DATABASE KEYS

PRIMARY, FOREIGN AND MORE...

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Primary Key

Candidate Key   Natural key

Superkey   Surrogate key

Alternate key   Simple Key

Foreign key   Composite Key

Employees

Name	Dept	SSN	email	Phone	Salary
Alice	Sales	123	a1@example.com	11111	2000
Bob	Sales	456	b1@example.com	22222	3000
Charlie	HR	345	c2@example.com	11111	5000
John	Eng	987	j4@example.com	66666	2000
Bob	Eng	678	b6@example.com	44444	4000
Alice	IT	384	a4@example.com	66666	3000

Query: "Find the Salary of Bob"

What is a key??

"One or more attributes that can uniquely identify a row (tuple) of data"

Key with 1 attribute: Simple Key

Key with multiple attributes: Composite Key

Employees

Superkey:

(SSN, email)

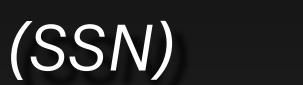| Name	Dept	SSN	email	Phone	Salary
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John	Eng	987	j4@example.com	66666	2000
Bob	Eng	678	b6@example.com	44444	4000
Alice	IT	384	a4@example.com	66666	3000
James	Eng	375	a4@example.com	54545	2500

Not minimal

Let *(Attr₁, Attr₂, Attr₃)* be a superkey

Subset

Let *(Attr₁, Attr₂)* also be a superkey

Superkeys:

(Name, SSN) ❌

(SSN) ✅

(Email) ✅

(SSN, email) ❌

(Name, Dept, email) ❌

(Email, Phone) ❌

...

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CANDIDATE KEYS

Candidate Key

- A minimal superkey

- Unique

- Can be simple or composite

Identifying the candidate keys is important to select the primary key

Candidate keys:

(SSN)

(Email)

Employees

Alternate Key

Primary Key

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Alice	IT	384	a4@example.com	66666	3000

Primary Key (PK)

- One of the candidate keys

- Unique

- Not NULL

- Stable (should not change)

- Can be simple or composite

Alternate Key

- Any candidate key that is not chosen as PK

Employees

Candidate keys:

(SSN) }
(Email) } Natural Keys

(ID) → Surrogate Key

ID	Name	Dept	SSN	email	Phone	Salary
1	Alice	Sales	123	a1@example.com	11111	2000
2	Bob	Sales	456	b1@example.com	22222	3000
3	Charlie	HR	345	c2@example.com	11111	5000
4	John	Eng	987	j4@example.com	66666	2000
5	Bob	Eng	678	b6@example.com	44444	4000
6	Alice	IT	384	a4@example.com	66666	3000

Employees

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5	Bob	Eng	678	b6@example.com	44444	4000
6	Alice	IT	384	a4@example.com	66666	3000

Foreign Key

Projects

Name	Lead
Project1	4
Project2	2
Project3	6

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