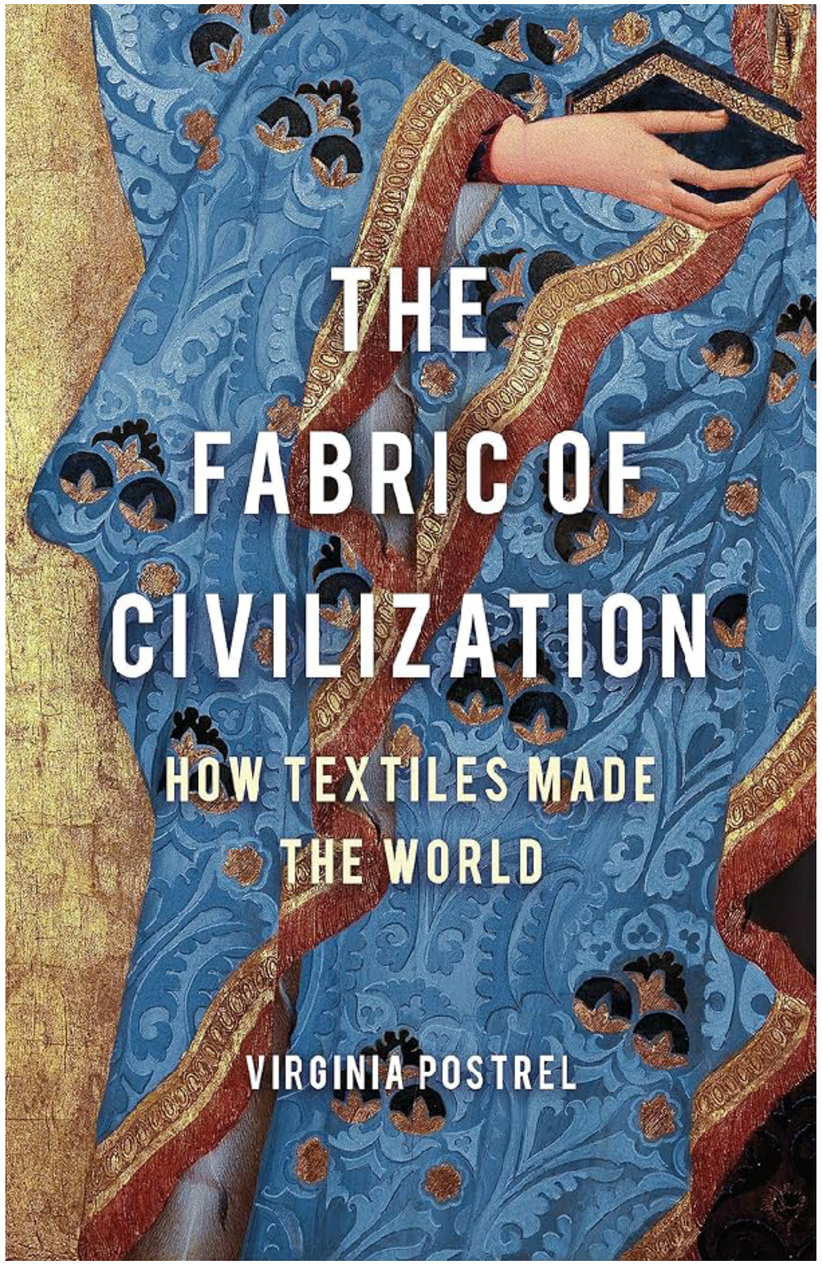
Projection 2

INVISIBLE THREADS OF COMPUTATION

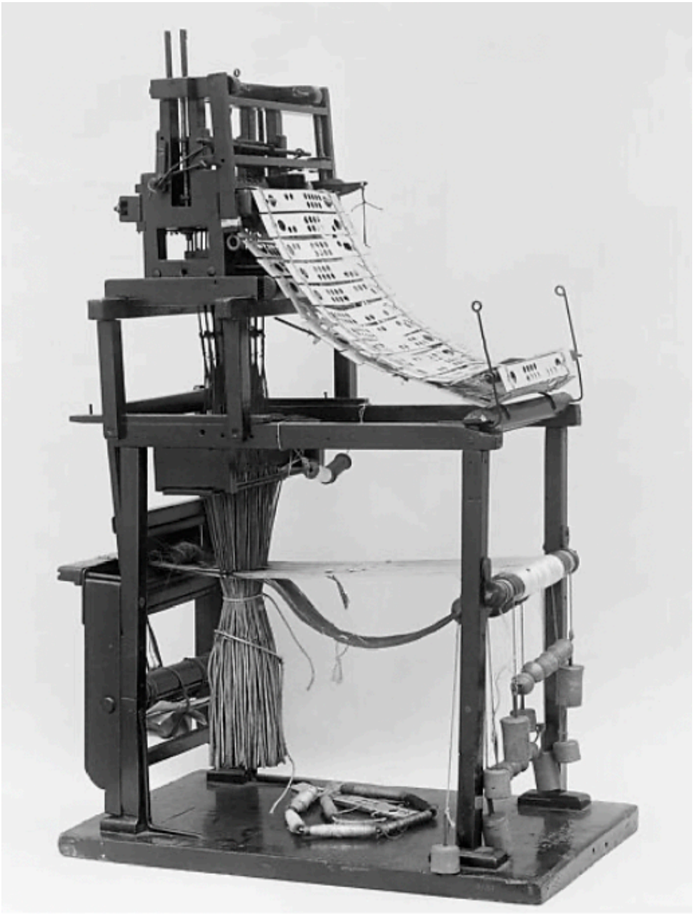
THE FABRIC OF CIVILIZATION BY VIRGINIA POSTREL

This book argues that textiles were among humanity's earliest information technologies. Weaving required counting, sequencing, and pattern-making - processes that resemble computational logic. From this perspective, the origins of computing can be traced not only through electronics, but through centuries of textile production and innovation.



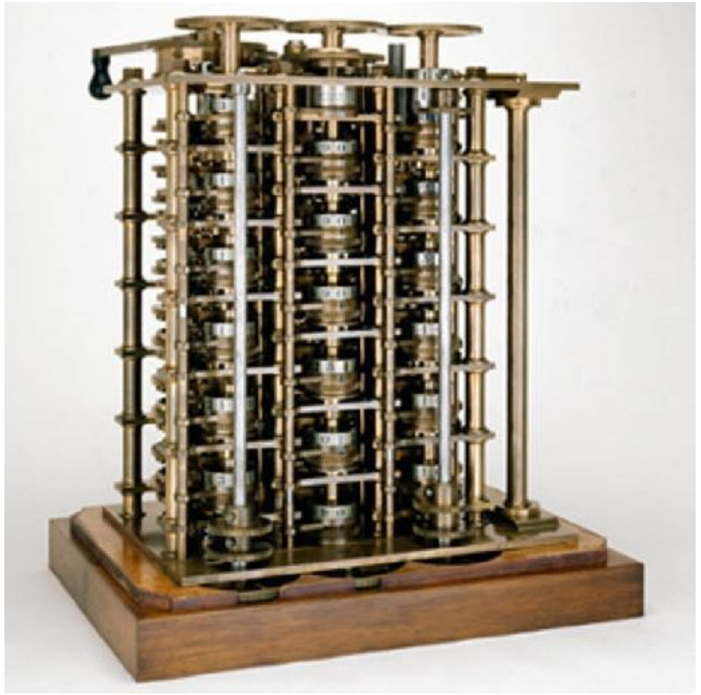
JOSEPH MARIE JACQUARD & THE JACQUARD LOOM

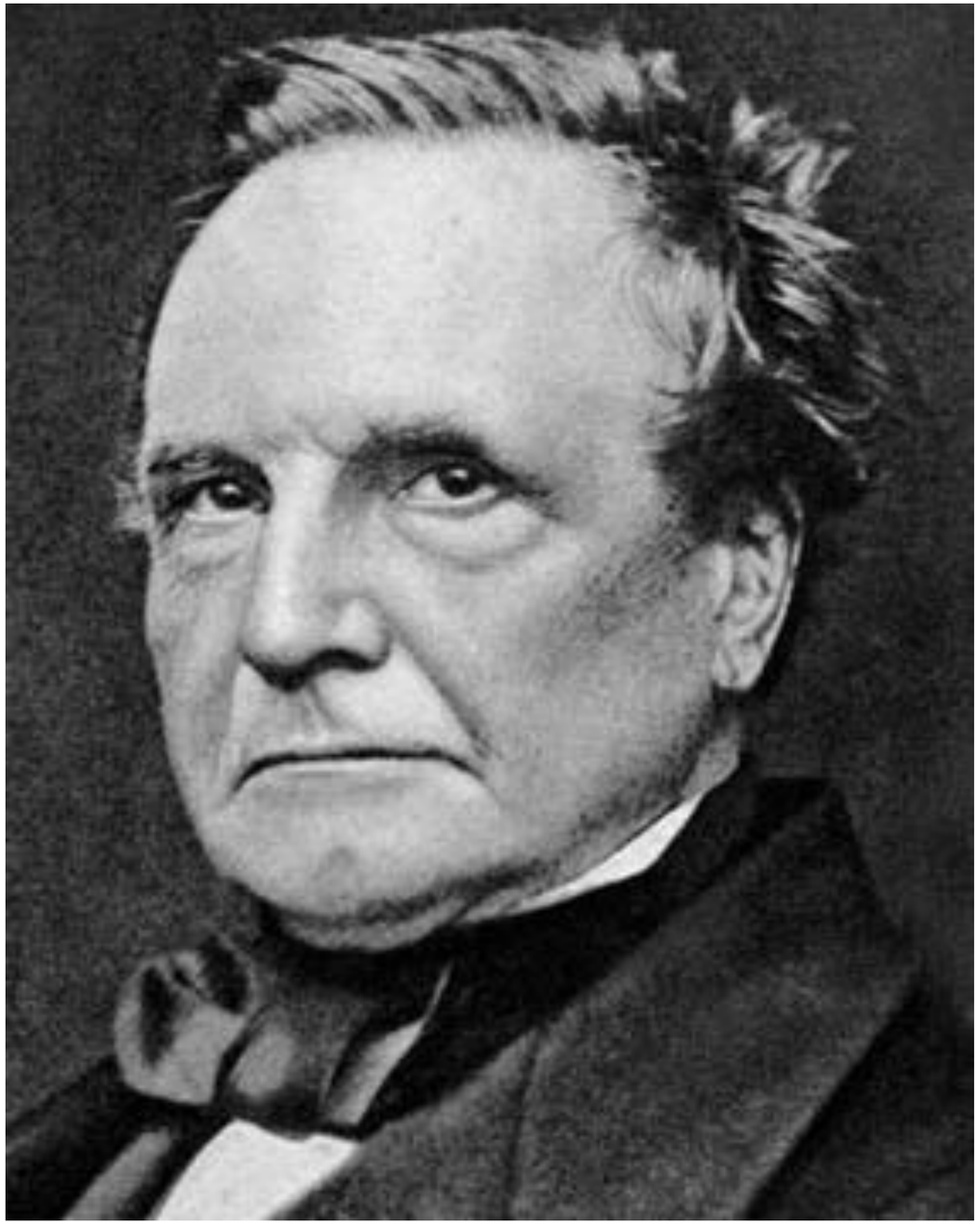
In 1804, Joseph Marie Jacquard developed the Jacquard loom, which used binary punched cards to automatically control woven patterns. By encoding instructions into interchangeable cards, the loom became one of the first programmable machines and established a direct link between textiles and computing.



CHARLES BABBAGE & THE ANALYTICAL ENGINE

Inspired by the Jacquard loom, Charles Babbage incorporated punch-card control into his design for the Analytical Engine in the 1830s. Although never fully built, the machine is widely considered the first concept of a general-purpose computer.





https://www.sciencemuseum.org.uk/objects-and-stories/charles-babbages-difference-engines-and-science-museum

ADA LOVELACE

Working with Babbage's Analytical Engine, Ada Lovelace realised that the machine could process symbols and patterns, not just numbers. Her notes included what is often considered the world's first computer program, earning her recognition as the first programmer.

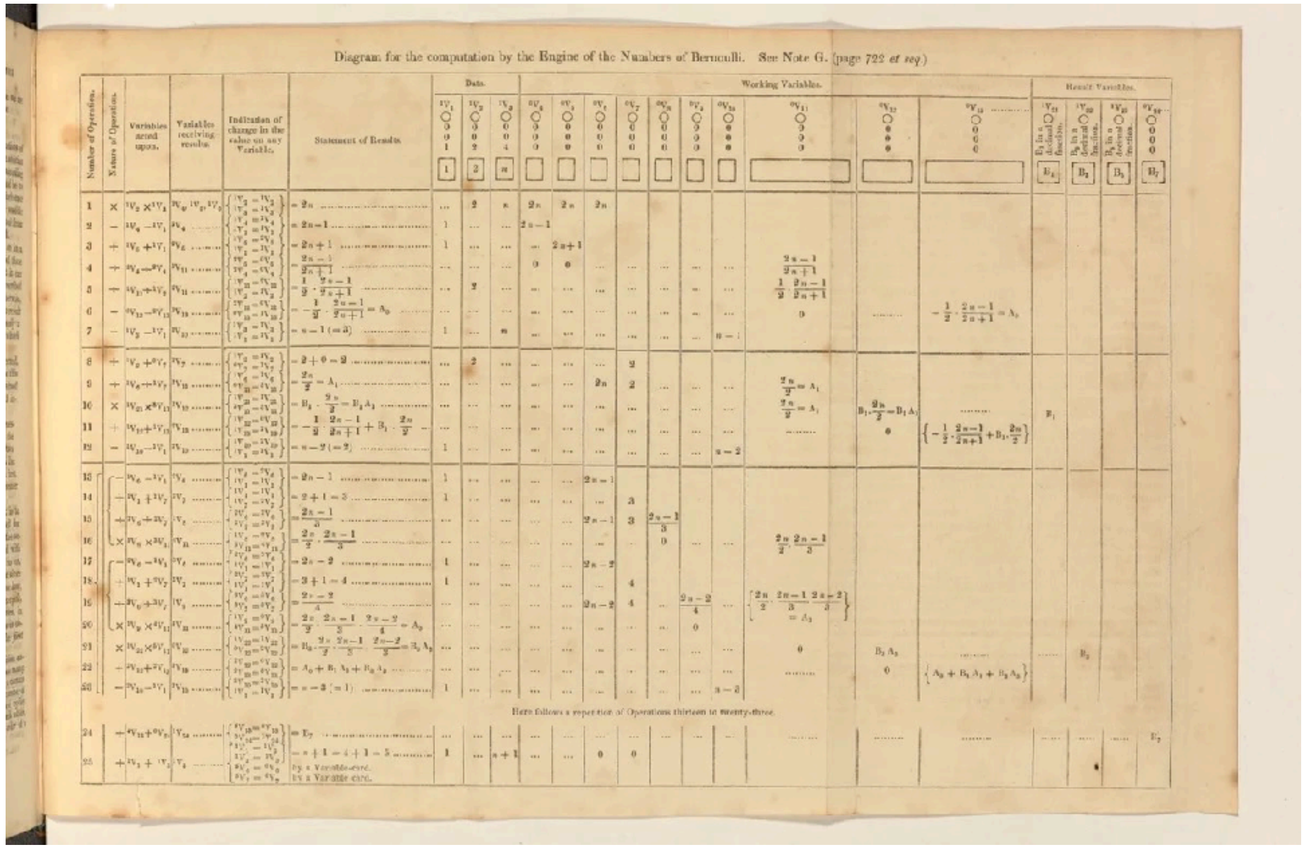


Diagram for the computation by the Engine of the Numbers of Bernoulli. See Note G. (page 722 *et seq.*)

https://www.sciencefocus.com/future-technology/how-ada-lovelaces-notes-on-the-analytical-engine-created-the-first-computer-program

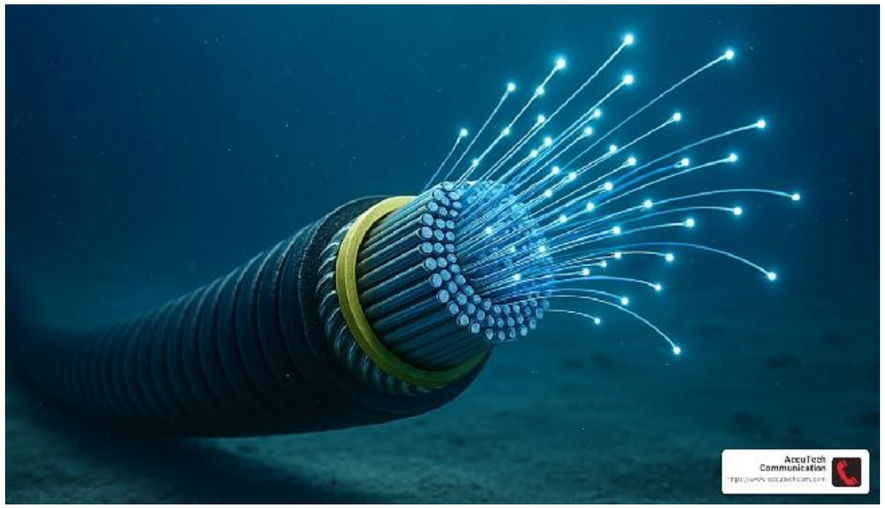
HERMAN HOLLERITH & PUNCHED-CARD TABULATOR

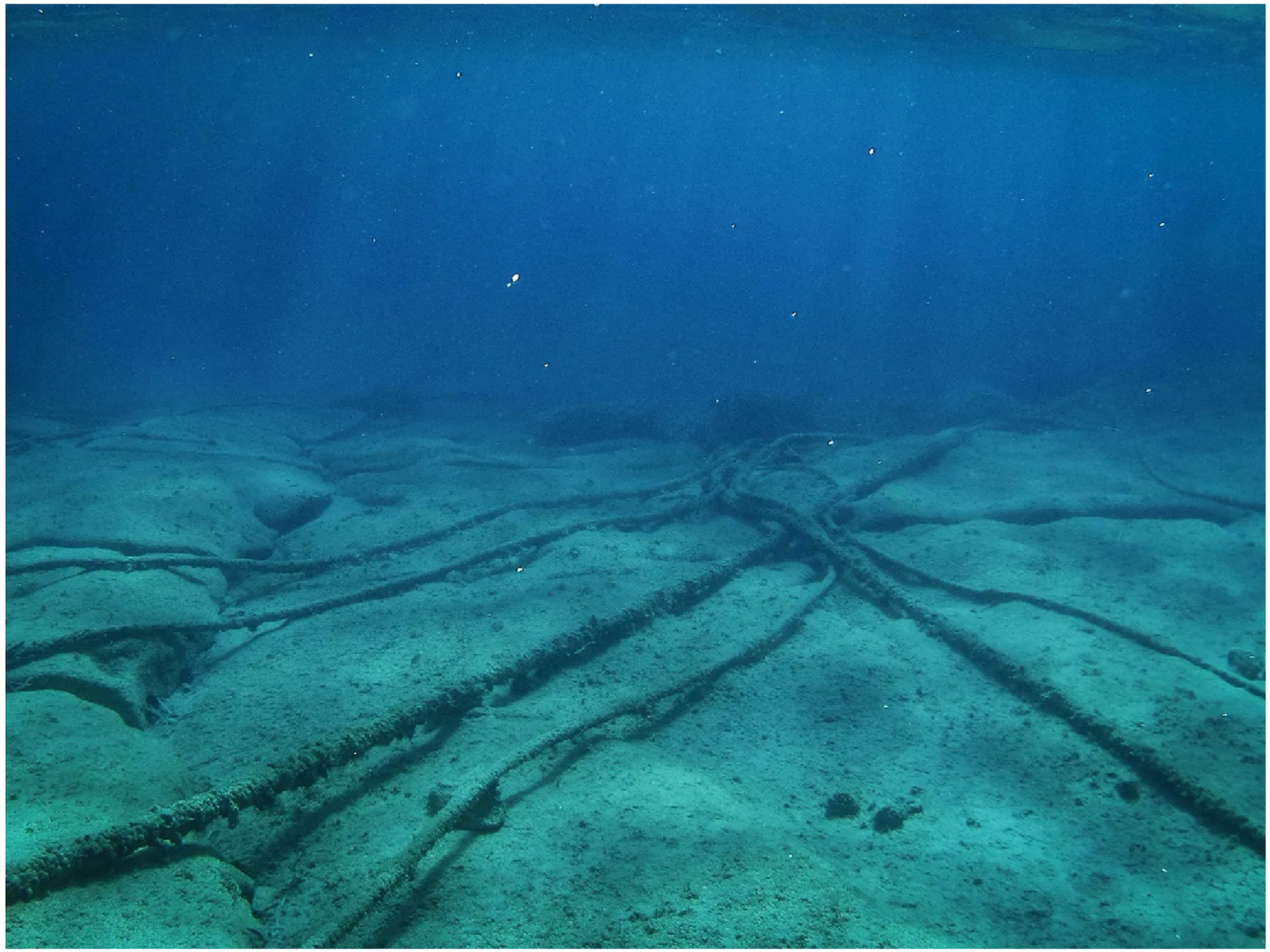
In 1890, Herman Hollerith used a punched-card tabulating system to process data for the U.S. Census, adapting a principle first used in textile machinery such as the Jacquard loom. By encoding information as holes in cards that could be read by machines, his invention greatly accelerated data processing and became a key stepping stone in the development of modern computing.

https://www.ibm.com/history/punched-card-tabulator

UNDERSEA CABLES

Fiber-optic cables transmit digital images by converting pixel data from each image into binary code (bits). Each pixel's colour values are stored as bytes, made up of 8 bits. This binary data is then converted into light pulses, which travel through optical fibers in the cable. At the other end, the light pulses are converted back into binary and reconstructed into the original pixels to form the image.





https://www.britannica.com/technology/undersea-cable

If we ask who invented the computer, the usual answers are Babbage, Lovelace, Hollerith, or later IBM engineers. However, The Fabric of Civilization suggests a broader, distributed history shaped by anonymous textile workers.

Weavers, drawloom operators, engineers, and craftspeople developed systems of instruction, sequencing, and pattern control that prefigure computation. Postrel reframes the computer as a textile artefact built through collective intelligence rather than isolated genius, much of it undocumented and without individual attribution.

What remains visible is not the maker, but the underlying logic they helped build. These invisible contributors form the underlying structure of computational thinking - their names are absent, but their systems remain.

ENQUIRY

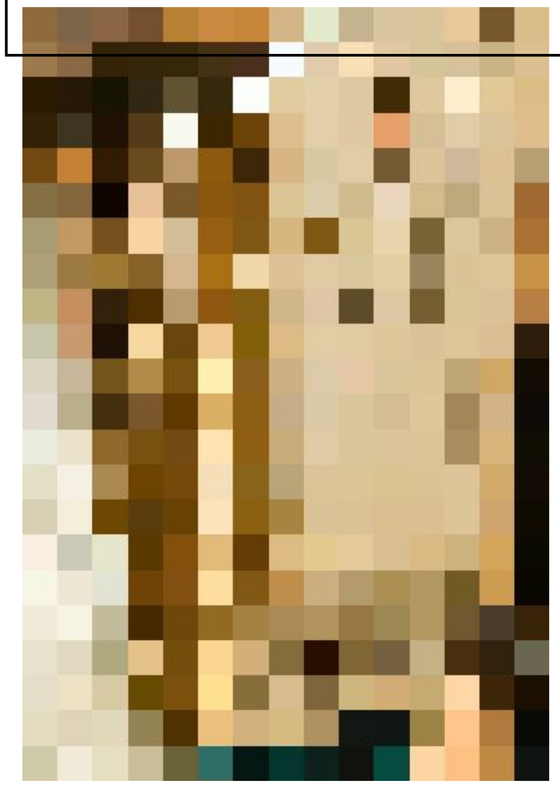
How can I reveal and honour the textile origins of the computer by translating digital, intangible systems into tactile, physical forms - making visible both the hidden data structures behind digital images and the often invisible, anonymous contributors who shaped computational thinking?

FROM IMAGE TO CODE

I wanted to create a coded programme that translates an image into binary code, visualised as a black-and-white pixel grid. This reflects the same underlying process used in digital image transmission through fibre optic light pulses.

Original image

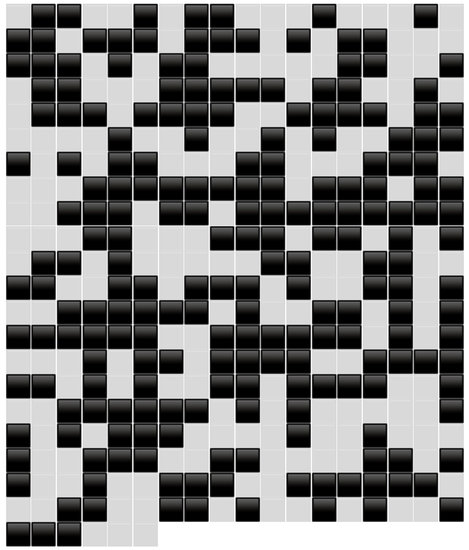
Pixellated image



RBG code to binary (row 1)

Pixel 1: (154,119,72) → 10011010 01110111 01001000
Pixel 2: (138,113,79) → 10001010 01110001 01001111
Pixel 3: (150,112,77) → 10010110 01110000 01001101
Pixel 4: (136,97,62) → 10001000 01100001 00111110
Pixel 5: (181,133,57) → 10110101 10000101 00111001
Pixel 6: (199,136,68) → 11000111 10001000 01000100
Pixel 7: (196,134,57) → 11000100 10000110 00111001
Pixel 8: (198,169,124) → 11000110 10101001 01111100
Pixel 9: (207,210,182) → 11001111 11010010 10110110
Pixel 10: (194,178,144) → 11000010 10110010 10010000
Pixel 11: (210,190,152) → 11010010 10111110 10011000
Pixel 12: (212,188,147) → 11010100 10111100 10010011
Pixel 13: (215,191,148) → 11010111 10111111 10010100
Pixel 14: (123,94,51) → 01111011 01011110 00110011
Pixel 15: (201,177,130) → 11001001 10110001 10000010
…

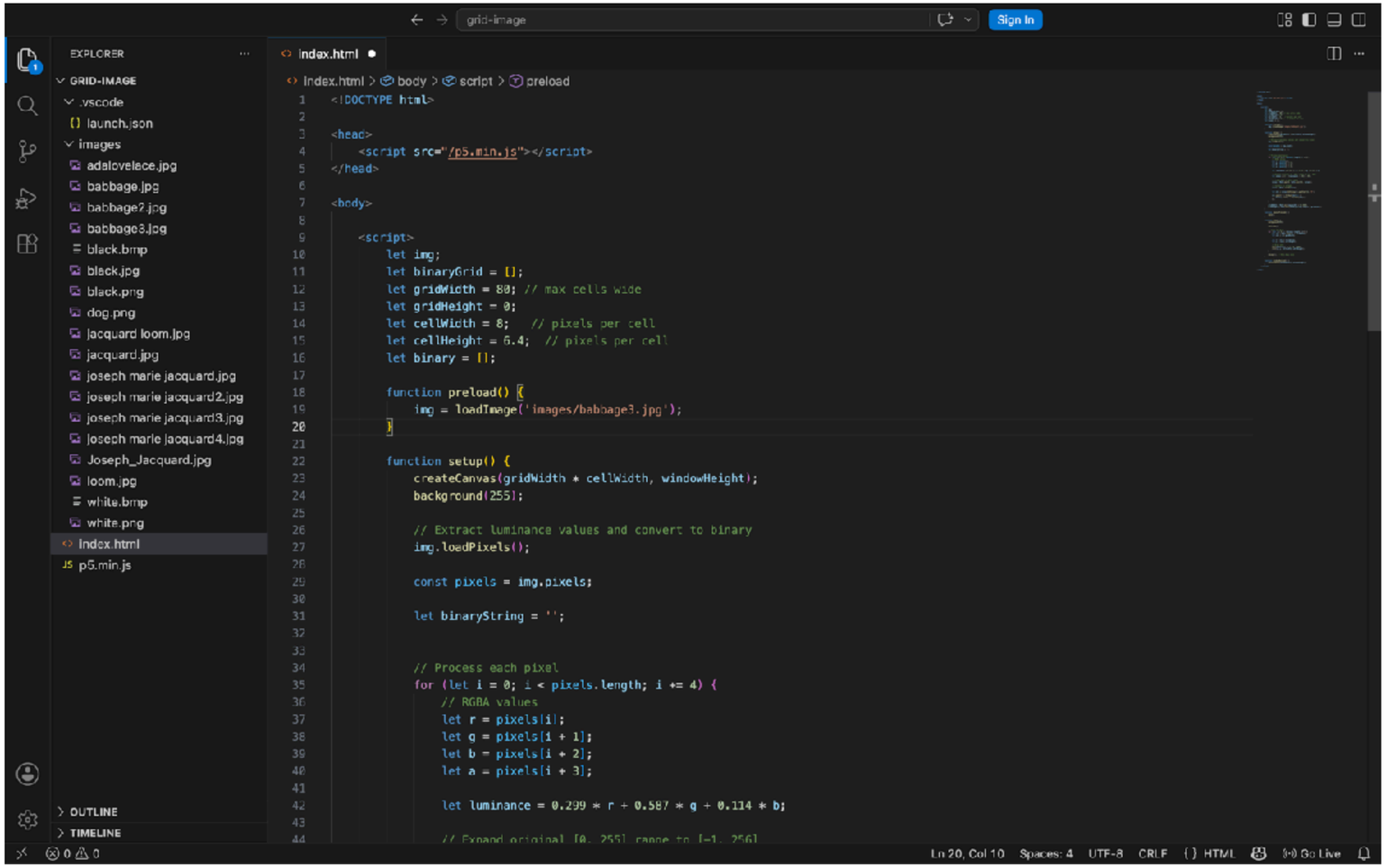
Binary to black/white pixels (row 1)



…

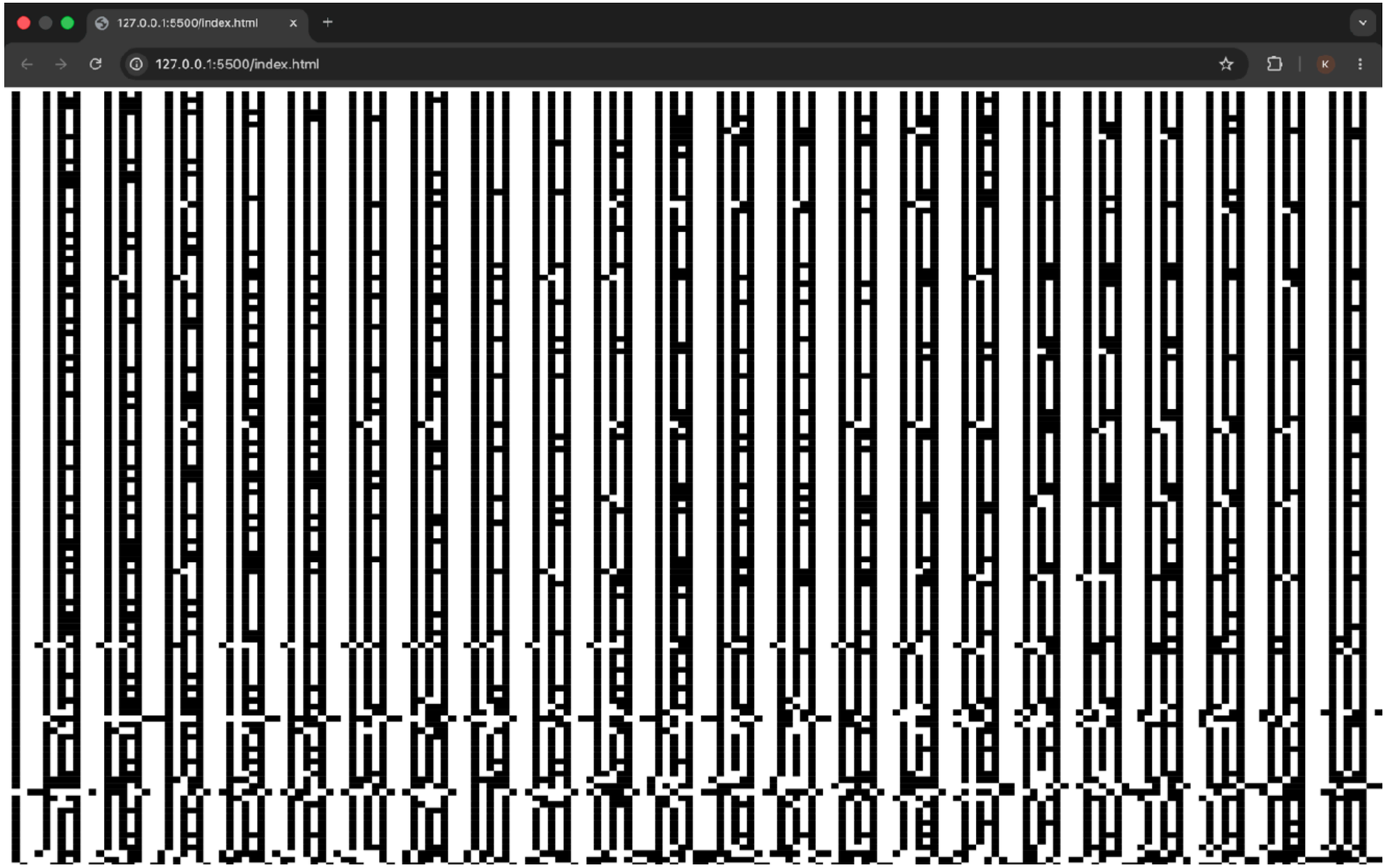
FROM IMAGE TO CODE

An image is uploaded, converted to greyscale, and each pixel is assigned a luminance value from 0–255. The resolution can be adjusted by changing pixel density. Instead of RGB values, each pixel is reduced to a single data value, simplifying the image into a structured system.



FROM IMAGE TO CODE

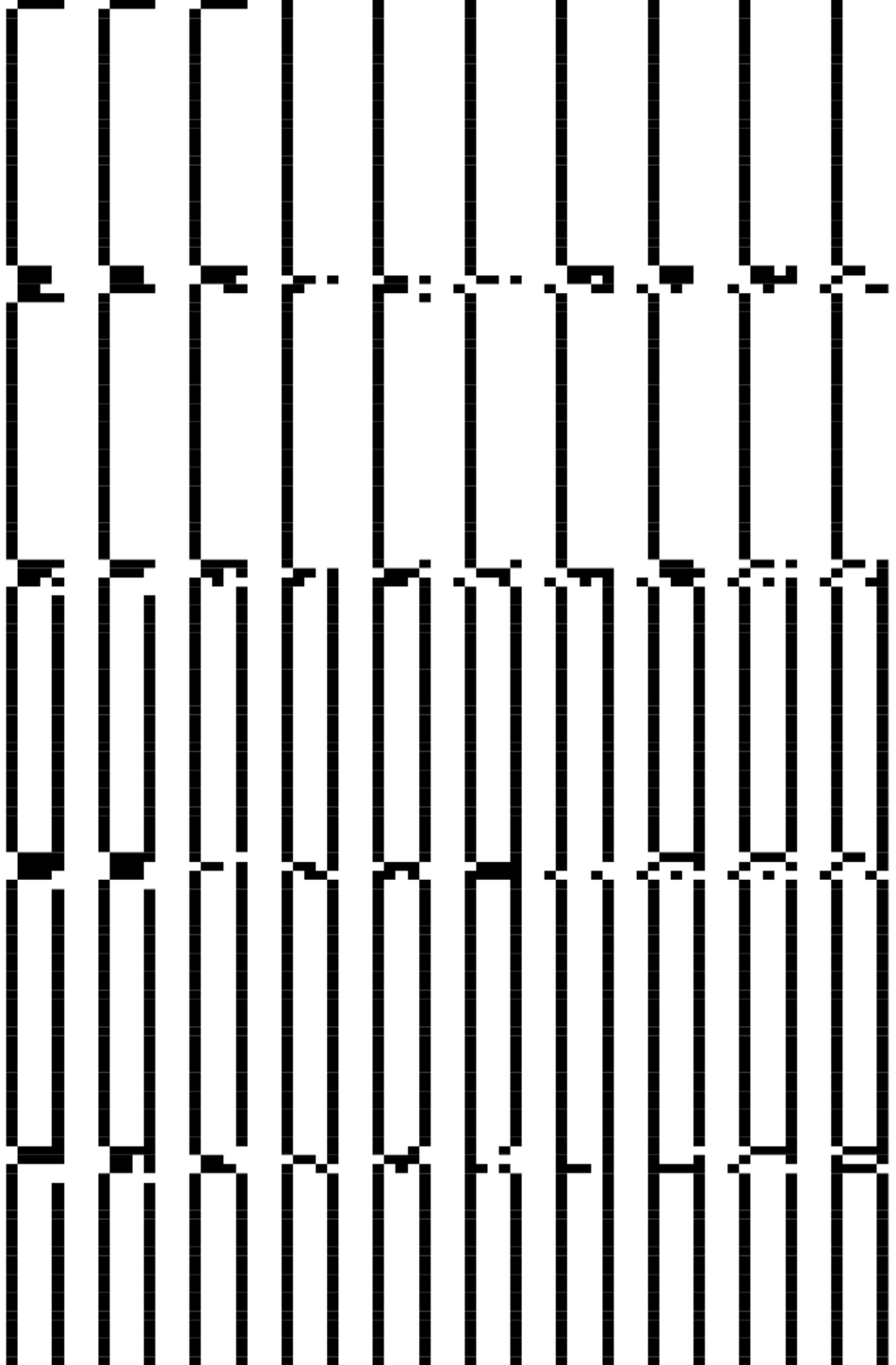
The output generates an 8-bit binary sequence per pixel, exposing the underlying logic of the image. This transforms visual information into structured data, mirroring how digital systems encode images into streams of light signals.



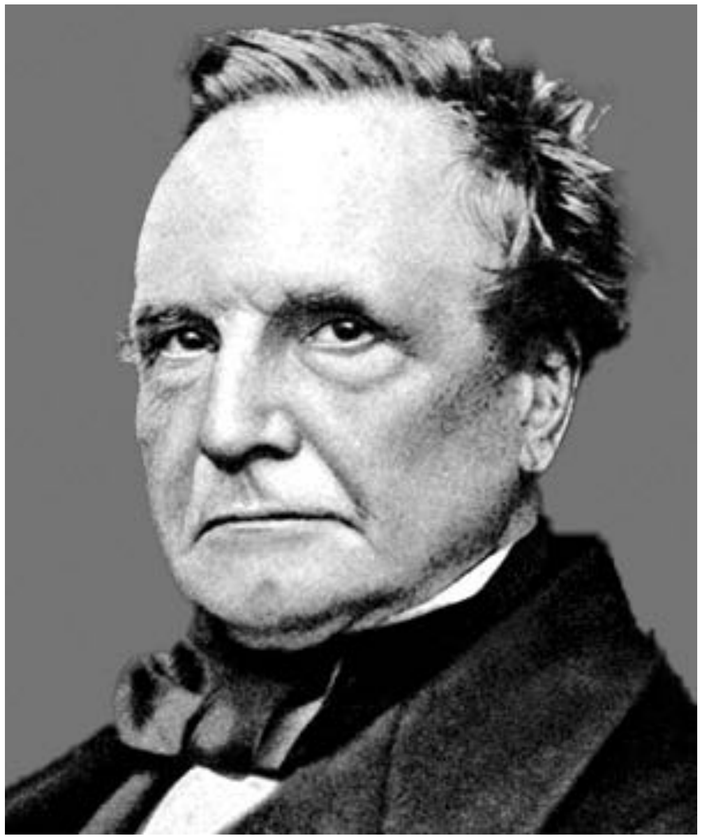
THE UNDERLYING CODE OF AN IMAGE

I took portrait images of well-documented figures involved in the history of computing and translated them into their underlying binary structure using my coded programme.

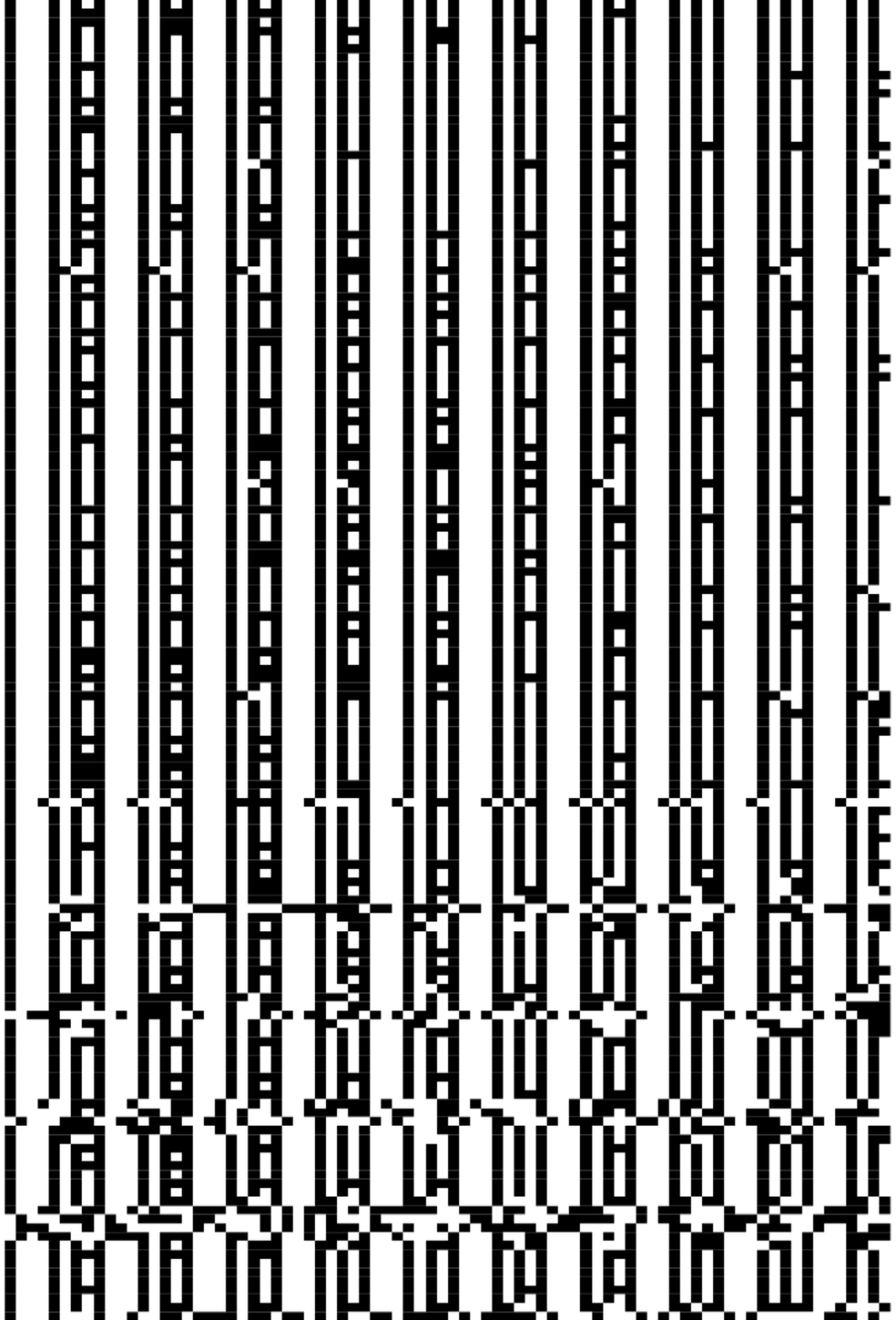
Joseph Marie Jacquard



THE UNDERLYING CODE OF AN IMAGE



Charles Babbage

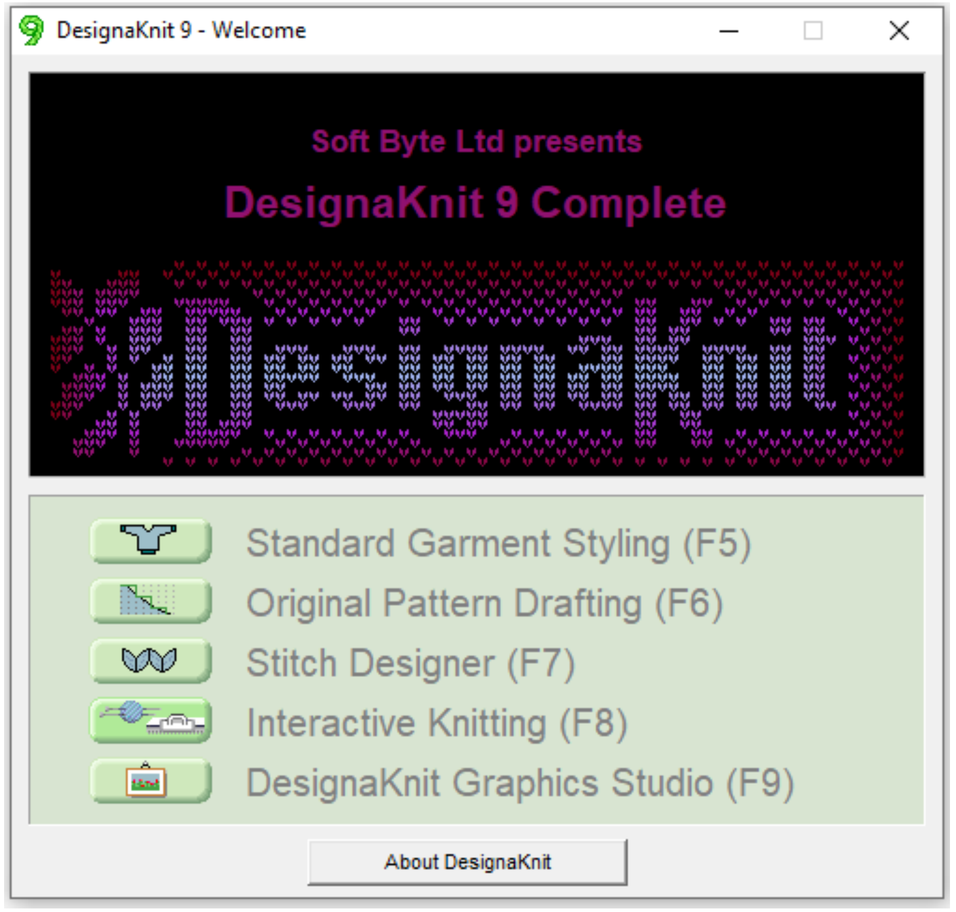


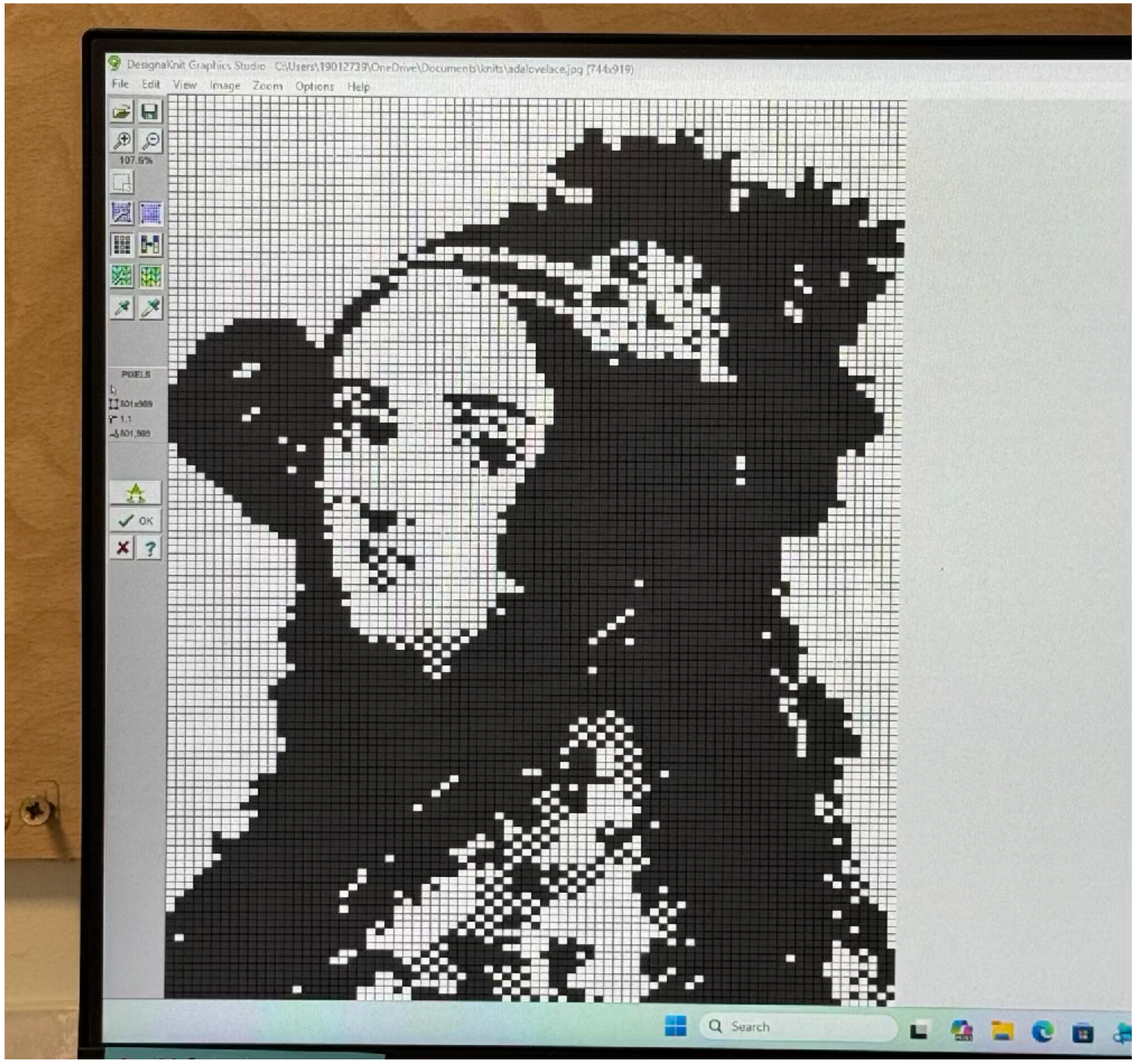
THE UNDERLYING CODE OF AN IMAGE

Ada Lovelace

DESIGNAKNIT SOFTWARE

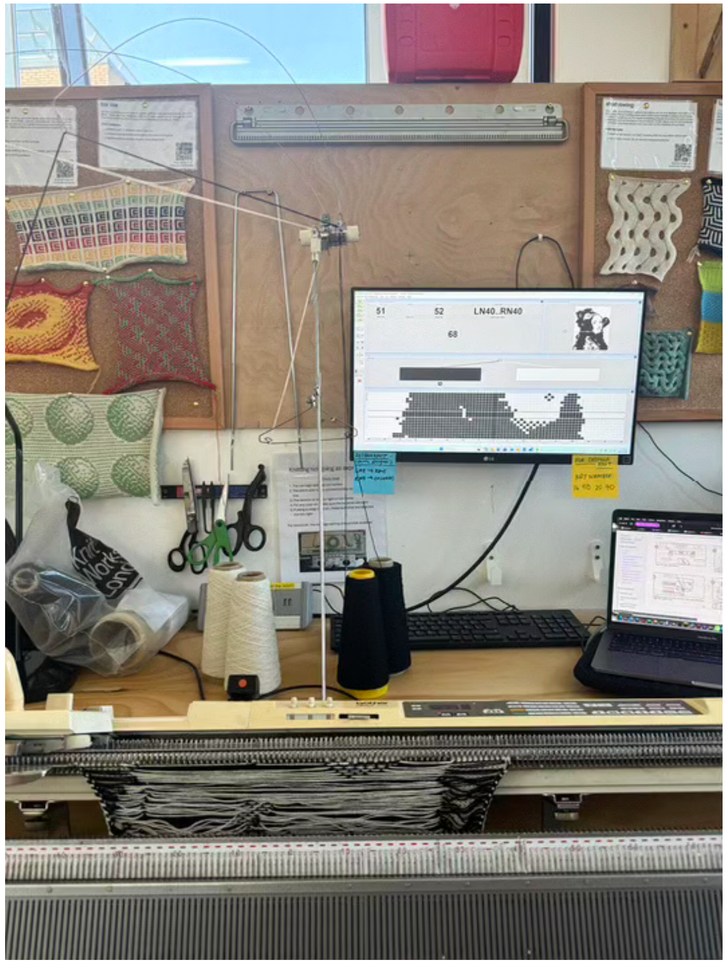
DesignaKnit is computer-aided design software that converts digital images into stitch patterns and colourwork, translating them into instructions that can be sent directly to a knitting machine and produced as physical knitted output.

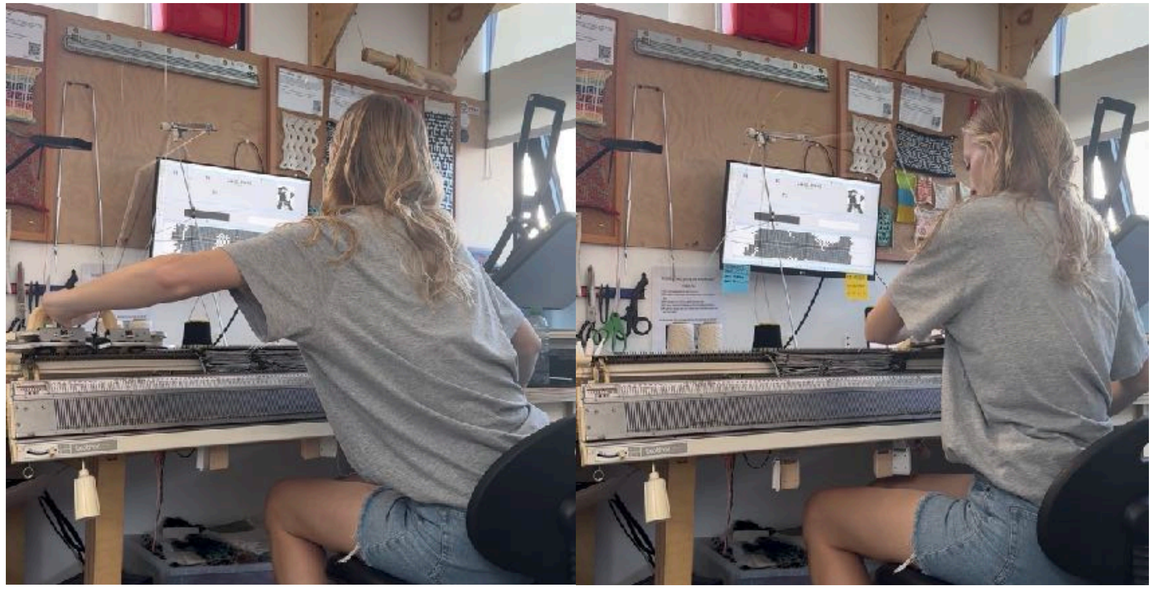


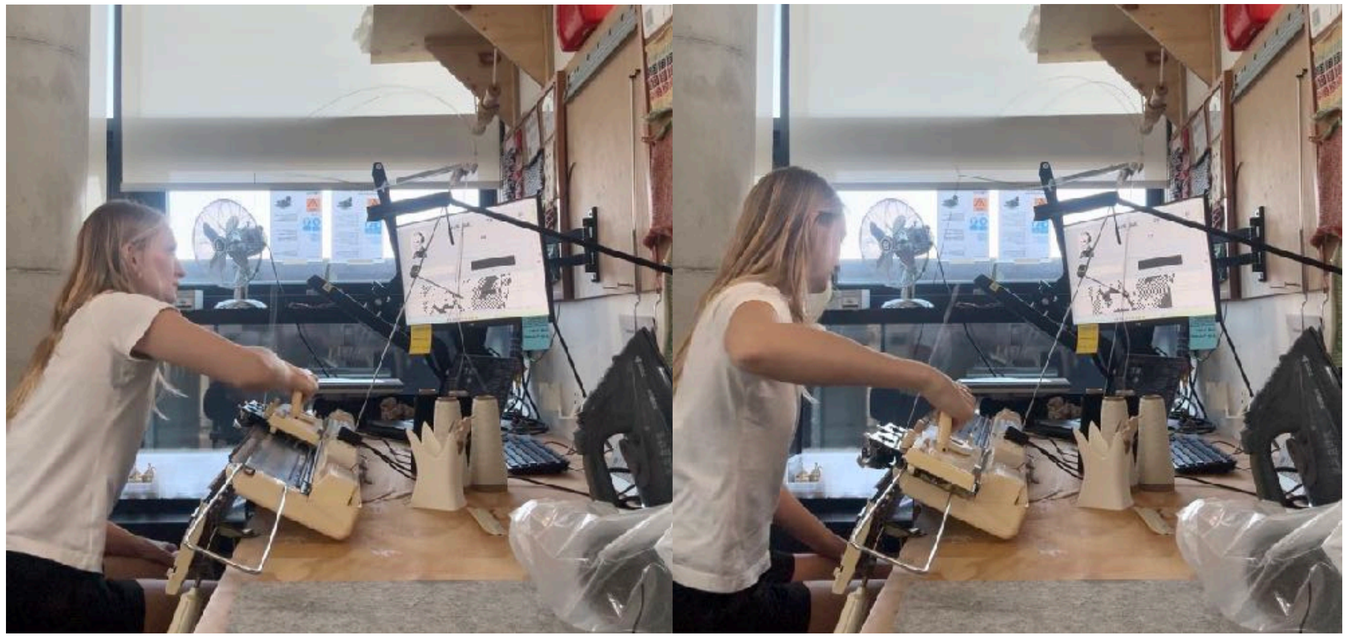


MACHINE KNITTING

With the knitting machine linked to DesignaKnit, I generated digital files from images that were translated into knitting stitches and downloaded directly to the machine. The machine automatically produced the correct stitches and colours, while my only role was moving the carriage from left to right.







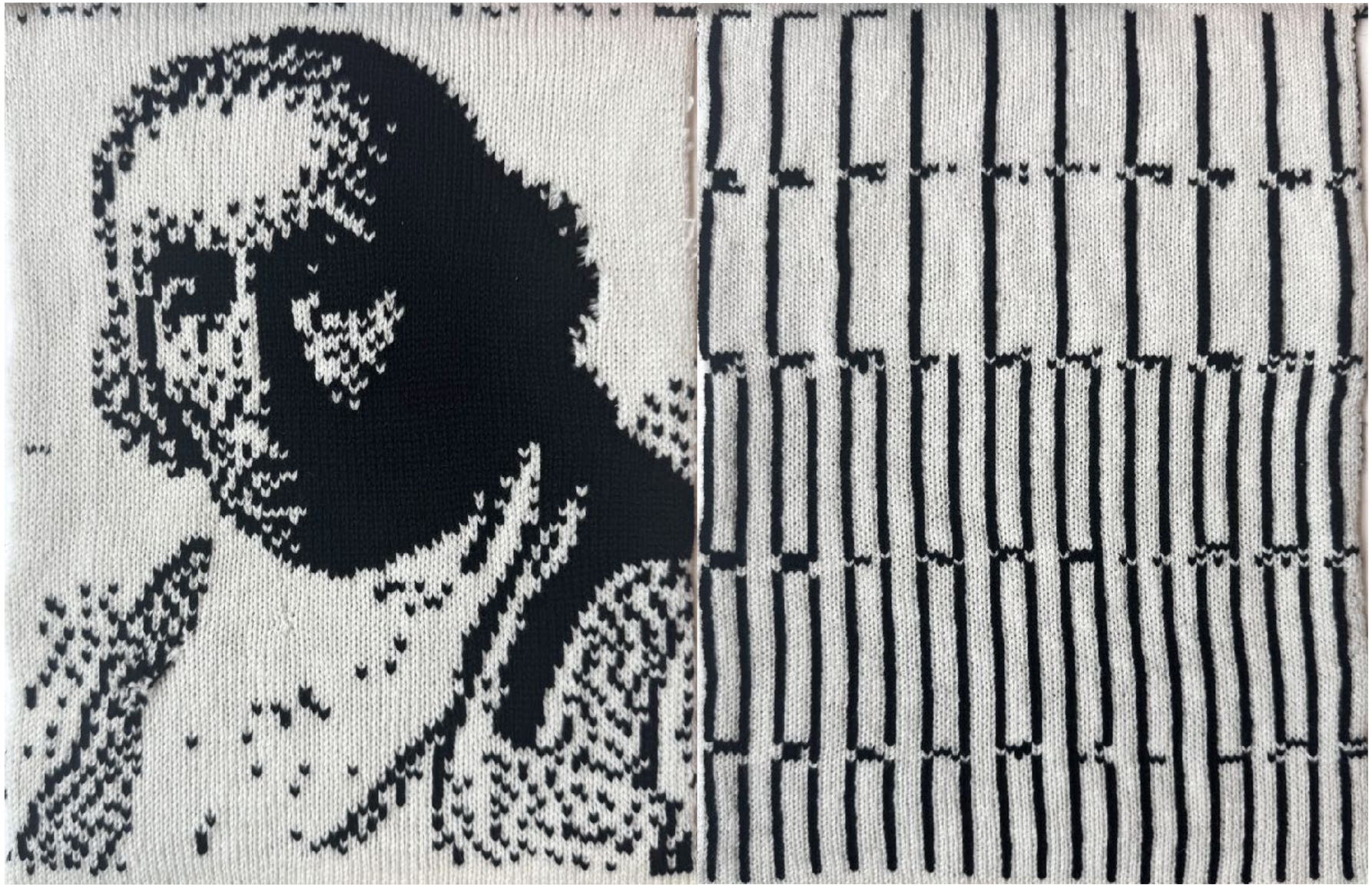
THE KNITTED IMAGE OUTCOMES

UNDERLYING SYSTEM OF HISTORICAL PORTRAITS

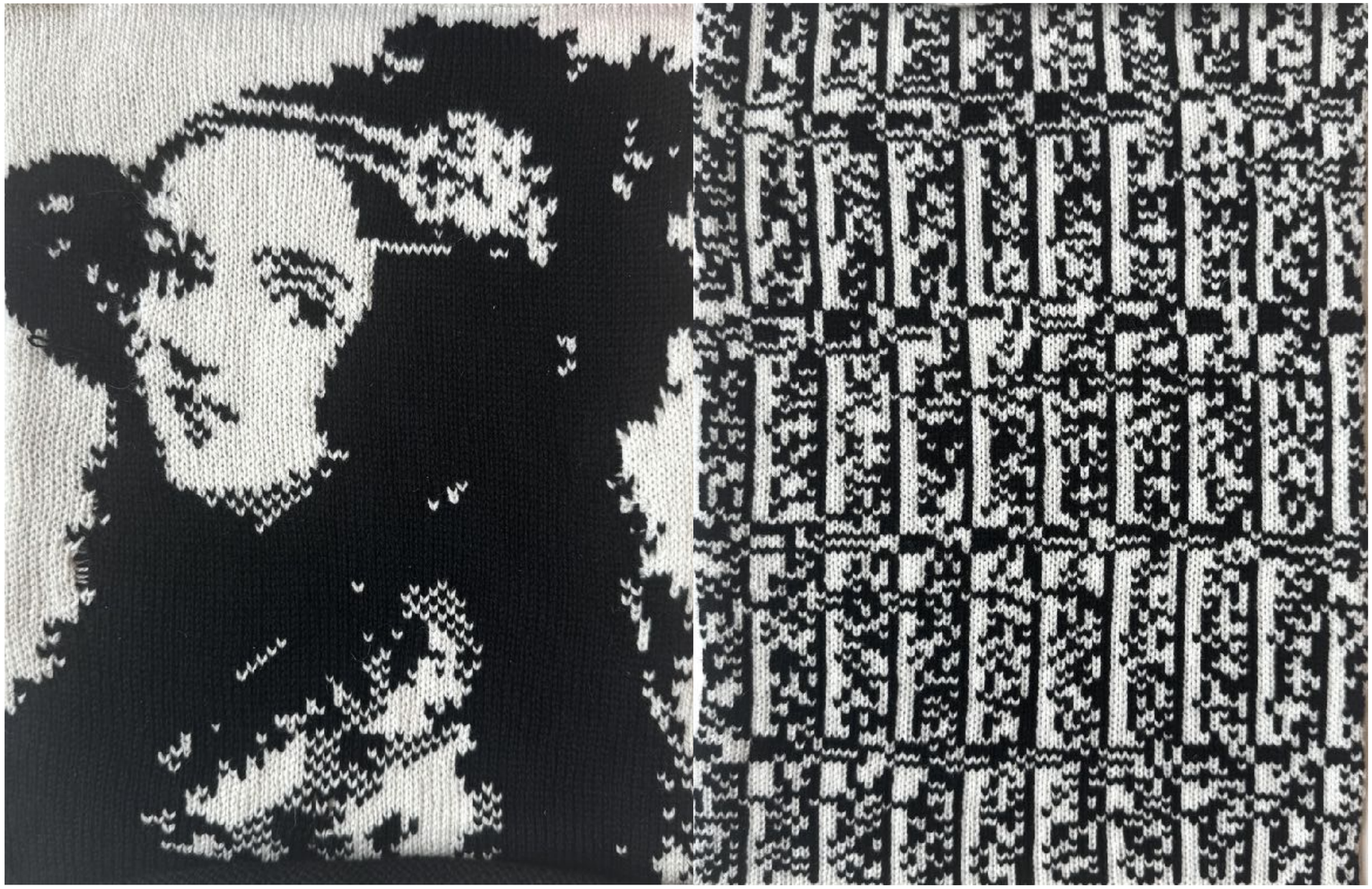
I also knitted the underlying code of each portrait image, transforming something usually invisible and digital into something tangible.

Behind every historical portrait is the underlying logic. For those who remain undocumented, the face and name may be absent, but the underlying logic still remains.

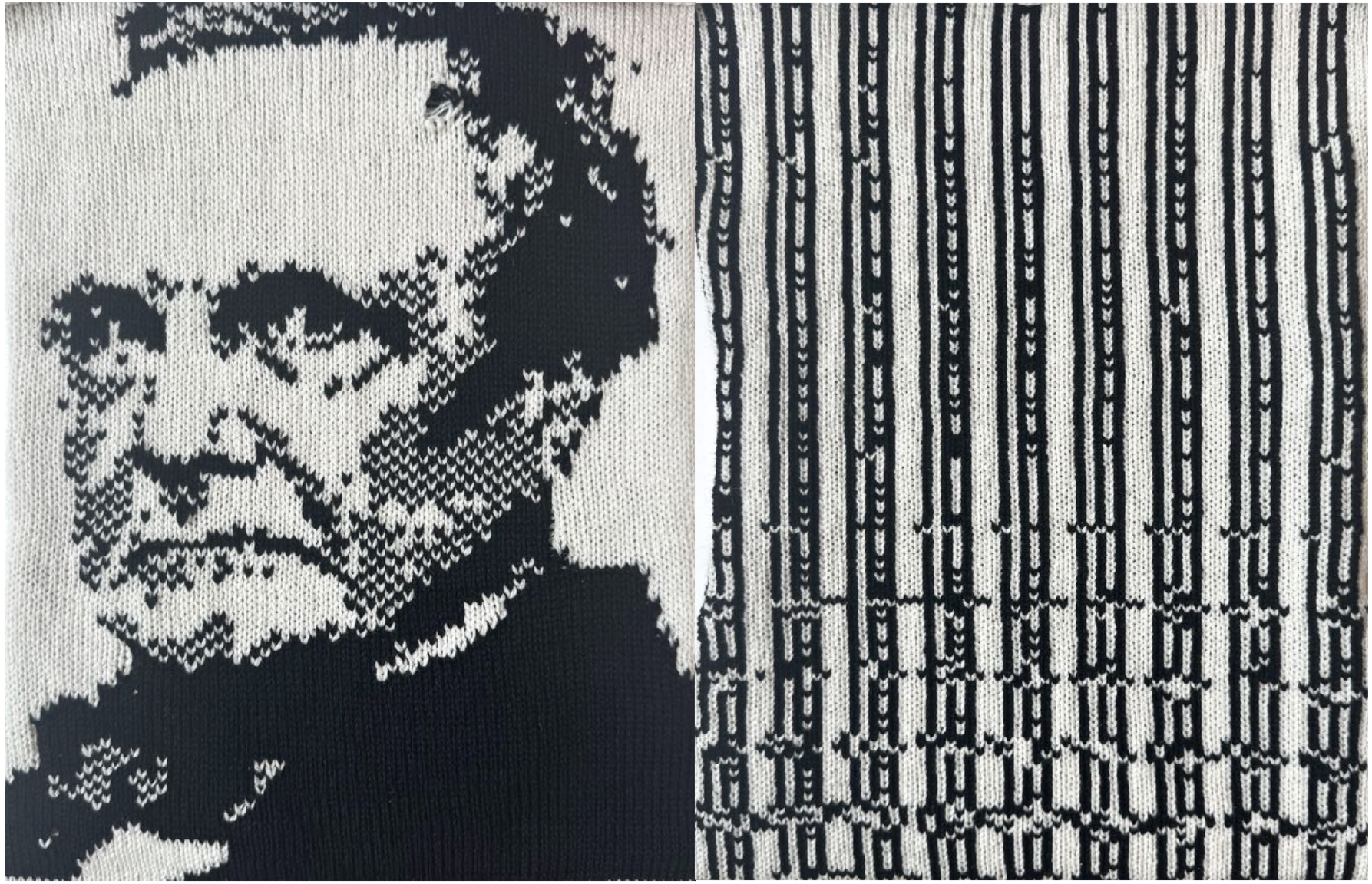
This system therefore represents all the anonymous contributors who have helped shape history.



UNDERLYING SYSTEM OF HISTORICAL PORTRAITS

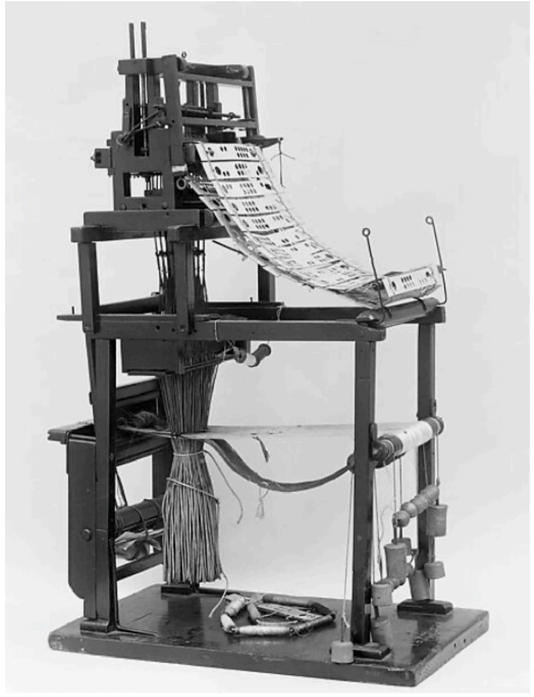


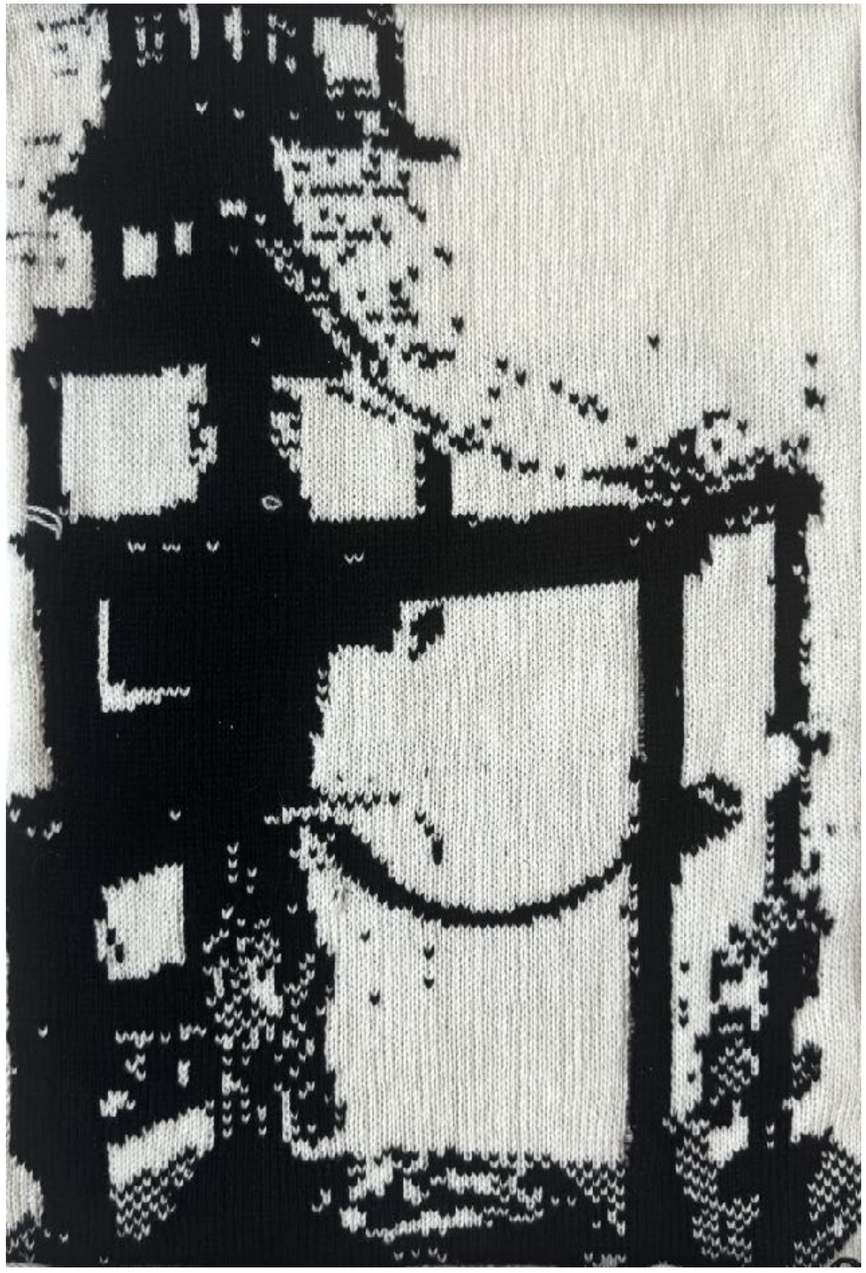
UNDERLYING SYSTEM OF
HISTORICAL PORTRAITS



THE JACQUARD LOOM AS COLLECTIVE INTELLIGENCE

The Jacquard loom, the precursor to the modern computer, is the result of many contributors and craftspeople throughout history. It can therefore be understood as a collective machine - representing not only its named inventor, but also the undocumented labour and knowledge that contributed to the development of computational systems.





THE REVERSE SIDE: WHERE THE SYSTEM BECOMES VISIBLE

The backend of the knitted Jacquard loom reveals the system behind the image. The threads expose how the front image is constructed.

In this piece, the threads hold together the collective work of anonymous and invisible contributors to the development of the computer - those who are not named or documented, but who live on through the systems they helped create.

The face and name are absent, but the logic remains. The work reflects their invisibility while revealing the systems of intelligence they helped shape.