup>5</sup> \_\_\_\_\_ to the level of the input signal. The power drives a motor <sup>6</sup> \_\_\_\_\_ to some linkage such as a set of gears. The mechanical linkage in the robotic hand ultimately <sup>7</sup> \_\_\_\_\_ the initial command signal into displacement at the fingertips.



6. Match the terms with the explanations:

Manufacturing	automated machines have human features, replace human workers
Mechanisation	use of control systems and IT to reduce physical and mental work
Automation	application of automation technologies in households
Robotics	producing goods, usually with the help of machines
Domotics	using machinery to assist with physical requirements of work