Education and Culture DG

Lifelong Learning Programme

Project coordinator:

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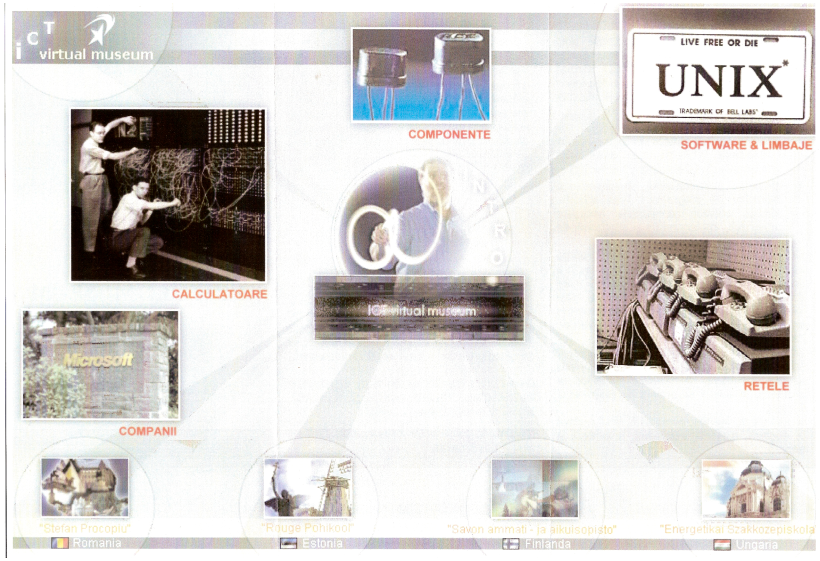
- „Rõuge Põhikool”, Estonia
- „E, Savo Consortium for Education”, Finnland

  „Energetikai Szakközépiskola és Kollégium”, Hungary



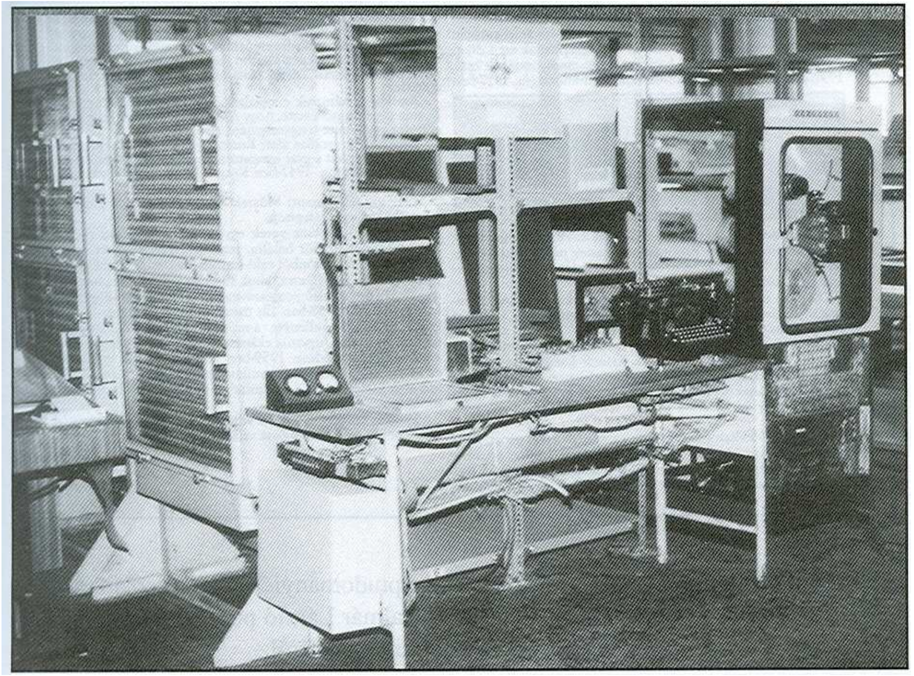
ICT Museum

Hungarian History of ICT

1938: Laszlo Kozma (1902-1983) makes the first electromechanic calculator in Belgium. This machine could count, but very slowly. The sum took 1-11, the multiplication took 5-10 seconds. Afterwards Laszlo Kozma made his second machine. Only one calculator system was made which was suitable for more places of work. A buffer store was connected with it. It was used by the work stations when the calculator could not receive the task. It was its memory. It was used for accounting in László Kozma's factory in Antwerpen. The workstations (telegraphs), the calculator and the wired memories were connected to each other by the telegraph center of the factory. To make this machine faster László Kozma built in a multiplication table. This way the sum and the multiplication became only one second long. This calculator was in a two meter-high, one metre-wide and half of metre deep wardrobe and it was available with the help of six table sets.
During the second World War one machine was sent to America because of the German attack but the machine never arrived there.

1952: The IAS (Institute for Advanced Study) machine was made which János Neumann planned and made with his co-workers in America. In its structure and memory this machine was the 'grandfather' of every later computer. This machine was copied by the most people in the world. János Neumann invented and put into practice the principle of stored program.

1955: The MESZ-1 (Technical University Calculator) was started to plan and built. Its mechanism system and elements were simple relays. This machine had been built by 1958. It was used for counting of different tasks for nearly ten years. The program of the machine was stored in it by a handmade holed x-ray film and the data were stored by relays. There were 45 instructions on a program sheet. It could count binary way. The numbers had to be put into it in decimal form. The result could appear – on Laszlo Kozma 's construction – on a MERCEDES typewriter also in decimal form.. This machine got into the Hungarian National Technical Museum in the late 1960s.



1956: MTA Cybernetics Research Group (MTA KKCS) was established, as an individual research place, the 'cradle' of the Hungarian computer science including the computer building department. Balint Domolki was its leader and Győző Kovács was the technical deputy director.

1957-1959: M3 was biult with the help of the Soviet Union and by a young Hungarian work team (Istvan Abraham, Balint Domolki, Joszef Drasny, Kalman Kardos, Győző Kovacs, Imre Molnar, Sandor Podhraszky etc.), their leader was Sandor Varga and Rezső Tarjan. It was the first Hungarian electronic computer with vacuum tubes. It filled in a 60 square-metre room. It did not have a cooling sytem. There was a fan on the ceiling to lead off the heat wich was launched by the machine, but it did not work properly, that is why the windows of the machine had to be removed. During its working hundreds of vacuum tubes became hot.
M3 machine did not have an operation system and Neumann's machine served as a model.
Its washing machine-sized magnetic drum memory was planned by Győző Kovacs. It had a very small memory. The first reserch works were in connection with the development of M3 which was done by research team of about 20 people. MTA KKCS transformed into MTA Calculating Centre (MTA SZK). That time the engineers' task was the maintenance, development of M3 and to make the programs run. From this time the machine was working 24 hours continuously. Operator, as a job, appeared first at this time. The first operators were Zsolt Varkonyi, Gabriella Varga and Mrs Kovacs.
At the same time 2 computers were built in Temesvar, Rumania, which memories were planned by Győző Kovacs.

Mihaly Kovacs, piarist monk, the teacher of Budapest Piarist Grammar School (1916-2006) tought cybernetics first in secondary schools in Hungary from the late 1950s.
During the 1960s he and his students together built cybernetic toys that were introduced to the press, such as Card-playing machine, Wondermill, Logi, Artificial Mouse.
Mihaly Kovacs wrote a lot of books which made the computer technology popular. During his whole profession he wrote articles, studies that were the basic methodology of physics and computer technology.
In the middle of 1960s he had a common licence with Lajos Terenyi: the Didaktomat reciting machine. In the second half of 1960s Mihaly Kovacs with his student, Woynarovich Ferenc, made the Mikromat cybernetics building set. It was a computer model with relays and printed electric circuit (electromechanic home computer) which was produced by Budaörs Craftmen's Co-operative and was available in the shops. Torch lamps showed the result and it was programmed by wires. The Canadian Minivac-601 served as its model but with significant changes. It was good to show the basic principles of computer technology and was available in the shops, too.

Laszlo Kalmar professor (1905-1976) established a cybernetic and programming educational centre in Szeged. On his iniative in the late 1950s the Cybernetic Laboratory was founded. Lazslo Kalmar made a machine with relays which was good to solve logical tasks. His stutent was Daniel Muszka, who made the LADYBIRD in Szeged, it was the first Hungarian artificial animal, which was the model of Pavlov conditioned reflex eg. it can follow the light of a torch, it gives indignant sound if any spot of it is pressed.

1960: Győző Kovacs starts to teach computer technoloy at University of Economics (MKKTE).
1960-1964 Laszlo Kozma built a target computer after MESZ-1 with Bela Frajka and their colleagues., which was used for linguistic statistical analysis. It was a computer with relays. The machine stored the text on a five-channel punched-tape.

1963: Arpad Klatsmanyi's product, the HUNOR table calculator appeared on the world market. Hunor 131 and 158 brought a big success for the Electronic Measuring Factory (EMG).
The EMG later produced table computers such as EMG-666, 666/B, 777 in the 1970-80s.
The EMG prepared to produce R-10 machines. In 1970 the test production started according to French licence and with French spare parts. But because of political reasons instead of EMG the VIDEOTON factory began to product R-10 machines.

1961-1965: beside M3 more and more computers arrived into Hungary. Two URAL-I, Bull Gamma ET data processing and twoELLIOT-803-B machine with a bigger output. Hungray bought three more URAL-II, that started to work in1965.

1960-1968: In this period the performance of unique designs was the main task to solve with computers. The Computer Technology Coordinator Institute (SZKI) was founded by Zsolt Naray and began to work from 1968. SZKI had significant products eg. the first Hungarian microcomputers: M05X, M08X and the first Hungarian PC (Proper).

In the middle of the1960s Program Stored Analysator (TPA) was born. 20-30 machines were made. TPA 1001 became soon out of date because it had Geranium transistor. At that time in Western Europe Silicium transistors were used. The integrated electrical circuit version of TPA computer (TPA-i) was started to be worked out. It had been made for a year and it was modal. Its usage was the same like PDP-8. This machine had small capacity and that is why the preparation of producing of TPA-70 was started. The TPA-70 computer converted into a 16-bite word lenght, it was more suitable for nuclear data collection. It had more registers so its working speed was faster. In the 1970s hardware centric thinking was formed and only a small software group worked. By the time TPA-70 had been made, the basic software had been made, too in order to use it.

Between 1969 and 1973 the experts endeavoured to work out program packages which could solve generally useable complex designing tasks. In the early 1970 120 computers worked in our country.

In 1970 it was Kozma László's big merit that Telecommunication Technique Department received a Japanese electronic computer and in 1972 the education of Digital Computer Technology Section was started. In the 1970s Hungary bought more IBM 360 or 370 computers for industrial usage.

By 1971 PDP-11 machine was made. PDP-11 was copied and this way TPA 1140 machine was started to produce. GD-71, the first Hungarian graphic set was also made, it was developed by SZTAKI and it was connected with TPA-70. It was used for making designs.

In 1974 the importance of computerised technical desingning was recognized and this year a Siemens-4004, a computer with big capacity was put into operation. The initiation of the computer technology into electronics was very fast. From 1974 the socialist countries worked out the program packages together and more and more computers got into Hungary.

In 1975 the Measurement and Computer Technology Research Institute was established (MSZKI). Computer technology profile was formed from the analysators which were needed in nuclear measuring technology.

In 1976 KFKI research institute gave the TPA-70 computer to the Electrical Automation Institute. This machine was suitable to control discreet processes, for process direction, it could be used for controlling machine-tool and in medical electornics. This way the Hungarian computer technology appeared on capitalist markets.

In 1977 Practicomp-300 microcomputer was developed. It was a slow machine which worked whith a monoprogram, it was used for management procedures.

In the late of 1977 number of computers increased by 850. The operative store capacity has risen from 38.3 Kb to 79.5 Kb on the average. The computer science held the experts attention in a large measure.
In 1979 R-40 computer was put into operation.

In the early of 1980s the BRG (Budapest Radio Engineering Factory) produced the ABC-80 home-computer within the framework of Swedish-Hungarian cooperation, its central unit was LUXOR production. The computer which had a data taperecorder with two cassettes, was connected with a TV. It showed black and white picture, it could have been programmed with Basic language and its RAM was 16 Kb. It was used at colleges and some secondary schools. Originally a one-cassette taperecorder belonged to the Swedish computer. The taperecorder mechanism was a Hungarian production.
At the same time HCC, computer makers' community was established according to a Californian pattern, its leader was Endre Simonyi. Within the framework of this club József Lukács and Endre Lukács built the HOMELAB home-computer. Small series of it were produced for education and playing.
In the middle of the 1980s BRAILAB,a speaking home-computer was made which was good for blind people's education. Its speaking modal was designed by András Arató and Teréz Vaspöri.
Marcell Jánosi who was a State-awarded taperecorder engineering general constructor, designed the first cassette floppy of the world, the forefather of 3.5 small floppies which are used today. It was the MCD-1. This desing was worked out in the 1970s but it could be produced only in the early of the 1980s. Later the licence expired and the cassette floppy was clonned all over the world.

The PROPER computer was an IBM clone which was produced by the Computer Technology Coordination Institute (SZKI) in 1982. (In 1981 the first IBM personal computer of the world appeared in America.)

Around 1983 the HT 1080Z school computer won the school computer competition and it became a generally used computer in public education. The original type had a 16 Kb memory, it was compatible with the American TRS-80 computer, it was the licence of the Far Eastern VIDEOGENIE machine. The HT 1080Z machine later had a 64 Kb version, too.

In the middle of 1980s the HT 3080C machine was introduced which could have been suitable to emulate the ZX Spectrum machine but it was not produced in series because COMMODORE computers became wide-spread istead of it.

In 1983 the first entirely Hungarian development appeared, the PRIMO home-computer, it was available in trade and designed by MTA (SZTAKI) experts. About 9000 pieces got into the shops. The

PRIMO A computer had capacitive, touching-button keyboard which was a Hungarian licence. It was available in the shops with 16, 32 and 48 Kb memory but it had setting and letter repetition problems.
About 1985 PRIMO B was made with traditional push-button keyboard.

From the 1970s VIDEOTON factory in Székesfehérvár produced line-printers, screen terminals, matrix printers, modems on world level. Then from the middle of the 1980s VIDEOTON TV Computer was produced which was the licence of the earlier version of ENTERPRISE machine. It had a good-quality keyboard, biult-in joystick, but it was not so popular as Commodore.

KFKI went on producing of TPA in Budapest, they made professional room-sized machines (which were used in computer centres) and desk computers, too for example TPA QUADRO. This computer got the form design award in Hungary.

Dozens of companies produced computer spare parts or whole computers in the country eg. ORION company made monitors, TV games, in Esztergom the Labor MIM firm produced the LabSys-80 professional computers.

During the 1980s the automatic word processor appeared instead of the the type-writers. ROLITRON firm made a set called ROSYTEXT, which was designed by László Rózsahegyi. It was advertised with the slogen: 'Rosy the electronical secretary'. Beside this one KODEX 2000 appeared and later at the end of the 1980s Vera word processor was made but it was not so wide-spread.

Charles Simonyi (1948-)

Károly Simonyi was born in Budapest, 10th September, 1948. He was a programmer working on Intentional Programming. He is the second Hungarian who was in the space, and also the fifth tourist who travelled there. His father was named Károly Simonyi, too.

He first got connected with information technology in the secondary school when he was doing his part-time job as a night watchman at a computer laboratory, overseeing a large Soviet Ural II mainframe.. A scientist showed him to program the machine. Károly wrote several translator programs when he was only eighteen years old. A program of his was even bought by a governmental company. In 1966 he travelled to Denmark where he worked for the first Danish information technology company, the Regnecentralen.

In 1968 he moved to the United States where he attended the University of California in Berkeley. Many famous people studied there for example Gordon E. Moore, who created the Moore law, Gróf András (also of Hungarian origin) , who later changed his name to Andrew Grove, and who was the head of the Intel company or Andrew Tanenbaum, the creator of the Minix. He graduated in 1972 (B.S. in Engineering Mathematics). He continued his studies at Stranford University and worked for the Xerox PARC with Alan Kay and Robert Metlcalfe. With Butler Lawson he designed the first WYSIWYG text editor program, the "Bravo" for the Alto personal

Computer. In 1977 he received his Ph.D. in computer science (dissertation on a software project management technique called "metaprogramming"). It is used to improve the effectiveness of the big-size softwarerprojects.

In 1981 following the advice of Metcalfe he applied to Bill Gates who gave him a job at Microsoft. Here, Simonyi was in charge of the development of Word and Excel, as well as Excel's predecessor Multiplan. His great achievement was ”virtual machine” technology, which makes programs' portability easier. Although the rapid adoption of MS-DOS made it less important. He introduced objectum-oriented programming at Microsoft, which he studied at Xerox and developed the Hungarian marking for variables' naming.

Simonyi worked for the Microsoft in its most-successful period, he became one of the leading software-developers. In his carrier he earned an incredible sum of money, about 1 billion US Dollars. According to the magazine Forbes he is the 374th wealthiest American.

In 2002 he left the Microsoft unexpectedly to set up his own company called International Business Company with his business mate, Gregor Kiczales, the British Columbian University's professor.

In 2004, Simonyi received the Wharton Infosys Business Transformation Award for the industry-wide impact of his innovative work in information technology. He is also known for his charity work, established more funds and foundations.

John Von Neumann (1903-1957)

„the last of the great mathematicians”

Born
1903 Budapest, Hungary
Fields
Mathematics, Quantum physics, Game theory, Computer science: Neimann architecture, ENIAC (Electronic Numerical Integrator And Computer) EDVAC (Electronic Discrete Variable Automatic Computer)
IAC (Integer Automatic Computer)
Prizes
Bôcher Memorial Prize, Enrico Fermi Award

The oldest of three brothers, von Neumann was born in Budapest, Hungary. His father died in 1929, and in 1930 Neumann, his mother and his brothers emigrated to the United

States. In 1938 John was awarded the Bôcher Memorial Prize for his work in analysis.

He was a Hungarian mathematician who made major contributions to set theory, functional analysis, quantum mechanics, continuous geometry, economics and game theory, computer science, numerical analysis, and statistics, as well as many other mathematical, physics fields. He was called "the last of the great mathematicians." He was a pioneer of the application of operator theory to quantum mechanics

While he was consulting on the EDVAC project, he wrote a set of notes, which was titled the First Draft of a Report on the EDVAC. The paper described a computer architecture, where date and program memory are mapped into the same address space. This architecture was contrasted with the Harvard architecture, which has separate program and data memories on a separate bus. This single-memory architecture became known by the name Neumann architecture, as a result of Neumann's paper. With a very few exceptions, all present-day home computers, microcomputers, minicomputers and mainframe computers use this single-memory computer architecture.

Neumann was diagnosed with cancer in 1955, it was possibly caused by the atomic bomb tests he participated in as well. Von Neumann died a year and a half following the initial diagnosis.

Von Neumann wrote 150 published papers in his life; 60 in pure mathematics, 20 in physics, and 60 in applied mathematics. His last work, published in book form as The Computer and the Brain, gives an indication of the direction of his interests at the time of his death.

Leó Szilárd (1898-1964)

Leó Szilárd was born on 11 February 1898. He was very weak boy.

His mother taught him at home when he was a child. He attended *Reáliskola* in Budapest. He enrolled as engineering student at Budapest Technical University. He wanted to be an electrical engineer but later he got interested in nuclear physics.

He continued his engineering studies at University of Berlin, he took physics lessons from Einstein , Planck, and Max von Laue. He wrote his doctorate dissertation on thermodynamics. His other paper **Entropy decrease in a thermodynamic system due to an intelligent** was published in 1929. In this classic paper Szilard identified the unit or "bit" of information, and he showed that the entropy of a unit of information was equal to k ln 2. It is considered to be the starting point of modern informatics. The World Wide Web that we now travel, and the computers that make it possible, show the importance of his long-unappreciated idea.

In 1938 Szilárd accepted an offer to conduct research at Columbia University in Manhattan, and moved to New York, and was soon joined by Fermi After learning about nuclear fission in 1939, they concluded that uranium would be the element capable of sustaining a chain reaction. Szilárd and Fermi conducted a simple experiment at Columbia and discovered significant neutron multiplication in uranium, proving that the chain reaction was possible and opening the way to nuclear weapons.

He was interested in the elimination of sleep and the intelligence of dolphins. He never had a house, he always travelled. His laboratory was the bath-tub.

When the doctors diagnosed his bladder cancer, he and his wife went to the library and they read about this illness and its treatment. He made use even of his illness, he worked out a new treatment: radiation therapy to cure cancer. Some years later he fully recovered. In 1964 he died of heart attack. His bladder cancer disappeared. His remains were scattered in the air.

Leo Szilárd conceived, and filed patent applications on many of the key inventions of the 20th century. His ideas included the cyclotron, linear accelerator, electron microscope, nuclear chain reaction, and nuclear reactor. Szilárd himself did not build all of these devices, or publish these ideas in scientific journals, and so their credit often went to others. As a result, Szilárd never received the Nobel Prize, but two of his inventions did. Ernest Lawrence received the 1939 Nobel Prize for the cyclotron. Ernst Ruska received the 1986 Nobel Prize for the electron microscope.

Tamás Roska (1940-)

Tamás Roska is one of the most recognised Hungarian engineer-researchers in electronics, participant or head of various researches. He is the co-inventor of the first programmable analogical cellular supercomputing theory and chip architecture, also of the CNN Bionic Eye.

He was born 2 September 1940 in Budapest, graduated from Budapest Technical University, Electrical Engineering Faculty with honours in 1964, where he later obtained his Ph.D. and D.Sc. degrees.

Since 1964 he has held various research positions. He is the Dean of the Faculty of Information Technology at the Pázmány Péter Catholic University, Budapest. Since 1989 each year, he has also been a Visiting Scholar at the University of California at Berkeley. Since 1982 he has been with the Computer and Automation Research Institute of the Hungarian Academy of Sciences where he is presently the head of the Analogical and Neural Computing Research Laboratory.

His main research interests include cellular neural networks, nonlinear circuit and systems, neural electronic circuits, visual information processing and analogical spatial-temporal supercomputing, generally speaking, high speed information processing.

Dr. Roska is the co-inventor with Leon O. Chua of the CNN (Cellular Nonlinear Network) Universal Machine and the analogical CNN chip the ‘Bionic Eye’, which can be the centre of an artificial eye in the future. One day the bionic eye can help the blind to see. The two scientists met at the University of California at Berkeley, although the theoretical background was provided by the Automation Research Institute of the Hungarian Academy of Sciences.

His new computing theory is also considered to be a break trough. Making use of the previous analogical (non-digital) experience he developed the first supercomputer, which can do certain tasks much faster than the digital ones. That’s why the Pentagon is also interested in the theory.

Professor Roska is the founder of the Faculty of Information Technology at the Pázmány Péter Catholic University, Budapest, where engineers are taught, while a great emphasis is put on their studies of human body, concentrating mainly on nervous, immune systems and genetics.

In 1993 he was elected to be the member of Academia Europea in London, and was given the D. Gabor Prize, the Szentgyörgyi Prize, and the Széchenyi Prize.

In 2000 he received the IEEE Third Millennium Medal and the IEEE Circuits and Systems Society's Golden Jubilee Award. In 2002 he received the Bolyai Prize, given to one Hungarian Scientist for his outstanding achievements in science, research, development, and education

Since 2005 he has been serving in the Advisory Committee of the EU Commissioner in the Commission of Information Society and Media Technologies in Brussels.