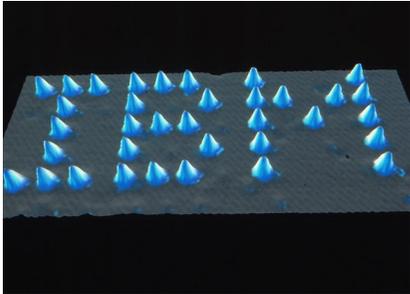## Scanning Tunneling Microscope



*A scanning tunneling microscope*

The Scanning Tunneling Microscope is an instrument for imaging surfaces at the atomic level, and was Invented in 1981 by Gerd Binnig and Heinrich Rohrer at IBM Zurich. It allows individual atoms in a material to be routinely imaged and manipulated.



IBM logo produced from 35 individual Xenon atoms

Using the microscope's ability to move and manipulate atoms, researchers created the world's smallest logo out of 35 Xenon atoms.

## Interactive Automated Teller Machine



**IBM 2984 Automated Teller Machine (Cashpoint®)**

In 1972, IBM introduced the 2984 Cash Issuing Terminal (CIT) for Lloyds Bank in the UK. Trademarked as the 'Cashpoint' by the bank, it was the first of the modern **A**utomated **T**eller **M**achines (ATM).

Earlier cash dispensing machines had accepted only a single-use token or voucher which was retained by the machine after use. The customer then had to go into the bank and purchase a new token. The 2984 was the first machine to interrogate, and debit, the customer's bank account in real-time, and issue varying amounts as requested by the Customer.

## SABRE Reservation System

**SABRE** *(**S**emi-**a**utomated **B**usiness **R**esearch **E**nvironment)* was developed by IBM to automate the way American Airlines booked reservations.

Before Sabre, all flights were booked manually, which meant travel agents had to call a central reservation department, where 8 operators had to handle all the bookings.

Costing $40 Million to develop and install in the 1960s, it was originally specified to handle 83,000 calls a day. In 1965 it was handling 7500 reservations per hour.

In 1976 Sabre was installed into travel agencies world wide for the first time, giving them instant access to flights. Now Sabre aggregates airlines, hotels, online and offline travel agents and travel buyers, and handles 42,000 transactions per second.
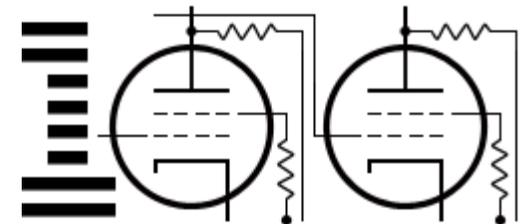
Find the museum online:
https://slx-online.biz/hursley
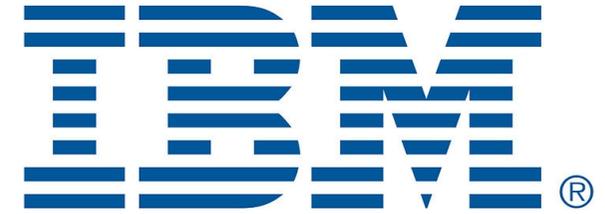
# Innovation that helped to change the world

( Part 1 )

## The inception of IBM

The name IBM (**I**nternational **B**usiness **M**achines) first came into being in 1924 when Thomas J Watson decided to rename the **C**omputer-**T**abulating-**R**ecording Company (**CTR**).

Since the early days, both CTR and IBM have been prolific creators of inventions and patents, that have helped shape the modern world. Here are just some of the inventions that have advanced technology across the years.

## Floppy Disk

The floppy disk, a flexible Mylar disk coated with magnetic material, was first introduced in 1971.



*An 8", a 5¼", and a 3½" floppy disk*

The first floppy disks were 8-inch disks with no cover, but they got dirty easily, so the team packaged them in slim but durable envelopes equipped with an innovative dust-wiping element, making it possible to handle and store them easily.

Capacities ranged from 80Kb for the first 8" disks to 240Mb for the last of the 3¼" disks. By the early 21st century, manufacturers stopped putting floppy drives in new computers although they are still used for backup in many instances.

## Hard Disk Drive

IBM produced the first **H**ard **D**isk **D**rive (**HDD**) in 1956. The **IBM 350,** a component of the IBM 305 RAMAC system, contained 50 magnetic disks, and was approximately 60"wide x 68"high x 29"deep (1.7m x 1.5m x 0.74m), weighed $1730$lbs. $(785\text{kg})$, and held up to 5 million
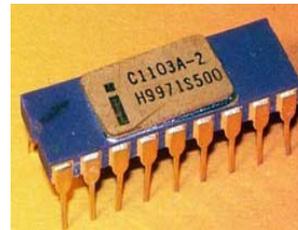
characters. In comparison,
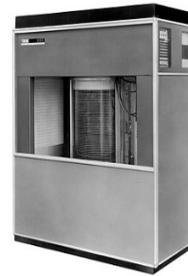


*IBM 350 Hard Disk Drive*

3.5" hard drives today (2019) are capable of storing 16 Tb of data, 20,000 times the capacity.

## Dynamic Random Access Memory

In 1967 Robert Dennard, and IBM researcher, filed a patent application for his single-transistor **D**ynamic **R**andom **A**ccess **M**emory (**DRAM**) cell.



*Intel 1103 1Kb DRAM*

DRAMs became the basis for most consumer memory solutions today, and now (2019) a single chip can contain 12Gb memory.

## FORTRAN Programming Language

FORTRAN (Formula Translation) is a general-purpose, compiled imperative programming language that is especially suited to numeric computation and scientific computing.

Originally developed in the 1950s for scientific and engineering applications, FORTRAN came to dominate

this area of programming early on and has been in continuous use for over six decades in computationally intensive areas such as numerical weather prediction, computational fluid dynamics, physics, crystallography and chemistry. It is a popular language for high performance computing.

## Magnetic Stripe Card



The first magnetic stripe plastic card

In 1969 IBM engineer Forrest Parry, had the idea of securing a piece of magnetic tape to a plastic card. It took almost two years to develop the process to fix the stripe to the card, and the process for encoding the magnetic stripe, but in 1971 card production began on a product that is still in use today.

## Universal Product Code

In 1952, Bernard Silver and Norman Woodland patented a circular 'Bull's eye' product code based on Morse code. The patent was sold to RCA sometime after 1962.

In 1966 the National Association of Food Chains held a meeting on the idea of automated checkout systems. In 1971, RCA demonstrated their 'bull's eye' code but on testing it was found to be prone to smearing when it was printed.



*An example of a Universal Product Code*

In the meantime, Woodland, who now worked for IBM, designed a linear version, which was adopted as the Universal Product Code (UPC), and first used on a packet of chewing gum in 1974. The UPC is commonly known as the Barcode.