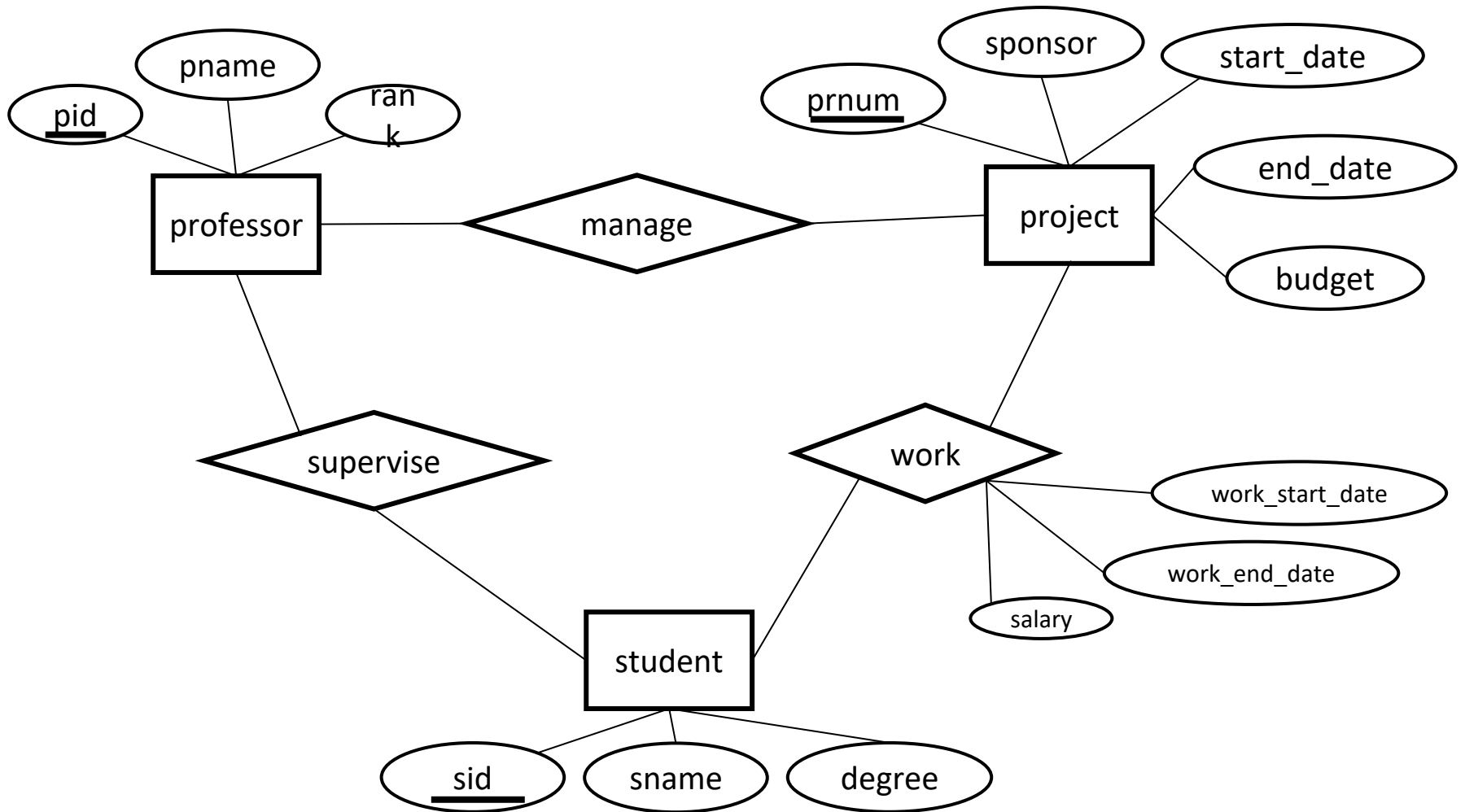


# Assignment 1 Solution

Introduction to Databases, 2025 Spring  
Datalab, NTHU

# Problem 1 – ER-Model



# Problem 1 – Relational-Model

```
CREATE TABLE professors (  
  pid      INTEGER,  
  pname    VARCHAR(40),  
  rank     VARCHAR(20),  
  PRIMARY KEY (pid)  
);
```

```
CREATE TABLE manage (  
  pid      INTEGER,  
  prnum    INTEGER,  
  PRIMARY KEY (pid, prnum),  
  FOREIGN KEY (pid) REFERENCES professors,  
  FOREIGN KEY (prnum) REFERENCES projects  
);
```

```
CREATE TABLE projects (  
  prnum    INTEGER,  
  sponsor  VARCHAR(100),  
  start_date DATE,  
  end_date  DATE,  
  budge     REAL,  
  PRIMARY KEY (prnum)  
);
```

```
CREATE TABLE supervise (  
  pid      INTEGER,  
  sid      INTEGER,  
  PRIMARY KEY (pid, sid),  
  FOREIGN KEY (pid) REFERENCES professors,  
  FOREIGN KEY (sid) REFERENCES students  
);
```

```
CREATE TABLE work (  
  sid      INTEGER,  
  prnum    INTEGER,  
  work_start_date DATE,  
  work_end_date  DATE,  
  salary    REAL,  
  PRIMARY KEY (sid, prnum),  
  FOREIGN KEY (sid) REFERENCES students,  
  FOREIGN KEY (prnum) REFERENCES projects  
);
```

```
CREATE TABLE students (  
  sid      INTEGER,  
  sname    VARCHAR(40),  
  degree   VARCHAR(10),  
  PRIMARY KEY (sid)  
);
```

# Problem 2

Request: Decompose this table to match the 3<sup>rd</sup> normal form

| forum_name | popularity | post_id | title       | article                    | reply                           |
|------------|------------|---------|-------------|----------------------------|---------------------------------|
| Gossiping  | 100        | 131     | Girlfriend  | How can I get girlfriend ? | ["Haha", "I don't know"]        |
| Gossiping  | 100        | 252     | Friends     | I don't have a friend...   | ["Haha", "I can be", "QQ"]      |
| Joke       | 23         | 46      | Knock       | Knock! Knock! ...          | ["Then?", "What's the point ?"] |
| Joke       | 23         | 151     | Santa Claus | Hold! Hold! Hold!          | ["XDD"]                         |

# Normal Form

- 1<sup>st</sup> normal form
  - No array
- 2<sup>nd</sup> normal form
  - No non-prime attribute that is *partially* dependent on any candidate key
- 3<sup>rd</sup> normal form
  - Every non-prime attribute is dependent on every candidate key

# First Normal Form

- 1<sup>st</sup> normal form
  - No array
- 2<sup>nd</sup> normal form
  - No non-prime attribute that is *partially* dependent on any candidate key
- 3<sup>rd</sup> normal form
  - Every non-prime attribute is dependent on every candidate key

# Step 1: To The 1<sup>st</sup> Normal Form

The 1<sup>st</sup> Normal Form: No array !!

| forum_name | popularity | post_id | title       | article                    | reply                           |
|------------|------------|---------|-------------|----------------------------|---------------------------------|
| Gossiping  | 100        | 131     | Girlfriend  | How can I get girlfriend ? | ["Haha", "I don't know"]        |
| Gossiping  | 100        | 252     | Friends     | I don't have a friend...   | ["Haha", "I can be", "QQ"]      |
| Joke       | 23         | 46      | Knock       | Knock! Knock! ...          | ["Then?", "What's the point ?"] |
| Joke       | 23         | 151     | Santa Claus | Hold! Hold! Hold!          | ["XDD"]                         |

# Step 1: To The 1<sup>st</sup> Normal Form

The 1<sup>st</sup> Normal Form: No array !!

| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |

Note: “reply\_id” is necessary to identify each content





# The Problems with This Table

- You cannot add a forum without a post and a reply

• You cannot add a post without a reply:

| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |

# Review: Candidate Key

- A candidate key is a set of attributes that
  - can uniquely identify each tuple
  - is minimal

# Review: Candidate Key

- A candidate key is a set of attributes that
  - can uniquely identify each tuple
  - is minimal

# Find Candidate Key

| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |

# Find Candidate Key

Forum\_name

→

popularity

Forum\_name, Post\_id


title, article



| <u>forum_name</u> | <u>popularity</u> | <u>post_id</u> | <u>reply_id</u> | title                      | → article | <u>reply_id</u>    | reply_content |
|-------------------|-------------------|----------------|-----------------|----------------------------|-----------|--------------------|---------------|
| Gossiping         | 100               | 131            | Girlfriend      | How can I get girlfriend ? | 1         | Haha               |               |
| Gossiping         | 100               | 131            | Girlfriend      | How can I get girlfriend ? | 2         | I don't know       |               |
| Gossiping         | 100               | 252            | Friends         | I don't have a friend...   | 1         | Haha               |               |
| Gossiping         | 100               | 252            | Friends         | I don't have a friend...   | 2         | I can be           |               |
| Gossiping         | 100               | 252            | Friends         | I don't have a friend...   | 3         | QQ                 |               |
| Joke              | 23                | 46             | Knock           | Knock! Knock! ...          | 1         | Then?              |               |
| Joke              | 23                | 46             | Knock           | Knock! Knock! ...          | 2         | What's the point ? |               |
| Joke              | 23                | 151            | Santa Claus     | Hold! Hold! Hold!          | 1         | XDD                |               |

# Find Candidate Key

A candidate key



| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |

Forum\_name



popularity


Forum\_name, Post\_id



title, article

# Find Candidate Key

Is this a candidate key?



| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |


# Review: Candidate Key

- A candidate key is a set of attributes that
  - can uniquely identify each tuple
  - is minimal



# Find Candidate Key

The only candidate key in this table



| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |

# Second Normal Form

- 1<sup>st</sup> normal form
  - No array
- 2<sup>nd</sup> normal form
  - No **non-prime attributes** that is *partially dependent on* any candidate key
- 3<sup>rd</sup> normal form
  - Every non-prime attribute is dependent on every candidate key

Forum\_name



popularity

Forum\_name, Post\_id



title, article

The only candidate key in this table

Forum\_name, Post\_id, reply\_id  
reply\_content

| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |

The remaining fields are all non-prime attributes

# Step 2: To The 2<sup>nd</sup> Normal Form

2<sup>nd</sup> Normal Form :No **non-prime attributes** that is *partially dependent on* any candidate key

Candidate key




| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |

Non-prime attributes



# Step 2: To The 2<sup>nd</sup> Normal Form

2<sup>nd</sup> Normal Form :No **non-prime attributes** that is *partially dependent on* any candidate key



| <u>forum_name</u> | popularity | <u>post_id</u> | title       | Forum_name, popularity, Forum_name, Post_id, Forum_name, Post_id, Reply_id, reply_content | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|---|-----------------|--------------------|
| Gossiping         | 100        | 111            | Girlfriend  | How can I get girlfriend ?  | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ?  | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...  | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...  | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...  | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...   | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...   | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!   | 1               | XDD                |

# Step 2: To The 2<sup>nd</sup> Normal Form

2<sup>nd</sup> Normal Form :No **non-prime attributes** that is *partially dependent on* any candidate key



| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | <del>1</del>    | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | <del>2</del>    | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |

Forum\_name

popularity

Forum\_name, Post\_id

→


→

title, article

# Step 2: To The 2<sup>nd</sup> Normal Form

2<sup>nd</sup> Normal Form :No **non-prime attributes** that is *partially dependent on* any candidate key

One final dependency



| <u>forum_name</u> | popularity | <u>post_id</u> | title       | article                    | <u>reply_id</u> | reply_content      |
|-------------------|------------|----------------|-------------|----------------------------|-----------------|--------------------|
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 100        | 131            | Girlfriend  | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 1               | Haha               |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 2               | I can be           |
| Gossiping         | 100        | 252            | Friends     | I don't have a friend...   | 3               | QQ                 |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 1               | Then?              |
| Joke              | 23         | 46             | Knock       | Knock! Knock! ...          | 2               | What's the point ? |
| Joke              | 23         | 151            | Santa Claus | Hold! Hold! Hold!          | 1               | XDD                |

Forum\_name

→

popularity

Forum\_name, Post\_id

→

title, article

# Step 2: To The 2<sup>nd</sup> Normal Form

Decompose the table to eliminate the first violation

| <u>forum_name</u> | <u>post_id</u>    | title      | article                    | <u>reply_id</u> | reply_content      |
|-------------------|-------------------|------------|----------------------------|-----------------|--------------------|
| Gossiping         | 131               | Girlfriend | How can I get girlfriend ? | 1               | Haha               |
| Gossiping         | 131               | Girlfriend | How can I get girlfriend ? | 2               | I don't know       |
| Gossiping         | 252               | Friends    | I don't have a friend...   | 1               | Haha               |
| <b>forum_name</b> | <b>popularity</b> | 252        | Friends                    | 2               | I can be           |
| Gossiping         | 100               | 252        | Friends                    | 3               | QQ                 |
| Joke              | 23                | 46         | Knock                      | 1               | Then?              |
| Joke              |                   | 46         | Knock                      | 2               | What's the point ? |
| Joke              |                   | 151        | Santa Claus                | 1               | XDD                |

Forum\_name

popularity

Forum\_name, Post\_id

Forum\_name, Post\_id, Reply\_id

→

→

→

title, article



# Step 2: To The 2<sup>nd</sup> Normal Form

Decompose the table to eliminate the second violation

| forum_name | post_id | title       | article                    |
|------------|---------|-------------|----------------------------|
| Gossiping  | 131     | Girlfriend  | How can I get girlfriend ? |
| Gossiping  | 252     | Friends     | I don't have a friend...   |
| Joke       | 46      | Knock       | Knock! Knock! ...          |
| Joke       | 151     | Santa Claus | Hold! Hold! Hold!          |

| forum_name | popularity |
|------------|------------|
| Gossiping  | 100        |
| Joke       | 23         |

| forum_name | post_id | reply_id | reply_content      |
|------------|---------|----------|--------------------|
| Gossiping  | 131     | 1        | Haha               |
| Gossiping  | 131     | 2        | I don't know       |
| Gossiping  | 252     | 1        | Haha               |
| Gossiping  | 252     | 2        | I can be           |
| Gossiping  | 252     | 3        | QQ                 |
| Joke       | 46      | 1        | Then?              |
| Joke       | 46      | 2        | What's the point ? |
| Joke       | 151     | 1        | XDD                |

Forum\_name

popularity

Forum\_name, Post\_id

Forum\_name, Post\_id, Reply\_id

→

→

→

title, article

# Third Normal Form

- 1<sup>st</sup> normal form
  - No array
- 2<sup>nd</sup> normal form
  - No non-prime attribute that is *partially* dependent on any candidate key
- 3<sup>rd</sup> normal form
  - Every non-prime attribute is dependent on every candidate key

# Step 3: To The 3<sup>rd</sup> Normal Form


| forum_name | post_id | title       | article                    |
|------------|---------|-------------|----------------------------|
| Gossiping  | 131     | Girlfriend  | How can I get girlfriend ? |
| Gossiping  | 252     | Friends     | I don't have a friend...   |
| Joke       | 46      | Knock       | Knock! Knock! ...          |
| Joke       | 151     | Santa Claus | Hold! Hold! Hold!          |

| forum_name | popularity |
|------------|------------|
| Gossiping  | 100        |
| Joke       | 23         |

| forum_name | post_id | reply_id | reply_content      |
|------------|---------|----------|--------------------|
| Gossiping  | 131     | 1        | Haha               |
| Gossiping  | 131     | 2        | I don't know       |
| Gossiping  | 252     | 1        | Haha               |
| Gossiping  | 252     | 2        | I can be           |
| Gossiping  | 252     | 3        | QQ                 |
| Joke       | 46      | 1        | Then?              |
| Joke       | 46      | 2        | What's the point ? |
| Joke       | 151     | 1        | XDD                |

# Step 3: To The 3<sup>rd</sup> Normal Form

Every non-prime attribute is dependent on every candidate key



| forum_name | popularity |
|------------|------------|
| Gossiping  | 100        |
| Joke       | 23         |


Forum\_name

popularity

→

# Step 3: To The 3<sup>rd</sup> Normal Form

Every non-prime attribute is dependent on every candidate key



| forum_name | post_id | title       | article                    |
|------------|---------|-------------|----------------------------|
| Gossiping  | 131     | Girlfriend  | How can I get girlfriend ? |
| Gossiping  | 252     | Friends     | I don't have a friend...   |
| Joke       | 46      | Knock       | Knock! Knock! ...          |
| Joke       | 151     | Santa Claus | Hold! Hold! Hold!          |

Forum\_name, Post\_id

→

title, article

# Step 3: To The 3<sup>rd</sup> Normal Form

Every non-prime attribute is dependent on every candidate key



| forum_name | post_id | reply_id | reply_content      |
|------------|---------|----------|--------------------|
| Gossiping  | 131     | 1        | Haha               |
| Gossiping  | 131     | 2        | I don't know       |
| Gossiping  | 252     | 1        | Haha               |
| Gossiping  | 252     | 2        | I can be           |
| Gossiping  | 252     | 3        | QQ                 |
| Joke       | 46      | 1        | Then?              |
| Joke       | 46      | 2        | What's the point ? |
| Joke       | 151     | 1        | XDD                |

Forum\_name, Post\_id, Reply\_id

→

# The Final Result

| forum_name | post_id | title       | article                    |
|------------|---------|-------------|----------------------------|
| Gossiping  | 131     | Girlfriend  | How can I get girlfriend ? |
| Gossiping  | 252     | Friends     | I don't have a friend...   |
| Joke       | 46      | Knock       | Knock! Knock! ...          |
| Joke       | 151     | Santa Claus | Hold! Hold! Hold!          |

| forum_name | popularity |
|------------|------------|
| Gossiping  | 100        |
| Joke       | 23         |

| forum_name | post_id | reply_id | reply_content      |
|------------|---------|----------|--------------------|
| Gossiping  | 131     | 1        | Haha               |
| Gossiping  | 131     | 2        | I don't know       |
| Gossiping  | 252     | 1        | Haha               |
| Gossiping  | 252     | 2        | I can be           |
| Gossiping  | 252     | 3        | QQ                 |
| Joke       | 46      | 1        | Then?              |
| Joke       | 46      | 2        | What's the point ? |
| Joke       | 151     | 1        | XDD                |