

What is a robot?

Many roboticists consider robot to be a machine that moves, or has moving parts, and that makes basic decisions while interacting with the world.

Discuss with your classmate

- Is a washing machine a robot?
- Is a computer a robot?

Milestone in history of robotics

For centuries, people have been making machines that can replicate human capabilities. These are the breakthroughs that allowed robots to come to today.

Using the data on the website

<https://www.aventine.org/robotics/history-of-robotics>

to match the following breakthrough events

<u>Year</u>	<u>Event</u>
1949 ◆	◆ A small robot arm with joints powered by electric motors was designed. This "Stanford Arm" had 6 axes of movement allowing it to more closely approximate the range of a human arm.
1959 ◆	◆ She believes that if we really want to work with robots, robots will need to be able to read people's emotions. With this in mind, she created Kismet, a robot head designed to respond to emotions.
1969 ◆	◆ A pair of turtle-shaped robots that can move around objects in the room, guiding themselves towards the light and find their way back to the charging station
1978 ◆	◆ "BigDog" is a four-legged robot that can be seen moving through rugged terrain. It is not autonomous; it is driven by a human controller, so it does not require complicated planning and vision systems.
2000 ◆	◆ The first industrial robotic arm was called "Unimate" and it worked at the General Motors factory to lift and stack hot die-cut metal parts. Unimate's robots were large and powered by hydraulics.
2004 ◆	◆ Japanese researchers designed a four-axis SCARA (Selective Compliant Assembly Robot Arm) that can pick up, rotate and accurately place it elsewhere in a smooth motion.

Arrange the following robots in chronological order

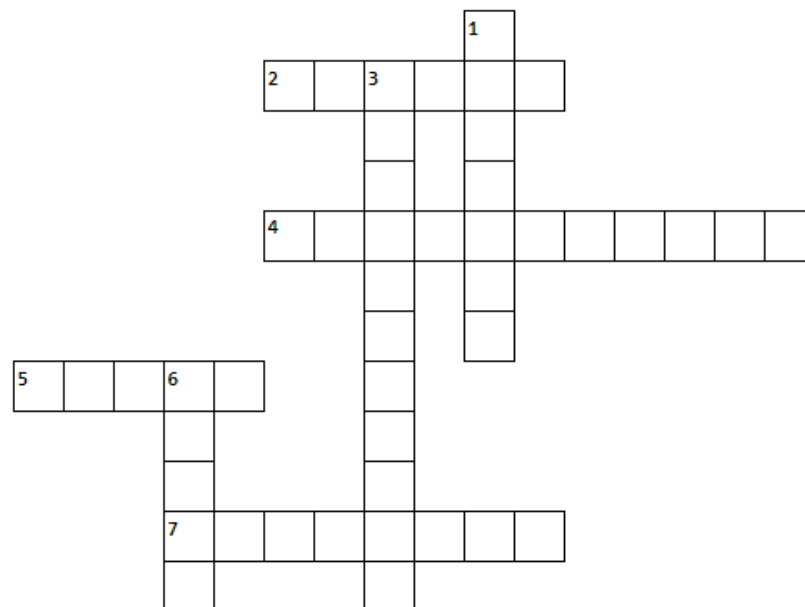
- "Stanford Arm"
- "BigDog"
- Kismet
- "Unimate"
- turtle-shaped robots
- SCARA



Why we use robots?

There are many different reasons for using a robot but the central reason for most applications is to eliminate a human operator. The most obvious reason is . . .

Complete the following crossword



Across

2. Robots can be left running overnight and during weekends with little supervision, so you can increase your production ??? levels and meet customer order deadlines.
4. Robots can add ??? to your production line. Once programmed, they can easily switch between processes, helping you to meet changes in product design or customer demand with the minimum of effort.
5. Robots can be mounted in multiple configurations to help you save highly valuable ??? in manufacturing areas.
7. With highly skilled manual workers becoming harder to find and more expensive to employ, robots can provide an ideal alternative. Once programmed for your process, robots are ready to begin work with none of the costs associated with recruitment or ongoing ???.

Down

1. The accuracy and repeatability of robots means you can achieve a consistently high ??? finish for every product produced. Robots eliminate the problems associated with tiredness, distraction and the effects of repetitive and tedious tasks.
3. Robots can readily take over unpleasant or health ??? tasks that may be currently undertaken by manual workers. By using robots, you can decrease the likelihood of accidents caused by contact with machine tools or other potentially hazardous processes.
6. Robots enable you to reduce ???. Take electricity for example. With no requirement for minimum lighting, robots offer a great opportunity to cut your electricity bills.

Homework

Read the following short article

<https://www.futurelearn.com/info/courses/begin-robotics/0/steps/2845>

and find out what are the advantages and disadvantages of using robots

Advantages of using robots

Disadvantages of using robots

Where we use robots?

The following five industries are utilizing robots to boost efficiency and convenience for both businesses and consumers.

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- ---
- ---
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Robotic-Assisted Surgery

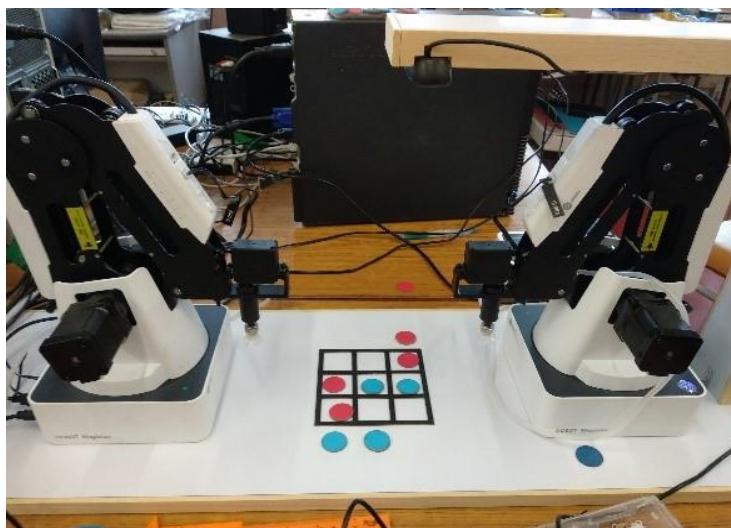
The da Vinci Surgical System is a robotic surgical system made by the American company **Intuitive Surgical**. It is designed to facilitate surgery using a minimally invasive approach, and is controlled by a surgeon from a console. In 2019-2020, there was an installed base of **4,986** units worldwide.

Discussion

- Why use robots for surgery?

- Will robots replace human doctors and surgeons one day?

- **Intuitive Surgical** has many career opportunities. Are you willing to join and work with these committed and passionate people when you grow up?



Two robots play tic-tac-toe

More information can be found on the display board on the 4th floor

