

Computer Science Illustrated through Old Computers

(at the Museum of Computing Tools)



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Giovanni A. Cignoni



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The HMR project

- Hacking the Macchina Ridotta
- History of the Italian early computers
- The **Macchina Ridotta**, built in Pisa in 1957
- The **Calcolatrice Elettronica Pisana**, built in 1961
- The **Olivetti** computers from 1959 to 1965
- From a deep technological point of view



Experimental archeology

- Lots of documents and blueprints from the archives, however, many are missing
- To understand the technology (to rebuild it) we must proceed **by hypotheses**
- Hypotheses are formulated on the basis of
 - Recovered information
 - Technological knowledge of the times
 - Memories of the designers still with us
- Hypotheses are verified **experimentally** by using edge software simulation technology



Results of the technological approach

- The rediscovering of the Macchina Ridotta
- A lost machine, dismantled 1959 and then forgotten
- A relevant computer
 - The **very first** built in Italy
 - Completely **different** from the second one built in 1961
 - Designed in 1956 and built in 1957 after **major revisions**
 - Used for computing **services** and for **training**
 - Small, but elegant, fast and **state of the art** (in 1957)
- A whole new chapter in the history of Italian computer science



Plus: a demonstrable simulator

- Simulators were used during the historical research to validate the rebuilding hypotheses
- Improved with a bit of eye-candy, simulators can be used to illustrate computer science
- From several points of view
 - **Mechanisms** of computer technology
 - **Basics** of computing theory
 - **Pop culture** about computers
- Historical value as well as oddity of old machines are exploited to raise interest through curiosity



Mechanisms: how to launch an application

- Today a click on an icon, but, inside the computer, still a jump to the first instruction of the program



- The jump has to be set manually, in binary

Basics: a game from the future

- The application we will run is a little game, a classical 3 reels, 8 symbols, slot machine



- Max interaction with a computer of the Fifties

Pop culture: lot of blinking lights

- Lights switch on/off, not too fast, often in patterns: computers must look complicated yet meaningful



- Examples from Desk Set (1957) and Alien (1979)



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now hands on the Macchina Ridotta

(virtually rebuilt by software simulation)

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