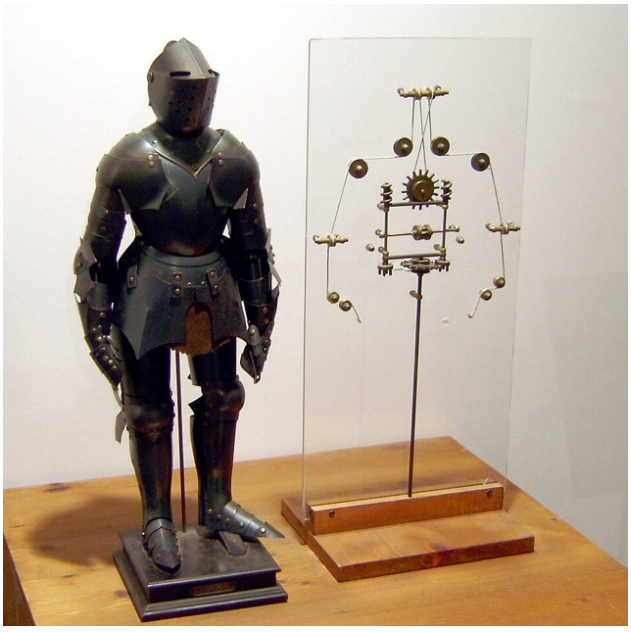
HISTORY OF ROBOTS

The idea of self-operating machines originates in the past, in the culture of ancient civilizations and developed along the centuries worldwide.
If you consider a robot as a general description for a mechanical, working replica of a living creature, man or animal, the robots existed 2000 years ago and in 18th and 19th centuries they were produced fairly in large quantities.
They were called then and are known today as *automaton* at singular, *automata* at plural. They were small moving mechanical figures developed from intricate spring, lever, gear and pulley-powered mechanisms used to make clocks.
Around 1495 year, Leonardo di ser Piero da Vinci (1452-1519) Italian polymath of High Renaissance, active as a painter, draughtsman, engineer, scientist, theorist, sculptor, architect sketched out - possibly made - a mechanical knight, which with cables and pulleys was designed to move in human-like ways.
The Model of Leonardo's robot with inner workings, possibly constructed by Leonardo da Vinci around 1495 is shown in the image below.



MODEL OF LEONARDO'S ROBOT

From ancient wooden puppets to modern computer characters in online games, people enjoined copying themselves. Humans are very complicated creatures with complex movement, brain and nervous system and powerful senses. Creating the human abilities and senses in a robot is a big challenge and scientists pursue it.

Robots or bots carry out tasks by themselves, yet it is considered that more interesting robots will still appear.

The idea of using robots to perform repetitious tasks quickly, cheaply and efficiently has intrigued human beings at least from the time of the Industrial Revolution in the eighteenth century. But not until the mid-twentieth century was the idea translated into reality.

The first design of a robot-type machine for industrial use in US is generally credited to *Plant Corp of Lansing* Michigan which in the year 1955 developed the PLANOBOT, a pick and place unit.

The next years followed UNIMATE and VERSATRAN.

In the year 1961, *General Motors* became the first major industrial firm to use robots. By 1970 year it expanded the use of robots to welding and automobile industry became the predominant user of robots in US.

By mid of years 1980, Japan with 250 robot manufacturers, leads the world in robotics development, production and application.

The first computer-controlled industrial robot T3 was developed in year 1973 by *Cincinnati Milacron*, forerunner of today intelligent robots, capable of using vision systems, sensors and responding to feedback.

In the 21st century, the robot is seen as a very powerful computer with equally powerful software housed in a mobile body and able to act rationally on its perception of the world around it.

There are famous robots:

LEONARDO DA VINCI

-The SKYWASH, a gigantic 33m long robot arm used in the year 1994 by Germany's airline *Lufthansa* to clean.

- KUKA TITAN, the world strongest industrial robot used in Germany in the year 2007. Its 32 m arm is able to lift 1000 Kg = 1 tone.

- WAKAMARU, Japanese robot made in the year 2005 by *Mitsubishi*. It is a 1m tall robot secretary on wheels.

- CYNTHIA is a 2m high robot bartender, built in the year 1999 by designer *Dick Becker* to pick up drink bottles and to mix 75 different cocktails drinks.

-DEEP BLUE II an *IBM* super-computer for chess playing, which beat the chess world champion Garry Kasparov in the year 1996.

- SOJOURNER was the first roving robot on Mars - 4 July 1997, 36 m/hour.

- Space builders built the International Space Station ISS between 1998÷2011. Crucial, integral role in its assembly, alongside human astronauts and mission controllers, played the robots: CANADARM2, ROBONAUT2, ASTROBEE Free space agencies including *NASA, Roscosmos, ESA, JAXA, CSA* have contributed to the ISS station's assembly.

- DA VINCI SURGICAL SYSTEM, fitted with 4 arms controlled by a surgeon sitting at a console. It is a robotic surgical platform built in the year 2000. It was conceived initially by Leonardo di ser Piero da Vinci.

- ROBODOC, robot that drills a very accurate hole down a leg bone to fit an artificial hip implant, first surgical robot to operate on human in US, year 1992.

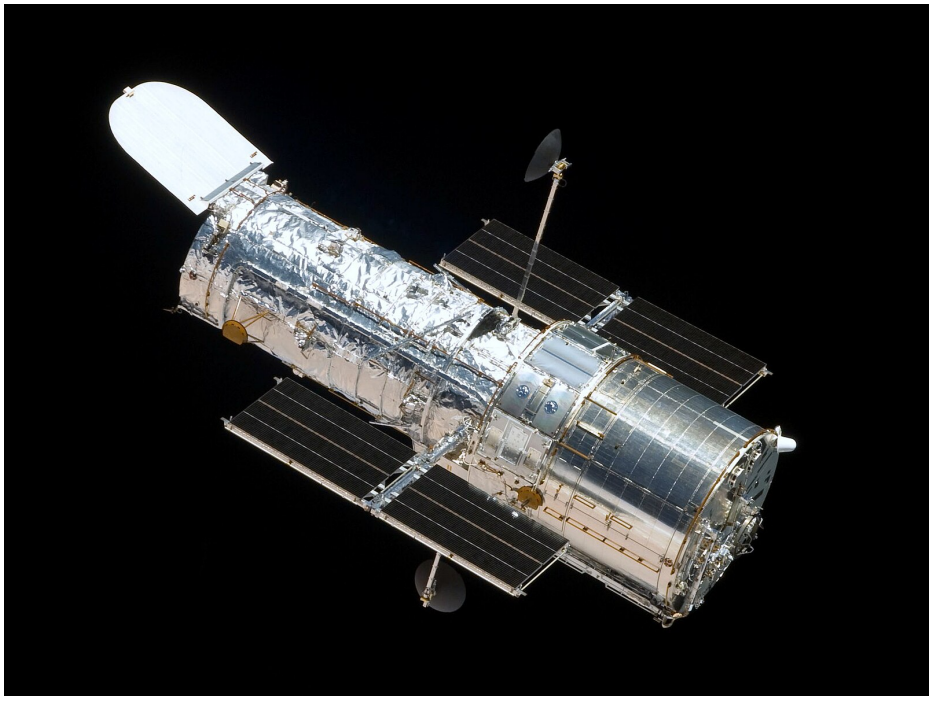
- ASIMO first humanoid to walk freely up, down stairs and around the corners. It was built in 2000 year. It stands for *Advanced Step in Innovative Mobility.*

- HUBBLE SPACE TELESCOPE is an unmanned robotic telescope, that has changed the face of astronomy and our understanding of the universe far beyond what was envisaged by Galileo Galilei (1564-1642), Italian astronomer, physicist, engineer, polymath, father of observational astronomy.
It is a large space-based observatory, launched in the year 1990, that orbits the Earth at 600km above the planet.

It observes the universe in visible, ultraviolet and infrared light, providing high resolution images and detailed spectroscopic data.

Hubble is joint project between *National Aeronautics and Space Administration NASA* and *European Space Agency ESA*.

It was initially designed for servicing by astronauts, now it operates remotely, controlled from the ground by NASA's Goddard Space Flight Centre.



HUBBLE SPACE TELESCOPE

Along the time, the lifestyle of inhabitants on planet Earth encountered more transition periods known as Ages:

- Agricultural Age, also known as Agricultural/Neolithic Revolution.

It started around 10.000 BCE and it was a period of transition from hunter-gatherer lifestyle to settled agriculture.
It involved the domestication of plants and animals, food surpluses, population growth, development of villages and eventually civilizations.
In a subclassification there are two agricultural revolutions: first and second.

- Industrial Age, known also as Industrial Revolution.

It was the transitional period of the global economy toward manufacturing processes, succeeding the second agricultural revolution.
Manly was characterized by significant technological advancements, changes in economic practices and transformations in society.
It began in the year 1760 in Great Britain and later in other countries by replacement of hand tools with power-driven machines (power loom, steam engine) and concentration of industry in large establishments.
In a subclassification there are four industrial revolutions:
First Industrial Revolution began in late 18th century and continued in 19th century, years 1760-1840. Manly was characterized by Mechanical Production.
Second Industrial Revolution 1870-1914 was a phase of rapid scientific discovery, standardisation, mass production and industrialisation based on electrical energy.
Third Industrial Revolution began in mid-20th century, when nuclear energy and electronics entered the industrial landscape. It is known as Digital Revolution/Age based on Computer and Internet.
Fourth Industrial Revolution or The Smart Factory is based on artificial intelligence AI and information technology IT. It is towards automation and data exchange in manufacturing technologies and processes which include cyber-physical systems CPS, internet of things IoT, cloud computing, cognitive computing and artificial intelligence AI.

- Information Age, it started in mid 20th century.

Was a rapid shift from traditional industries, established during the industrial revolution, to an economy centred on the information technology IT.
It is the modern time regarded as a time when information is a commodity quickly, widely disseminated and easily available by computer technology.

- Intelligence Age

Now we are moving deeper in 21st century, away from Information Age, into Age of Intelligence. That means that understanding, analysing and processing data is becoming increasingly important.

Literature comments:

The last trillion-dollar industry was built on a code of 0s and 1s.
The next will be built on our genetic code.

The world has left the Cold War behind only to enter the Code War.
Industry of the future is the weaponization of code – a cyber-industrial complex.