

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?

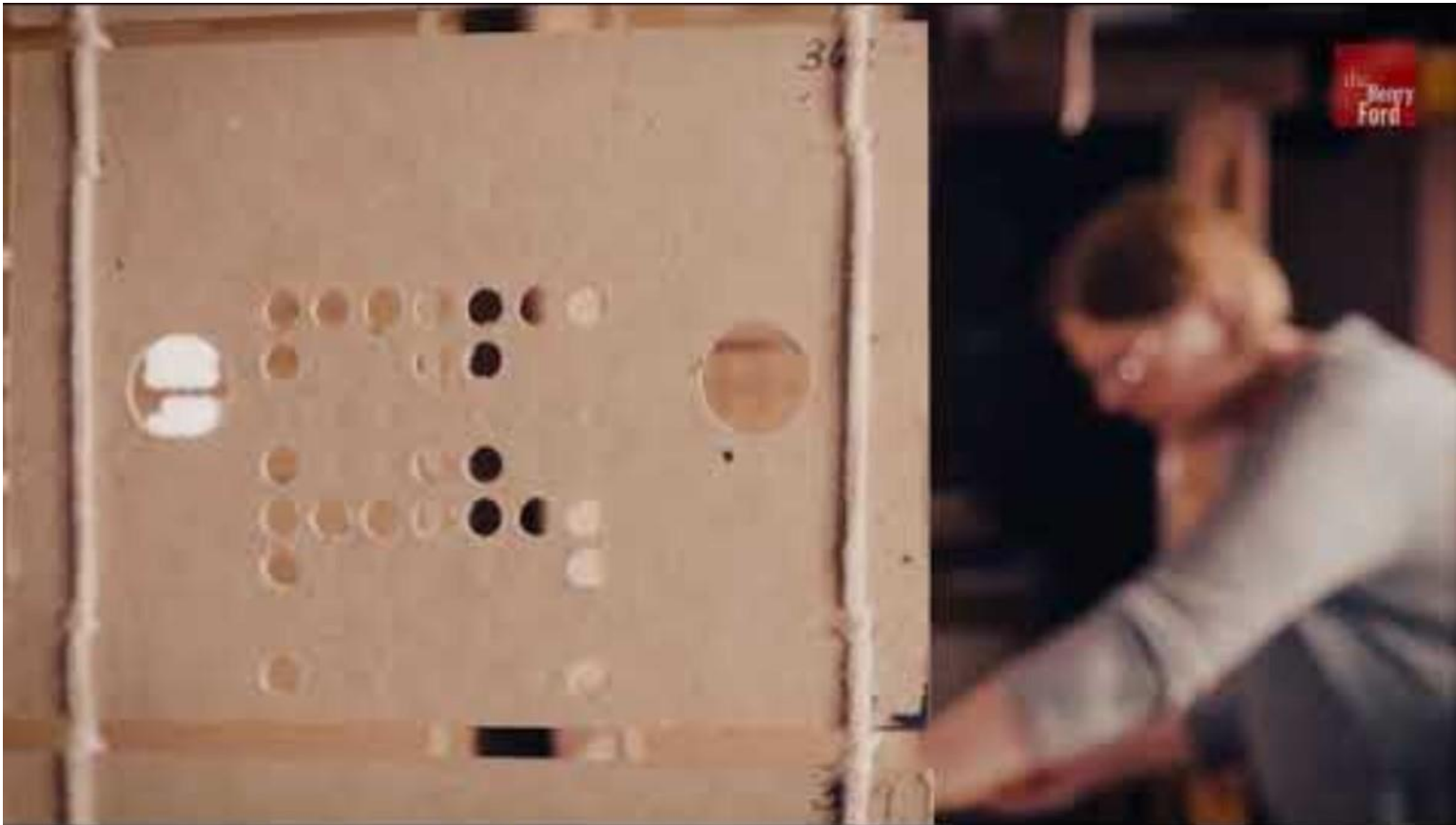


- We use records to never forget.
- We use records to measure “stuff”.
- And most of these records are not digital.

+ Jacquard Loom (1804)



+ Jacquard Loom





The ten commandments

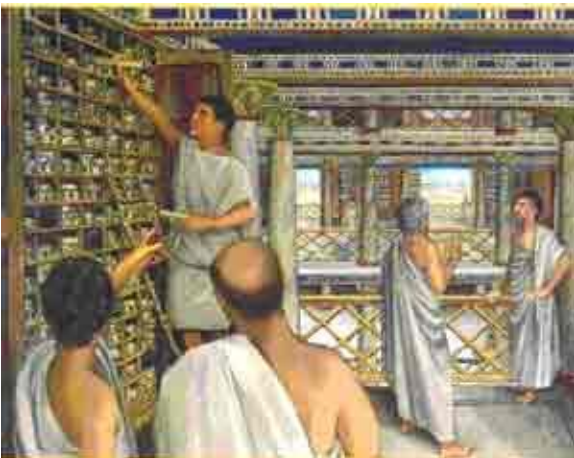


Other non-electronic records

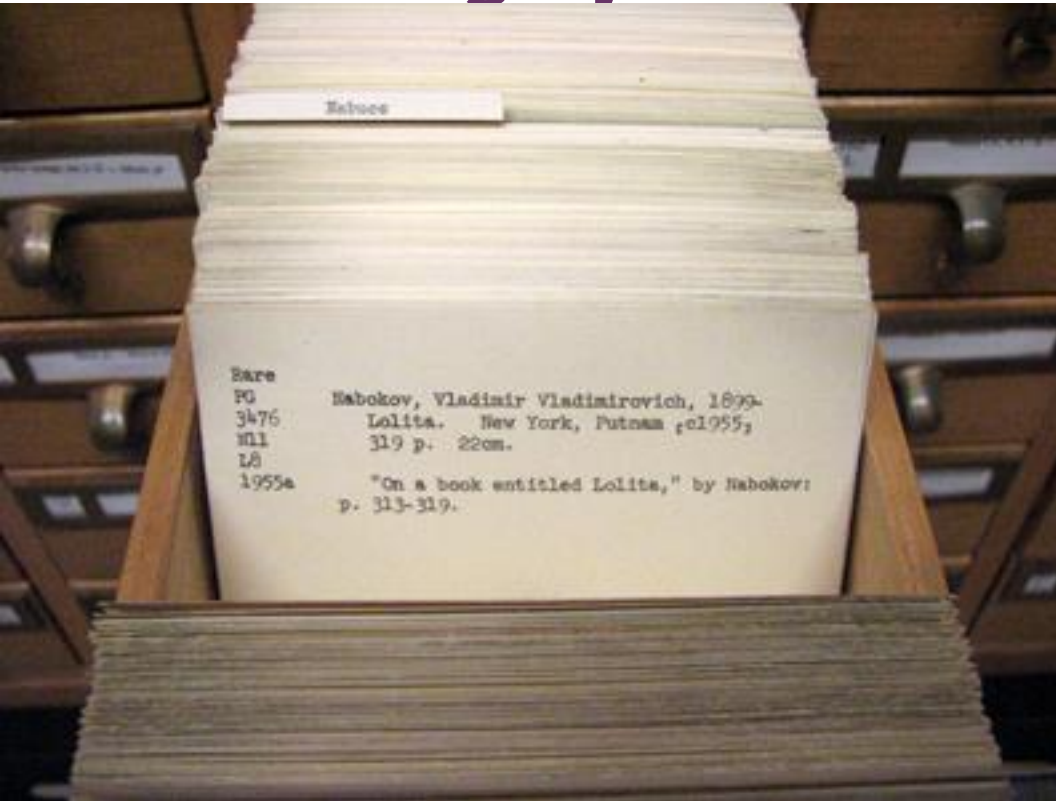
- SS cards – 35 million hand typed between 1937-1938
- Motor vehicle licenses and registrations
- Financial records for companies
- School records

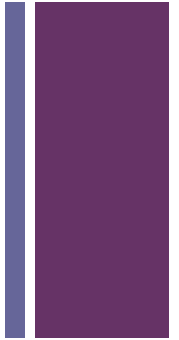


icfes



+ 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.

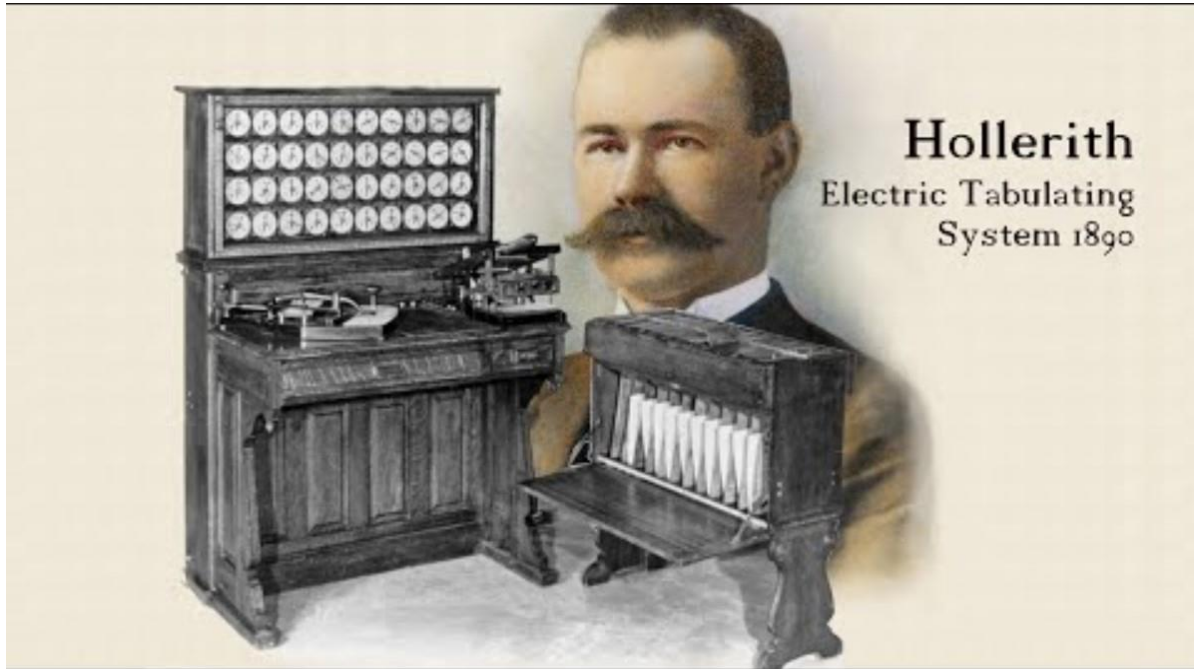
+ Problem – The 1890 census



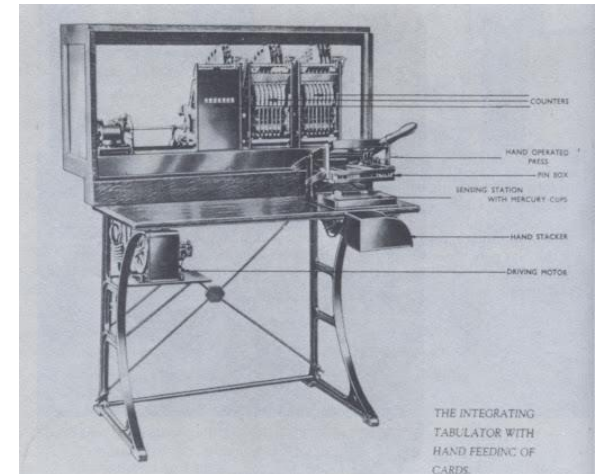
- Enter Herman Hollerith.



+ Hollerith's device

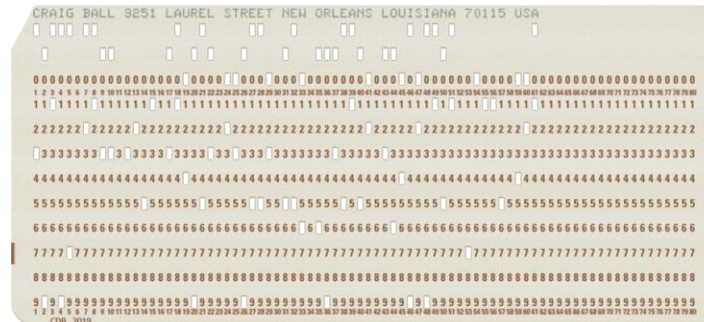


Integrating machine



pantograph

Hollerith card





+ First computers

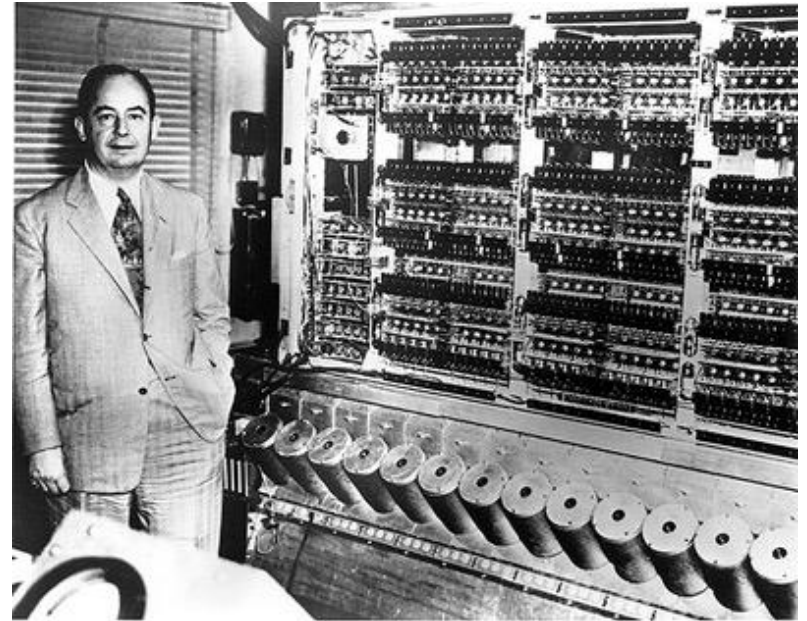


1964 IBM 029 Keypunch Card Punching Demonstration

+ Electronic files – Early computing 1950s



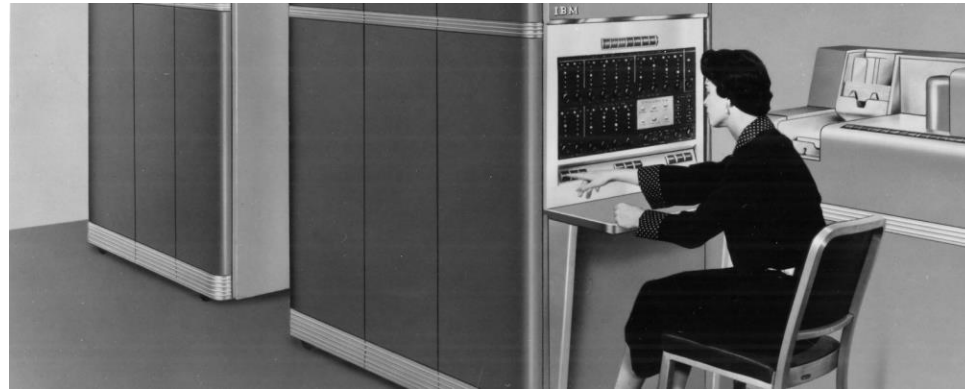
Universal Automatic Computer
(UNIVAC) 1951



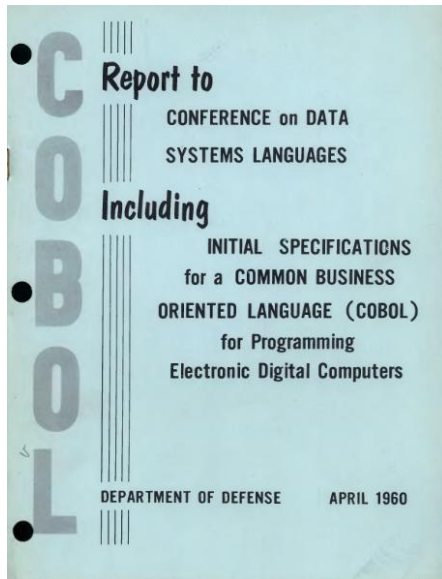
von Neumann, precursor innegable de la
física moderna, y la EDVAC (Electronic
Discrete Variable Automatic Computer)
(1952-1957)

+ Electronic files – Early computing 1950s

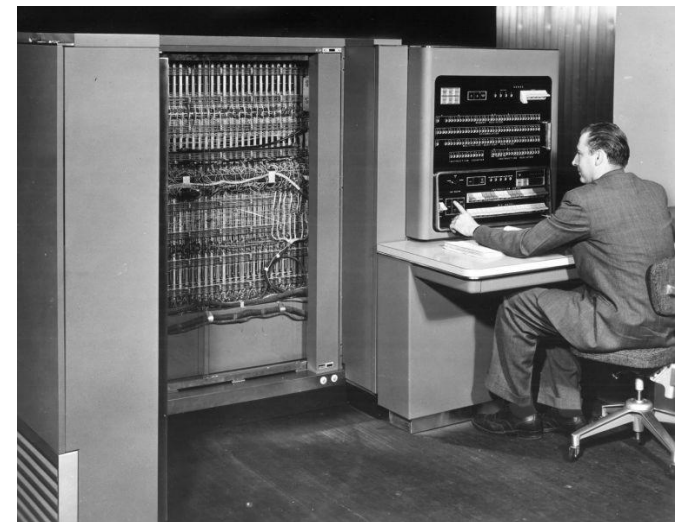
The IBM 650 (1954)



COBOL (Common
Business Oriented
Language) (1959)
CODASYL

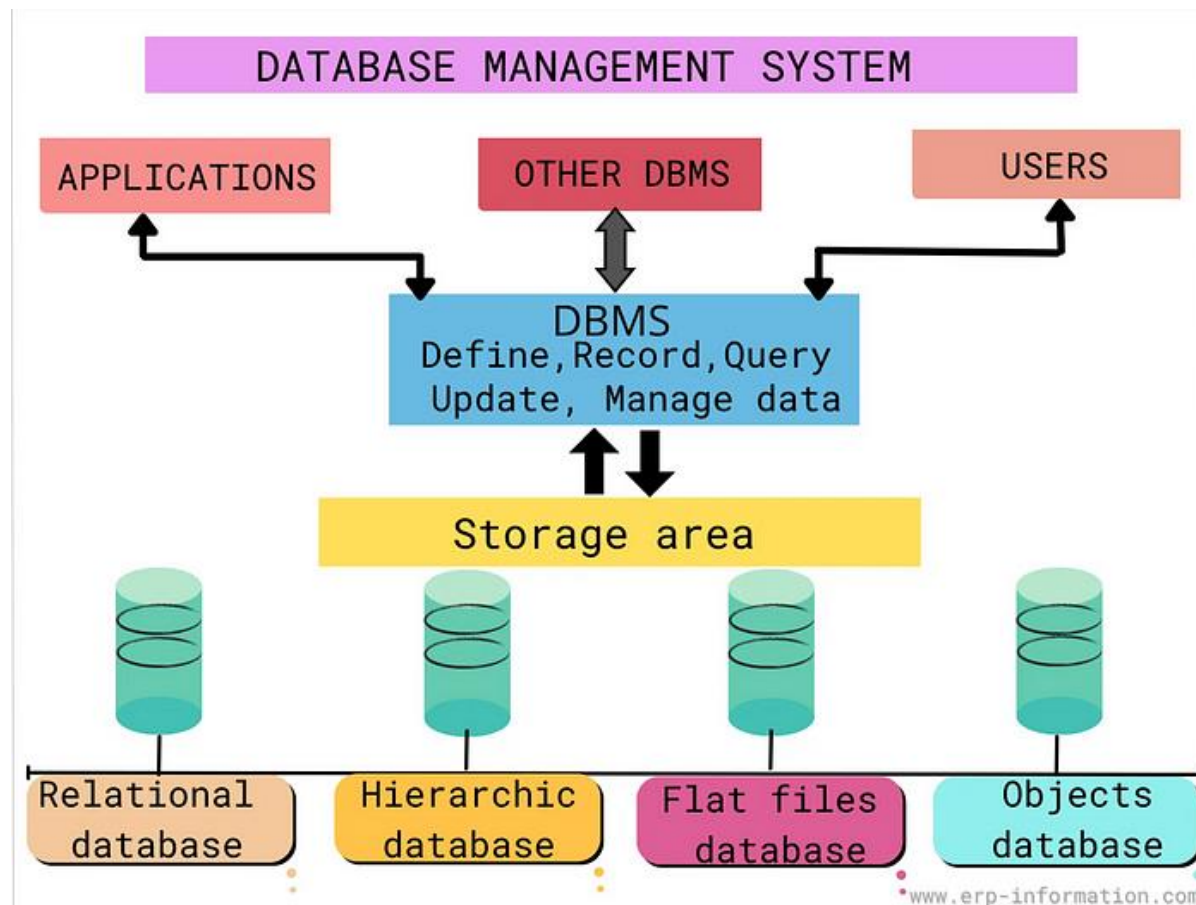


The IBM 700 Series (1953)

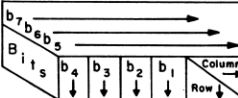


+ Enter the database – Early 1960s

- 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)

					0	0	0	0	1	1	1	1
0	0	0	0	0	0	1	1	1	1			
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



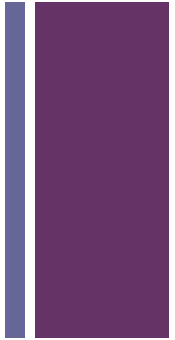
Information Management System (IMS)
Hierarchical data model.
Hard drives



"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

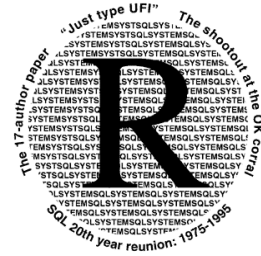


Relational DBMS

- 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

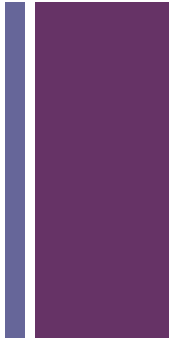
@Andy_Pavlo // 15- 721 // Spring 2020

+ Relational Ideas



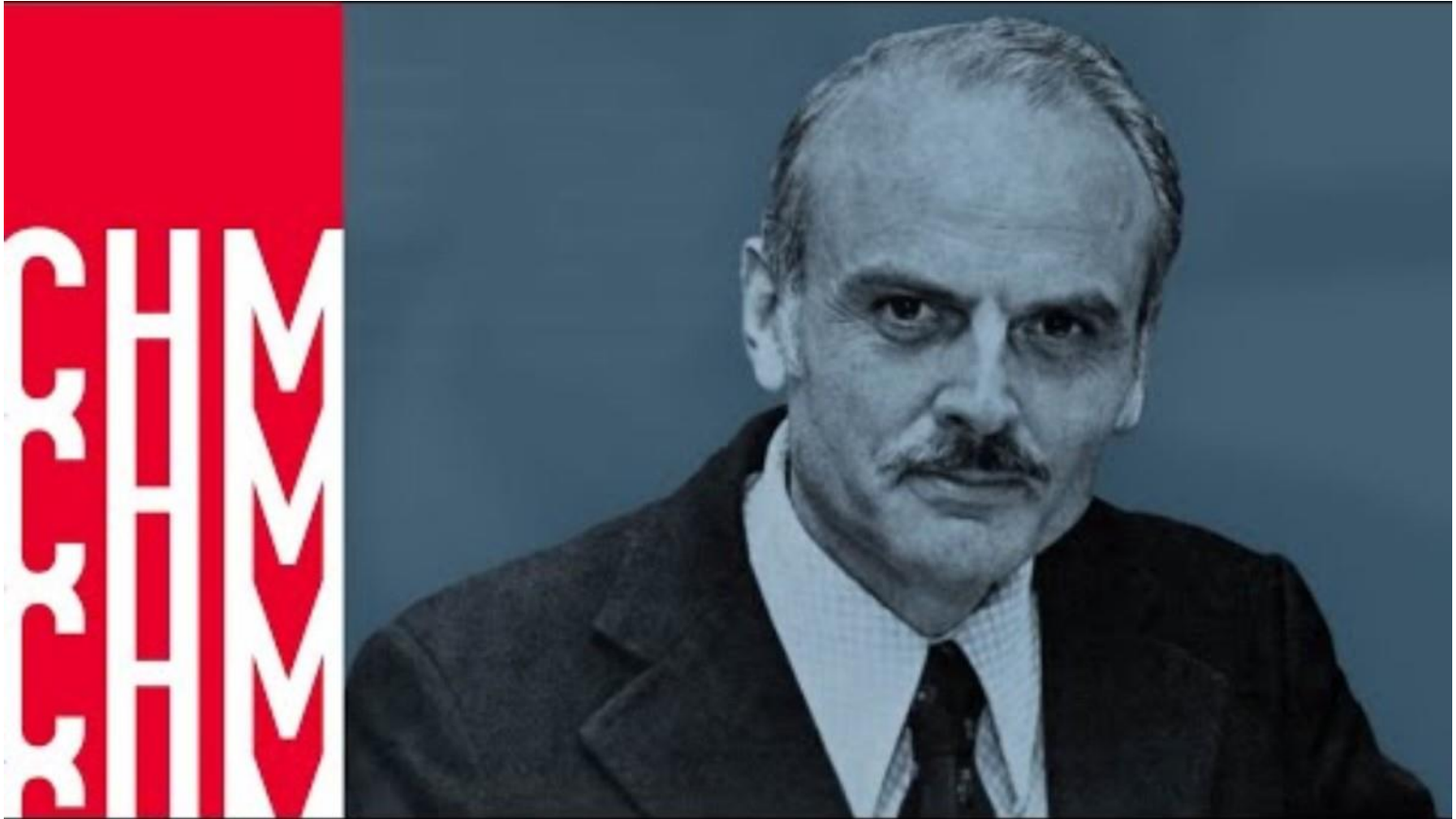
- Data is represented as a series of tables.
- The tables are Related to one another through a series of keys and foreign keys.
- A standard language is used to define the database (DDL) and to query the database (DML).
- Tables within the database contain the data about the database (meta data).

+ 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



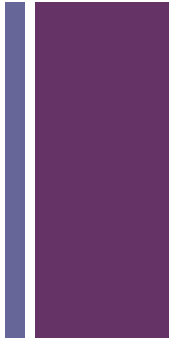
+ Electronic files – Early computing 1950s – 1970s



+ 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

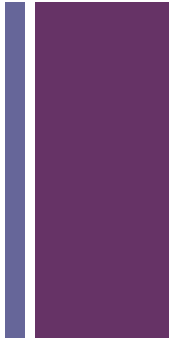
popular database
management systems



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

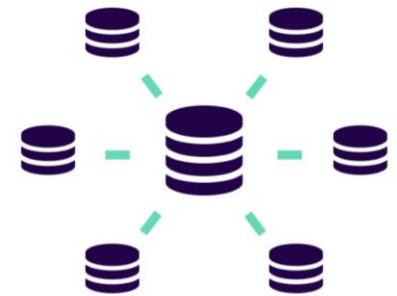
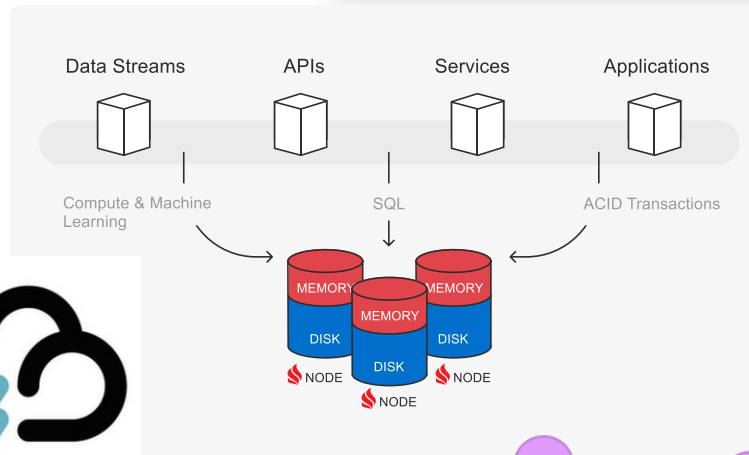
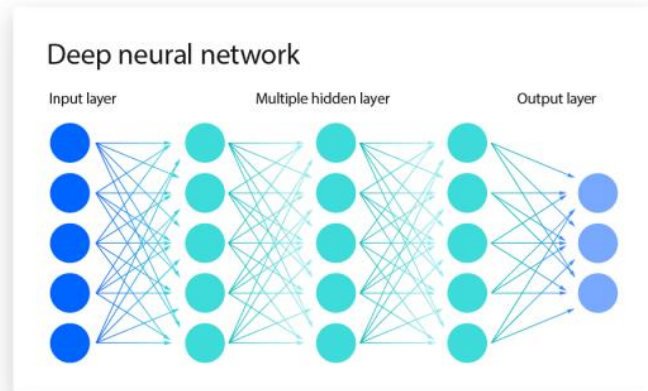
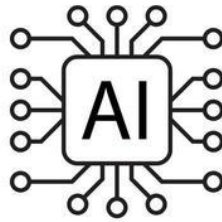


The Future?

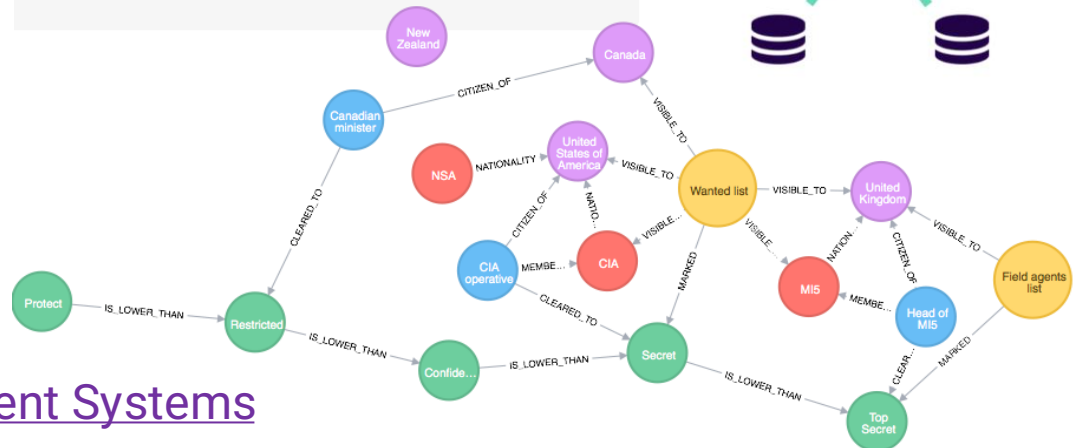


- Object Oriented Databases
 - Combine data and operations on those data
 - Allows for inheritance
 - Oracle (Object-Relational Database)
 - Postgre(open source object-relational DBMS)
 - <http://www.postgresql.org/about/>
- XML and XML DBMS
 - XML designed to transport and store data initially envisioned 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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