

# The history of automation

## The steam engine

The first step towards automation was **mechanisation**, the substitution of human work with machines, especially for heavy or dangerous jobs. However, while automation provides self-controlling systems for the machines, mechanisation implies that machines still need some form of human control.

The invention of the steam **engine** was the first big step towards mechanisation and marked the beginning of the Industrial Revolution in the last decades of the 18<sup>th</sup> century.

## The automatic loom

Each new development in the history of machines has brought with it an increased requirement for control systems that enable machines to be more and more autonomous. Around 1801, the French inventor J. M. Jacquard devised an automatic loom capable of producing complex **patterns** in textiles by controlling the motions of different coloured **threads**. The selection of the different patterns was determined by a program contained in steel cards in which holes were **punched**. These were the **ancestors** of the paper cards that controlled the first modern automatic machines.

## The analytical engine

The concept of programming a machine was further developed later in the 19<sup>th</sup> century when Charles Babbage, an English mathematician,

proposed a complex “analytical engine” that could perform arithmetic and data processing. Although Babbage was never able to complete it, this device was the precursor of the computer.

## The assembly line

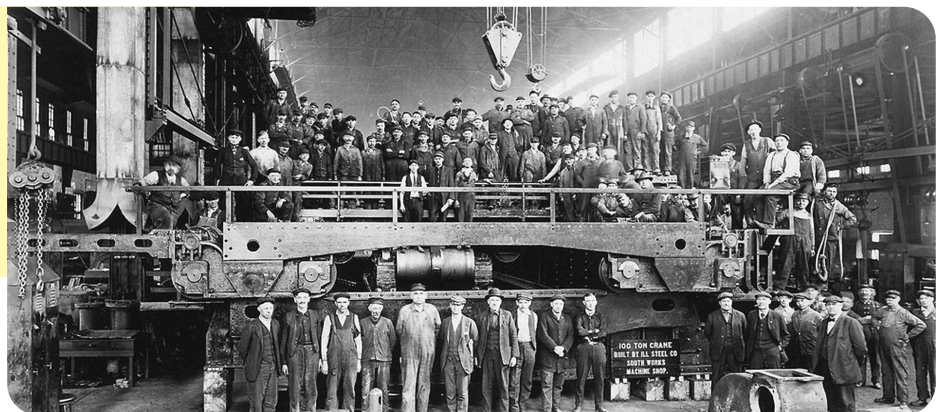
The automobile industry was the first to use the word “automation” to talk about its production processes. The mechanisation of production lines started at the beginning of the 20<sup>th</sup> century at the Ford Motor Company in the USA, where the first **assembly line** began to operate in 1913. Since then, mechanised production lines have become more and more automated, as they use computerised action instead of human intelligence.

## Further developments

Automation has progressed to the **extent** we know of today thanks to a number of significant developments that occurred during the 20<sup>th</sup> century. Firstly, the birth of digital computer soon after World War II which was later followed by improvements in data-storage technology and the software used to write computer programs; finally, advances in sensor technology, and the derivation of mathematical control theory. All of these developments have contributed to the evolution of today’s automation technology.

Adapted from: <https://www.britannica.com/technology/automation>

**ancestor:** *antenato*  
**assembly line:** *catena di montaggio*  
**engine:** *motore*  
**extent:** *misura, livello*  
**loom:** *telaio*  
**pattern:** *modello, disegno*  
**to punch:** *perforare*  
**thread:** *filo*



**1**  Put these events from the text in chronological order and complete the table with a time period or date.

- Construction of the first assembly line
- Development of the analytical engine
- Creation of the first digital computer
- Invention of the automatic loom
- Improvement in software programming and digital data storage
- Invention of the steam engine

Time	Event
1.	
2.	
3.	
4.	
5.	
6. 20 <sup>th</sup> century	Improvement in software programming and digital data storage

**2**  Decide if the statements are true or false. Correct the false statements.

1. Mechanisation and automation are not synonyms.
2. Mechanisation came after automation.
3. A mechanised system needs human control.
4. The steam engine was invented in the late 1800s.
5. Jacquard's loom was one of the first examples of automation
6. The loom was controlled through an "analytical engine".
7. The assembly line was first used in a textile factory in the USA.
8. Automation has progressed thanks to the development of IT and electronics.

T	F
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**3**  Find words in the text that match each definition.

1. The substitution of human workers with machines. ....
2. The use of machines that can self-regulate their processes. ....
3. A synonym of "motor". ....
4. A machine that produces clothes. ....
5. The precursor of the computer. ....
6. A synonym of "car". ....

**4**  For each of the words in the previous activity, write a sentence containing it.

1. ....
2. ....
3. ....
4. ....
5. ....
6. ....