

A brief history of data and databases

Technological School Instituto Técnico Centrais
ETITC - 2024 - 2

+ Record Keeping – How long?



[Xerxes I inscription at Van](#)



Al-Hasakah, 3300–3100 BC, Uruk culture



The Kish tablet, 3500 BC, Kish period

Jemdet Nasr period, c.
3100–2900 BC



Sumerian, 3300 B.C.

<https://en.wikipedia.org/wiki/Cuneiform>

+ Why?

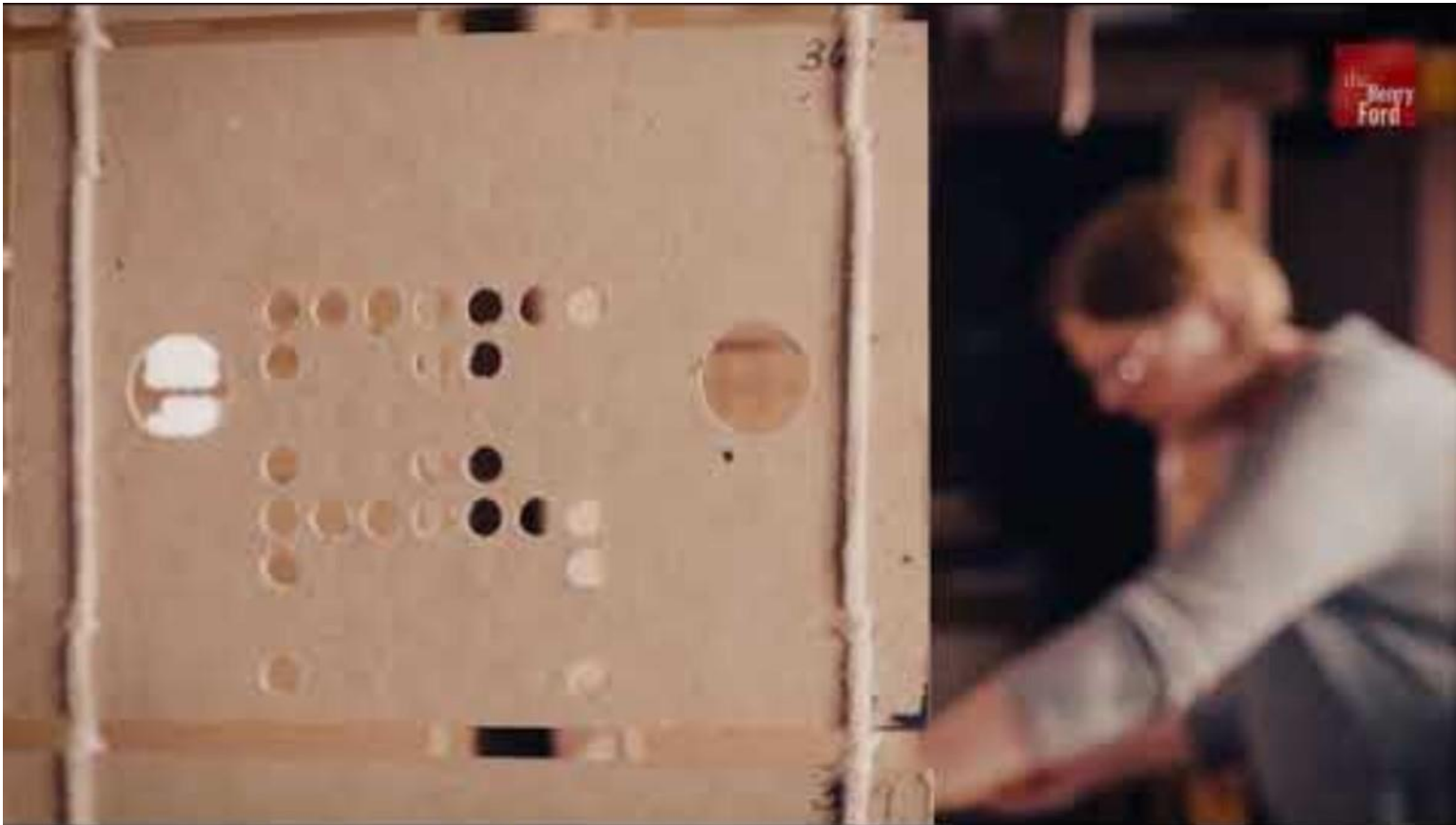


- We use records to never forget.
- We use records to measure “stuff”.
- And most of these records are not digital.

+ Jacquard Loom (1804)

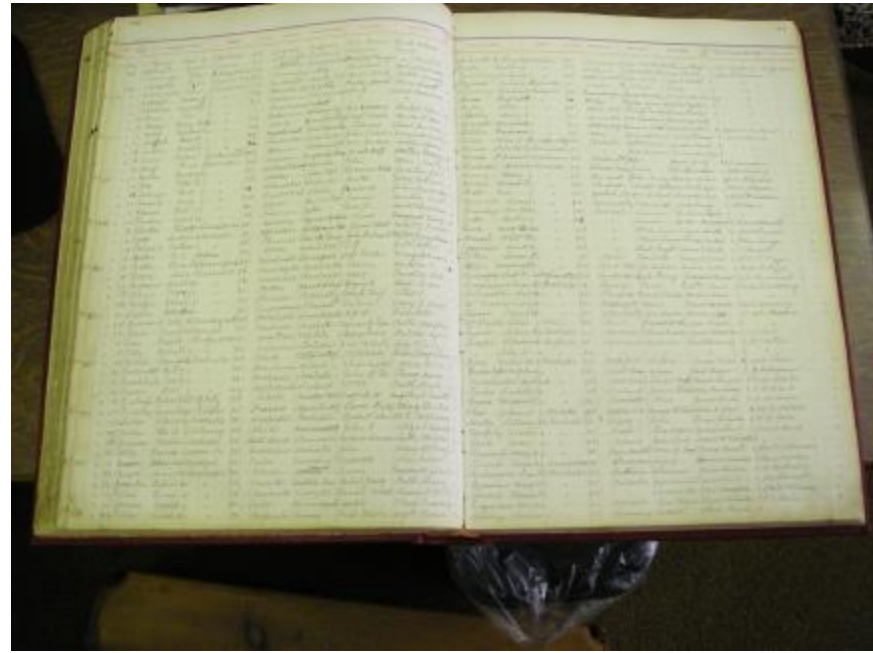


+ Jacquard Loom



Market Street
130

Anna Lee over & under	2109	1196	399	302	69
James Burton	230	3	3	3	
Bolton Emma	231	1	2	6	
Charles Schultz	236	4		3	
Elizabeth Bickel	238			1	
John Hinckle	240	1	2	3	
Thomas Murgatroyd	246	1	3	1	2
David Russell	246	2	1	3	
Thomas Mifflin	248	2		3	2
Ann York	250		1	2	
John W. DeBraham	252				
Benjamin Thumacher	254	1	3	4	1
Henry Alvin	256	1	1	1	
Henry Asam	268	2		1	
Joseph Ogden	270	6		5	
William Leeman	272	1	1	2	
James New House	274				
William Hamilton	276				
Amundson Brown	278				



Marriage book, Rochester, NY, chronological filing of marriage licenses.

Van Buren in
the Western
Edmund Rando

No.	When Married	Name and Surname	Age	Condition
1	April 25 th 1854	Robert Fleming	33	Bachelor
2	April 25 th 1854	Mary Lamb	38	Spinster

1790 US census

1854. Marriage solemnized at the Parish Church in

No.	When Married	Name and Surname	Age	Condition
355	April 25 th 1854	Robert Fleming	33	Bachelor
		Mary Lamb	38	Spinster

Married in the Parish Church according to the Rites and Ceremoni

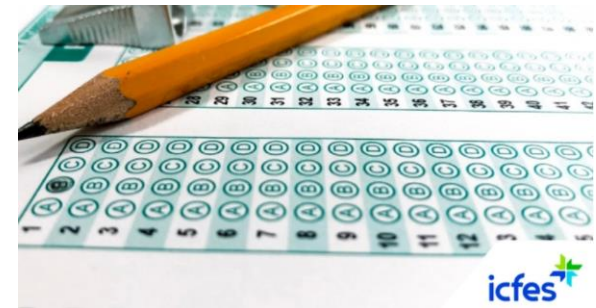
Aug 13th 1864
List of Paupers not at the Poor House for month

Name	Mo	Dis	Mo
Adcock Patty	150	9 00	
Anderson Sally	150	9 00	
Allen Mary	150	6 00	
Allen Mary	150	12 00	
Cary Mrs	100	6 00	
Cash Mary	150	9 00	
Finch Anna	150	9 00	
Fernell Jane	150	9 00	
Gregory Charity	200	12 00	
Grisham Peggy	150	9 00	
Grisham Elizabeth	150	9 00	
Gillman Betty	150	9 00	
Howman Mrs			200
Parham Susan			150
Proctor Elizabeth			150
Purser Lisha			150
Reilly Betty			150
Ross Lucy			150
Pope Clara			150
Pollard Anna			150
Primrose Agnes			150
Stone Betty			100

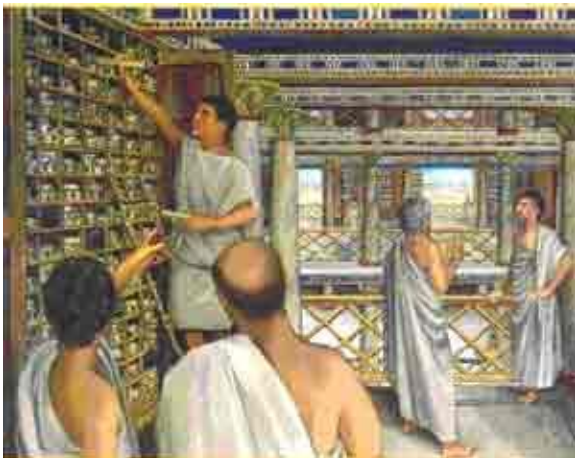


Other non-electronic records

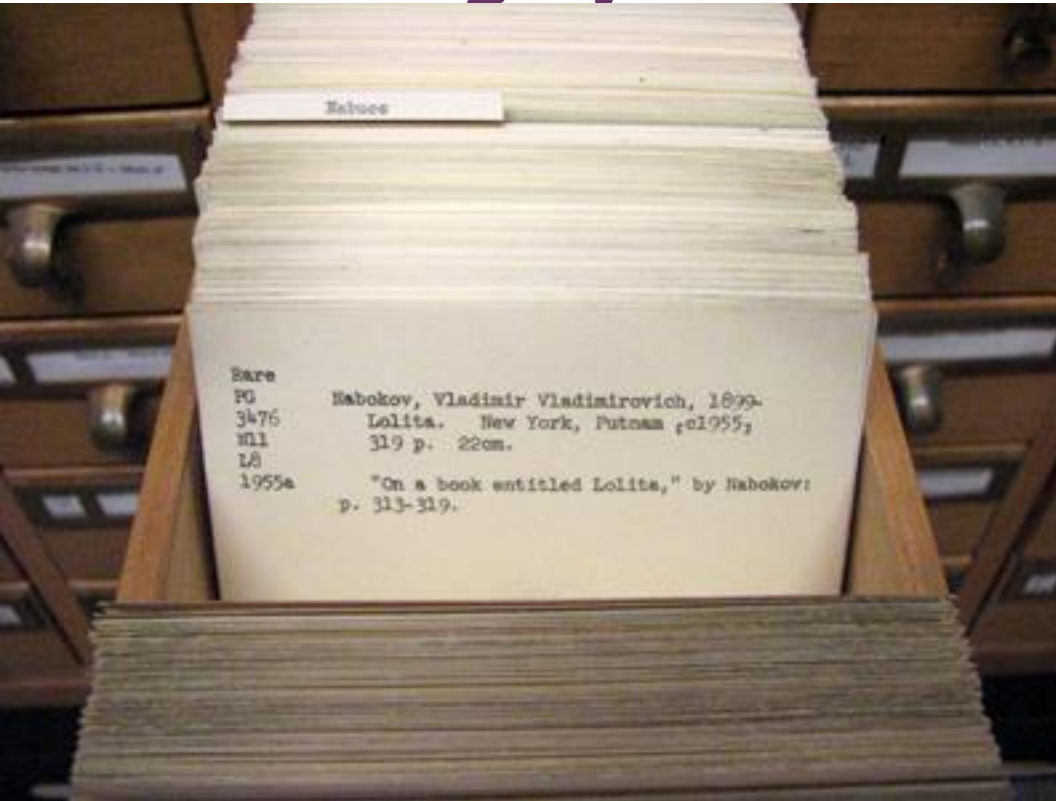
- SS cards – 35 million hand typed between 1937-1938
- Motor vehicle licenses and registrations
- Financial records for companies
- School records

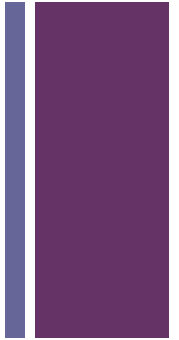


icfes



+ Card Catalogs – An ingenious indexing system





- It didn't indicate whether the book was available, just where it should be found.(example cards)
- Creating the cards required the expertise of librarians.

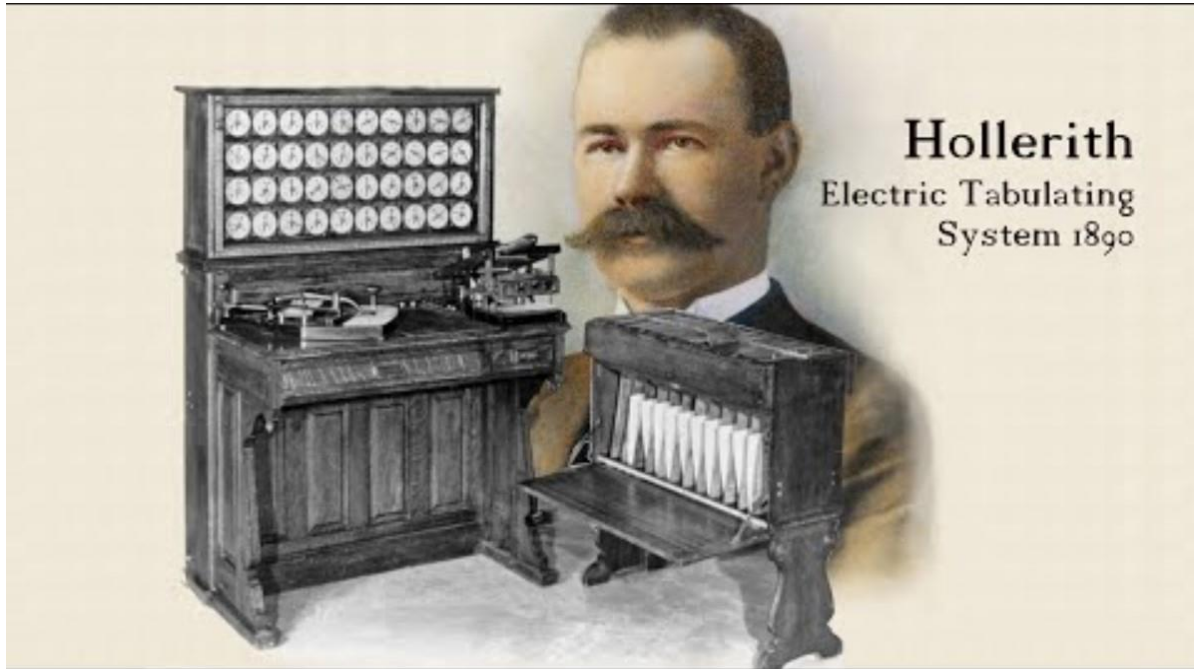
+ Problem – The 1890 census



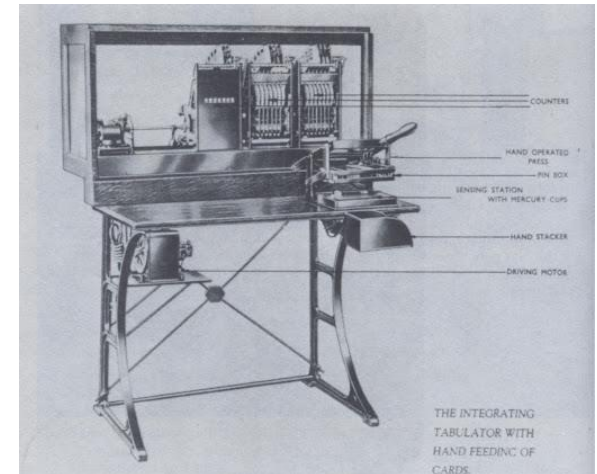
- Enter Herman Hollerith.



+ Hollerith's device



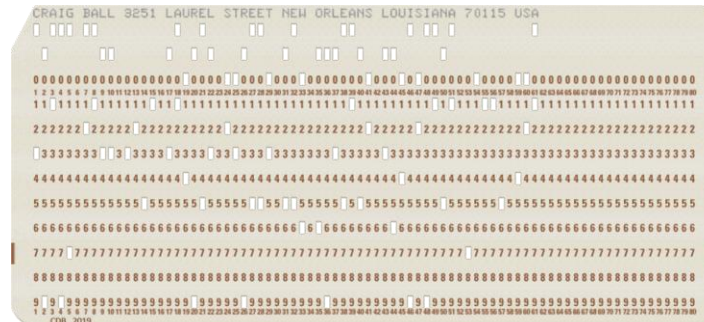
Integrating machine



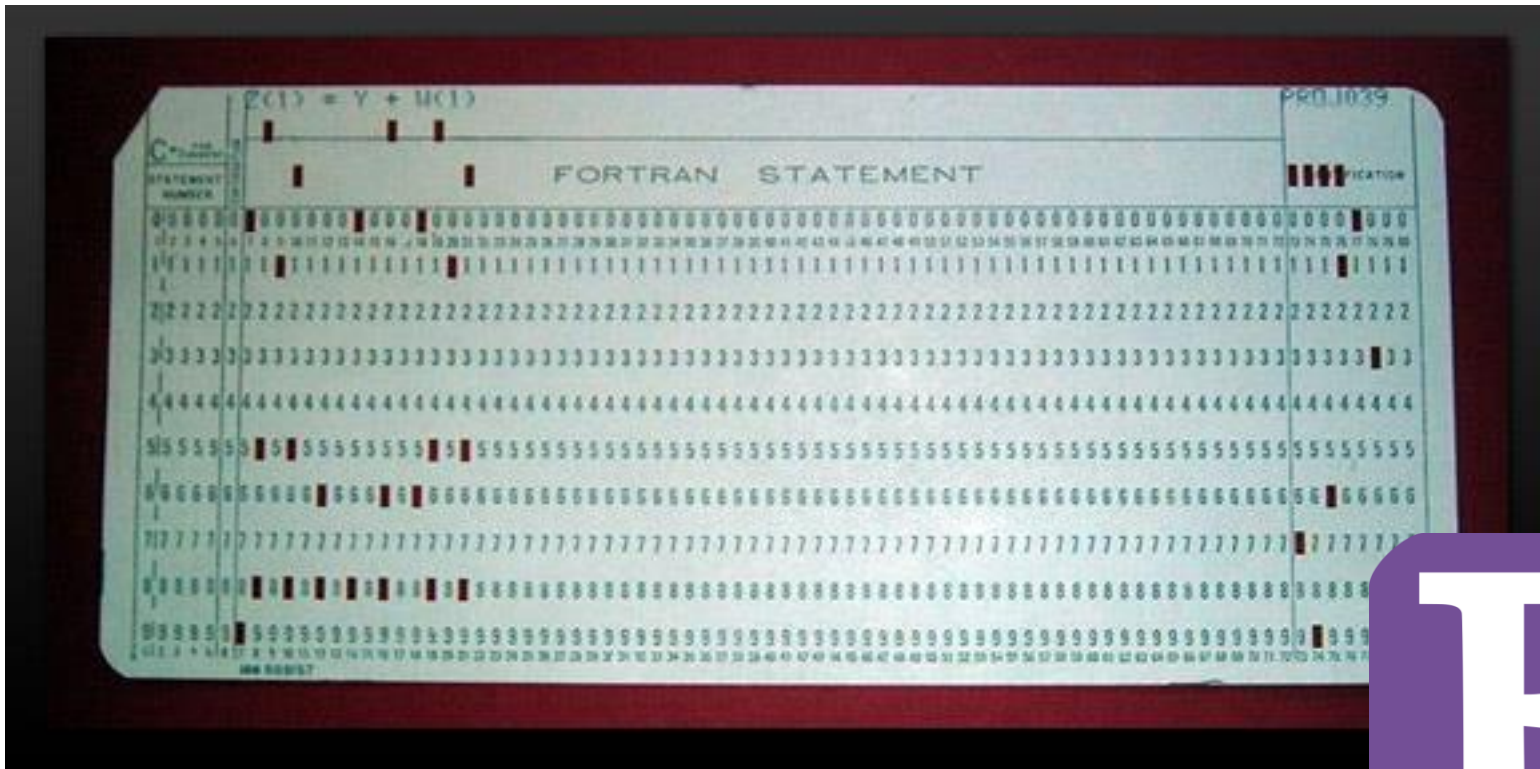
Hollerith card



pantograph



+ First computers



The program, the data, the JCL – all done with punchcards



+ First computers

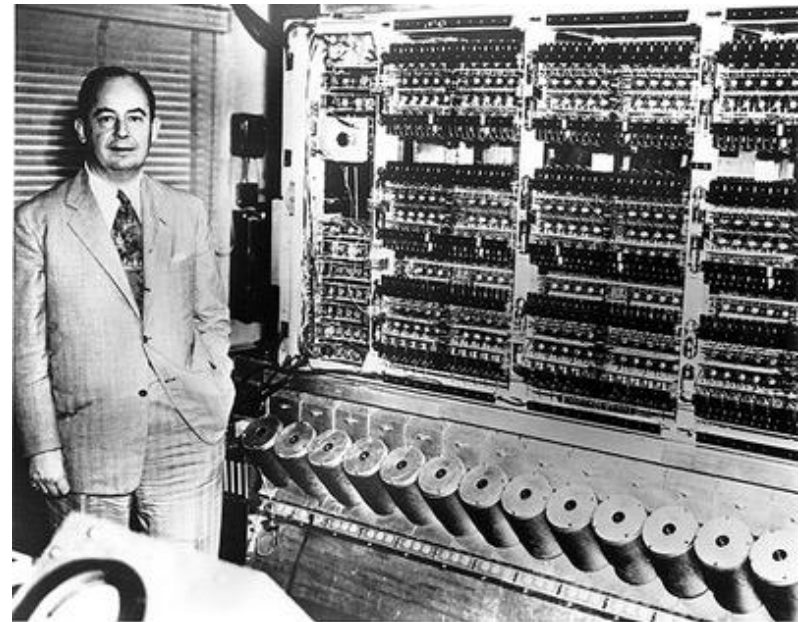


1964 IBM 029 Keypunch Card Punching Demonstration

+ Electronic files – Early computing 1950s



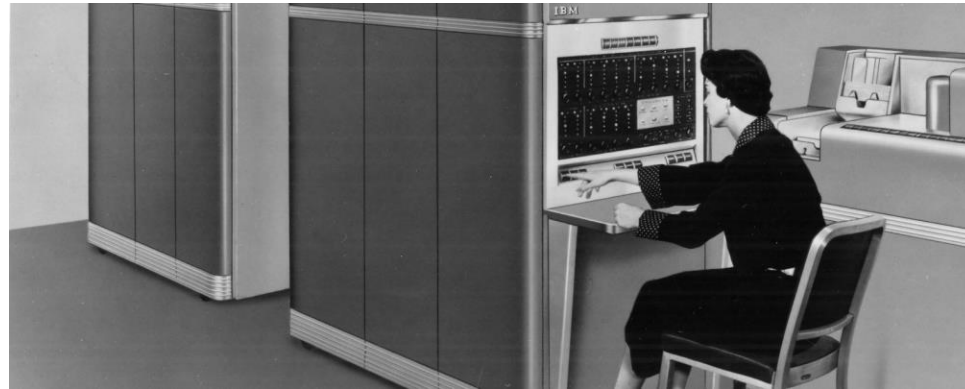
Universal Automatic Computer
(UNIVAC) 1951



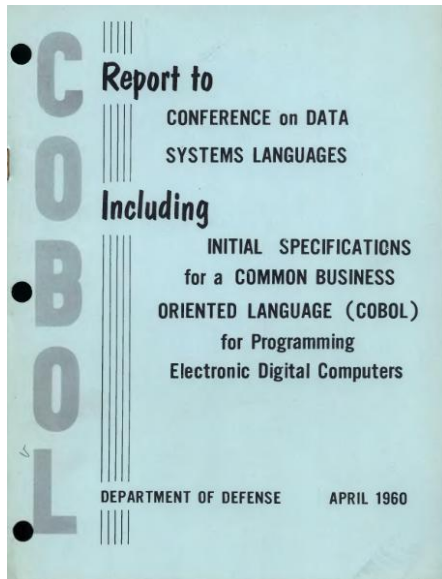
von Neumann, precursor innegable de la
física moderna, y la EDVAC (Electronic
Discrete Variable Automatic Computer)
(1952-1957)

+ Electronic files – Early computing 1950s

The IBM 650 (1954)



COBOL (Common
Business Oriented
Language) (1959)
CODASYL

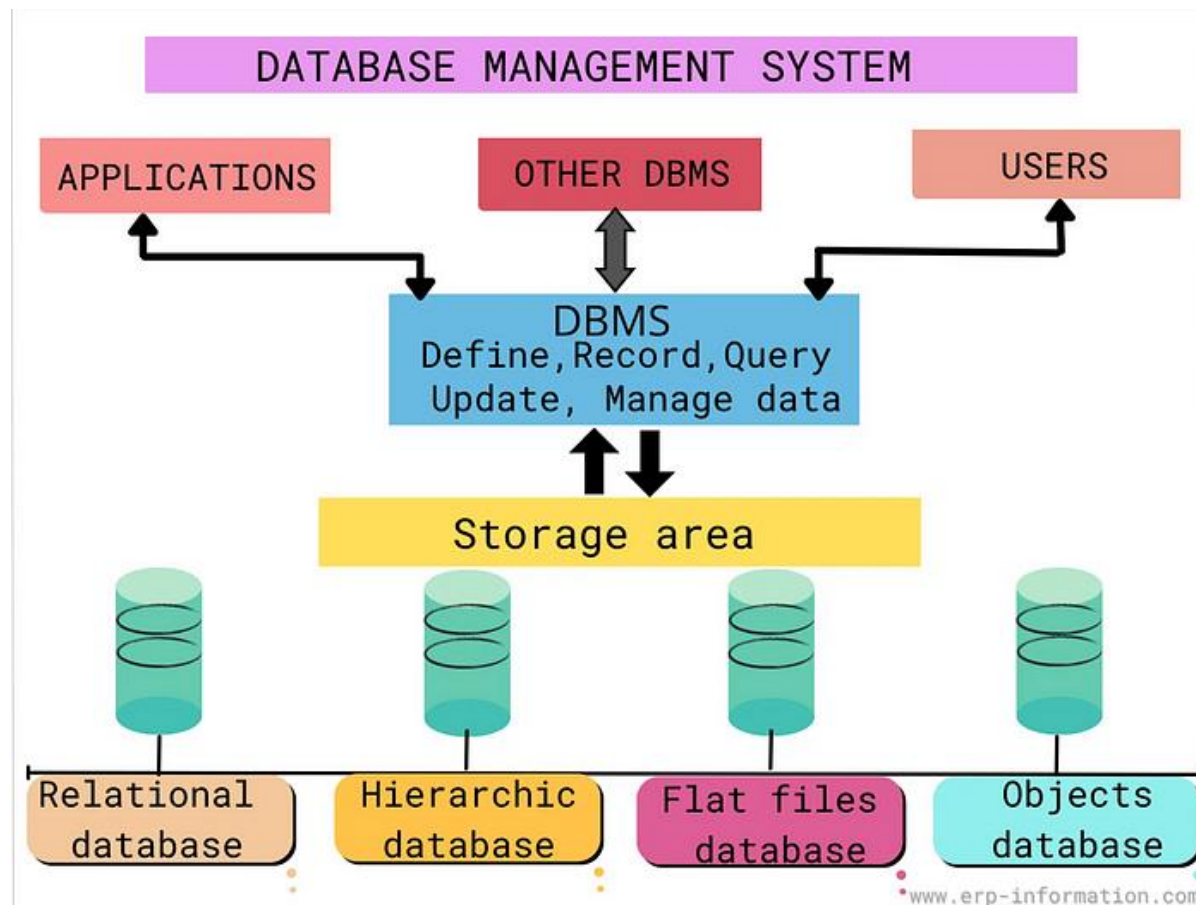


The IBM 700 Series (1953)



+ Enter the database – Early 1960s

- Objects in a database can be related to one another.
- Hierarchical – One record leads to the related record. (Like a tree)
- Network – Allowed for multiple relationships (like a network)
- The databases used pointers to relate one record to another.



ASCII (American Standard Code for Information Interchange) (1963)

 b7b6b5b4b3b2b1 Column Row					0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1	
Bits	b4	b3	b2	b1		0	1	2	3	4	5	6	7
	0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
	0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
	0	0	1	0	2	STX	DC2	"	2	B	R	b	r
	0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
	0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t
	0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
	0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
	0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
	1	0	0	0	8	BS	CAN	(	8	H	X	h	x
	1	0	0	1	9	HT	EM	)	9	I	Y	i	y
	1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
	1	0	1	1	11	VT	ESC	+	;	K	[	k	{
	1	1	0	0	12	FF	FS	,	<	L	\	l	|
	1	1	0	1	13	CR	GS	—	=	M	]	m	}
	1	1	1	0	14	SO	RS	>	>	N	^	n	~
	1	1	1	1	15	SI	US	/	?	O	_	o	DEL

+ Electronic files – Early computing 1960s, Charles Bachman



Integrated data store (IDS) – Dow Chemical
CASE products (Computer Aided Engineering)

+ Electronic files – Early computing 1960s



Information Management System (IMS)
Hierarchical data model.
Hard drives



"My professor brought in a 10MB
hard disk from the 1960's" xD



Some Issues



- While an improvement over file-based systems, these systems required knowledge of the structures to use them. No built-in search mechanism.
- Very few users understood the structures, access limited to an elite few.
- Queries were complex. Took time to get new information and expensive programmer time to produce.



Enter the relational DBMS

1970, Edgar Codd

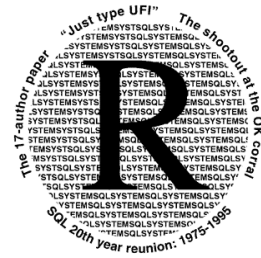


Relational DBMS

- Mathematician at IBM
- Based on Relational Calculus and set theory

U of Michigan

- MicroDBMS



IBM

- System R (1975)
- First implementation of SQL

Led to

- Oracle
- IBM DB2
- INGRES
- Informix
- Sybase
- MS SQL Server (based on Sybase)

+ Sperry Univac computer system (1978)





DBMS Timeline

<https://15721.courses.cs.cmu.edu/spring2020/slides/01-history.pdf> Pag. 42-59

Lecture #01

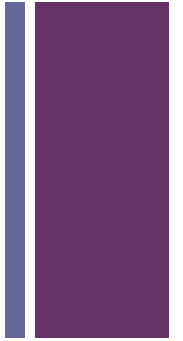
Carnegie Mellon University

ADVANCED DATABASE SYSTEMS

History of Databases

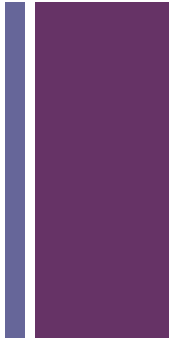
@Andy_Pavlo // 15- 721 // Spring 2020

+ Relational Ideas



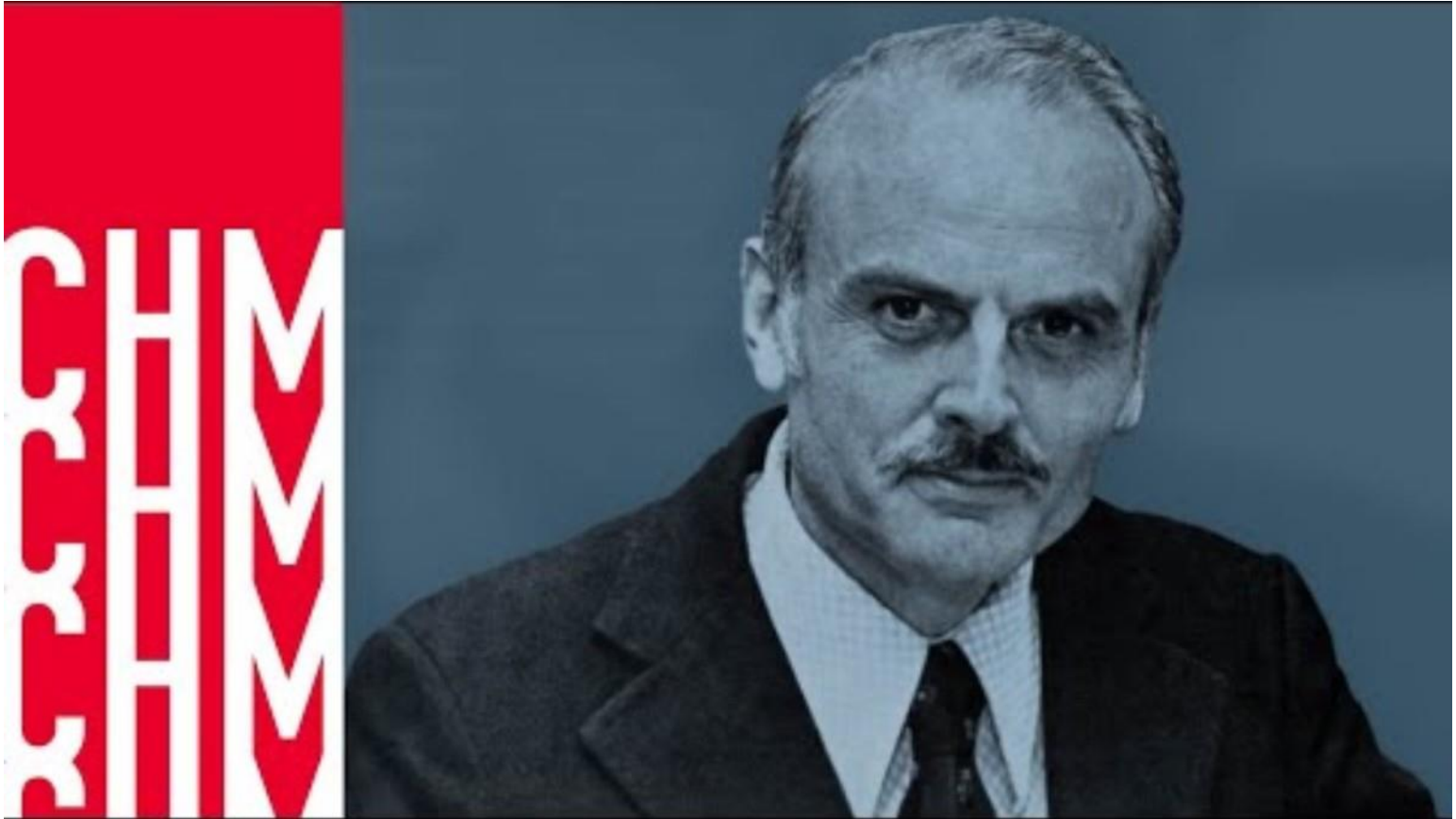
- Data is represented as a series of tables.
- The tables are Related to one another through a series of keys and foreign keys.
- A standard language is used to define the database (DDL) and to query the database (DML).
- Tables within the database contain the data about the database (meta data).

+ Why Relational?



- It is easy for most people to “see” and “get it”.
- Makes the data accessible for a wider number of users through user friendly query tools.
- Through good database design, space usage is efficient (although this has become less of an issue of late).

+ In a nutshell



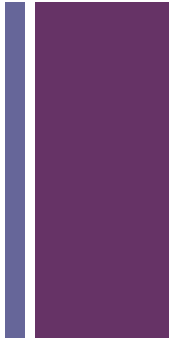
+ Electronic files – Early computing 1950s – 1970s



+ Database Paradigms



+ Databases today

The background of the slide is a dark, high-contrast photograph of a person's hands typing on a laptop keyboard. The lighting is dramatic, with the hands and keyboard keys highlighted against a dark background.

10

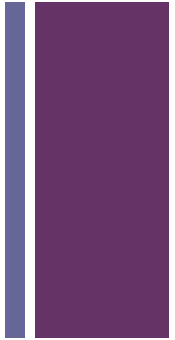
popular database management systems



[10 popular database management systems \(DBMS\)](#)

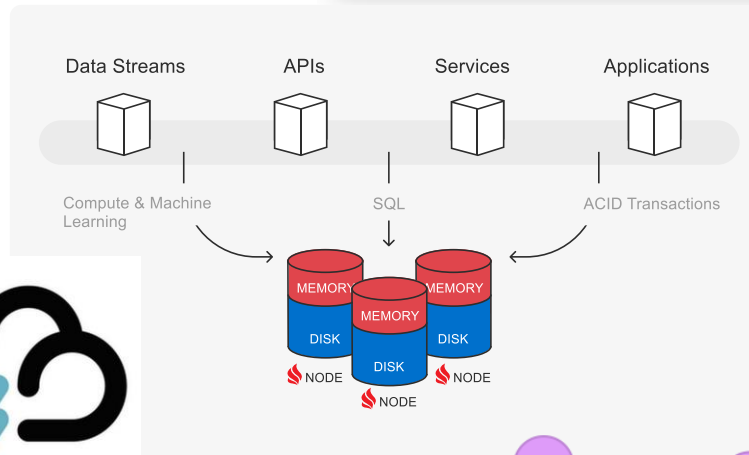
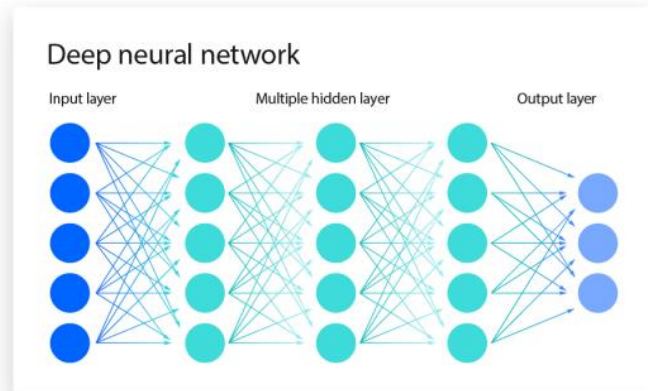
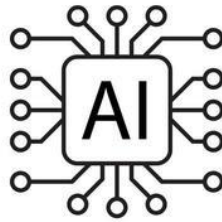


The Future?

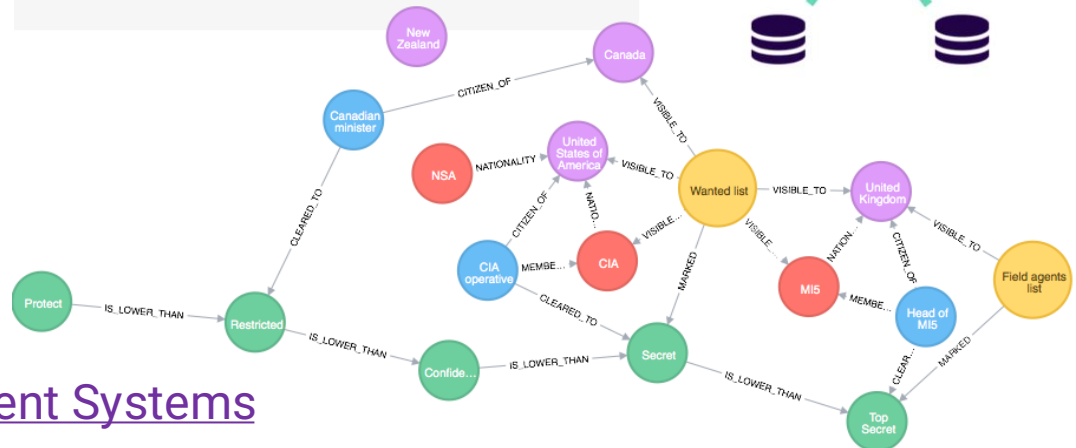
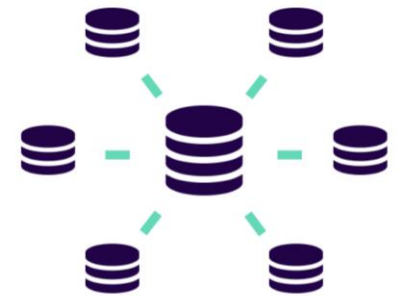


- Object Oriented Databases
 - Combine data and operations on those data
 - Allows for inheritance
 - Oracle (Object-Relational Database)
 - Postgre(open source object-relational DBMS)
 - <http://www.postgresql.org/about/>
- XML and XML DBMS
 - XML designed to transport and store data initially envisioned as moving data across the web (w3schools.com)
 - XML Database Management System manages that data

+ The Future?



CYBERSECURITY
SLOGAN GOES HERE



The Future of Database Management Systems
Exploring the Future of Databases



Thanks!

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