Introduction to SQL(MySQL)

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Agenda

- What is Database? Why?
- Relational Database
- Types of Relation
- Introduction to SQL
- MySQL Query (SELECT, WHERE, DELETE, INSERT etc.)
- Join
- Query optimization
- Some important topics for interview

What is Database?

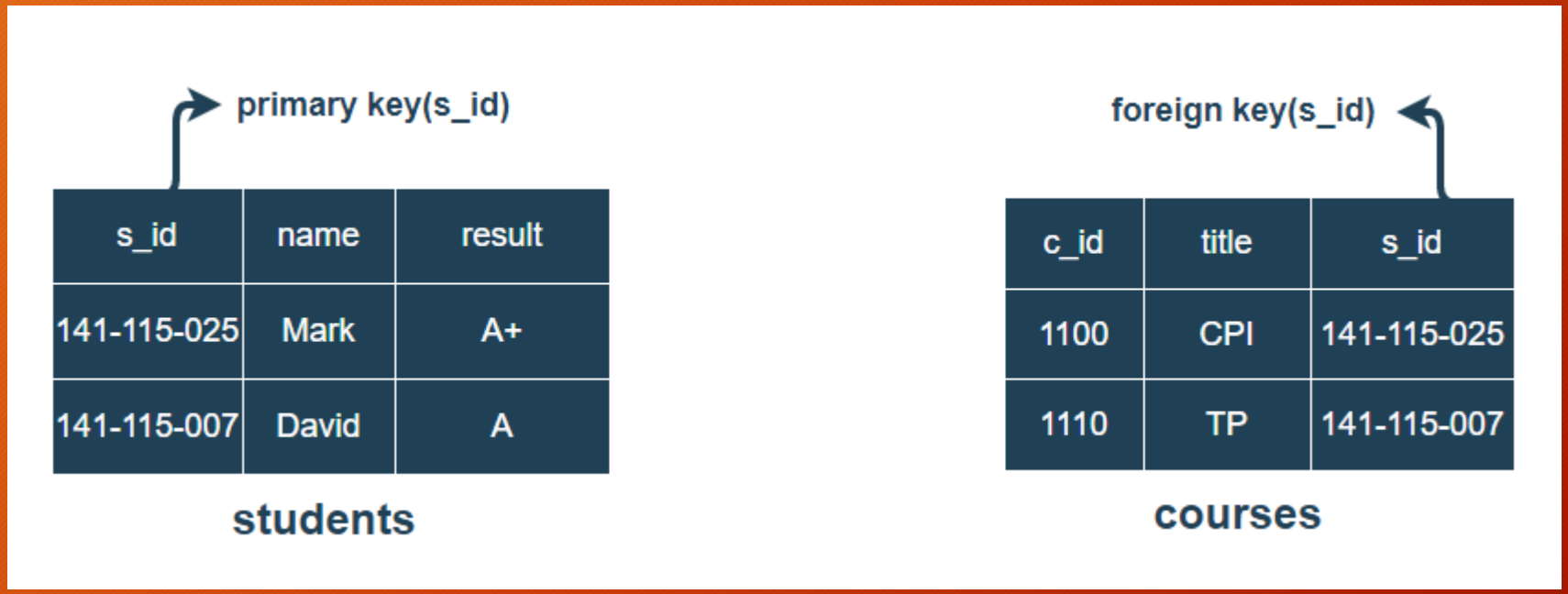
Database is a system to store, retrieve data.

DBMS or Database Management System is a software designed to store, retrieve and manage data.

Why Database?

- Easily store data for long time.
- Easily access data.
- Better Data Security.
- Reduced data redundancy.
- Reduced data entry, storage, and retrieval costs.

Key


primary key(s_id)
s_id
name
result
141-115-025
Mark
A+
141-115-007
David
A
students
foreign key(s_id)
c_id
title
s_id
1100
CPI
141-115-025
1110
TP
141-115-007
courses

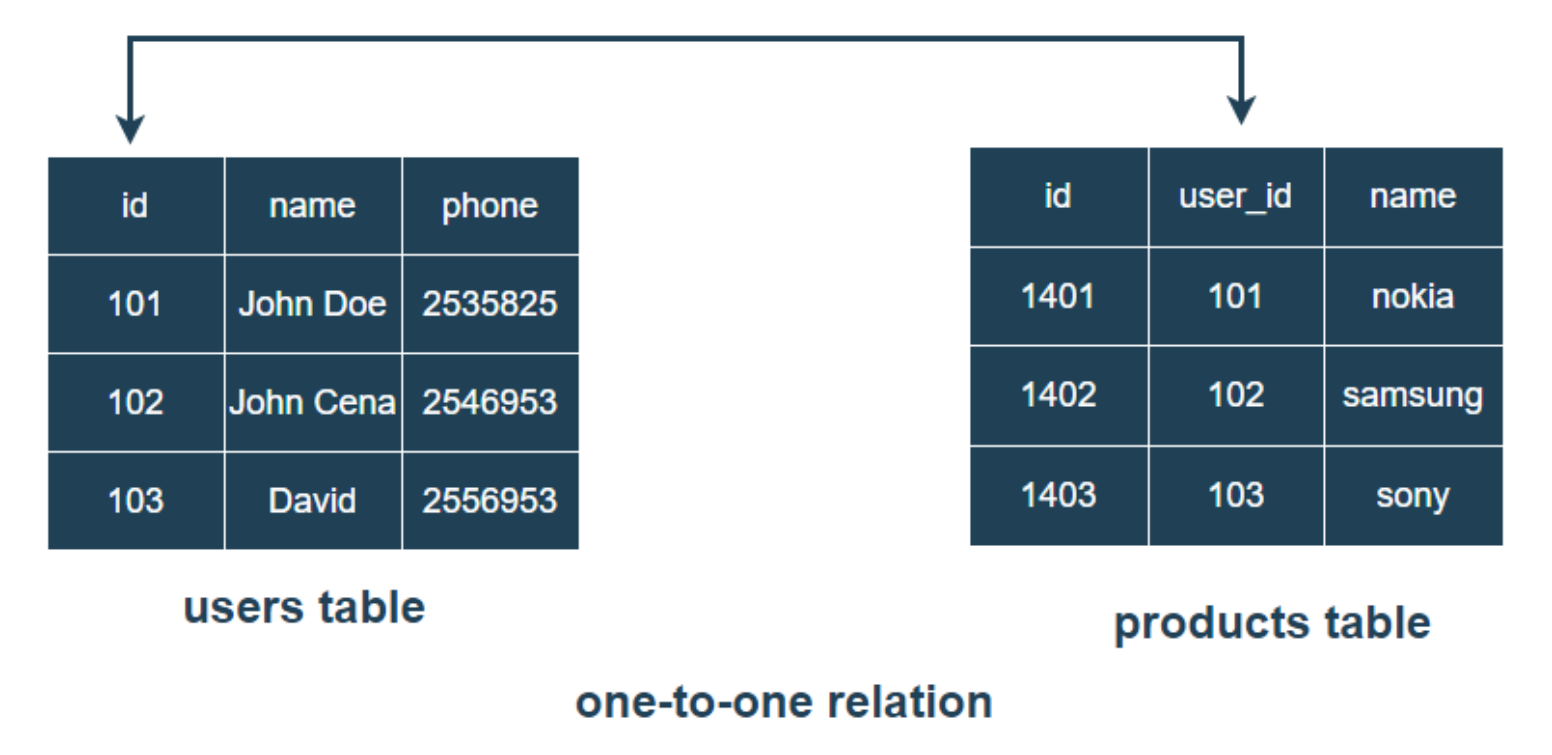
Relational Database

Relational Database creates relation between two tables.

There are 4 types of relation,

i) one-to-one
ii) one-to-many
iii) many-to-one
iv) many-to-many

One-to-one relation



id	name	phone
101	John Doe	2535825
102	John Cena	2546953
103	David	2556953

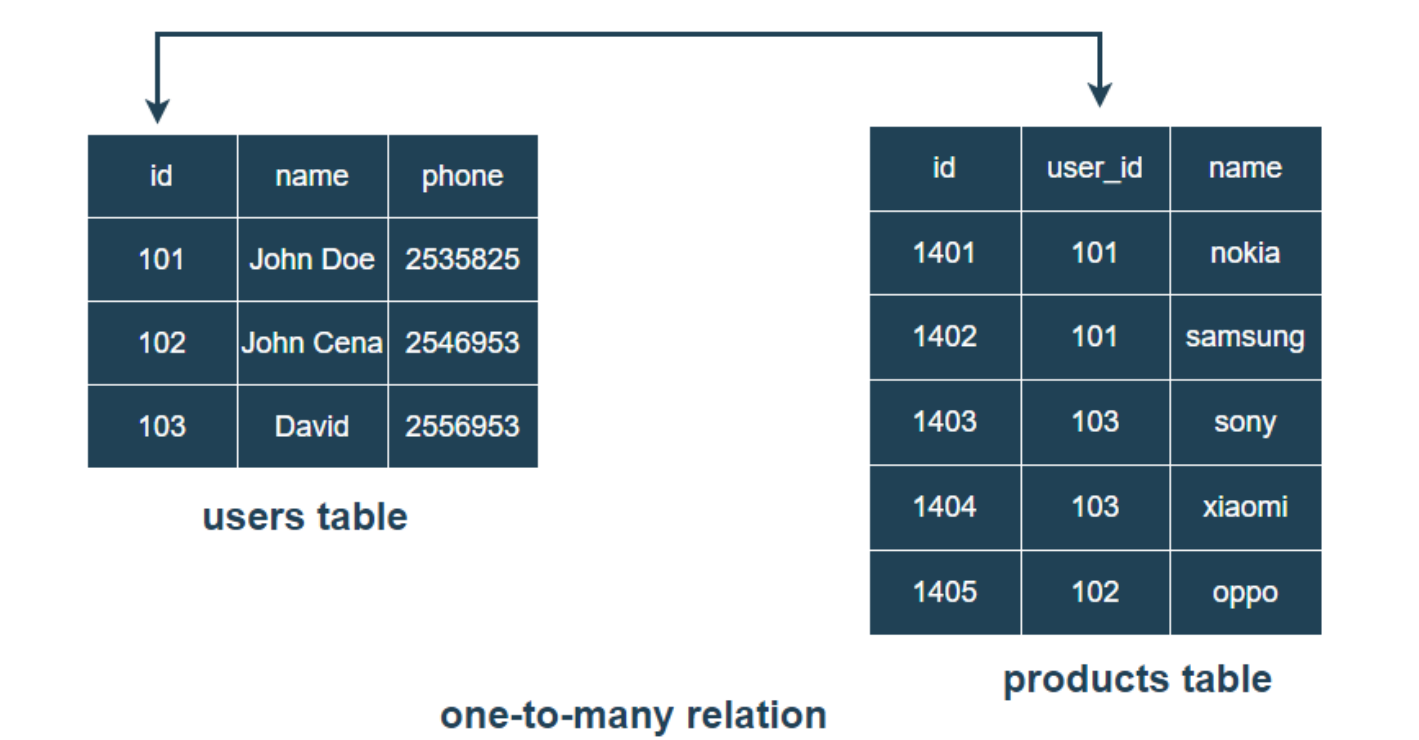
users table

id	user_id	name
1401	101	nokia
1402	102	samsung
1403	103	sony

products table

one-to-one relation

One-to-many relation



id	name	phone
101	John Doe	2535825
102	John Cena	2546953
103	David	2556953

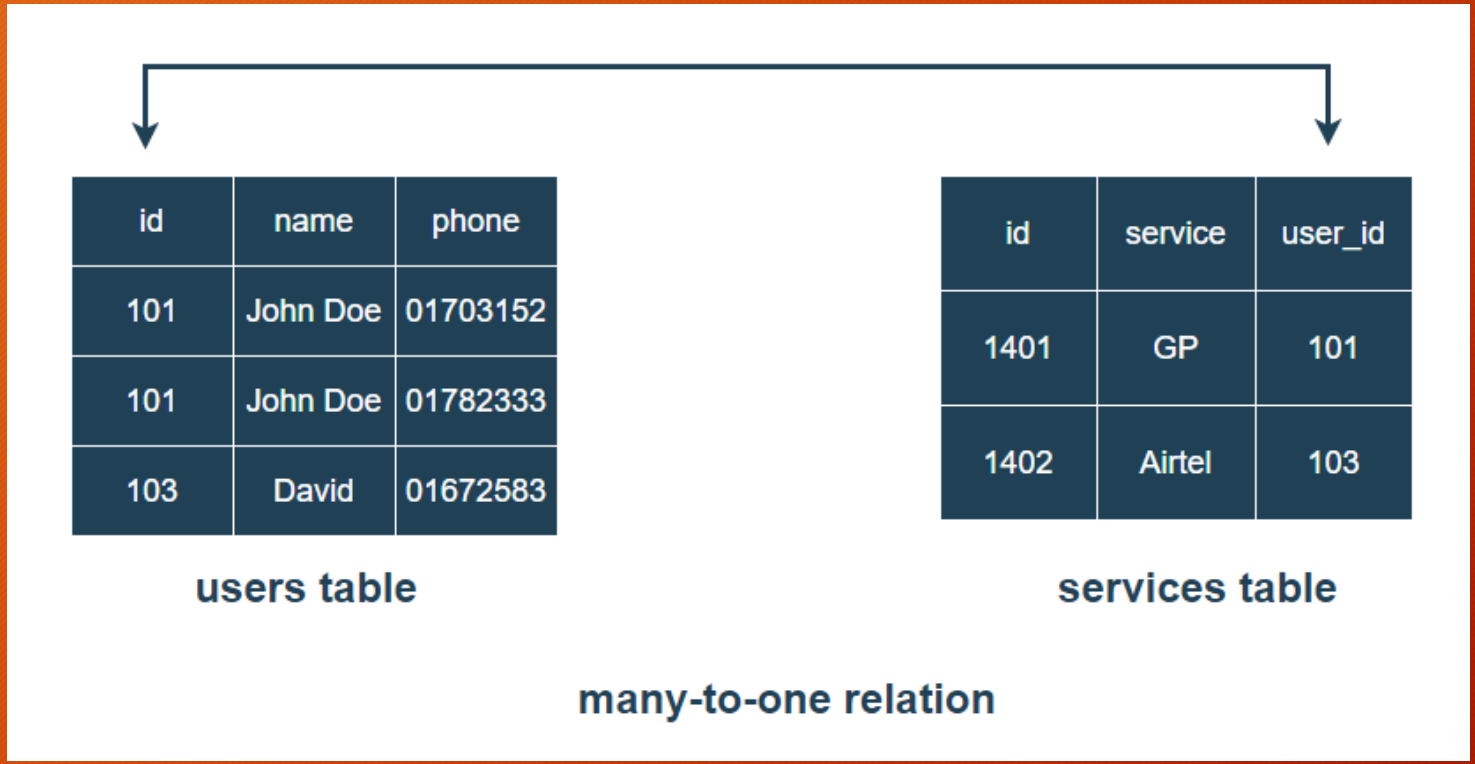
users table

id	user_id	name
1401	101	nokia
1402	101	samsung
1403	103	sony
1404	103	xiaomi
1405	102	oppo

products table

one-to-many relation

Many-to-one relation



id	name	phone
101	John Doe	01703152
101	John Doe	01782333
103	David	01672583

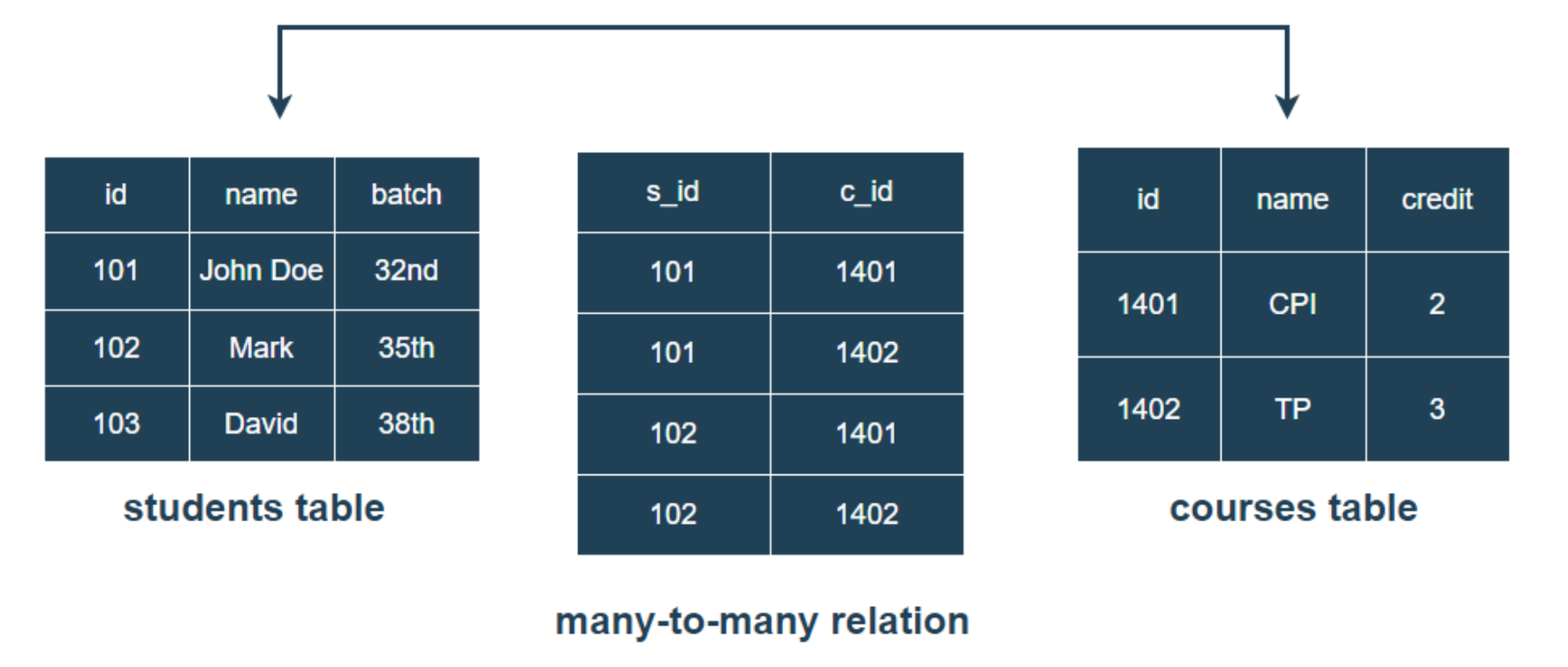
users table

id	service	user_id
1401	GP	101
1402	Airtel	103

services table

many-to-one relation

Many-to-many relation



id	name	batch
101	John Doe	32nd
102	Mark	35th
103	David	38th

students table

s_id	c_id
101	1401
101	1402
102	1401
102	1402

many-to-many relation

id	name	credit
1401	CPI	2
1402	TP	3

courses table

Introduction to SQL.

- SQL stands for Structured Query Language.
- It used to communicate data stored in a Relational Database Management System.

Popular SQL to communicate RDBMS

- MySQL
- PostgreSQL
- Oracle DB

MySQL Query(SELECT)

SELECT clause is used grab everything or something from a table,

SELECT * FROM users;
(This will grab everything)

SELECT name, username, email FROM users;
(This will grab name, username & email)

MySQL Query(WHERE)

Using WHERE we can get something based on some conditions.

SELECT * FROM users WHERE country = “Bangladesh”

SELECT * FROM users WHERE birth_date >= “01-01-1994”

SELECT * FROM users WHERE user_name LIKE “%ab%”

MySQL Query(DELETE, UPDATE)

DELETE * FROM users WHERE user_name=“john”

UPDATE users SET name=“Michael” WHERE id=“10”

Join

Two tables merge together.

There has to be a common attribute.

Natural Join

Inner Join

Outer Join

Self Join

Natural Join

Find the name of the students who has grade.

Natural Join

s_id	name	dept
141-115-025	Mark	CSE
141-115-007	David	CSE
141-115-010	John	CSE

students

r_id	grade	s_id
1100	A+	141-115-025
1110	A	141-115-007

results

```
SELECT name FROM students,  results WHERE students.s_id = results.s_id;
```

Query Optimizations

- Avoid using * to scan.

  SELECT name, username FROM users
- Use LIMIT clause.

  SELECT * FROM users LIMIT 20
- Split multiple query try to avoid using them a single query
- Avoid using ‘%{any_text}’ as it causes a full table scan

  SELECT name, username WHERE username LIKE ‘%abc’

Some important topics for interview

- Advantage of DBMS
- Keys(Primary, Foreign)
- Normalization
- SQL Query
- Relational Algebra(Union, Project Op)
- Join
- Trigger