Robotics

Introduction of Robotics

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●What is a robot?

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What is a robot?

- **The word *robot* was introduced in 1920**

  - By the Czech writer Karel Čapek in his play R.U.R. (Rossum's Universal Robots)
    - "robota" in Slavic languages means "work", "labor"
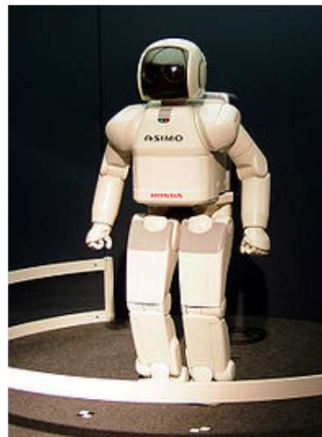 - A story of artificial people called robots

A scene from R.U.R.

What is a robot? [cont'd]

- A **mechanical device** that can **perform tasks (semi) automatically**

  ○ Not necessarily a humanoid in appearance

  ○ Some robots require human guidance or remote control

  ○ Usually an electro-mechanical machine
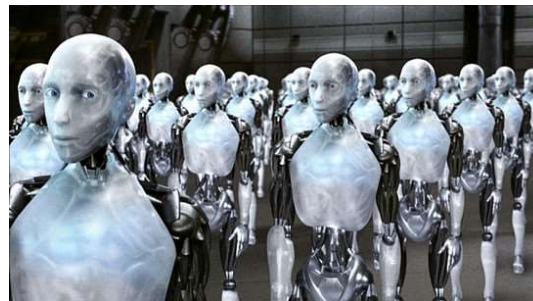

Teakwon V

ASIMO

Industrial robot

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What is a robot? [cont'd]

- **No one definition of robot satisfies everyone**

- **Examples**

  ○ Mechanical device able to <mark>perform preset motions</mark>

  ○ <mark>Remotely operated</mark> vehicle

  ○ <mark>Self-controlled</mark> car which could sense its environment and make driving decisions

  ○ Mechanical <mark>humanoid</mark>

  ○ Sentiment robot

History

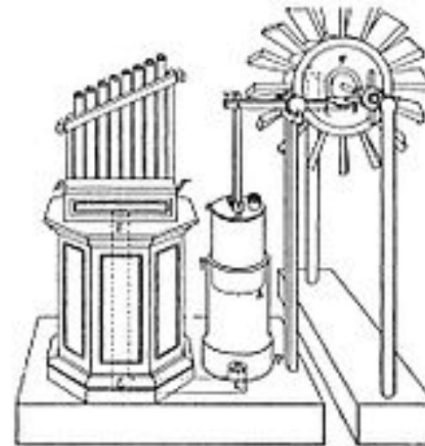● **Machinery for repetitive functions**

  ○ Lifting water and grinding grain

● **Hero of Alexandria (1st century AD)**

  ○ First recorded *steam* engine

  ○ *Wind-powered* organ – first instance of wind powering a machine in human history

Hero's engine (aeolipile)   Wind-powered organ

History [cont'd]

● **Al-Jazari (12th century AD)**

○ *The Book of Knowledge of Ingenious Mechanical Devices*

○ Automaton (*self-operating* machine) – <mark>a boat with four automatic musicians</mark> that floated on a lake to entertain guests at royal drinking parties

History [cont'd]

● **Leonardo's robot (1495)**

○ *Humanoid automaton* designed by Leonardo da Vinci

  − Not known whether he actually built it

○ Design notes were discovered in the 1950s

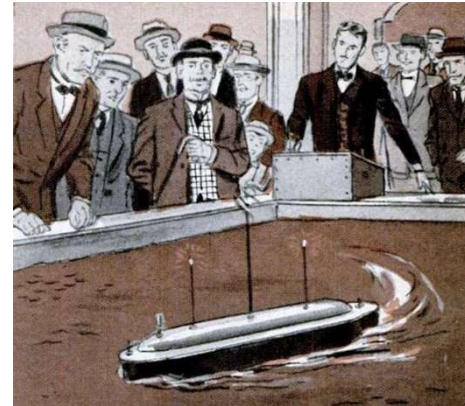○ Able to make several human-like motions
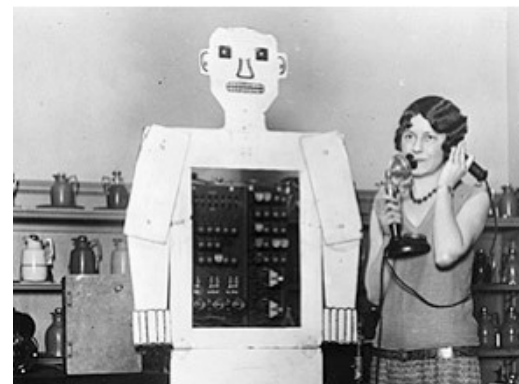

Model of Leonardo's robot

History [cont'd]

● **Nikola Tesla (1898)**

○ A <mark>*radio-controlled*</mark> boat

○ Tesla VS Edison

● <mark>**Televox**</mark> **(1926)**

○ Considered as first robot put to *useful work for consumer*

○ Connected to various devices via phone lines and allows users to turn equipment off and on using voice commands
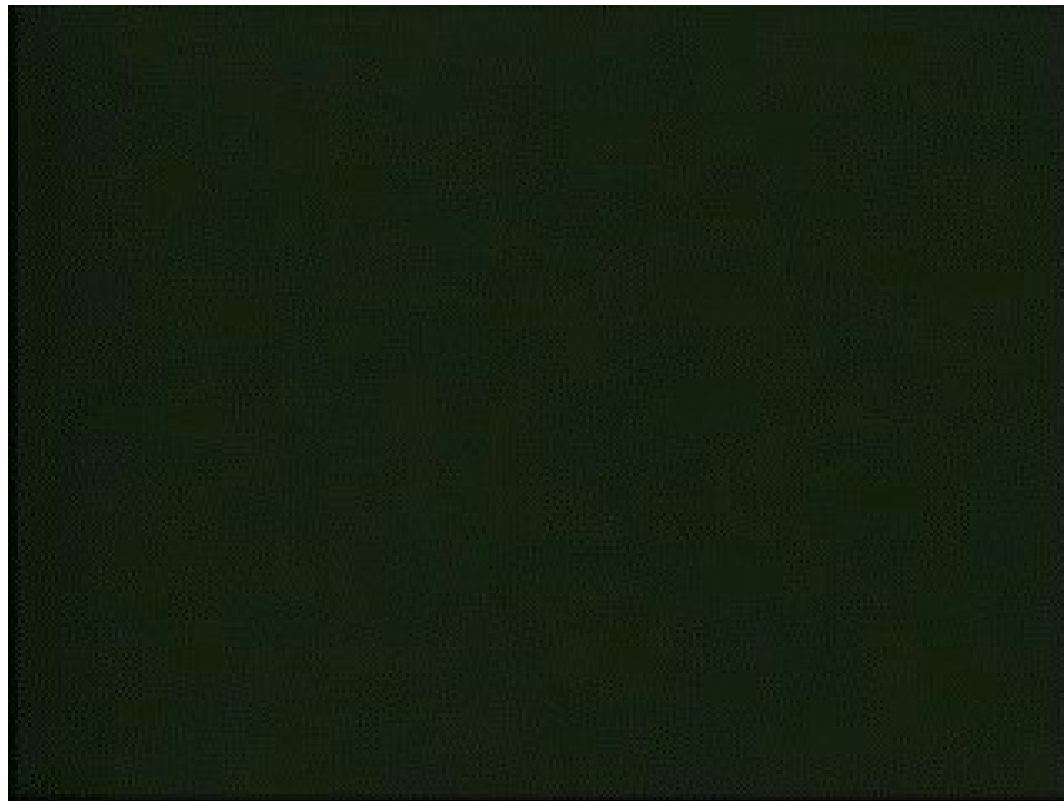
History [cont'd]

- **William Grey Walter (1948)**

  ○ First electronic *autonomous robots* recognizing environments

    − Tasks in unknown environments without human guidance

    − Grey Walter's Tortoise

History [cont'd]

● **George Devol (1954)**

○ First patent about digital and **programmable** robot

○ Tasks can be programmable – general-purpose robot which can do multiple tasks

● **Joseph Engelberger (1961)**

○ Unimate : First **industrial robot** which worked on General Motors assembly line
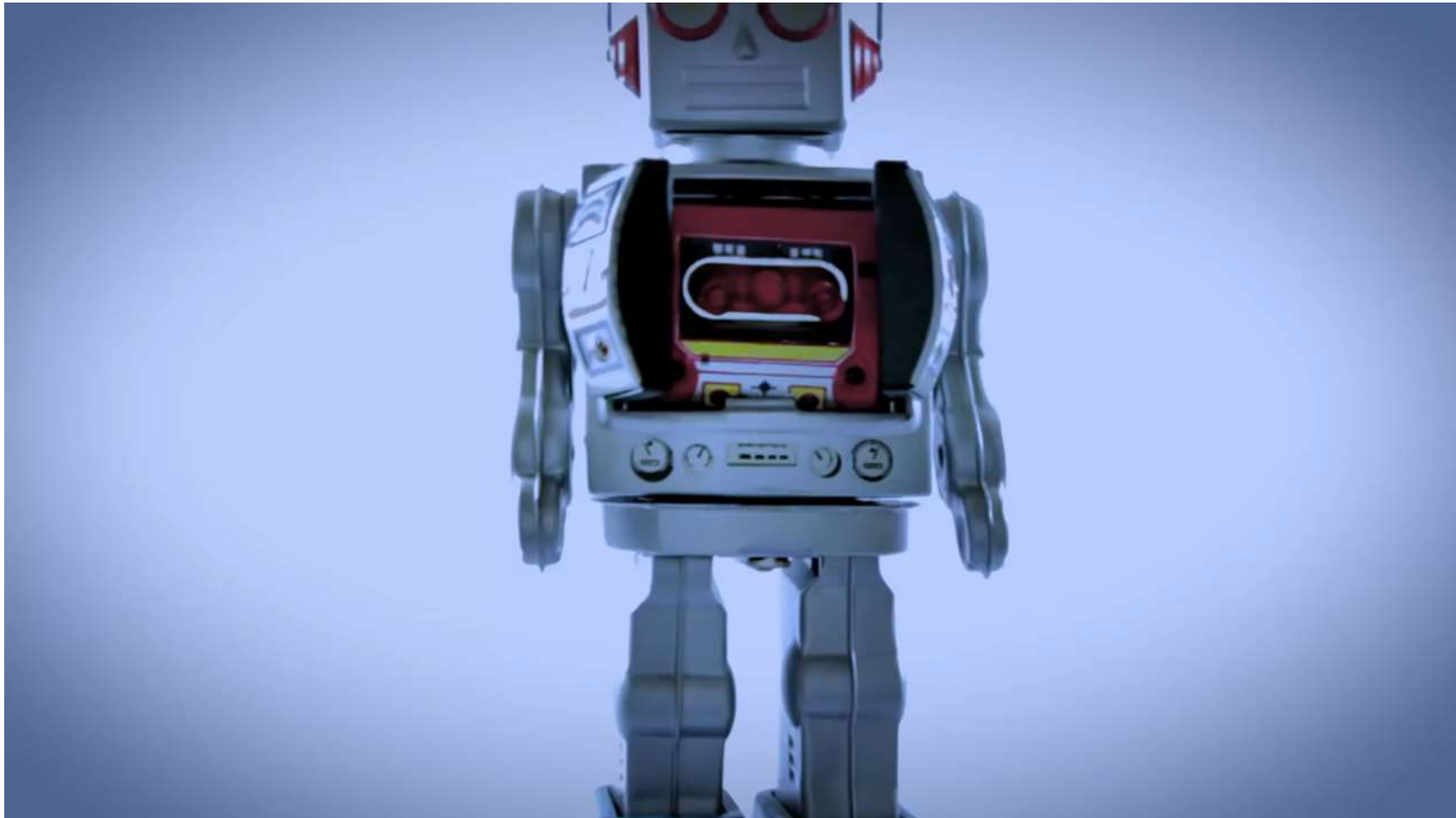
History [cont'd]

● <mark>ASIMO</mark> (2000~2018)

○ A humanoid robot created by Honda

○ Designed as a helper to people : 130cm and 54kg, operate in real-world environments

State of the arts

- **Pepper** - SoftBank

State of the arts [cont'd]

● **Ongoing robot technology to create the IRON-MAN!!!!(3m)**

State of the arts [cont'd]

- <mark>Jibo</mark> - MIT