



**Kampus  
Merdeka**  
INDONESIA JAYA



# Relational Data Model

Bachelor of Information Systems

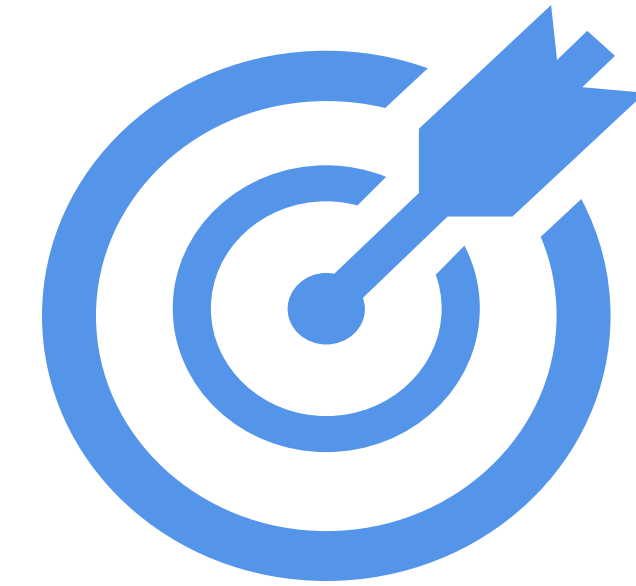


INTRODUCTION TO  
DATABASE AND INFORMATION SYSTEM



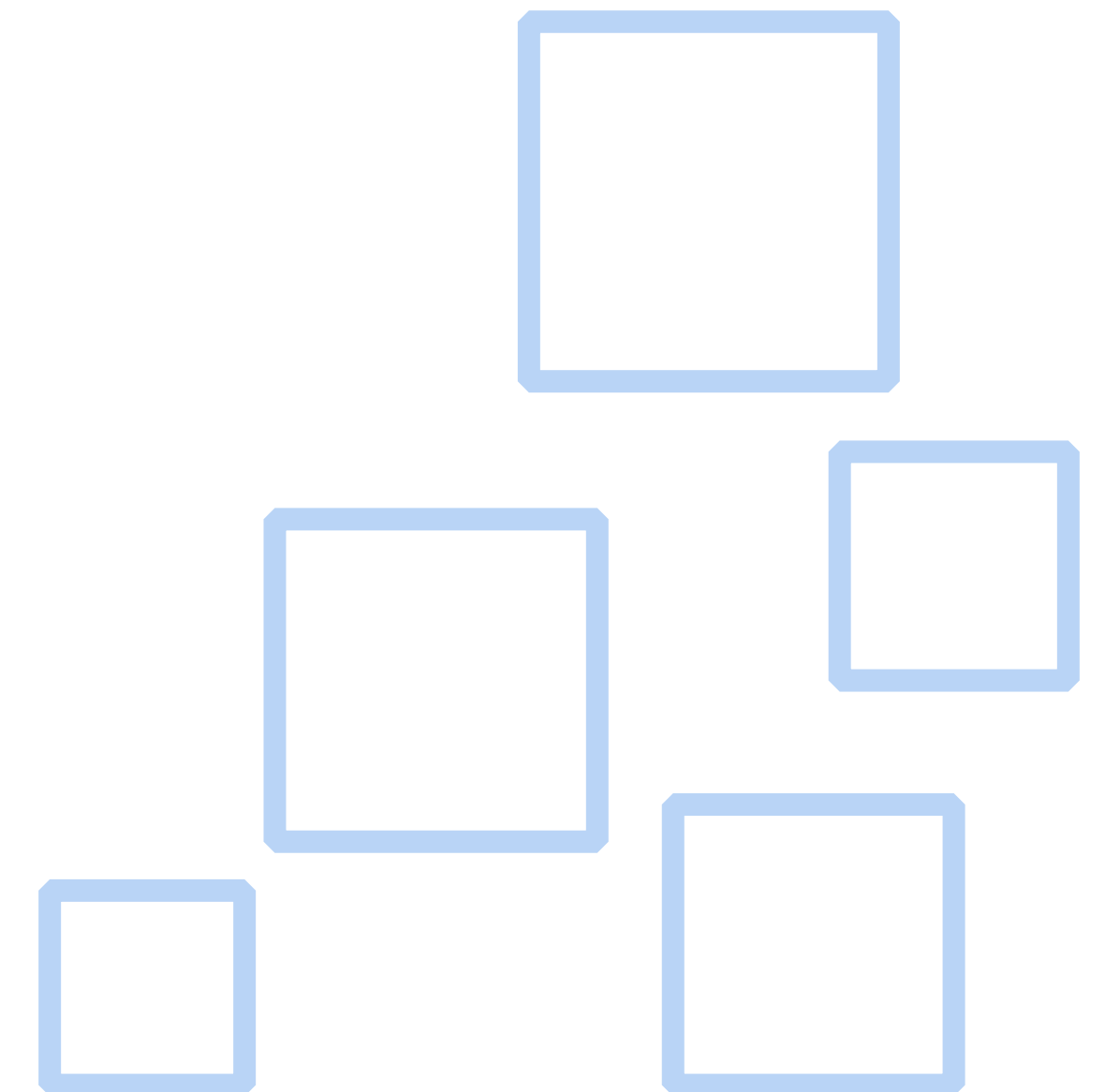
# Learning Objective(s)

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This material should address the following question(s).

- ❓ We have the ERD, isn't it time to go to the physical?





# Case Study



Inside the campus library.



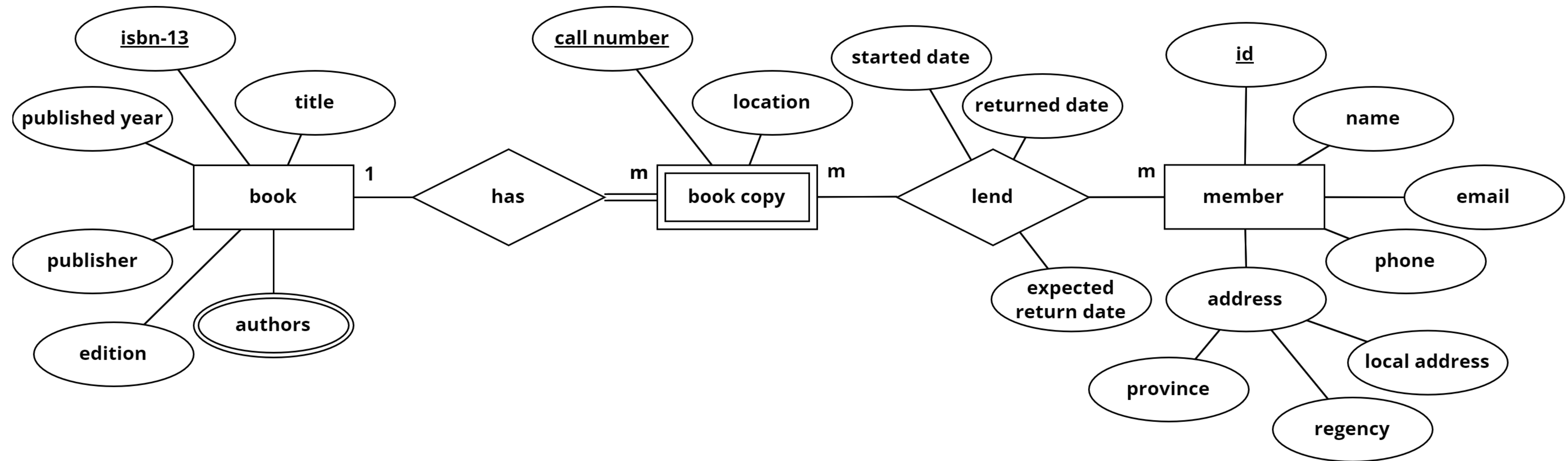
# Case Study

- A library has a multitude copies of books, articles, etc.
  - New collections come periodically.
- Anyone may come and enjoy the collections.
  - Only library members can lend books for period of time.

Inside the campus library.



# The Library's ER Diagram



# Question

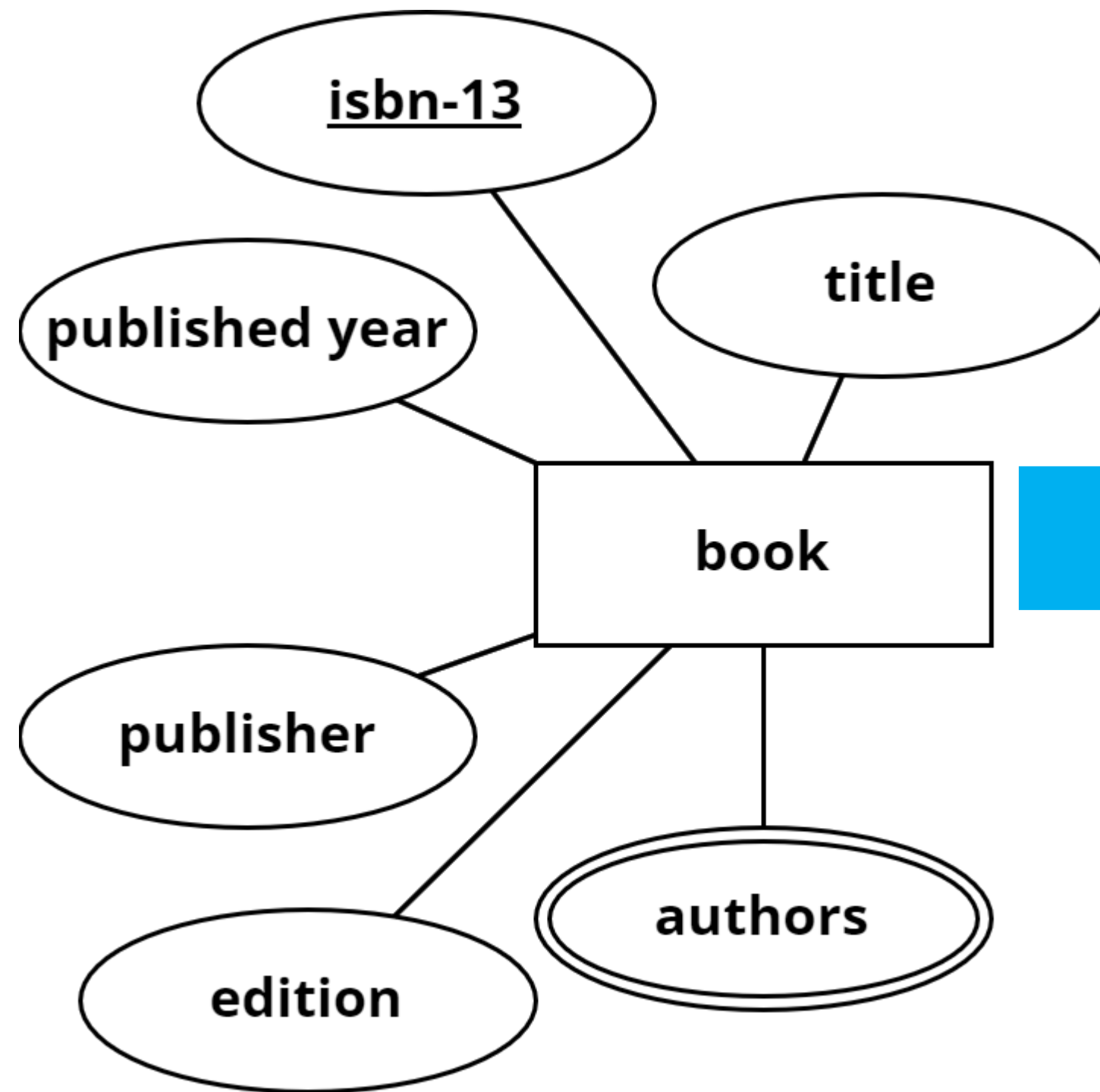


The conceptual is here,  
should we develop  
the physical





conceptual



physical

A screenshot of a database application window titled "books". The window has tabs for "Properties", "Data", and "ER Diagram". The "Data" tab is active, showing a table with 10 rows and 7 columns. The columns are "isbn\_13", "title", "authors", "publisher", "published\_year", "edition", and "123 edition". The table contains data for various books, including "Database System Concepts", "Introduction to Algorithms", "Software Engineering: A Practitioner's Guide", "Software Engineering", "Operating System Concepts", "SQL QuickStart Guide: The Simplified Way", "Data Mining: Concepts and Techniques", "Machine Learning System Design", "Head First Java: A Brain-Friendly Guide", and "Data Engineering with Python". A blue arrow points from the conceptual diagram to the table.

	isbn_13	title	authors	publisher	published_year	edition
1	978-0078022159	Database System Concepts	A. Silberschatz, H. F. Korth	McGraw-Hill	2019	7
2	978-0262032933	Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest	The MIT Press	2001	2
	978-0078022128	Software Engineering: A Practitioner's Guide	Roger S. Pressman, Bruce G. W. Panko	McGraw Hill	2014	8
	978-1292096131	Software Engineering	Ian Sommerville	Courier Westford	2016	10
5	978-0470889206	Operating System Concepts	A. Silberschatz, P.B. Galvin	John Wiley and Sons	2013	9
6	978-1945051753	SQL QuickStart Guide: The Simplified Way	Walter Shields	ClydeBank Media	2019	1
7	978-9380931913	Data Mining: Concepts and Techniques	Jiawei Han, Micheline Kamber	Morgan Kaufmann	2011	3
8	978-1736049129	Machine Learning System Design	Alex Xu, Ali Aminian	ByeByteGo	2023	1
9	978-1491910771	Head First Java: A Brain-Friendly Guide	Trisha Gee, Bert Bates, Kathy Sierra	O'Reilly Media	2022	3
10	978-1839214189	Data Engineering with Python: A Practical Guide	Paul Crickard	Packt Publishing	2020	1

# Question



**Not quite.  
We need to design  
how the database  
should look like**





# ERD to Database

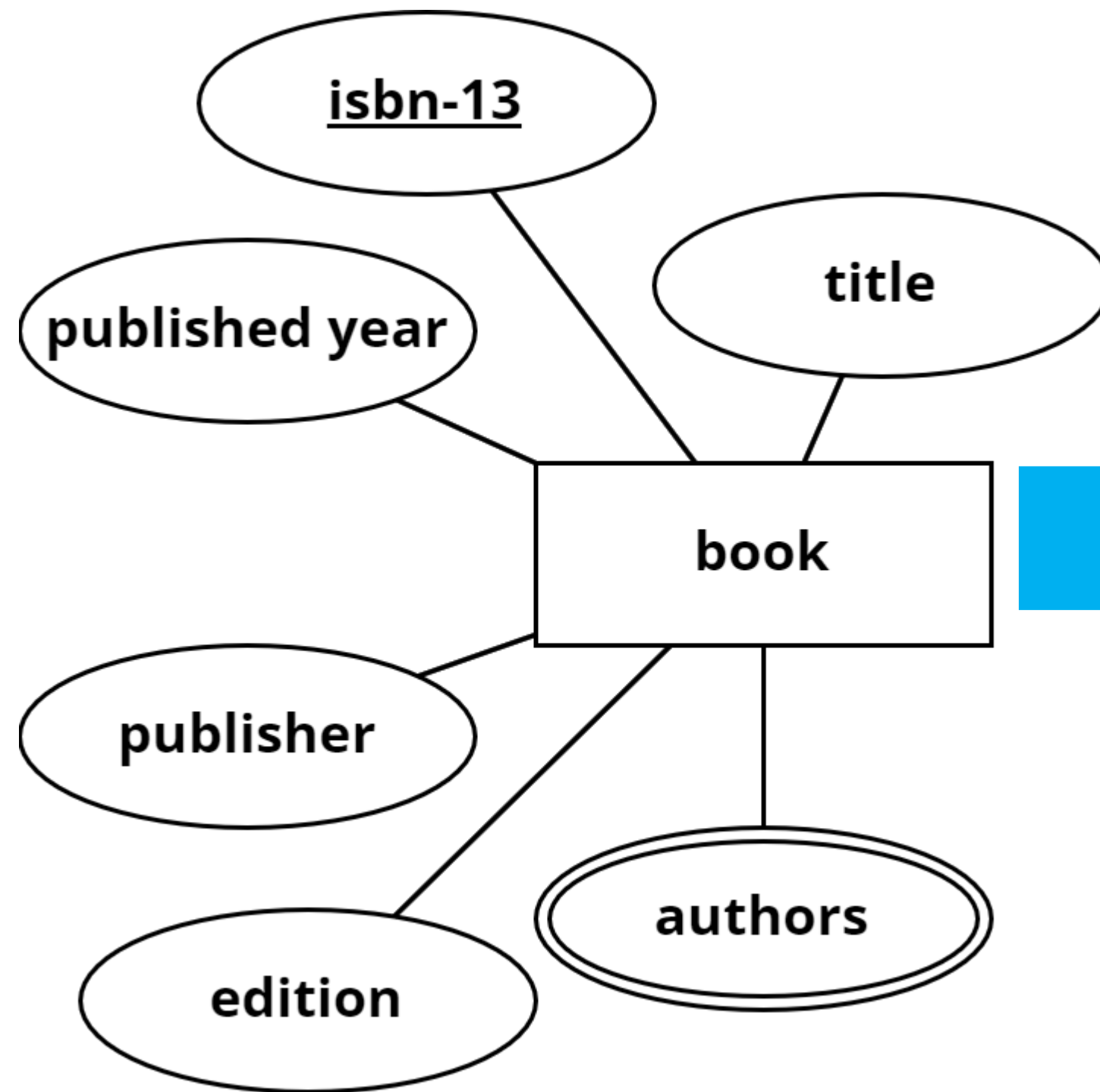
- A complete ERD helps us to understand the requirements.
  - ERD does not clearly tell how the database would look like.
- Going to physical:
  - Design.
  - Implementation.



## Before translating ...

We need to understand the concepts in relational model:  
**tuples, attributes, domains, and relations.**

conceptual



physical

A screenshot of a database viewer application showing the physical implementation of the "books" table. The application has tabs for "Properties", "Data", and "ER Diagram". The "Data" tab is active, displaying a table with 10 rows and 7 columns: "isbn\_13", "title", "authors", "publisher", "published\_year", "edition", and an unnamed column. A large blue arrow points from the conceptual diagram to this table. The table data is as follows:

	isbn_13	title	authors	publisher	published_year	edition
1	978-0078022159	Database System Concepts	A. Silberschatz, H. F. K...	McGraw-Hill	2019	7
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10	978-1839214189	Data Engineering with Python: W...	Paul Crickard	Packt Publishing	2020	1

The interface includes a search bar with the text "Enter a SQL expression to filter results (use Ctrl+Space)", a "Grid" view selector, and a "Record" view selector. The status bar at the bottom indicates "10 row(s) fetched - 1ms (1ms fetch), on 2023-09-24 at 06:04:07".



books

Properties Data ER Diagram database.sqlite Tables books

books Enter a SQL expression to filter results (use Ctrl+Space)

	isbn_13	title	authors	publisher	published_year	edition
1	978-0078022159	Database System Concepts	A. Silberschatz, H. F. Korth	McGraw-Hill	2019	7
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6	978-1945051753	SQL QuickStart Guide: The Simple Way to Master SQL	Walter Shields	ClydeBank Media	2019	1
7	978-9380931913	Data Mining: Concepts and Techniques	Jiawei Han, Micheline Kamber	Morgan Kaufmann	2011	3
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10	978-1839214189	Data Engineering with Python: With Apache Spark and Hadoop	Paul Crickard	Packt Publishing	2020	1

Refresh Save Cancel Export data 200 10

10 row(s) fetched - 1ms (1ms fetch), on 2023-09-24 at 06:04:07

relation

attribute

domain

tuple

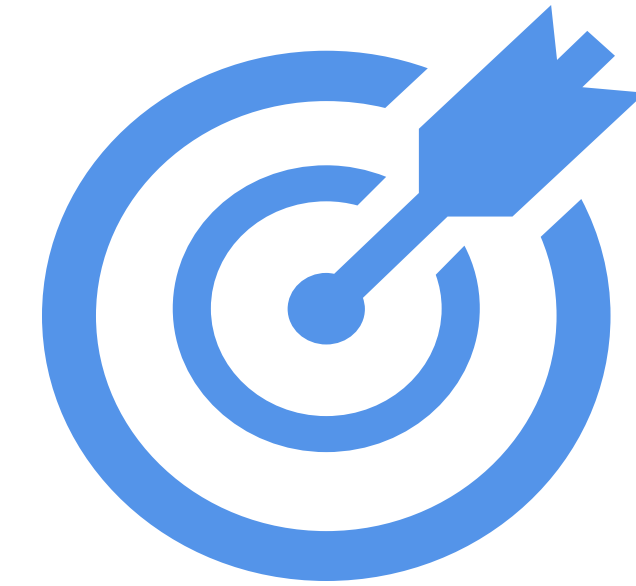
books							
Properties		Data		ER Diagram		database.sqlite Tables books	
books Enter a SQL expression to filter results (use Ctrl+Space)							
Grid		isbn_13	title	authors	publisher	published_year	edition
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10		978-1839214189	Data Engineering with Python: Workflow Automation and Data Management	Paul Crickard	Packt Publishing	2020	1
Refresh Save Cancel Export data 200 10							
10 row(s) fetched - 1ms (1ms fetch), on 2023-09-24 at 06:04:07							

<i>analysis</i>		<i>design</i>		<i>implementation</i>
entity set	— — →	relation	— — →	table
entity	— — →	tuple	— — →	record
attribute	— — →	attribute	— — →	column
attribute value	— — →	domain	— — →	value



# Conclusion

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- ✓ There is a concept gap between ER and the relational model.
- ✓ The ER concepts must be translated into the relational concepts.
- ✓ Relational concepts are tuples, attributes, domains, and relations.

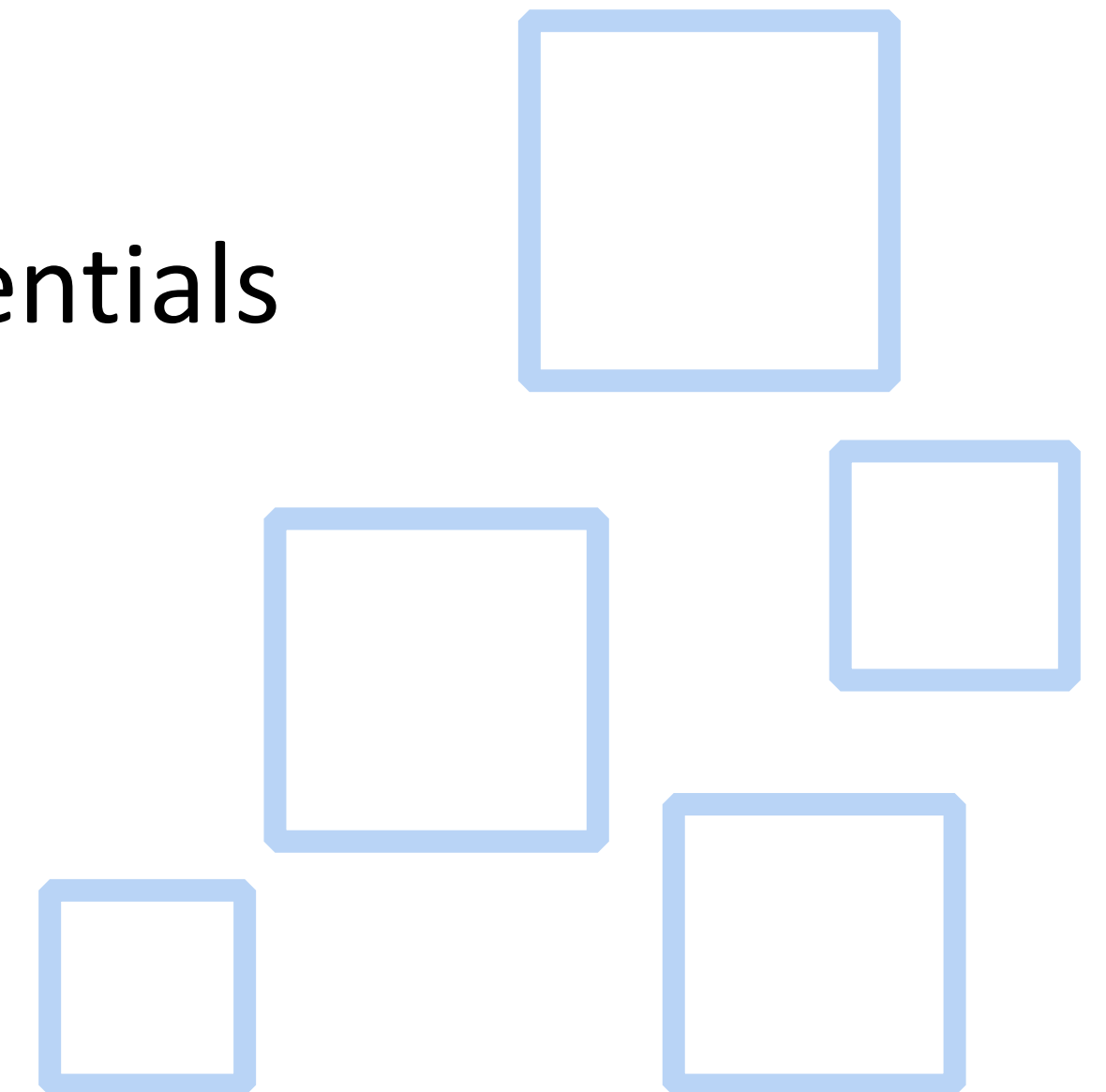


# References

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- R, Elmasri, et. al., Fundamentals of Database Systems.
- A. Silberschatz, et. al., Database System Concepts.
- R. K. Rainer, et. al., Introduction to Information Systems.
- G. M. Marakas et. al., Introduction to Information Systems: Essentials for The e-Business Enterprise.



## Course



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