



**Kampus
Merdeka**
INDONESIA JAYA



Functional Dependency

Bachelor of Information Systems

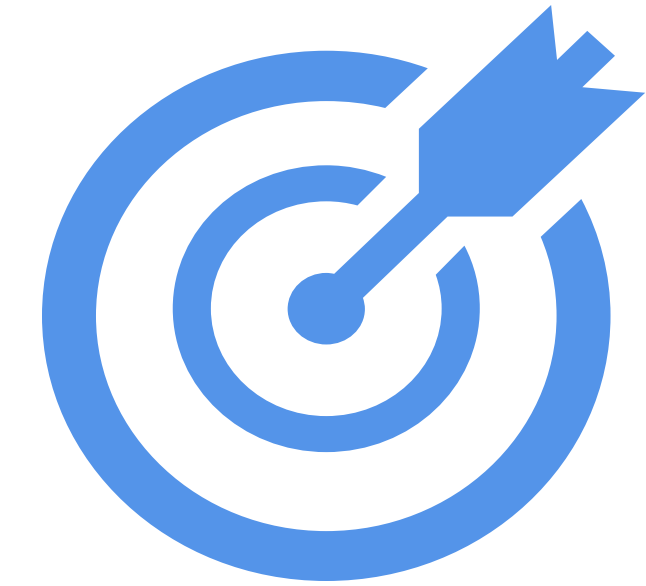


INTRODUCTION TO
DATABASE AND INFORMATION SYSTEM



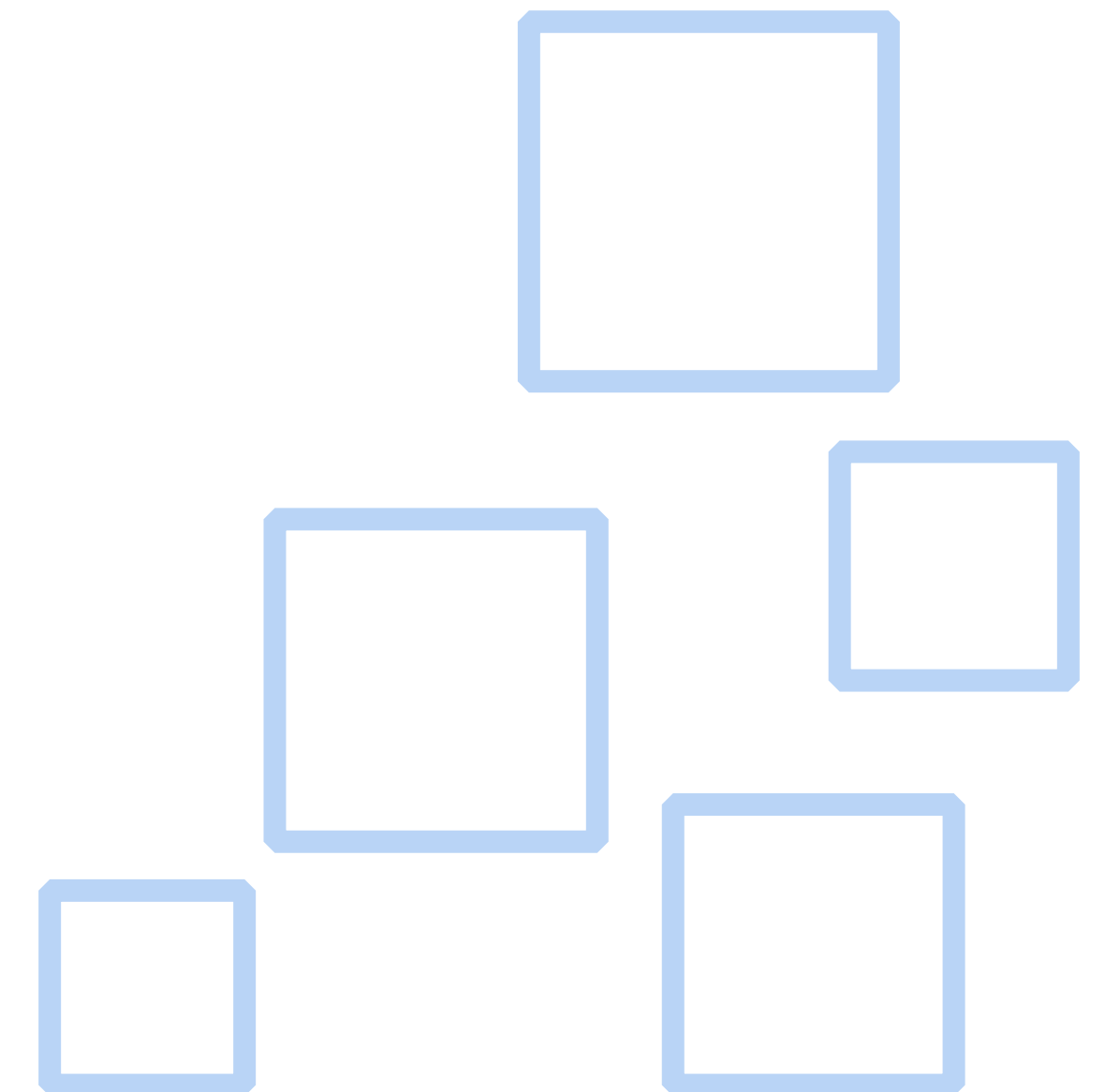
Learning Objective(s)

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This material should address the following question(s).

- ❓ What is functional dependency?
- ❓ How to identify functional dependencies in a relation?



Functional dependency

It is a condition where value (X) of an attribute (A_1) determines value (Y) of another attribute (A_2) in R.

Functional dependency

FD is used to find out the strongest attribute(s) in the relation (candidate key) and the most irrelevant ones.

	A1	A2
t_1	1	A
t_2	2	B
t_3	3	C
t_{\dots}	4	D
t_n	2	E

$t_1[X]$

$t_1[Y]$

$R(\underline{A}_1, A_2)$

$X \rightarrow Y$

Y is a possible value
of A_2 .

X determines Y; or
Y is functionally dependent to X.
Functional dependency is
denoted by an \rightarrow or f.d.

X is a possible
value of A_1 .

$R(\underline{A}_1, A_2)$

$X \rightarrow Y$

How to check functional dependency?
Say, will f.d. $A_1 \rightarrow A_2$ hold?

*If $t_i[X] = t_j[X]$ then
 $t_i[Y] = t_j[Y]$*

Will the following functional dependencies hold?

Relation R

	A1	A2
t_1	1	A
t_2	2	B
t_3	3	C
t_{\dots}	4	D
t_n	2	E

$$A_1 \rightarrow A_2$$

*If $t_i[X] = t_j[X]$ then
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Will the following functional dependencies hold?

Relation R

	A1	A2
t_1	1	A
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$A_1 \rightarrow A_2$

*If $t_i[X] = t_j[X]$ then
 $t_i[Y] = t_j[Y]$*

No duplication, no need to check.

Duplication, need to check.

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Duplication, need to check.

Will the following functional dependencies hold?

Relation R

	A1	A2
t_1	1	A
t_2	2	B
t_3	3	C
t_{\dots}	4	D
t_n	2	E

$A_1 \rightarrow A_2$

*If $t_i[X] = t_j[X]$ then
 $t_i[Y] = t_j[Y]$*

*If $t_2[2] = t_n[2]$ then
 $t_2[A] = t_n[E]$ **fails**.*

The functional dependency **does not** hold.

Will the following functional dependencies hold?

Relation R

	A1	A2
t_1	1	A
t_2	2	B
t_3	3	C
t_{\dots}	4	D
t_n	2	E

$$A_2 \rightarrow A_1$$

*If $t_i[X] = t_j[X]$ then
 $t_i[Y] = t_j[Y]$*

The short answer is **yes!**

$R(\underline{A}_1, A_2, \dots, A_n)$

$X, Y \rightarrow Z$

It is possible to have a combination of multiple attributes to determine the value of another attribute.

For instance $X, Y \rightarrow Z$.
Where X and Y, together, determine Z.

books ×

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2	978-0262032933	Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest	The MIT Press	2001	2
3	978-0078022128	Software Engineering: A Practitioner's Approach	Roger S. Pressman, Bruce G. W. Panko	McGraw Hill	2014	8
4	978-1292096131	Software Engineering	Ian Sommerville	Courier Westford	2016	10
5	978-0470889206	Operating System Concepts	A. Silberschatz, P.B. Galvin, G. Gagne	John Wiley and Sons	2013	9
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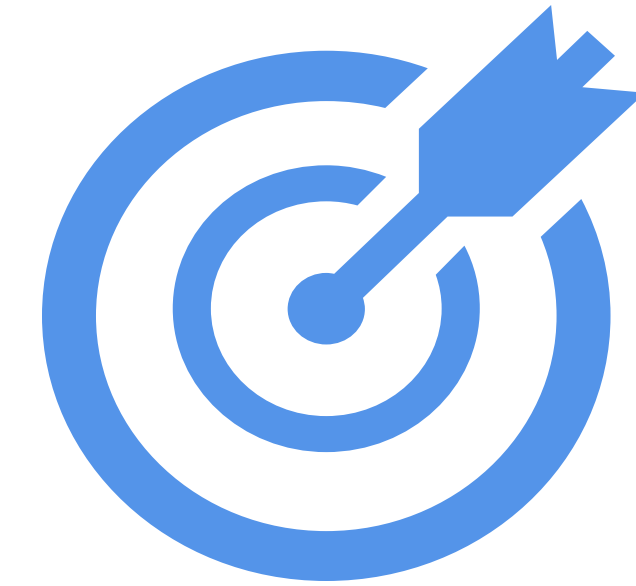
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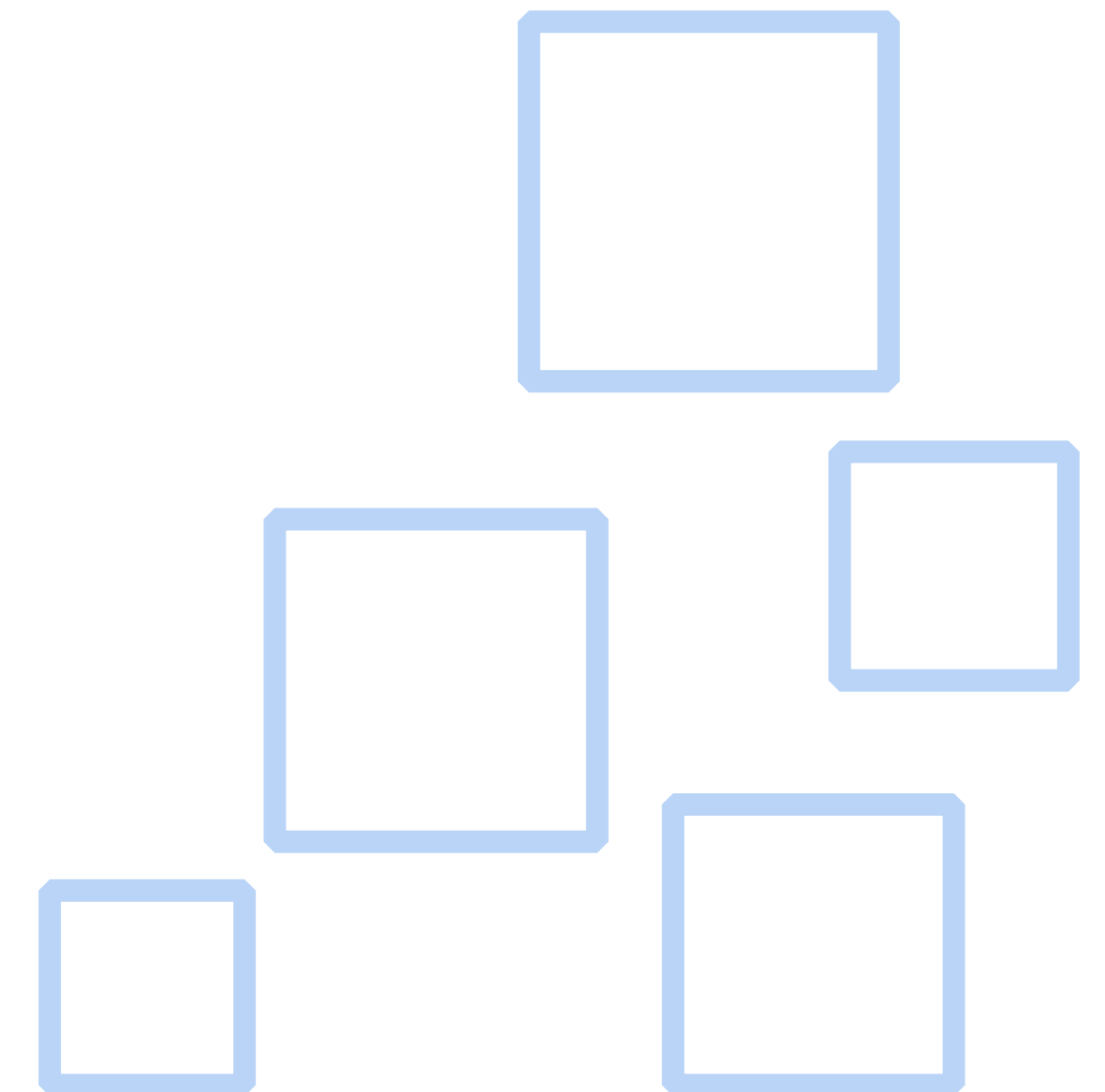
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Conclusion

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- ✓ FD shows whether the value of an attribute(s) determines other's.
- ✓ Representative dataset is important to check FD.



References

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- 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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